

McAdam Design

CHARTERED ARCHITECTS AND CIVIL ENGINEERS

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SURVEY OF CAMP AERODROMES FOR FALKLAND ISLANDS GOVERNMENT

Introduction

At the request of the Falkland Islands Government, McAdam Design was instructed to carry out surveys of 24 air designated camp aerodromes in East and West Falkland. The purpose of the survey was to progressively measure and record alignments, levels and gradients of the aerodromes.

FALKLAND ISLAND GOVERNMENT AIR SERVICE

It is proposed to upgrade the strips to conform to the United Kingdom Civil Air Regulations (UK CAR) Landing Standards. This report details the survey work and investigates possible methods of upgrading the existing strips to meet the CAR Standards.

SURVEY OF CAMP AERODROMES

Terms of Reference

The terms of reference are as set out in McAdam Design's letter to Falkland Islands Government paragraph 1 dated 5 February 1988.

Extent of Survey

The following aerodromes were surveyed. The number of strips surveyed at each site is shown in brackets.

1. Eleazer Island (7)	13. Pebble Island (13)
2. Farness Island (2)	14. Port Howard (11)
3. Chertree (2)	15. Port San Carlos (1)
4. Douglas (2)	16. Port Stephens (2)
5. Dunnet (2)	17. Roy Cove (1)
6. ... Road (2)	18. ... (1)
7. ... East (2)	19. ... (1)
8. Fox Bay West (2)	20. ... (2)
9. Green Green (1)	21. ... (1)
10. Green Patch (1)	22. ... (2)
11. Hill Cove (2)	23. ... (2)
12. North Arm (2)	24. ... (2)

MAY 1988

Mc ADAM DESIGN
 AIRPORT ROAD
 STANLEY

Brief Outline of Survey Method

The length of each strip was measured and a series of levels taken at 15 m or 50 m intervals to determine longitudinal and cross gradients. Longitudinal gradients were calculated at 25 m intervals. Cross gradients calculated at 50 m intervals wherever possible. The survey approach headings were checked using a landing compass supplied by the Client.

McAdam Design

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SURVEY OF CAMP AERODROMES FOR FALKLAND ISLANDS GOVERNMENT

Introduction

At the request of the Falkland Islands Government, McAdam Design were instructed to carry out surveys of 24 Nr designated camp aerodromes in East and West Falkland. The purpose of the survey was to accurately measure and record alignments, levels and gradients of the strips.

It is proposed to upgrade the strips to conform to the United Kingdom Civil Aviation Authority Licensing Standards. This report details the findings of the survey work and investigates possible methods of upgrading the existing sites to meet the CAA Standards.

Terms of Reference

The terms of reference are as set but in McAdam Design's letter to Falkland Islands Government paragraph 1 dated 5 February 1988.

Extent of Survey

The following aerodromes were surveyed. The number of strips surveyed at each site is shown in brackets.

1. Bleaker Island (2)	13. Pebble Island (3)
2. Carcass Island (2)	14. Port Howard (1)
3. Chartres (2)	15. Port San Carlos (1)
4. Douglas (2)	16. Port Stephens (2)
5. Dunbar (2)	17. Roy Cove (1)
6. Dunnose Head (2)	18. Salvador (1)
7. Fox Bay East (2)	19. San Carlos (2)
8. Fox Bay West (2)	20. Saunders (2)
9. Goose Green (1)	21. Sea Lion (2)
10. Green Patch (1)	22. Speedwell (1)
11. Hill Cove (2)	23. Teal Inlet (2)
12. North Arm (2)	24. Weddell Island (2)

Brief Outline of Survey Method

The length of each strip was measured and a series of levels taken at 25 m or 50 m intervals to determine longitudinal and cross gradients. Longitudinal gradients were calculated at 25 m intervals. Cross gradients calculated at 50 m intervals generally. The runway approach headings were checked using a landing compass supplied by the Client.

Associates

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Major obstructions and obvious faults were noted at the time of the survey.

Brief Summary of CAA Standards

(a) Main Strips Code 1B aerodromes

Runway length (including stopways)	: 600 m
Runway width	: 18 m
Runway strip width	: 60 m
Overall longitudinal runway gradient	: 2%
Maximum local centre line gradient	: 3%
Maximum runway cross gradient	: 2%
Maximum runway strip cross gradient	: 3%

(b) Cross Strips

Runway length (including stopways)	: 300 m
Runway width	: 18 m
Runway strip width	: 60 m
Overall longitudinal runway gradient	: 2%
Maximum local centre line gradient	: 2%
Maximum runway cross gradient	: 2%
Maximum runway strip cross gradient	: 3%

Notes

1. Undulations or appreciable changes in slopes to be avoided.
2. Transition curves between changes in gradients to be a curved surface with a maximum rate of change of slope of 0.4% over 30 m.
3. The distance between slope changes should be either 45 m or 50 x difference % gradient (whichever is the greater).

Summary of Survey Results

The following information is given in tabular form for each strip.

1. Length of runway (including stopways)
2. Width of runway
3. Width of runway strip
4. Maximum longitudinal gradient along runway centre line
5. Maximum change in slope along runway centre line
6. Maximum runway crossfall
7. Maximum runway strip crossfall
8. General notes

SUMMARY OF RESULTS

	RUNWAY HEADING	RUNWAY LENGTH (m)	RUNWAY WIDTH (m)	RUNWAY STRIP WIDTH (m)	C/L(%) MAX (%)	C/L(%) MAX CHANGE (%)	RUNWAY MAX C/FALL (%)	RUNWAY STRIP MAX C/FALL (%)
C.A.A. STANDARD		600	18	60	± 3.0	.3	± 2.0	± 3.0
BLEAKER ISLAND MAIN	33/15	475	30	60	-3.0	2.3	5.3	6.3
BLEAKER ISLAND CROSS	03/21	325	26	60	1.6	1.5	5.8	4.8
CARCASS ISLAND MAIN	30/12	550	40	80	-3.3	1.5	3.4	3.5
CARCASS ISLAND CROSS	01/19	500	18.5	60	1.1	1.5	4.9	4.7
CHARTRES MAIN	28/10	525	23	60	-6.0	3.0	-6.6	-6.5
CHARTRES CROSS 1	30/12	275	20	60	-2.8	2.5	-4.6	-3.9
CHARTRES CROSS 2	07/25	325	20	60	3.2	4.9	-6.9	6.4
DOUGLAS STATION MAIN	23/05	500	30	60	-2.6	1.5	4.3	5.8
DOUGLAS STATION CROSS	32/14	325	30	60	5.9	2.6	-1.2	-7.0
DUNBAR MAIN	21/03	625	25	60	5.5	2.2	3.2	4.6
DUNBAR CROSS	30/12	250	28	60	-2.6	2.1	-2.8	-5.0
DUNNOSE HEAD MAIN	06/24	600	20	60	-1.6	1.4	-2.4	-5.1
DUNNOSE HEAD CROSS	01/19	500	20	60	-3.4	3.2	5.2	6.8
FOX BAY EAST MAIN	30/12	475	20	60	-4.7	2.8	4.7	5.6
FOX BAY EAST CROSS	02/20	225	15	60	3.0	4.7	-4.1	-2.8
FOX BAY WEST MAIN	32/14	650	36.5	60	2.9	3.0	-6.4	-6.9
FOX BAY WEST CROSS	28/10	250	30	60	1.4	1.4	2.6	2.4
GREEN PATCH	08/26	360	20	60	-2.0	2.0	-4.5	-3.0

SUMMARY OF RESULTS

	RUNWAY HEADING	RUNWAY LENGTH (m)	RUNWAY WIDTH (m)	RUNWAY STRIP WIDTH (m)	C/L(%) MAX (%)	C/L(%) MAX CHANGE (%)	RUNWAY MAX C/FALL (%)	RUNWAY STRIP MAX C/FALL (%)
C.A.A. STANDARD		600	18	60	± 3.0	.3	± 2.0	± 3.0
HILL COVE MAIN	19/01	575	20	60	3.5	4.4	-8.9	-24.5
HILL COVE CROSS	27/09	325	20	60	3.4	1.6	3.1	3.2
NORTH ARM MAIN	18/00	600	20	60	-3.0	2.2	5.4	5.3
NORTH ARM CROSS	21/03	450		60	1.5	.8	-2.0	-3.1
PEBBLE ISLAND MAIN	31/13	600	20	60	1.9	1.4	-3.9	-3.6
PEBBLE ISLAND CROSS 1	05/23	375	20	60	-3.0	1.5	-3.5	2.9
PEBBLE ISLAND CROSS 2	04/22	275	20	60	-4.3	1.7	2.1	2.0
PORT HOWARD	19/01	500	20	60	5.5	3.2	5.7	10.9
PORT SAN CARLOS	11/29	600	20	60	4.6	3.5	-6.1	8.4
PORT STEPHENS MAIN	31/13	600	29	60	-4.7	4.1	6.9	-6.1
PORT STEPHENS CROSS	34/16	400	17	60	-3.3	1.4	-3.1	-5.2
ROY COVE	28/10	600	30	60	2.8	2.5	6.5	-18.7
SALVADOR MAIN	22/04	625	20	60	3.7	3.2	9.0	-9.6
SALVADOR CROSS	16/34	275	20	60	4.7	2.7	4.3	5.3
SAN CARLOS MAIN	11/29	500	20	60	5.1	2.5	5.2	4.2
SAN CARLOS CROSS			NOT SURVEYED					

SUMMARY OF RESULTS

	RUNWAY HEADING	RUNWAY LENGTH (m)	RUNWAY WIDTH (m)	RUNWAY STRIP WIDTH (m)	C/L(%) MAX (%)	C/L(%) MAX CHANGE (%)	RUNWAY MAX C/FALL (%)	RUNWAY STRIP MAX C/FALL (%)
C.A.A. STANDARD		600	18	60	±3.0	.3	±2.0	±3.0
SAUNDERS MAIN	28/10	500	30	60	4.0	2.3	6.0	-7.5
SAUNDERS CROSS	29/11	600	30	60	4.9	3.7	4.3	-6.0
SEA LION MAIN	12/30	600	20	60	4.2	1.3	-3.9	-2.1
SEA LION CROSS	03/21	350	20	60	-1.1	1.6	-3.2	-3.2
SPEEDWELL MAIN	21/03	525	20	60	3.9	2.3	-3.7	2.8
TEAL INLET MAIN	06/24	575	35	60	-5.2	4.5	6.5	6.8
TEAL INLET CROSS	16/34	350	29	60	-3.8	2.9	-5.8	-4.8
WEDDELL ISLAND MAIN	33/15	425	20	60	5.3	3.1	-3.6	-6.6
WEDDELL ISLAND CROSS	08/26	300	20	60	5.3	7.0	5.6	4.8

Options for Upgrading Existing Strips

As can be readily seen from the above summary of the survey findings, none of the existing aerodromes sites comply fully with the requirements of the CAA Standards.

Some form of regrading and/or resurfacing will be required in most cases.

The choice of final finished surface for the upgraded strips is very limited. Ideally a hard wearing relatively maintenance free surface is desirable. Concrete, asphalt and paved surfaces are the ideal but are totally impractical in most cases. The logistics involved and expense incurred would be prohibitive.

A grassed surface appears to be the only practical solution in most locations.

Discussions with ARC staff in Stanley have been held to assess the problems involved and timescale required to reseed the strips. Most of their experience to date has been gained in upgrading agricultural pastures to give increased yield for sheep fodder. Following extensive research, they have found that the most efficient method of reseeding is as follows:

1. Spring - Rotavate and relevel or regrade the site as necessary.
2. Late Spring/
Early Summer - Burn off debris and trash to eliminate all unwanted roots and debris. The time of this exercise is important. Surface must be dry and subsoil wet to prevent the possibility of the fire getting into the peat subsoil and out of control.
3. Late
Summer - Consolidate, sow grass, fertilise.
4. Winter - Leave or roll periodically.
5. Spring - Fertilise and leave for a growing season.
6. Late Summer - Animals allowed on to graze.

In other words, it takes 18 months between initial surface regrading and finally establishment of grass cover to the area. It seems likely that the 18 month period would have to be increased in the case of airstrips to allow the ground to achieve sufficient strength to carry the loads imposed by air craft movements. Thus the strips would be unserviceable for between 2-2½ years. The costs involved in regrading and reseeding will vary for each strip, but will be in the order of £100,000 per site. Where extensive earthworks are required to lengthen strips, this figure will undoubtedly increase.

Grass Reinforcement Fabrics/Membranes

There are a number of proprietary polypropylene fabrics available which can be used to reinforce grassed areas subject to heavy wear and tear. Principal uses are on sports grounds, embankment slopes, car parking, coastal protection, etc.

These fabrics are laid just below the final surface and provide anchorage for newly established grass root systems and also help to stabilize and bind in the finished top surface. The load carrying capacity of the ground is regained more quickly using these materials. The estimated cost of providing and laying the fabric is approximately £200,000 per site.

