Survey of a Possible Long Barrow at The Bostle, Woodingdean, Brighton, Sussex. (Accession Number)

During August 1996 the Brighton and Hove Archaeological Society conducted a survey at The Bostle, Woodingdean, Brighton. (Ref TQ37 350530) . The project was initiated by Ros Parker of English Heritage and Martin Brown Assistant County Archaeologist for East Sussex County Council. English Heritage had been in the process of scheduling several barrow groups around the Sussex area including the Bostle. Examination of aerial photographs at the Bostle had shown the features orientated north/south, the configuration suggested a possible “robbed” long barrow rather than a series of round barrows.

The Brighton and Hove Archaeological Society Field Unit used the project as a means of training personnel in surveying techniques. Geophysics was our priority and we tried to determine the nature of the ditches using a resistivity meter. We also conducted a contour survey using a dumpy level (Fig 2.) and surveyed the site with the use of a plane table (Fig 1). The use of a prismatic compass was also demonstrated. Fourteen members of the Society Field Unit participated and Mr Jason Brooker of the Downland Ranger Service, who also transported all of the equipment. The weather during the preceding four weeks had been predominantly dry.

The Resisitivity Survey

The farmer has been lifting his plough blades as he approaches the barrows and dropping them again on the opposite side, this has the effect of leaving a grass island in the corn crop. The site was set out in 20 metre squares running north to south along the length of the unploughed section. The approximate shape of the island is indicated in Fig 1.

The resistivity survey was conducted using an RM4 resistivity meter, the reading intervals were 1 metre and the readings were in ohms. The resistivity survey was conducted in four complete squares and one, number 5, was only 80% completed.

The contour survey was conducted in squares 2,3 and 4. The readings were taken in lines 2 metres apart and the readings along each line spaced 2 metres apart.

Conclusions

Colour coding of the data sheets suggests circular rather than longitudinal features or ditches. The central area in squares 2 and 3 has very positive low readings in a curved direction. The features to the south in square 1 are more ephemeral. Square 5 has several focal points of low readings, but these are with a central low area perhaps indicating pits. The data sheets have now been passed to Mr David Coombes of the Wealden Iron Research Group for processing on his geophysical

database. This will allow enhancement of the geophysical data.

It was unfortunate that the survey of 8 squares could not be completed as it would have produced a more detailed picture. Apparently only one day had been negotiated with the farmer.

From the evidence of the resistivity survey it appears that although the farmer has been trying to protect the monument, there is some erosion by ploughing on the eastern side of the barrows. A larger area needs to be removed from cultivation.
Fieldwalking

Several members of the BHAS Field Unit were introduced to field walking techniques around the area being surveyed. Finds of Neolithic flint flakes with a white patination were found, some fire fractured flint and a solitary piece of oyster shell. The finds tended to be concentrated in an area to the south east of the barrow features.

Fieldwalking Material Details

Flint flakes- 14 in total (8 with cortex attached 57%) No tools

Fire-fractured flint 8 pieces (Weight total 494 grammes)