Drainage Works to the Strips

In addition to regrading and reseeding works already outlined, a number of the strips surveyed require drainage works. The survey was carried out at the end of a very dry summer and the grass surfaces and subsoil were generally dry. In winter months surfaces become waterlogged and soggy resulting in increased drag loads on the aircraft.

Each strip would have to be considered on an individual basis but a complete subsoil drainage installation could cost up to £100,000 per aerodrome.

Suggested Procedure

The work involved in bringing existing strips up to standard is considerable.

It is suggested that a phased programme of priorities is drawn up to identify the most heavily used airstrips. Available funds can then be concentrated to best effect. It is difficult to envisage how the upgrading works can be undertaken by local settlement owners without considerable assistance with labour, plant and materials.

Conclusions

1. None of the strips surveyed conforms fully with CAA Licensing Standards.
2. In order to meet CAA Standards, site works, regrading and/or reseeding will be required.
3. Reseeding operations will require a period of approximately 2½ years to complete before grass cover can be established. Areas under reseed will be un-usable. Estimated budget cost approximately £100,000 per site.

4. The use of polypropylene reinforcing fabrics should allow the period of unserviceability to be decreased significantly. However the additional cost will be in the order of £200,000 per site.
5. There are a number of aerodromes where the approach is severely hampered by buildings, water tanks, etc. These structures should be relocated clear of the strips wherever possible. Alternatively realignment of the strip may have to be undertaken.

Recommendations

1. Establish an order of priority for upgrading the sites.
2. Establish a financial programme over an accepted timescale.
3. Draw up detailed proposals for upgrading each site on the priority list.
4. Implement the upgrading works on a pre-planned phased programme.

APPENDIX : DETAILED SURVEY RESULTS

QUESTION 1: How satisfied are you with the quality of the service provided by the company? (1 = Not at all satisfied, 5 = Very satisfied)

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105

McADAM DESIGN : FIGAS AERODROME SURVEY : BLEAKER ISLAND : MAIN STRIP : RUNWAY HEADING : 33/15

SURVEY DATE : 28/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
-50 *			10.014	10.163	10.062				1.0	-0.7	
-25 *		10.292	10.422			1.6		.9			
0	9.862	10.802	10.435	10.736	10.734	.1	6.3	-2.4	2.0		1.5
25			10.372			-0.3					
50	9.853	10.161	10.277	10.445	10.620	-0.4	2.1	.8	1.1	1.2	1.3
75			10.235			-0.2					
100	9.675	10.102	10.388	10.588	10.745	.6	2.8	1.9	1.3	1.0	1.8
125			9.971			-1.7					
150	9.864	9.876	9.975	10.148	10.328		.1	.7	1.2	1.2	.8
175			10.164			.8					
200	10.502	10.455	10.662	10.737	10.883	2.0	-0.3	1.4	.5	1.0	.6
225			11.043			1.5					
250	10.487	10.893	11.400	11.707	11.898	1.4	2.7	3.4	2.0	1.3	2.4
275			11.640			1.0					
300	10.487	11.167	11.960	12.181	12.542	1.3	4.5	5.3	1.5	2.4	3.4
325			11.980			.1					
350	10.445	10.998	11.631	12.130	12.368	-1.4	3.7	4.2	3.3	1.6	3.2
375			11.327			-1.2					
400	10.145	10.675	11.290	11.781	12.163	-0.1	3.5	4.1	3.3	2.5	3.4
425			11.030			-1.0					
450	9.497	10.146	10.627	10.971	11.397	-1.6	4.3	3.2	2.3	2.8	3.2
475	9.000	9.649	9.885	10.300	10.262	-3.0	4.3	1.6	2.8	-0.3	2.1

O/A C/L GRADIENT : -0.1

MAX + (%)	2.0	6.3	5.3	3.3	2.8	3.4
MAX - (%)	-3.0	-0.3	-2.4	.0	-0.3	.0

McADAM DESIGN : FIGAS AERODROME SURVEY : BLEAKER ISLAND : CROSS STRIP : RUNWAY HEADING : 03/21

SURVEY DATE : 28/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					C/L (%)	(% GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	13.0 SOUTH	C/L	13.0 NORTH	30.0 NORTH		30.0 S 13.0 S	13.0 S C/L	C/L 13.0 N	13.0 N 30.0 N	30.0 S 30.0 N	
0	10.240	10.162	10.020	9.905	9.605		-0.5	-1.1	-0.9	-1.8	-1.1	
25			10.350			1.3						
50	10.750	10.575	10.300	10.090	9.655	-0.2	-1.0	-2.1	-1.6	-2.6	-1.8	
75			10.230			-0.3						
100	11.070	10.735	10.305	9.965	9.515	0.3	-2.0	-3.3	-2.6	-2.6	-2.6	
125			10.140			-0.7						
150	10.850	10.350	10.005	9.735	9.670	-0.5	-2.9	-2.7	-2.1	-0.4	-2.0	
175			9.850			-0.6						
200	9.705	9.625	9.768	9.960	10.160	-0.3	-0.5	1.1	1.5	1.2	0.8	
225			9.850			0.3						
250	9.060	9.540	9.800	10.185	10.570	-0.2	2.8	2.0	3.0	2.3	2.5	
275			9.675			-0.5						
300	8.840	9.335	9.775	10.220	11.035	0.4	2.9	3.4	3.4	4.8	3.7	
325			10.065			1.2						
350	9.035	9.700	10.460	11.125	11.835	1.6	3.9	5.8	5.1	4.2	4.7	
O/A C/L GRADIENT :			0.1	MAX +(%)			1.6	3.9	5.8	5.1	4.8	4.7
				MAX -(%)			-0.7	-2.9	-3.3	-2.6	-2.6	-2.6

McADAM DESIGN : FIGAS AERODROME SURVEY : CARCASS ISLAND : MAIN STRIP : RUNWAY HEADING : 30/12

SURVEY DATE : 30/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(% GRADIENTS AND CROSSFALLS						
	40.0 NORTH	20.0 NORTH	C/L	20.0 SOUTH	40.0 SOUTH	C/L (%)	40.0 N 20.0 N	20.0 N C/L	C/L 20.0 S	20.0 S 40.0 S	40.0 N 40.0 S	
0	19.490	19.575	19.425	18.970	18.800		.4	-.8	-2.3	-.9	-.9	
25			18.910			-2.1						
50	18.390	18.500	18.415	18.130	17.770	-2.0	.6	-.4	-1.4	-1.8	-.8	
75			17.915			-2.0						
100	17.105	17.090	17.315	17.060	16.675	-2.4	-.1	1.1	-1.3	-1.9	-.5	
125			16.635			-2.7						
150	15.555	15.770	16.170	16.140	15.675	-1.9	1.1	2.0	-.2	-2.3	.2	
175			15.765			-1.6						
200	13.835	14.415	15.090	15.075	14.980	-2.7	2.9	3.4	-.1	-.5	1.4	
225			14.400			-2.8						
250	12.635	13.325	13.725	13.630	13.490	-2.7	3.5	2.0	-.5	-.7	1.1	
275			13.070			-2.6						
300	11.370	12.050	12.455	12.330	12.115	-2.5	3.4	2.0	-.6	-1.1	.9	
325			11.955			-2.0						
350	9.950	10.520	11.200	11.325	11.160	-3.0	2.9	3.4	.6	-.8	1.5	
375			10.370			-3.3						
400	8.820	9.245	9.585	9.895	9.780	-3.1	2.1	1.7	1.6	-.6	1.2	
425			9.180			-1.6						
450	7.790	8.240	8.605	9.055	9.195	-2.3	2.3	1.8	2.3	.7	1.8	
475			8.155			-1.8						
500	7.335	7.465	7.780	8.205	8.290	-1.5	.7	1.6	2.1	.4	1.2	
525			7.510			-1.1						
550	6.885	7.055	7.430	7.620	7.815	-.3	.9	1.9	1.0	1.0	1.2	
575 *			7.111			-1.3						
600 *	6.510	6.690	6.880	7.225	7.530	-.9	.9	1.0	1.7	1.5	1.3	
625 *			6.750			-.5						
650 *	6.475	6.600	6.780	6.925		.1	.6	.9	.7			
O/A C/L GRADIENT :			-2.2	MAX +(%)			.0	3.5	3.4	2.3	1.0	1.8
				MAX -(%)			-3.3	-.1	-.8	-2.3	-2.3	-.9

McADAM DESIGN : FIGAS AERODROME SURVEY : CARCASS ISLAND : CROSS STRIP : RUNWAY HEADING : 01/19

SURVEY DATE : 30/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	9.2 SOUTH	C/L	9.2 NORTH	30.0 NORTH	C/L (%)	30.0 S 9.2 S	9.2 S C/L	C/L 9.2 N	9.2 N 30.0 N	30.0 S 30.0 N
-25 *			7.365								
0	7.225	7.400	7.640	7.885	8.330	1.1	.8	2.6	2.7	2.1	1.8
25			7.870			.9					
50	7.295	7.665	7.805	8.060	8.750	-.3	1.8	1.5	2.8	3.3	2.4
75			7.855			.2					
100	6.990	7.570	7.710	7.985	8.535	-.6	2.8	1.5	3.0	2.6	2.6
125			7.600			-.4					
150	6.960	7.175	7.490	7.690	7.780	-.4	1.0	3.4	2.2	.4	1.4
175			7.210			-1.1					
200	6.960	7.155	7.090	7.240	7.425	-.5	.9	-.7	1.6	.9	.8
225			7.060			-.1					
250	6.810	6.860	6.915	7.008	7.370	-.6	.2	.6	1.0	1.7	.9
275			6.935			.1					
300	6.805	6.930	7.005	7.200	7.555	.3	.6	.8	2.1	1.7	1.3
325			6.940			-.3					
350	6.915	6.895	6.955	7.130	7.810	.1	-.1	.7	1.9	3.3	1.5
375			7.105			.6					
400	6.980	7.115	7.355	7.810	8.795	1.0	.6	2.6	4.9	4.7	3.0
425			7.570			.9					
450	6.995	7.293	7.420	7.715	8.465	-.6	1.4	1.4	3.2	3.6	2.5
475			7.185			-.9					
500	6.795	6.972	7.070	7.085	7.535	-.5	.9	1.1	.2	2.2	1.2

O/A C/L GRADIENT : -.1

MAX + (%)	1.1	2.8	3.4	4.9	4.7	3.0
MAX - (%)	-1.1	-.1	-.7	.0	.0	.0

McADAM DESIGN : FIGAS AERODROME SURVEY : CHARTRES : MAIN STRIP : RUNWAY HEADING 28/10

SURVEY DATE : 16/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	11.5 SOUTH	C/L	11.5 NORTH	30.0 NORTH	C/L (%)	30.0 S 11.5 S	11.5 S C/L	C/L 11.5 N	11.5 N 30.0 N	30.0 S 30.0 N	
0	9.600	10.150	10.030	8.870	7.750		3.0	-1.0	-10.1	-6.1	-3.1	
25			10.200			.7						
50	8.995	9.840	10.300	9.560	8.365	.4	4.6	4.0	-6.4	-6.5	-1.1	
75			9.660			-2.6						
100	8.655	8.970	9.475	9.320	8.815	-.7	1.7	4.4	-1.3	-2.7	.3	
125			9.545			.3						
150	8.810	9.350	9.725	9.405	8.630	.7	2.9	3.3	-2.8	-4.2	-.3	
175			9.485			-1.0						
200	8.570	9.425	9.430	9.135	8.815	-.2	4.6		-2.6	-1.7	.4	
225			9.530			.4						
250	8.265	8.855	9.090	8.720	8.415	-1.8	3.2	2.0	-3.2	-1.6	.3	
275			9.015			-.3						
300	7.910	8.410	8.705	8.310	7.630	-1.2	2.7	2.6	-3.4	-3.7	-.5	
325			8.900			.8						
350	7.325	8.265	8.615	8.060	7.125	-1.1	5.1	3.0	-4.8	-5.1	-.3	
375			8.135			-1.9						
400	6.965	7.950	8.000	7.410	6.285	-.5	5.3	.4	-5.1	-6.1	-1.1	
425			7.890			-.4						
450	6.650	7.300	7.030	6.275	5.360	-3.4	3.5	-2.3	-6.6	-4.9	-2.2	
475			5.535			-6.0						
500	5.540	5.115	4.515	3.625	2.580	-4.1	-2.3	-5.2	-7.7	-5.6	-4.9	
525		3.980	3.260	2.610		-5.0		-6.3	-5.7			
O/A C/L GRADIENT :			-1.3	MAX +(%)			.8	5.3	4.4	.0	.0	.4
				MAX -(%)			-6.0	-2.3	-6.3	-10.1	-6.5	-4.9

McADAM DESIGN : FIGAS AERODROME SURVEY : CHARTRES : CROSS STRIP 1 : RUNWAY HEADING : 30/12

SURVEY DATE : 23/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS						
CH.	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S	
-50 *		8.880	8.520	8.000					-3.6	-5.2		
-25 *		8.540	8.350	8.420		-.7			-1.9	.7		
0	8.800	8.800	8.800	8.910	8.620	1.8			1.1	-1.5	-.3	
25			8.690			-.4						
50	9.775	9.330	8.870	8.710	8.700	.7	-2.2	-4.6	-1.6	-.1	-1.8	
75			9.370			2.0						
100	8.725	9.270	9.455	9.265	8.480	.3	2.7	1.9	-1.9	-3.9	-.4	
125			9.145			-1.2						
150	8.395	8.815	8.455	8.620	9.000	-2.8	2.1	-3.6	1.7	1.9	1.0	
175			8.010			-1.8						
200	7.770	7.585	7.580	7.600	7.870	-1.7	-.9	-.1	.2	1.4	.2	
225			7.335			-1.0						
250	6.040	6.730	6.960	6.980	6.925	-1.5	3.5	2.3	.2	-.3	1.5	
275			6.470			-2.0						
300 *	4.250	5.485	5.815	6.160	6.130	-2.6	6.2	3.3	3.5	-.2	3.1	
325 *			4.350			-5.9						
O/A C/L GRADIENT :			-.8	MAX +(%)			2.0	3.5	2.3	1.7	1.9	1.5
				MAX -(%)			-2.8	-2.2	-4.6	-1.9	-3.9	-1.8

McADAM DESIGN : FIGAS AERODROME SURVEY : CHARTRES : CROSS STRIP 2 : RUNWAY HEADING : 07/25

SURVEY DATE : 23/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS						
CH.	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W	
-25 *			6.005									
0	6.750	7.125	7.140	6.905	6.225	4.5	1.9	.2	-2.4	-3.4	-.9	
25			7.950			3.2						
50	7.175	7.305	7.515	7.800	8.110	-1.7	.7	2.1	2.9	1.6	1.6	
75			7.620			.4						
100	8.000	7.860	7.920	8.210	8.775	1.2	-.7	.6	2.9	2.8	1.3	
125			8.385			1.9						
150	9.640	9.075	8.685	8.000	8.780	1.2	-2.8	-3.9	-6.9	3.9	-1.4	
175			9.320			2.5						
200			9.410			.4						
225			9.110			-1.2						
250	9.225	8.780	8.820	8.890	9.480	-1.2	-2.2	.4	.7	3.0	.4	
275			8.675			-.6						
300	7.465	8.735	8.635	8.590	8.430	-.2	6.4	-1.0	-.5	-.8	1.6	
325			8.230			-1.6						
O/A C/L GRADIENT :			.3	MAX +(%)			3.2	6.4	2.1	2.9	3.9	1.6
				MAX -(%)			-1.7	-2.8	-3.9	-6.9	-3.4	-1.4

McADAM DESIGN : FIGAS AERODROME SURVEY : DOUGLAS STATION : MAIN STRIP : RUNWAY HEADING : 23/05

SURVEYED : 03/03/88

NOTE : Chainages marked thus (*) are outside the boundaries of the existing runway

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
0	8.424	8.894	9.271	9.645	9.759		3.1	2.5	2.5	.8	2.2
25			9.349			.3					
50	8.146	8.595	9.241	9.466	9.294	-.4	3.0	4.3	1.5	-1.1	1.9
75			9.137			-.4					
100	8.368	8.479	8.856	9.029	8.795	-1.1	.7	2.5	1.2	-1.6	.7
125	7.238	8.111	8.614	8.743	8.577	-1.0	5.8	3.4	.9	-1.1	2.2
150	8.328	8.553	8.473	8.495	8.383	-.6	1.5	-.5	.1	-.7	.1
175			8.565			.4					
200	7.954	8.315	8.364	8.159	8.077	-.8	2.4	.3	-1.4	-.5	.2
225			8.184			-.7					
250	7.713	8.100	8.020	7.837	7.429	-.7	2.6	-.5	-1.2	-2.7	-.5
275			7.897			-.5					
300	6.781	7.446	7.558	7.387	7.018	-1.4	4.4	.7	-1.1	-2.5	.4
325			7.363			-.8					
350	6.786	7.011	7.081	6.919	6.516	-1.1	1.5	.5	-1.1	-2.7	-.5
375			6.435			-2.6					
400	5.769	5.816	5.971	6.095	5.745	-1.9	.3	1.0	.8	-2.3	
425			5.346			-2.5					
450	4.870	4.965	5.032	4.746	4.738	-1.3	.6	.4	-1.9	-.1	-.2
475			4.663			-1.5					
500	4.213	4.308	4.328	4.117	4.405	-1.3	.6	.1	-1.4	1.9	.3
525 *			4.107			-.9					
550 *	3.630	3.815	4.138	4.240	4.265	.1	1.2	2.2	.7	.2	1.1
575 *	3.800	4.080	4.170	4.227	4.300	.1	1.9	.6	.4	.5	.8
O/A C/L GRADIENT :						-1.0					
MAX + (%)						.4	5.8	4.3	2.5	1.9	2.2
MAX - (%)						-2.6	.0	-.5	-1.9	-2.7	-.5

McADAM DESIGN : FIGAS AERODROME SURVEY : DOUGLAS STATION : CROSS STRIP : RUNWAY HEADING : 32/14

SURVEY DATE : 03/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.							(%) GRADIENTS AND CROSSFALLS				
CH.	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
0	6.070	6.010	5.830	5.815	5.375		-.4	-1.2	-.1	-2.9	-1.2
25			7.315			5.9					
50	8.100	8.090	8.210	8.060	7.015	3.6	-.1	.8	-1.0	-7.0	-1.8
75			8.527			1.3					
100	8.275	8.335	8.400	8.492	8.625	-.5	.4	.4	.6	.9	.6
125			8.275			-.5					
150	8.110	8.240	8.285	8.220	8.175		.9	.3	-.4	-.3	.1
175			8.205			-.3					
200	9.020	8.955	8.780	8.600	8.480	2.3	-.4	-1.2	-1.2	-.8	-.9
225			9.175			1.6					
250	9.255	9.365	9.225	9.050	8.935	.2	.7	-.9	-1.2	-.8	-.5
275			9.270			.2					
300	9.310	9.255	9.250	9.273	9.135	-.1	-.4		.2	-.9	-.3
325			9.320			.3					
350 *	10.010	9.845	9.775	9.550	9.375	1.8	-1.1	-.5	-1.5	-1.2	-1.1
375 *			10.095			1.3					
400 *	9.940	10.185	9.915	9.700	9.365	-.7	1.6	-1.8	-1.4	-2.2	-1.0
425 *			9.780			-.5					
450 *	10.125	10.055	9.850	9.580	9.300	.3	-.5	-1.4	-1.8	-1.9	-1.4
O/A C/L GRADIENT :			1.1	MAX +(%)		5.9	.9	.8	.6	.9	.6
				MAX -(%)		-.5	-.4	-1.2	-1.2	-7.0	-1.8

McADAM DESIGN : FIGAS AERODROME SURVEY : DUNBAR : MAIN STRIP : RUNWAY HEADING : 21/03

SURVEY DATE : 23/03/88

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	12.5 SOUTH	C/L	12.5 NORTH	30.0 NORTH	C/L (%)	30.0 S 12.5 S	12.5 S C/L	C/L 12.5 N	12.5 N 30.0 N	30.0 S 30.0 N
0	5.605	6.405	6.743	6.931	6.860		4.6	2.7	1.5	-.4	2.1
25			7.632			3.6					
50	7.595	8.027	8.259	8.226	8.336	2.5	2.5	1.9	-.3	.6	1.2
75			8.532			1.1					
100	8.007	8.247	8.404	8.516	8.467	-.5	1.4	1.3	.9	-.3	.8
125			8.552			.6					
150	9.037	8.986	9.082	9.066	8.956	2.1	-.3	.8	-.1	-.6	-.1
175			9.403			1.3					
200	9.870	9.706	9.610	9.652	9.574	.8	-.9	-.8	.3	-.4	-.5
225			9.821			.8					
250	10.352	10.272	10.163	10.060	9.957	1.4	-.5	-.9	-.8	-.6	-.7
275			10.512			1.4					
300	11.406	11.287	11.111	11.039	10.790	2.4	-.7	-1.4	-.6	-1.4	-1.0
325			11.726			2.5					
350	13.249	12.765	12.903	12.741	12.696	4.7	-2.8	1.1	-1.3	-.3	-.9
375			13.577			2.7					
400	14.967	14.719	14.646	14.536	14.218	4.3	-1.4	-.6	-.9	-1.8	-1.2
425			15.428			3.1					
450	16.569	16.108	16.374	16.776	16.592	3.8	-2.6	2.1	3.2	-1.1	
475			17.737			5.5					
500	19.198	19.201	19.090	19.138	18.936	5.4		-.9	.4	-1.2	-.4
525			20.027			3.7					
550	20.826	20.787	20.955	20.939	20.579	3.7	-.2	1.3	-.1	-2.1	-.4
575			21.664			2.8					
600	22.109	22.114	22.178	22.319	22.169	2.1		.5	1.1	-.9	.1
625			22.821			2.6					

O/A C/L GRADIENT : 2.6

MAX + (%)	5.5	4.6	2.7	3.2	.6	2.1
MAX - (%)	-.5	-2.8	-1.4	-1.3	-2.1	-1.2

McADAM DESIGN : FIGAS AERODROME SURVEY : DUNBAR : CROSS STRIP : RUNWAY HEADING : 30/12

SURVEY DATE : 23/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(% GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	14.0 SOUTH	C/L	14.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 14.0 S	14.0 S C/L	C/L 14.0 N	14.0 N 30.0 N	30.0 S 30.0 N
-100 *	11.220	10.780	10.580	9.110	9.965		-2.8	-1.4	-10.5	5.3	-2.1
-75 *			10.220			-1.4					
-50 *	10.290	10.015	9.705	9.400	8.830	-2.1	-1.7	-2.2	-2.2	-3.6	-2.4
-25 *			9.315			-1.6					
0	10.025	9.625	9.235	8.905	8.100	-.3	-2.5	-2.8	-2.4	-5.0	-3.2
25			9.650			1.7					
50	10.230	10.060	9.970	9.770	9.605	1.3	-1.1	-.6	-1.4	-1.0	-1.0
75			9.865			-.4					
100	10.115	9.915	9.710	9.625	9.545	-.6	-1.3	-1.5	-.6	-.5	-1.0
125			9.735			.1					
150	9.755	9.765	9.655	9.525	9.285	-.3	.1	-.8	-.9	-1.5	-.8
175			9.335			-1.3					
200	9.685	9.400	9.235	9.005	8.950	-.4	-1.8	-1.2	-1.6	-.3	-1.2
225			9.105			-.5					
250			8.455			-2.6					

O/A C/L GRADIENT : - .3

MAX + (%)	1.7	.1	.0	.0	.0	.0
MAX - (%)	-2.6	-2.5	-2.8	-2.4	-5.0	-3.2

McADAM DESIGN : FIGAS AERODROME SURVEY : DUNNOSE HEAD : MAIN STRIP : RUNWAY HEADING : 06/24

SURVEY DATE : 16/03/88

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS						
CH.	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S	
0	12.665	11.795	11.600	11.390	11.215		-4.4	-2.0	-2.1	-.9	-2.4	
25			11.200			-1.6						
50	11.520	11.070	10.890	10.780	10.495	-1.2	-2.3	-1.8	-1.1	-1.4	-1.7	
75			10.855			-.1						
100	10.975	10.825	10.655	10.500	10.135	-.8	-.8	-1.7	-1.6	-1.8	-1.4	
125			10.760			.4						
150	10.835	10.860	10.725	10.580	10.345	-.1	.1	-1.4	-1.5	-1.2	-.8	
175			10.665			-.2						
200	10.825	10.810	10.645	10.425	9.925	-.1	-.1	-1.7	-2.2	-2.5	-1.5	
225			10.555			-.4						
250	10.705	10.595	10.475	10.335	9.905	-.3	-.6	-1.2	-1.4	-2.2	-1.3	
275			10.325			-.6						
300	10.675	10.210	10.035	9.955	9.790	-1.2	-2.3	-1.8	-.8	-.8	-1.5	
325			10.080			.2						
350	10.250	10.010	10.045	9.910	9.620	-.1	-1.2	.4	-1.4	-1.5	-1.1	
375			10.150			.4						
400	10.365	10.175	9.990	9.755	9.285	-.6	-1.0	-1.9	-2.4	-2.4	-1.8	
425			9.755			-.9						
450	9.900	9.660	9.510	9.440	9.375	-1.0	-1.2	-1.5	-.7	-.3	-.9	
475			9.540			.1						
500	9.550	9.600	9.705	9.655	9.235	.7	.3	1.1	-.5	-2.1	-.5	
525			9.860			.6						
550	9.785	9.880	9.745	9.635	9.220	-.5	.5	-1.4	-1.1	-2.1	-.9	
575			9.800			.2						
600	9.990	10.175	10.125	9.905	8.880	1.3	.9	-.5	-2.2	-5.1	-1.9	
O/A C/L GRADIENT :			-.2	MAX +(%)			1.3	.9	1.1	.0	.0	.0
				MAX -(%)			-1.6	-4.4	-2.0	-2.4	-5.1	-2.4

McADAM DESIGN : FIGAS AERODROME SURVEY : DUNNOSE HEAD : CROSS STRIP : RUNWAY HEADING : 01/19

SURVEY DATE : 16/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS					
CH.	30.0 WEST	10.0 WEST	C/L	10.0 EAST	30.0 EAST	C/L (%)	30.0 W 10.0 W	10.0 W C/L	C/L 10.0 E	10.0 E 30.0 E	30.0 W 30.0 E
0			8.740								
25	9.135	9.090	9.065	8.905	8.250	1.3	-.2	-.3	-1.6	-3.3	-1.5
50	9.305	9.320	9.270	9.170	8.525	.8	.1	-.5	-1.0	-3.2	-1.3
75			9.355			.3					
100	9.595	9.310	9.200	9.110	8.900	-.6	-1.4	-1.1	-.9	-1.1	-1.2
125			9.350			.6					
150	9.930	9.900	9.700	9.445	9.115	1.4	-.2	-2.0	-2.6	-1.7	-1.4
175			9.975			1.1					
200			10.165			.8					
225			10.305			.6					
250	10.600	10.390	10.375	10.390	10.080	.3	-1.1	-.2	.2	-1.6	-.9
275			10.350			-.1					
300	10.290	10.260	10.310	10.365	10.040	-.2	-.2	.5	.6	-1.6	-.4
325			10.250			-.2					
350	9.440	9.345	9.395	9.415	9.425	-3.4	-.5	.5	.2	.1	
375			9.165			-.9					
400	9.015	9.110	9.045	9.085	9.120	-.5	.5	-.7	.4	.2	.2
425			8.935			-.4					
450	7.105	8.460	8.485	8.415	7.470	-1.8	6.8	.3	-.7	-4.7	.6
475			8.330			-.6					
500	6.865	7.715	8.230	7.965	7.355	-.4	4.3	5.2	-2.7	-3.1	.8
O/A C/L GRADIENT :						-.1					
MAX +(%)						1.4	6.8	5.2	.6	.2	.8
MAX -(%)						-3.4	-1.4	-2.0	-2.7	-4.7	-1.5

McADAM DESIGN : FIGAS AERODROME SURVEY : FOX BAY EAST : MAIN STRIP : RUNWAY HEADING : 30/12

SURVEY DATE : 08/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runways

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	10.0 SOUTH	C/L	10.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 10.0 S	10.0 S C/L	C/L 10.0 N	10.0 N 30.0 N	30.0 S 30.0 N
-75 *	7.079	7.434	7.384	7.124	6.719		1.8	-0.5	-2.6	-2.0	-0.6
-50 *	7.845	8.286	8.416	8.419	7.612	4.1	2.2	1.3		-4.0	-0.4
-25 *	8.694	9.034	9.054	9.329	8.700	2.6	1.7	0.2	2.8	-3.1	
0	9.229	9.459	9.646	9.644	9.702	2.4	1.2	1.9		0.3	0.8
25			9.991			1.4					
50	9.935	10.031	10.290	10.543	10.810	1.2	0.5	2.6	2.5	1.3	1.5
75			10.483			0.8					
100	10.183	10.385	10.476	10.755	11.375		1.0	0.9	2.8	3.1	2.0
125			10.480								
150	9.153	9.867	10.290	10.705	11.492	-0.8	3.6	4.2	4.2	3.9	3.9
175			9.724			-2.3					
200	8.165	8.704	9.137	9.607	9.940	-2.3	2.7	4.3	4.7	1.7	3.0
225			8.665			-1.9					
250	7.363	7.758	7.500	7.643	8.083	-4.7	2.0	-2.6	1.4	2.2	1.2
275			6.654			-3.4					
300	5.083	5.606	5.788	6.068	6.720	-3.5	2.6	1.8	2.8	3.3	2.7
325			5.303			-1.9					
350	3.658	4.327	4.448	4.638	4.862	-3.4	3.3	1.2	1.9	1.1	2.0
375			3.569			-3.5					
400	2.044	2.922	3.355	3.704	4.254	-0.9	4.4	4.3	3.5	2.8	3.7
425			3.085			-1.1					
450	1.825	2.787	3.102	3.323	3.422	0.1	4.8	3.2	2.2	0.5	2.7
475	1.520	2.632	2.767	2.507	2.092	-1.3	5.6	1.4	-2.6	-2.1	1.0
O/A C/L GRADIENT :						-1.4					
MAX +(%)						2.4	5.6	4.3	4.7	3.9	3.9
MAX -(%)						-4.7	0.0	-2.6	-2.6	-2.1	0.0

McADAM DESIGN : FIGAS AERODROME SURVEY : FOX BAY EAST : CROSS STRIP : RUNWAY HEADING : 02/20

SURVEY DATE : 08/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS						
CH.	30.0 WEST	7.5 WEST	C/L	7.5 EAST	30.0 EAST	C/L (%)	30.0 W 7.5 W	7.5 W C/L	C/L 7.5 E	7.5 E 30.0 E	30.0 W 30.0 E	
-75 *	7.490	8.070	8.310	8.475	8.845		2.6	3.2	2.2	1.6	2.3	
-50 *	7.550	8.490	8.800	8.865	8.922	2.0	4.2	4.1	.9	.3	2.3	
-25 *	8.500	8.755	8.900	8.990	9.170	.4	1.1	1.9	1.2	.8	1.1	
0	9.370	9.615	9.655	9.670	10.045	3.0	1.1	.5	.2	1.7	1.1	
25			10.335			2.7						
50	9.620	9.800	9.845	10.070	10.315	-2.0	.8	.6	3.0	1.1	1.2	
75			10.015			.7						
100	10.045	10.370	10.555	10.590	10.550	2.2	1.4	2.5	.5	-.2	.8	
125			11.300			3.0						
150	11.435	11.510	11.205	11.100	10.975	-.4	.3	-4.1	-1.4	-.6	-.8	
175			10.485			-2.9						
200	10.270	10.255	10.240	10.125	9.505	-1.0	-.1	-.2	-1.5	-2.8	-1.3	
225	9.710	9.565	9.520	9.400	7.630	-2.9	-.6	-.6	-1.6	-7.9	-3.5	
O/A C/L GRADIENT :			-0.1	MAX + (%)			3.0	1.4	2.5	3.0	1.7	1.2
				MAX - (%)			-2.9	-.6	-4.1	-1.6	-7.9	-3.5

McADAM DESIGN : FIGAS AERODROME SURVEY : FOX BAY WEST : MAIN STRIP : RUNWAY HEADING : 32/14

SURVEY DATE : 09/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	18.3 SOUTH	C/L	18.3 NORTH	30.0 NORTH	C/L (%)	30.0 S 18.3 S	18.3 S C/L	C/L 18.3 N	18.3 N 30.0 N	30.0 S 30.0 N
0	5.471	5.659	4.594	3.429	3.139		1.6	-5.8	-6.4	-2.5	-3.9
25			5.037			1.8					
50	5.186	5.050	5.100	4.143	3.746	.3	-1.2	.3	-5.2	-3.4	-2.4
75			4.553			-2.2					
100	4.860	4.612	4.416	4.303	3.490	-.5	-2.1	-1.1	-.6	-6.9	-2.3
125			4.509			.4					
150	5.827	5.600	5.205	4.593	3.945	2.8	-1.9	-2.2	-3.3	-5.5	-3.1
175			5.550			1.4					
200	6.054	6.127	5.525	5.200	4.655	-.1	.6	-3.3	-1.8	-4.7	-2.3
225			5.663			.6					
250	6.490	6.312	5.992	5.495	5.355	1.3	-1.5	-1.7	-2.7	-1.2	-1.9
275			6.690			2.8					
300	6.850	7.090	7.140	6.587	6.403	1.8	2.1	.3	-3.0	-1.6	-.7
325			6.835			-1.2					
350	6.314	6.759	6.600	6.295	6.020	-.9	3.8	-.9	-1.7	-2.4	-.5
375			6.515			-.3					
400	5.960	6.245	6.310	6.250	6.114	-.8	2.4	.4	-.3	-1.2	.3
425			6.519			.8					
450	6.900	6.850	6.645	6.420	6.157	.5	-.4	-1.1	-1.2	-2.2	-1.2
475			6.855			.8					
500	7.505	7.358	7.223	6.930	6.770	1.5	-1.3	-.7	-1.6	-1.4	-1.2
525			7.600			1.5					
550	8.052	8.063	7.992	7.730	7.860	1.6	.1	-.4	-1.4	1.1	-.3
575			8.180			.8					
600	8.225	8.280	8.315	8.285	8.225	.5	.5	.2	-.2	-.5	
625			8.343			.1					
650	8.543	8.750	9.080	8.960	9.050	2.9	1.8	1.8	-.7	.8	.8
O/A C/L GRADIENT :						.7					
MAX +(%)						2.9	3.8	1.8	.0	1.1	.8
MAX -(%)						-2.2	-2.1	-5.8	-6.4	-6.9	-3.9

McADAM DESIGN : FIGAS AERODROME SURVEY : FOX BAY WEST : CROSS STRIP : RUNWAY HEADING : 28/10

SURVEY DATE : 09/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					C/L (%)	(%) GRADIENTS AND CROSSFALLS				
	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH		30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
0	7.215	7.410	7.800	8.185	8.295		1.3	2.6	2.6	.7	1.8
25			8.050			1.0					
50	8.105	8.160	8.215	8.225	8.295	.7	.4	.4	.1	.5	.3
75			8.230			.1					
100	8.218	8.235	8.300	8.400	8.335	.3	.1	.4	.7	-.4	.2
125			8.300								
150	8.410	8.505	8.660	8.650	8.805	1.4	.6	1.0	-.1	1.0	.7
175			8.780			.5					
200	8.570	8.605	8.640	8.850	9.215	-.6	.2	.2	1.4	2.4	1.1
225			8.780			.6					
250	8.805	8.860	8.945	9.055	9.000	.7	.4	.6	.7	-.4	.3
275		8.975	9.050	9.025		.4		.5	-.2		
O/A C/L GRADIENT :			.5	MAX +(%)		1.4	1.3	2.6	2.6	2.4	1.8
				MAX -(%)		-.6	.0	.0	-.2	-.4	.0

McADAM DESIGN : FIGAS AERODROME SURVEY : GREEN PATCH : MAIN STRIP : RUNWAY HEADING : 08/26

SURVEY DATE : 02/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S
0	9.560	9.755	9.700	9.750	9.270		1.0	-.6	.5	-2.4	-.5
25			9.860			.6					
50	9.565	9.930	9.800	9.595	9.065	-.2	1.8	-1.3	-2.1	-2.7	-.8
75			9.765			-.1					
100	9.985	9.945	9.860	9.610	9.110	.4	-.2	-.9	-2.5	-2.5	-1.5
125			9.735			-.5					
150	10.195	10.080	9.630	9.455	8.865	-.4	-.6	-4.5	-1.8	-3.0	-2.2
175			9.875			1.0					
200	10.215	10.100	10.000	9.845	9.400	.5	-.6	-1.0	-1.6	-2.2	-1.4
225			9.900			-.4					
250	9.890	9.825	9.705	9.490	8.940	-.8	-.3	-1.2	-2.2	-2.8	-1.6
275			9.380			-1.3					
300	9.050	8.960	8.870	8.720	8.465	-2.0	-.5	-.9	-1.5	-1.3	-1.0
325			8.485			-1.5					
350	8.415	8.110	8.080	7.965	7.595	-1.6	-1.5	-.3	-1.2	-1.9	-1.4
375 *			7.880			-.8					
400 *	8.140	8.085	8.025	8.065	8.390	.6	-.3	-.6	.4	1.6	.4
425 *			8.395			1.5					
450 *	8.620	8.535	8.380	8.435	8.605	-.1	-.4	-1.6	.6	.9	
475 *			8.855			1.9					
500 *	9.045	9.260	9.415	9.480	9.560	2.2	1.1	1.6	.7	.4	.9
525 *			9.700			1.1					
550 *	9.255	9.550	9.770	9.960	10.175	.3	1.5	2.2	1.9	1.1	1.5
575 *			9.875			.4					
600 *	9.155	9.580	9.815	9.965	9.905	-.2	2.1	2.4	1.5	-.3	1.3
O/A C/L GRADIENT :						-.5					
MAX +(%)						1.0	1.8	.0	.5	.0	.0
MAX -(%)						-2.0	-1.5	-4.5	-2.5	-3.0	-2.2

McADAM DESIGN : FIGAS AERODROME SURVEY : HILL COVE : MAIN STRIP : RUNWAY HEADING : 19/01

SURVEY DATE : 22/03/88 NOTE : Chainages marked thus (■) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS					
CH.	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W
-75 ■			7.085								
-50 ■	9.230	9.110	8.935	8.340	7.885	7.4	-.6	-1.8	-6.0	-2.3	-2.2
-25 ■			9.845			3.6					
0	11.815	10.900	10.620	10.480	10.895	3.1	-4.6	-2.8	-1.4	2.1	-1.5
25			11.500			3.5					
50	12.830	12.220	12.110	12.215	12.390	2.4	-3.1	-1.1	1.1	.9	-.7
75			12.980			3.5					
100	14.330	14.030	13.700	13.880	13.600	2.9	-1.5	-3.3	1.8	-1.4	-1.2
125			14.430			2.9					
150	14.655	15.050	14.960	14.830	14.870	2.1	2.0	-.9	-1.3	.2	.4
175			15.315			1.4					
200	16.000	15.745	15.655	15.685	15.880	1.4	-1.3	-.9	.3	1.0	-.2
225			16.150			2.0					
250	16.830	16.770	16.720	16.715	16.555	2.3	-.3	-.5	-.1	-.8	-.5
275			17.310			2.4					
300	18.045	17.885	17.845	17.705	17.625	2.1	-.8	-.4	-1.4	-.4	-.7
325			18.390			2.2					
350	19.130	19.100	18.995	18.785	18.520	2.4	-.2	-1.1	-2.1	-1.3	-1.0
375			19.635			2.6					
400 +	20.311	20.400	20.390	20.460	20.185	3.0	.9	-.1	.7	-1.4	-.2
425 +	21.130	21.180	21.205	20.890	19.510	3.3	.5	.3	-3.2	-6.9	-2.7
450 +	21.650	21.640	20.920	20.150	18.965	-1.1	-.1	-7.2	-7.7	-5.9	-4.5
475 +	22.120	22.000	21.195	20.355	18.880	1.1	-1.2	-8.1	-8.4	-7.4	-5.4
500 +	22.450	22.240	21.380	20.490	18.760	.7	-2.1	-8.6	-8.9	-8.7	-6.2
525 +	22.310	21.775	20.935	20.250	17.630	-1.8	-5.4	-8.4	-6.9	-13.1	-7.8
550 +	22.130	21.600	21.110	20.640	17.065	.7	-5.3	-4.9	-4.7	-17.9	-8.4
575 +	22.520	21.985	21.450	20.655	15.750	1.4	-5.4	-5.4	-8.0	-24.5	-11.3

O/A C/L GRADIENT : 1.9

NB : (+) 20m EAST

MAX + (%)	3.5	2.0	.3	1.8	2.1	.4
MAX - (%)	-1.8	-5.4	-8.6	-8.9	-24.5	-11.3

McADAM DESIGN : FIGAS AERODROME SURVEY : HILL COVE : CROSS STRIP : RUNWAY HEADING : 27/09

SURVEY DATE : 22/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	10.0 SOUTH	C/L	10.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 10.0 S	10.0 S C/L	C/L 10.0 N	10.0 N 30.0 N	30.0 S 30.0 N
0	14.445	14.175	14.345	14.315	13.960		-1.4	1.7	-.3	-1.8	-.8
25			15.205			3.4					
50	16.565	15.925	15.675	15.395	14.775	1.9	-3.2	-2.5	-2.8	-3.1	-3.0
75			15.850			.7					
100	16.925	16.345	16.040	15.865	15.425	.8	-2.9	-3.1	-1.8	-2.2	-2.5
125			16.170			.5					
150	16.600	16.215	16.075	16.040	15.770	-.4	-1.9	-1.4	-.4	-1.4	-1.4
175			16.060			-.1					
200	16.715	16.280	16.160	16.055	15.800	.4	-2.2	-1.2	-1.1	-1.3	-1.5
225			16.010			-.6					
250	16.600	16.420	16.250	16.090	15.685	1.0	-.9	-1.7	-1.6	-2.0	-1.5
275			15.755			-2.0					
300	16.190	15.640	15.370	15.175	14.810	-1.5	-2.8	-2.7	-2.0	-1.8	-2.3
325			14.905			-1.9					
350	13.950	13.975	13.665	13.900	13.030	-5.0	.1	-3.1	2.4	-4.4	-1.5

O/A C/L GRADIENT : -.2

MAX + (%)	3.4	.1	1.7	2.4	.0	.0
MAX - (%)	-5.0	-3.2	-3.1	-2.8	-4.4	-3.0

McADAM DESIGN : FIGAS AERODROME SURVEY : NORTH ARM : MAIN STRIP : RUNWAY HEADING : 18/00

SURVEY DATE : 10/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS				
	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W
0	9.875	10.200	10.045	9.930	9.600		1.6	-1.6	-1.2	-1.7	-0.5
25			10.075			.1					
50	9.070	9.745	10.010	10.245	9.905	-0.3	3.4	2.7	2.4	-1.7	1.4
75			9.385			-2.5					
100	7.400	8.285	8.715	9.140	9.690	-2.7	4.4	4.3	4.3	2.8	3.8
125			7.975			-3.0					
150	6.325	6.925	7.350	7.760	8.425	-2.5	3.0	4.3	4.1	3.3	3.5
175			6.635			-2.9					
200	5.445	5.990	6.320	6.680	7.225	-1.3	2.7	3.3	3.6	2.7	3.0
225			6.250			-0.3					
250	5.080	5.675	5.930	6.180	6.690	-1.3	3.0	2.6	2.5	2.6	2.7
275			5.425			-2.0					
300	3.995	4.765	5.005	5.295	5.850	-1.7	3.9	2.4	2.9	2.8	3.1
325			5.055			.2					
350	3.460	4.205	4.660	5.200	5.655	-1.6	3.7	4.6	5.4	2.3	3.7
375			4.190			-1.9					
400	2.725	3.250	3.495	3.745	4.800	-2.8	2.6	2.5	2.5	5.3	3.5
425			3.255			-1.0					
450	2.230	2.770	3.040	3.150	4.150	-0.9	2.7	2.7	1.1	5.0	3.2
475			2.735			-1.2					
500	1.805	2.215	2.500	2.745	3.430	-0.9	2.1	2.9	2.5	3.4	2.7
525			2.185			-1.3					
550	1.710	1.975	2.205	2.445	3.225	.1	1.3	2.3	2.4	3.9	2.5
575			1.960			-1.0					
600	1.195	1.575	1.765	2.070	2.935	-0.8	1.9	1.9	3.1	4.3	2.9

O/A C/L GRADIENT : -1.4

MAX +(%)	.2	4.4	4.6	5.4	5.3	3.8
MAX -(%)	-3.0	.0	-1.6	-1.2	-1.7	-0.5

MCADAM DESIGN : FIGAS AERODROME SURVEY : NORTH ARM : CROSS STRIP : RUNWAY HEADING : 21/03

SURVEY DATE : 10/03/88

NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.			- (%) GRADIENTS AND CROSSFALLS				
CH.	30.0 WEST	C/L	30.0 EAST	C/L (%)	30.0 W C/L	C/L 30.0 E	
0	9.235	8.630			-2.0		
50	9.940	9.365	8.425	1.5	-1.9	-3.1	
100	10.020	9.705	8.940	.7	-1.1	-2.6	
150	9.785	9.805	10.000	.2	.1	.7	
200	9.570	9.535	9.880	-.5	-.1	1.2	
250	9.915	9.395	10.040	-.3	-1.7	2.2	
300	9.605	9.050	9.530	-.7	-1.9	1.6	
350	9.250	8.970	9.460	-.2	-.9	1.6	
400	8.855	8.830	9.000	-.3	-.1	.6	
450	9.535	8.985	8.755	.3	-1.8	-.8	
475		9.345		1.4			
<hr/>							
C/L (%)		.2		MAX + (%)	1.5	.1	2.2
<hr/>				MAX - (%)	-.7	-2.0	-3.1
<hr/>							

McADAM DESIGN : FIGAS AERODROME SURVEY : PEBBLE ISLAND : MAIN STRIP : RUNWAY HEADING 31/13

SURVEY DATE : 24/03/88

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 S/WEST	10.0 S/WEST	C/L	10.0 N/EAST	30.0 N/EAST	C/L (%)	30.0SW 10.0SW	10.0SW C/L	C/L 10.0NE	10.0NE 30.0NE	30.0SW 30.0NE
0	11.410	11.305	11.010	10.695	10.060		-0.5	-3.0	-3.2	-3.2	-1.1
25			11.160			.6					
50	12.270	11.810	11.420	11.175	10.660	1.0	-2.3	-3.9	-2.5	-2.6	-0.9
75			11.560			.6					
100	12.620	11.910	11.555	11.325	10.635		-3.6	-3.6	-2.3	-3.5	-1.2
125			11.705			.6					
150	12.780	12.310	11.965	11.665	11.105	1.0	-2.4	-3.5	-3.0	-2.8	-0.9
175			12.250			1.1					
200	13.195	12.770	12.505	12.275	11.690	1.0	-2.1	-2.7	-2.3	-2.9	-1.0
225			12.515								
250	13.280	12.870	12.670	12.445	12.045	.6	-2.1	-2.0	-2.3	-2.0	-0.7
275			12.805			.5					
300	13.750	13.455	13.270	13.160	12.750	1.9	-1.5	-1.9	-1.1	-2.1	-0.7
325			13.705			1.7					
350	14.245	14.215	14.150	13.995	13.620	1.8	-0.2	-0.7	-1.6	-1.9	-0.6
375			14.520			1.5					
400	14.905	14.940	14.810	14.695	14.235	1.2	0.2	-1.3	-1.2	-2.3	-0.8
425			15.015			.8					
450	15.275	15.330	15.185	15.070	14.655	.7	0.3	-1.5	-1.2	-2.1	-0.7
475			15.190								
500	15.200	15.320	15.265	15.155	14.790	.3	0.6	-0.6	-1.1	-1.8	-0.6
525			15.280			.1					
550	15.230	15.455	15.410	15.380	15.190	.5	1.1	-0.5	-0.3	-1.0	-0.3
575			15.590			.7					
600	15.805	15.615	15.695	15.765	16.045	.4	-1.0	0.8	0.7	1.4	0.5

O/A C/L GRADIENT :	.8					
MAX +(%)	1.9	1.1	.8	.7	1.4	.5
MAX -(%)	0	-3.6	-3.9	-3.2	-3.5	-1.2

McADAM DESIGN : FIGAS AERODROME SURVEY : PEBBLE ISLAND : CROSS STRIP 1 : RUNWAY HEADING : 05/23

SURVEY DATE : 24/03/88

GROUND LEVELS TO SITE T.B.M.							(% GRADIENTS AND CROSSFALLS				
CH.	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S
0	12.555	13.135	13.155	13.300	13.420		2.9	.2	1.5	.6	1.4
25			13.465			1.2					
50	12.845	13.330	13.400	13.560	13.465	-0.3	2.4	.7	1.6	-0.5	1.0
75			13.205			-0.8					
100	12.995	13.015	12.940	12.905	12.635	-1.1	.1	-0.8	-0.4	-1.4	-0.6
125			12.460			-1.9					
150	12.515	12.075	11.855	11.705	11.530	-2.4	-2.2	-2.2	-1.5	-0.9	-1.6
175			11.380			-1.9					
200	11.310	11.010	10.715	10.465	10.105	-2.7	-1.5	-3.0	-2.5	-1.8	-2.0
225			9.990			-2.9					
250	9.930	9.620	9.270	9.080	8.680	-2.9	-1.6	-3.5	-1.9	-2.0	-2.1
275			8.630			-2.6					
300	8.660	8.145	7.905	7.715	7.220	-2.9	-2.6	-2.4	-1.9	-2.5	-2.4
325			7.165			-3.0					
350			6.445			-2.9					
375			5.920			-2.1					

MAX + (%)	1.2	2.9	.7	1.6	.6	1.4
MAX - (%)	-3.0	-2.6	-3.5	-2.5	-2.5	-2.4

McADAM DESIGN : FIGAS AERODROME SURVEY : PEBBLE ISLAND : CROSS STRIP 2 : RUNWAY HEADING : 04/22

SURVEY DATE : 24/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS				
	30.0 SOUTH	10.0 SOUTH	C/L	10.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 10.0 S	10.0 S C/L	C/L 10.0 N	10.0 N 30.0 N	30.0 S 30.0 N
0	13.190	13.180	13.075	12.950	12.765		-0.1	-1.1	-1.3	-0.9	-0.7
25			13.445			1.5					
50	13.550	13.570	13.520	13.535	13.700	.3	.1	-0.5	.2	.8	.3
75			13.165			-1.4					
100			12.645			-2.1					
125			12.210			-1.7					
150	11.310	11.585	11.650	11.810	12.175	-2.2	1.4	.7	1.6	1.8	1.4
175			10.870			-3.1					
200	9.480	9.875	10.080	10.290	10.500	-3.2	2.0	2.1	2.1	1.1	1.7
225			9.010			-4.3					
250	7.965	8.210	8.350	8.540	8.790	-2.6	1.2	1.4	1.9	1.3	1.4
275			7.940			-1.6					
300 *			6.700			-5.0					
325 *			5.745			-3.8					

O/A C/L GRADIENT : -1.9

MAX +(%)	1.5	2.0	2.1	2.1	1.8	1.7
MAX -(%)	-4.3	-0.1	-1.1	-1.3	-0.9	-0.7

McADAM DESIGN : FIGAS AERODROME SURVEY : PORT HOWARD : MAIN STRIP : RUNWAY HEADING : 19/01

SURVEY DATE : 17/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.							(%) GRADIENTS AND CROSSFALLS				
CH.	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W
-50 *			7.100								
-25 *	7.330	7.810	7.605	6.940	6.200	2.0	2.4	-2.1	-6.7	-3.7	-1.9
0	8.875	8.825	8.660	8.130	7.120	4.2	-0.3	-1.7	-5.3	-5.1	-2.9
25			9.375			2.9					
50	9.130	9.905	10.145	9.970	9.220	3.1	3.9	2.4	-1.8	-3.8	.2
75			10.110			-0.1					
100	8.780	9.705	10.010	10.280	9.585	-0.4	4.6	3.1	2.7	-3.5	1.3
125			9.900			-0.4					
150	7.735	8.645	9.215	9.375	9.185	-2.7	4.6	5.7	1.6	-1.0	2.4
175			8.455			-3.0					
200	7.110	8.370	8.450	8.405	7.700		6.3	.8	-0.5	-3.5	1.0
225	6.500	8.680	9.030	9.030	8.245	2.3	10.9	3.5		-3.9	2.9
250	9.395	9.685	9.820	9.795	9.330	3.2	1.5	1.4	-0.3	-2.3	-0.1
275			11.200			5.5					
300	12.550	12.390	12.225	11.790	10.590	4.1	-0.8	-1.7	-4.4	-6.0	-3.3
325			12.800			2.3					
350	13.660	13.250	12.945	12.795	11.290	.6	-2.1	-3.1	-1.5	-7.5	-4.0
375			13.780			3.3					
400	13.930	13.980	13.970	13.825	12.370	.8	.3	-0.1	-1.5	-7.3	-2.6
425			13.475			-2.0					
450	12.525	12.655	12.405	12.150	11.560	-4.3	.7	-2.5	-2.6	-3.0	-1.6
475			11.440			-3.9					
500	10.600	11.020	10.650	10.240		-3.2	2.1	-3.7	-4.1		

O/A C/L GRADIENT :	.4					
MAX + (%)	5.5	10.9	5.7	2.7	.0	2.9
MAX - (%)	-4.3	-2.1	-3.7	-5.3	-7.5	-4.0

McADAM DESIGN : FIGAS AERODROME SURVEY : PORT SAN CARLOS : MAIN STRIP : RUNWAY HEADING 11/29

SURVEY DATE : 22/02/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S
0	8.685	9.145	9.165	9.335	9.610		2.3	.2	1.7	1.4	1.5
25			10.305			4.6					
50	10.325	11.190	11.450	11.775	11.770	4.6	4.3	2.6	3.3		2.4
75			12.170			2.9					
100	11.375	12.395	12.890	13.160	13.600	2.9	5.1	5.0	2.7	2.2	3.7
125			12.730			-.6					
150	11.265	12.215	12.570	12.705	12.705	-.6	4.8	3.6	1.4		2.4
175			11.900			-2.7					
200	10.345	11.025	11.225	11.270	11.010	-2.7	3.4	2.0	.5	-1.3	1.1
225			10.695			-2.1					
250	9.750	10.130	10.165	9.985	9.350	-2.1	1.9	.4	-1.8	-3.2	-.7
275			9.600			-2.3					
300	8.645	9.040	9.030	8.765	8.545	-2.3	2.0	-.1	-2.7	-1.1	-.2
325			8.550			-1.9					
350	7.145	8.165	8.075	7.930	7.700	-1.9	5.1	-.9	-1.5	-1.2	.9
375			8.230			.6					
400	7.030	8.065	8.385	8.430	8.190	.6	5.2	3.2	.5	-1.2	1.9
425			8.405			.1					
450	7.960	8.185	8.425	8.485	8.480	.1	1.1	2.4	.6		.9
475			8.780			1.4					
500	7.200	8.875	9.135	9.135	9.275	1.4	8.4	2.6		.7	3.5
525			9.605			1.9					
550	10.085	10.075	10.075	10.015	9.940	1.9	-.1		-.6	-.4	-.2
575			10.020			-.2					
600	10.905	10.420	9.965	9.360	8.325	-.2	-2.4	-4.6	-6.1	-5.2	-4.3

O/A C/L GRADIENT : .1

MAX + (%)	4.6	8.4	5.0	3.3	2.2	3.7
MAX - (%)	-2.7	-2.4	-4.6	-6.1	-5.2	-4.3

McADAM DESIGN : FIGAS AERODROME SURVEY : PORT STEPHENS : MAIN STRIP : RUNWAY HEADING : 31/13

SURVEY DATE : 15/03/88 NOTE : Chainages marked thus (■) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(% GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	14.5 SOUTH	C/L	14.5 NORTH	30.0 NORTH	C/L (%)	30.0 S 14.5 S	14.5 S C/L	C/L 14.5 N	14.5 N 30.0 N	30.0 S 30.0 N
0	19.870	19.515	20.510	20.560	19.615		-2.3	6.9	.3	-6.1	-.4
25			20.215			-1.2					
50	19.370	19.966	19.726	20.205	20.006	-2.0	3.8	-1.7	3.3	-1.3	1.1
75			19.945			.9					
100	19.285	19.750	19.832	19.939	20.054	-.5	3.0	.6	.7	.7	1.3
125			19.346			-1.9					
150	18.520	18.875	18.826	19.026	18.906	-2.1	2.3	-.3	1.4	-.8	.6
175			18.260			-2.3					
200	16.687	17.290	17.570	17.465	17.875	-2.8	3.9	1.9	-.7	2.6	2.0
225			16.530			-4.2					
250	15.375	15.435	15.355	15.030	15.725	-4.7	.4	-.6	-2.2	4.5	.6
275			14.535			-3.3					
300	13.370	13.900	13.635	13.547	13.945	-3.6	3.4	-1.8	-.6	2.6	1.0
325			12.810			-3.3					
350	11.400	12.210	12.003	11.875	11.515	-3.2	5.2	-1.4	-.9	-2.3	.2
375			11.905			-.4					
400	10.315	10.700	10.785	10.514	10.193	-4.5	2.5	.6	-1.9	-2.1	-.2
425			10.235			-2.2					
450	9.470	9.785	9.520	9.155	9.200	-2.9	2.0	-1.8	-2.5	.3	-.5
475			8.920			-2.4					
500	8.677	8.920	8.890	8.355	7.825	-.1	1.6	-.2	-3.7	-3.4	-1.4
525			8.115			-3.1					
550	7.542	7.455	7.492	7.590	6.795	-2.5	-.6	.3	.7	-5.1	-1.2
575			6.765			-2.9					
600	5.905	6.160	6.175	6.360	6.340	-2.4	1.6	.1	1.3	-.1	.7

O/A C/L GRADIENT : -2.4

MAX + (%)	.9	5.2	6.9	3.3	4.5	2.0
MAX - (%)	-4.7	-2.3	-1.8	-3.7	-6.1	-1.4

McADAM DESIGN : FIGAS AERODROME SURVEY : PORT STEPHENS : CROSS STRIP : RUNWAY HEADING : 34/16

SURVEY DATE : 15/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS						
	30.0 SOUTH	8.5 SOUTH	C/L	8.5 NORTH	30.0 NORTH	C/L (%)	30.0 S 8.5 S	8.5 S C/L	C/L 8.5 N	8.5 N 30.0 N	30.0 S 30.0 N	
0	6.185	8.185	8.435	8.680	9.150		9.3	2.9	2.9	2.2	4.9	
25			8.090			-1.4						
50	6.525	7.380	7.400	7.510	7.880	-2.8	4.0	.2	1.3	1.7	2.3	
75			6.825			-2.3						
100	5.960	6.185	6.350	6.530	5.985	-1.9	1.0	1.9	2.1	-2.5		
125			6.050			-1.2						
150	5.275	5.530	5.440	5.500	5.555	-2.4	1.2	-1.1	.7	.3	.5	
175			5.080			-1.4						
200	4.525	4.595	4.650	4.645	4.500	-1.7	.3	.6	-.1	-.7		
225			4.050			-2.4						
250	3.570	3.650	3.550	3.415	2.290	-2.0	.4	-1.2	-1.6	-5.2	-2.1	
275			3.030			-2.1						
300	2.490	2.690	2.650	2.495	1.935	-1.5	.9	-.5	-1.8	-2.6	-.9	
325			2.060			-2.4						
350	.930	1.512	1.325	1.060	.285	-2.9	2.7	-2.2	-3.1	-3.6	-1.1	
375			.545			-3.1						
400	-2.000	-.200	-.280	-.530	-1.000	-3.3	8.4	-.9	-2.9	-2.2	1.7	
O/A C/L GRADIENT :			-2.2	MAX +(%)			.0	9.3	2.9	2.9	2.2	4.9
				MAX -(%)			-3.3	.0	-2.2	-3.1	-5.2	-2.1

McADAM DESIGN : FIGAS AERODROME SURVEY : ROY COVE : MAIN STRIP : RUNWAY HEADING : 28/10

SURVEY DATE : 22/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
-25 *	3.812	4.973	6.562	7.265	6.924		7.7	10.6	4.7	-2.3	5.2
0	4.892	6.025	6.997	7.090	6.675	1.7	7.6	6.5	.6	-2.8	3.0
25			7.063			.3					
50	6.186	6.747	6.956	6.680	6.260	-.4	3.7	1.4	-1.8	-2.8	.1
75			6.766			-.8					
100	6.447	6.763	6.734	6.623	5.375	-.1	2.1	-.2	-.7	-8.3	-1.8
125			7.215			1.9					
150	7.885	7.793	7.710	7.315	4.513	2.0	-.6	-.6	-2.6	-18.7	-5.6
175			8.023			1.3					
200	8.485	8.475	8.245	7.745	6.245	.9	-.1	-1.5	-3.3	-10.0	-3.7
225			8.318			.3					
250	8.675	8.642	9.025	8.955	8.680	2.8	-.2	2.6	-.5	-1.8	
275			9.530			2.0					
300	9.845	10.010	9.975	9.760	9.405	1.8	1.1	-.2	-1.4	-2.4	-.7
325			10.130			.6					
350	10.035	10.115	10.075	9.920	9.695	-.2	.5	-.3	-1.0	-1.5	-.6
375			10.015			-.2					
400	10.442	10.500	10.490	10.360	10.280	1.9	.4	-.1	-.9	-.5	-.3
425			10.780			1.2					
450	11.100	11.230	11.140	11.075	10.810	1.4	.9	-.6	-.4	-1.8	-.5
475			11.575			1.7					
500	11.100	12.240	11.887	11.475	11.100	1.2	7.6	-2.4	-2.7	-2.5	
525			11.990			.4					
550	12.290	12.830	12.595	12.180	11.740	2.4	3.6	-1.6	-2.8	-2.9	-.9
575			12.788			.8					
600	13.120	13.050	12.580	12.190		-.8	-.5	-3.1	-2.6		

O/A C/L GRADIENT : .9

MAX +(%)	2.8	7.6	6.5	.6	.0	3.0
MAX -(%)	-.8	-.6	-3.1	-3.3	-18.7	-5.6

McADAM DESIGN : FIGAS AERODROME SURVEY : SALVADOR : MAIN STRIP : RUNWAY HEADING : 22/04

SURVEY DATE : 24/02/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	10.0 SOUTH	C/L	10.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 10.0 S	10.0 S C/L	C/L 10.0 N	10.0 N 30.0 N	30.0 S 30.0 N
0		9.340	9.765	10.055				4.3	2.9		
25			9.865			.4					
50	9.445	9.950	9.965	9.860	9.555	.4	2.5	.2	-1.1	-1.5	.2
75			10.055			.4					
100	9.345	9.825	10.143	10.360	10.755	.4	2.4	3.2	2.2	2.0	2.4
125			10.345			.8					
150	9.115	9.990	10.435	10.910	11.500	.4	4.4	4.5	4.8	3.0	4.0
175	8.130	9.075	9.975	10.780	11.755	-1.8	4.7	9.0	8.1	4.9	6.0
200	8.040	9.105	9.840	10.425	11.735	-.5	5.3	7.4	5.9	6.6	6.2
225	9.055	10.030	10.520	11.010	11.905	2.7	4.9	4.9	4.9	4.5	4.8
250	9.640	10.950	11.335	11.715	12.390	3.3	6.6	3.9	3.8	3.4	4.6
275			12.270			3.7					
300	11.815	12.760	12.870	13.080	12.930	2.4	4.7	1.1	2.1	-.8	1.9
325			13.265			1.6					
350	12.415	13.310	13.510	13.715	13.100	1.0	4.5	2.0	2.1	-3.1	1.1
375	11.725	13.240	13.430	13.455	13.010	-.3	7.6	1.9	.3	-2.2	2.1
400	12.605	13.285	13.405	13.290	12.645	-.1	3.4	1.2	-1.2	-3.2	.1
425			13.550			.6					
450	13.325	13.655	13.700	13.520	12.700	.6	1.7	.5	-1.8	-4.1	-1.0
475			13.655			-.2					
500	12.430	13.470	13.740	13.785	13.185	.3	5.2	2.7	.5	-3.0	1.3
525			13.810			.3					
550	13.170	13.805	13.900	13.885	13.355	.4	3.2	1.0	-.2	-2.7	.3
575			13.790			-.4					
600	13.920	13.795	13.645	13.385	11.475	-.6	-.6	-1.5	-2.6	-9.6	-4.1

O/A C/L GRADIENT :	.6					
MAX + (%)	3.7	7.6	9.0	8.1	6.6	6.2
MAX - (%)	-1.8	-.6	-1.5	-2.6	-9.6	-4.1

McADAM DESIGN : FIGAS AERODROME SURVEY : SALVADOR : CROSS STRIP : RUNWAY HEADING : 16/34

SURVEY DATE : 24/02/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS					
CH.	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W
0		10.540	10.580	10.525				.4	-.6		
25			11.765			4.7					
50	13.360	13.085	12.915	12.665	12.155	4.6	-1.4	-1.7	-2.5	-2.6	-2.0
75			13.735			3.3					
100	13.115	13.800	13.875	13.830	13.445	.6	3.4	.8	-.5	-1.9	.6
125			13.800			-.3					
150	12.110	13.170	13.595	13.885	13.800	-.8	5.3	4.3	2.9	-.4	2.8
175			13.340			-1.0					
200	12.240	13.000	13.245	13.500	13.175	-.4	3.8	2.5	2.6	-1.6	1.6
225			13.455			.8					
250	12.780	13.370	13.580	13.675	13.350	.5	3.0	2.1	1.0	-1.6	1.0
275			13.315			-1.1					
300	12.730	12.775	12.755	12.785	12.620	-2.2	.2	-.2	.3	-.8	-.2
325 *			11.995			-3.0					
350 *	11.640	11.715	11.475	11.100	10.380	-2.1	.4	-2.4	-3.8	-3.6	-2.1

O/A C/L GRADIENT : .7

MAX + (%)	4.7	5.3	4.3	2.9	.0	2.8
MAX - (%)	-2.2	-1.4	-1.7	-2.5	-2.6	-2.0

McADAM DESIGN : FIGAS AERODROME SURVEY : SAN CARLOS : MAIN STRIP : RUNWAY HEADING : 11/29

SURVEY DATE : 03/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S	
-100 *	3.000	4.000	4.000	4.040	3.750		5.0		.4	-1.5	1.3	
-75 *			4.415			1.7						
-50 *	4.740	5.160	5.060	4.980	5.070	2.6	2.1	-1.0	-.8	.5	.6	
-25 *			6.050			4.0						
0	7.325	7.455	7.330	7.192	6.350	5.1	.7	-1.3	-1.4	-4.2	-1.6	
25	8.500	8.375	8.150	7.985	7.530	3.3	-.6	-2.3	-1.7	-2.3	-1.6	
50	9.150	8.905	8.460	8.315	8.165	1.2	-1.2	-4.5	-1.5	-.8	-1.6	
75	8.420	8.785	8.815	8.900	8.660	1.4	1.8	.3	.9	-1.2	.4	
100	8.265	8.810	9.115	9.050	8.820	1.2	2.7	3.1	-.7	-1.2	.9	
125			8.875			-1.0						
150	8.640	9.085	9.125	8.945	8.565	1.0	2.2	.4	-1.8	-1.9	-.1	
175			9.515			1.6						
200	9.335	9.745	9.735	9.785	9.465	.9	2.1	-.1	.5	-1.6	.2	
225			10.250			2.1						
250	10.450	10.975	11.010	11.115	10.865	3.0	2.6	.4	1.1	-1.3	.7	
275			11.250			1.0						
300	10.560	11.030	11.085	11.395	11.535	-.7	2.4	.6	3.1	.7	1.6	
325			11.115			.1						
350	10.725	11.380	11.715	11.980	11.875	2.4	3.3	3.4	2.7	-.5	1.9	
375			12.120			1.6						
400	11.565	12.200	12.355	12.605	12.525	.9	3.2	1.6	2.5	-.4	1.6	
425			12.610			1.0						
450	10.935	11.765	12.225	12.455	11.920	-1.5	4.2	4.6	2.3	-2.7	1.6	
475			11.300			-3.7						
500	9.935	10.775	11.295	11.645	11.410		4.2	5.2	3.5	-1.2	2.5	

O/A C/L GRADIENT : .8

MAX + (%)	5.1	4.2	5.2	3.5	.7	2.5
MAX - (%)	-3.7	-1.2	-4.5	-1.8	-4.2	-1.6

McADAM DESIGN : FIGAS AERODROME SURVEY : SAUNDERS ISLAND : MAIN STRIP : RUNWAY HEADING : 28/10

SURVEY DATE : 24/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(%) GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
-100 *			9.100								
-75 *			9.385			1.1					
-50 *			9.618			.9					
-25 *			9.813			.8					
0	8.850	9.650	10.028	9.845	9.805	.9	5.3	2.5	-1.2	-.3	1.6
25			10.188			.6					
50	9.145	9.725	10.238	10.450	10.325	.2	3.9	3.4	1.4	-.8	2.0
75			10.300			.2					
100	9.585	9.855	10.760	10.820	10.865	1.8	1.8	6.0	.4	.3	2.1
125			10.645			-.5					
150	10.678	10.195	10.525	10.955	11.460	-.5	-3.2	2.2	2.9	3.4	1.3
175			10.555			.1					
200	11.363	10.715	10.765	11.530	12.000	.8	-4.3	.3	5.1	3.1	1.1
225			10.925			.6					
250	12.215	11.615	11.135	11.335	11.775	.8	-4.0	-3.2	1.3	2.9	-.7
275			11.610			1.9					
300	12.975	12.282	11.695	11.705	12.115	.3	-4.6	-3.9	.1	2.7	-1.4
325			12.150			1.8					
350	13.375	12.689	12.810	13.340	13.680	2.6	-4.6	.8	3.5	2.3	.5
375			13.240			1.7					
400	14.462	13.772	13.820	14.300	14.980	2.3	-4.6	.3	3.2	4.5	.9
425			14.280			1.8					
450	15.967	14.835	14.730	15.080	15.480	1.8	-7.5	-.7	2.3	2.7	-.8
475			15.420			2.8					
500	17.713	17.025	16.430	16.212	16.475	4.0	-4.6	-4.0	-1.5	1.8	-2.1

O/A C/L GRADIENT : 1.3

MAX + (%)	4.0	5.3	6.0	5.1	4.5	2.1
MAX - (%)	-.5	-7.5	-4.0	-1.5	-.8	-2.1

McADAM DESIGN : FIGAS AERODROME SURVEY : SAUNDERS : CROSS STRIP : RUNWAY HEADING : 29/11

SURVEY DATE : 24/03/88 NOTE : Chainages marked thus (#) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	15.0 SOUTH	C/L	15.0 NORTH	30.0 NORTH	C/L (%)	30.0 S 15.0 S	15.0 S C/L	C/L 15.0 N	15.0 N 30.0 N	30.0 S 30.0 N
0	5.880	5.415	5.345	5.460	6.080		-3.1	-.5	.8	4.1	.3
25			5.620			1.1					
50	6.530	6.135	6.050	6.245	6.735	1.7	-2.6	-.6	1.3	3.3	.3
75			6.345			1.2					
100	7.505	6.905	6.675	7.210	7.775	1.3	-4.0	-1.5	3.6	3.8	.5
125			7.080			1.6					
150	8.155	7.770	7.480	7.980	8.560	1.6	-2.6	-1.9	3.3	3.9	.7
175			7.845			1.5					
200	9.215	8.375	8.105	8.705	9.390	1.0	-5.6	-1.8	4.0	4.6	.3
225			8.240			.5					
250	9.775	8.875	8.470	8.890	9.760	.9	-6.0	-2.7	2.8	5.8	
275			8.800			1.3					
300	10.190	9.290	9.110	9.570	10.225	1.2	-6.0	-1.2	3.1	4.4	.1
325			9.303			.8					
350	10.415	9.785	9.580	10.175	10.795	1.1	-4.2	-1.4	4.0	4.1	.6
375			9.935			1.4					
400	11.200	10.470	10.215	10.595	11.075	1.1	-4.9	-1.7	2.5	3.2	-.2
425			10.385			.7					
450	11.485	10.730	10.715	11.365	11.875	1.3	-5.0	-.1	4.3	3.4	.7
475			10.985			1.1					
500	12.105	11.420	11.125	11.485	11.790	.6	-4.6	-2.0	2.4	2.0	-.5
525			11.395			1.1					
550	12.200	11.670	11.685	12.045	12.095	1.2	-3.5	.1	2.4	.3	-.2
575			12.905			4.9					
600	12.815	13.240	13.650	13.750	13.780	3.0	2.8	2.7	.7	.2	1.6

O/A C/L GRADIENT : 1.4

MAX + (%)	4.9	2.8	2.7	4.3	5.8	1.6
MAX - (%)	.0	-6.0	-2.7	.0	.0	-.5

McADAM DESIGN : FIGAS AERODROME SURVEY : SEA LION ISLAND : MAIN STRIP : RUNWAY HEADING : 12/30

SURVEY DATE : 09/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS						
CH.	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S	
0	1.445	1.165	.780	.580	.160		-1.4	-3.9	-2.0	-2.1	-2.1	
25			1.110			1.3						
50	1.980	1.700	1.690	1.620	1.410	2.3	-1.4	-.1	-.7	-1.1	-1.0	
75			2.195			2.0						
100	2.955	2.855	2.810	2.760	2.690	2.5	-.5	-.5	-.5	-.4	-.4	
125			3.365			2.2						
150	4.470	4.175	3.995	3.805	3.810	2.5	-1.5	-1.8	-1.9		-1.1	
175			4.730			2.9						
200	5.975	5.875	5.785	5.635	5.265	4.2	-.5	-.9	-1.5	-1.9	-1.2	
225			6.655			3.5						
250	7.620	7.640	7.570	7.505	7.435	3.7	.1	-.7	-.7	-.4	-.3	
275			8.400			3.3						
300	9.000	9.150	9.140	9.215	9.185	3.0	.8	-.1	.8	-.2	.3	
325			9.930			3.2						
350	10.285	10.510	10.715	10.875	10.820	3.1	1.1	2.1	1.6	-.3	.9	
375			11.285			2.3						
400	11.505	11.690	11.745	11.810	11.990	1.8	.9	.6	.7	.9	.8	
425			12.255			2.0						
450	12.560	12.830	12.855	12.905	13.025	2.4	1.4	.3	.5	.6	.8	
475			13.300			1.8						
500	13.675	13.825	13.925	13.935	14.180	2.5	.8	1.0	.1	1.2	.8	
525			14.525			2.4						
550	14.835	15.000	15.180	15.230	15.270	2.6	.8	1.8	.5	.2	.7	
575			15.860			2.7						
600	16.500	16.720	16.780	16.810	16.690	3.7	1.1	.6	.3	-.6	.3	
O/A C/L GRADIENT :			2.7	MAX + (%)			4.2	1.4	2.1	1.6	1.2	.9
				MAX - (%)			.0	-1.5	-3.9	-2.0	-2.1	-2.1

McADAM DESIGN : FIGAS AERODROME SURVEY : SEA LION ISLAND : CROSS STRIP : RUNWAY HEADING : 03/21

SURVEY DATE : 09/03/88

NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.				(% GRADIENTS AND CROSSFALLS		
CH.	30.0 WEST	C/L	30.0 EAST	C/L (%)	30.0 W C/L	C/L 30.0 E
0	4.610	5.400	6.240		2.6	2.8
50	4.690	5.460	6.290	.1	2.6	2.8
100	4.950	5.630	6.570	.3	2.3	3.1
150	6.735	5.915	4.950	.6	-2.7	-3.2
200		5.410		-1.0		
250	5.800	4.865	4.175	-1.1	-3.1	-2.3
300	5.585	4.825	3.985	-.1	-2.5	-2.8
350	5.975	5.210	3.715	.8	-2.6	-5.0

C/L (%)	-.1
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MAX + (%)	.8	2.6	3.1
MAX - (%)	-1.1	-3.1	-5.0

McADAM DESIGN : FIGAS AERODROME SURVEY : SPEEDWELL ISLAND : MAIN STRIP : RUNWAY HEADING : 21/30

SURVEY DATE : 28/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(% GRADIENTS AND CROSSFALLS					
	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W
-100 *	1.610	1.555	1.635	1.760	1.660		-.3	.8	1.3	-.5	.1
-75 *			1.805			.7					
-50 *	2.780	2.535	2.435	2.350	2.350	2.5	-1.2	-1.0	-.9		-.7
-25 *			3.460			4.1					
0	4.615	4.565	4.435	4.350	4.040	3.9	-.3	-1.3	-.9	-1.6	-1.0
25			5.070			2.5					
50	5.492	5.505	5.545	5.660	5.950	1.9	.1	.4	1.2	1.5	.8
75			6.230			2.7					
100	6.505	6.705	6.840	7.015	7.570	2.4	1.0	1.4	1.8	2.8	1.8
125			7.385			2.2					
150	7.725	7.995	7.810	7.845	7.870	1.7	1.4	-1.9	.4	.1	.2
175			7.945			.5					
200	8.985	8.715	8.420	8.050	7.875	1.9	-1.4	-3.0	-3.7	-.9	-1.9
225			8.485			.3					
250	9.390	9.185	9.145	9.085	8.760	2.6	-1.0	-.4	-.6	-1.6	-1.1
275			9.775			2.5					
300	10.355	10.255	10.125	10.040	9.905	1.4	-.5	-1.3	-.9	-.7	-.8
325			10.585			1.8					
350	11.160	10.945	10.820	10.640	10.340	.9	-1.1	-1.3	-1.8	-1.5	-1.4
375			10.640			-.7					
400	11.055	10.860	10.750	10.615	10.415	.4	-1.0	-1.1	-1.4	-1.0	-1.1
425			10.860			.4					
450	11.365	11.175	11.100	11.015	10.925	1.0	-1.0	-.8	-.9	-.5	-.7
475			11.335			.9					
500	11.865	11.815	11.830	11.755	11.595	2.0	-.3	.2	-.8	-.8	-.5

O/A C/L GRADIENT :	1.5	MAX +(%)	3.9	1.4	1.4	1.8	2.8	1.8
		MAX -(%)	-.7	-1.4	-3.0	-3.7	-1.6	-1.9

McADAM DESIGN : FIGAS AERODROME SURVEY : TEAL INLET : MAIN STRIP : RUNWAY HEADING : 06/24

SURVEY DATE : 02/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(% GRADIENTS AND CROSSFALLS					
	30.0 SOUTH	17.5 SOUTH	C/L	17.5 NORTH	30.0 NORTH	C/L (%)	30.0 S 17.5 S	17.5 S C/L	C/L 17.5 N	17.5 N 30.0 N	30.0 S 30.0 N
0		20.490	21.260	22.307				4.4	6.0		
25	20.115	20.970	21.780	22.407	22.790	2.1	6.8	4.6	3.6	3.1	4.5
50	20.500	21.150	21.190	22.335	22.500	-2.4	5.2	.2	6.5	1.3	3.3
75			21.415			.9					
100	19.960	20.420	20.585	20.824	20.745	-3.3	3.7	.9	1.4	-.6	1.3
125			19.850			-2.9					
150	18.745	19.130	19.210	19.060	19.100	-2.6	3.1	.5	-.9	.3	.6
175			18.700			-2.0					
200	18.235	18.205	18.260	18.310	18.145	-1.8	-.2	.3	.3	-1.3	-.2
225			18.030			-.9					
250	17.360	17.330	17.530	17.520	17.340	-2.0	-.2	1.1	-.1	-1.4	
275			17.070			-1.8					
300	16.700	16.795	16.655	16.440	16.220	-1.7	.8	-.8	-1.2	-1.8	-.8
325			16.150			-2.0					
350	15.525	15.530	15.240	14.924	14.715	-3.6		-1.7	-1.8	-1.7	-1.4
375			14.445			-3.2					
400	13.725	13.730	13.660	13.560	13.070	-3.1		-.4	-.6	-3.9	-1.1
425			13.030			-2.5					
450	12.460	12.400	12.005	11.600	11.345	-4.1	-.5	-2.3	-2.3	-2.0	-1.9
475			11.235			-3.1					
500	10.580	10.675	10.585	10.330	10.023	-2.6	.8	-.5	-1.5	-2.5	-.9
525			9.600			-3.9					
550	8.440	8.460	8.575	8.530	8.335	-4.1	.2	.7	-.3	-1.6	-.2
575	6.750	7.135	7.275	7.475	7.430	-5.2	3.1	.8	1.1	-.4	1.1
600	5.350	5.605	5.965	6.160	6.140	-5.2	2.0	2.1	1.1	-.2	1.3

O/A C/L GRADIENT : -2.5

MAX +(%)	2.1	6.8	4.6	6.5	3.1	4.5
MAX -(%)	-5.2	-.5	-2.3	-2.3	-3.9	-1.9

McADAM DESIGN : FIGAS AERODROME SURVEY : TEAL INLET : CROSS STRIP : RUNWAY HEADING : 16/34

SURVEY DATE : 02/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

GROUND LEVELS TO SITE T.B.M.						(% GRADIENTS AND CROSSFALLS					
CH.	30.0 SOUTH	14.3 SOUTH	C/L	14.3 NORTH	30.0 NORTH	C/L (%)	30.0 S 14.3 S	14.3 S C/L	C/L 14.3 N	14.3 N 30.0 N	30.0 S 30.0 N
-100 *	7.535	7.090	6.835	6.245	5.855		-2.8	-1.8	-4.1	-2.5	-2.8
-75 *			7.013			.7					
-50 *	7.805	7.645	7.228	6.675	6.195	.9	-1.0	-2.9	-3.9	-3.1	-2.7
-25 *			7.555			1.3					
0	8.700	8.475	8.280	7.510	6.760	2.9	-1.4	-1.4	-5.4	-4.8	-3.2
25			8.470			.8					
50	9.185	8.995	8.740	8.285	7.745	1.1	-1.2	-1.8	-3.2	-3.4	-2.4
75			8.680			-.2					
100	9.480	9.440	8.750	8.360	7.705	.3	-.3	-4.8	-2.7	-4.2	-3.0
125	10.060	9.325	8.805	8.215	7.650	.2	-4.7	-3.6	-4.1	-3.6	-4.0
150	9.915	9.665	9.580	9.155	8.755	3.1	-1.6	-.6	-3.0	-2.5	-1.9
175			10.505			3.7					
200	11.945	11.485	11.190	10.760	10.405	2.7	-2.9	-2.1	-3.0	-2.3	-2.6
225			11.845			2.6					
250	13.390	13.130	12.615	12.170	11.564	3.1	-1.7	-3.6	-3.1	-3.9	-3.0
275			13.345			2.9					
300	14.910	14.260	13.785	13.450	13.000	1.8	-4.1	-3.3	-2.3	-2.9	-3.2
325			14.285			2.0					
350	15.050	14.580	14.121	13.800	13.800	-.7	-3.0	-3.2	-2.2		-2.1
375	14.555	13.930	13.600	13.225	12.845	-2.1	-4.0	-2.3	-2.6	-2.4	-2.9
400	14.160	13.485	12.660	12.540	12.165	-3.8	-4.3	-5.8	-.8	-2.4	-3.3
O/A C/L GRADIENT :			1.1	MAX +(%)			3.7	.0	.0	.0	.0
				MAX -(%)			-3.8	-4.7	-5.8	-5.4	-4.8

McADAM DESIGN : FIGAS AERODROME SURVEY : WEDDELL ISLAND : MAIN STRIP : RUNWAY HEADING : 33/15

SURVEY DATE : 15/03/88 NOTE : Chainages marked thus (*) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(%) GRADIENTS AND CROSSFALLS					
	30.0 EAST	10.0 EAST	C/L	10.0 WEST	30.0 WEST	C/L (%)	30.0 E 10.0 E	10.0 E C/L	C/L 10.0 W	10.0 W 30.0 W	30.0 E 30.0 W
-100 *	.175	.655	.965	.940	1.360		2.4	3.1	-.3	2.1	2.0
-75 *			1.380			1.7					
-50 *	1.590	1.805	2.050	1.825	2.115	2.7	1.1	2.5	-2.3	1.5	.9
-25 *			2.610			2.2					
0	3.380	3.485	3.250	3.300	3.240	2.6	.5	-2.4	.5	-.3	-.2
25	4.830	4.660	4.485	4.385	4.695	4.9	-.9	-1.8	-1.0	1.6	-.2
50	5.720	6.175	5.820	5.835	4.970	5.3	2.3	-3.6	.2	-4.3	-1.3
75			6.900			4.3					
100	6.895	7.260	7.420	7.365	6.355	2.1	1.8	1.6	-.6	-5.1	-.9
125			7.685			1.1					
150	7.100	7.590	7.915	8.120	7.245	.9	2.5	3.3	2.1	-4.4	.2
175			8.140			.9					
200	7.985	8.335	8.555	8.675	7.715	1.7	1.8	2.2	1.2	-4.8	-.5
225			9.055			2.0					
250	9.275	9.675	9.725	9.680	8.360	2.7	2.0	.5	-.5	-6.6	-1.5
275			10.365			2.6					
300	9.850	10.520	10.805	11.020	10.260	1.8	3.4	2.9	2.2	-3.8	.7
325			11.020			.9					
350	10.830	11.400	11.630	11.915	11.700	2.4	2.9	2.3	2.9	-1.1	1.5
375			11.845			.9					
400	11.435	12.065	12.265	12.480	12.070	1.7	3.2	2.0	2.2	-2.1	1.1
425			12.480			.9					
450 *	11.635	12.090	11.920	11.835	12.485	-2.2	2.3	-1.7	-.9	3.3	1.4
475 *			11.465			-1.8					
500 *	9.850	11.380	11.180	10.725	11.385	-1.1	7.7	-2.0	-4.6	3.3	2.6

O/A C/L GRADIENT :	2.2					
MAX +(%)	5.3	3.4	3.3	2.9	1.6	1.5
MAX -(%)	.9	-.9	-3.6	-1.0	-6.6	-1.5

McADAM DESIGN : FIGAS AERODROME SURVEY : WEDDELL ISLAND : CROSS STRIP : RUNWAY HEADING : 08/26

SURVEY DATE : 15/03/88 NOTE : Chainages marked thus (#) are outside the boundaries of existing runway

CH.	GROUND LEVELS TO SITE T.B.M.					(% GRADIENTS AND CROSSFALLS						
	30.0 NORTH	10.0 NORTH	C/L	10.0 SOUTH	30.0 SOUTH	C/L (%)	30.0 N 10.0 N	10.0 N C/L	C/L 10.0 S	10.0 S 30.0 S	30.0 N 30.0 S	
0	7.775	8.390	8.565	8.655	7.720		3.1	1.8	.9	-4.7	-.1	
25	6.720	7.675	8.130	8.600	8.735	-1.7	4.8	4.6	4.7	.7	3.4	
50	8.380	9.155	9.445	9.435	9.125	5.3	3.9	2.9	-.1	-1.6	1.2	
75			10.150			2.8						
100	10.670	11.080	11.070	11.040	11.285	3.7	2.1	-.1	-.3	1.2	1.0	
125												
150	9.850	10.405	10.565	10.800	11.155		2.8	1.6	2.4	1.8	2.2	
175			10.135			-1.7						
200	9.805	9.825	9.885	10.060	10.410	-1.0	.1	.6	1.8	1.8	1.0	
225	9.775	9.750	10.065	10.210	10.375	.7	-.1	3.2	1.5	.8	1.0	
250	9.275	9.875	10.000	10.165	10.410	-.3	3.0	1.3	1.7	1.2	1.9	
275			10.020			.1						
300	9.000	9.720	9.885	10.440	10.505	-.5	3.6	1.7	5.6	.3	2.5	
325			9.720			-.7						
O/A C/L GRADIENT :			.4	MAX + (%)			5.3	4.8	4.6	5.6	1.8	3.4
				MAX - (%)			-1.7	-.1	-.1	-.3	-4.7	-.1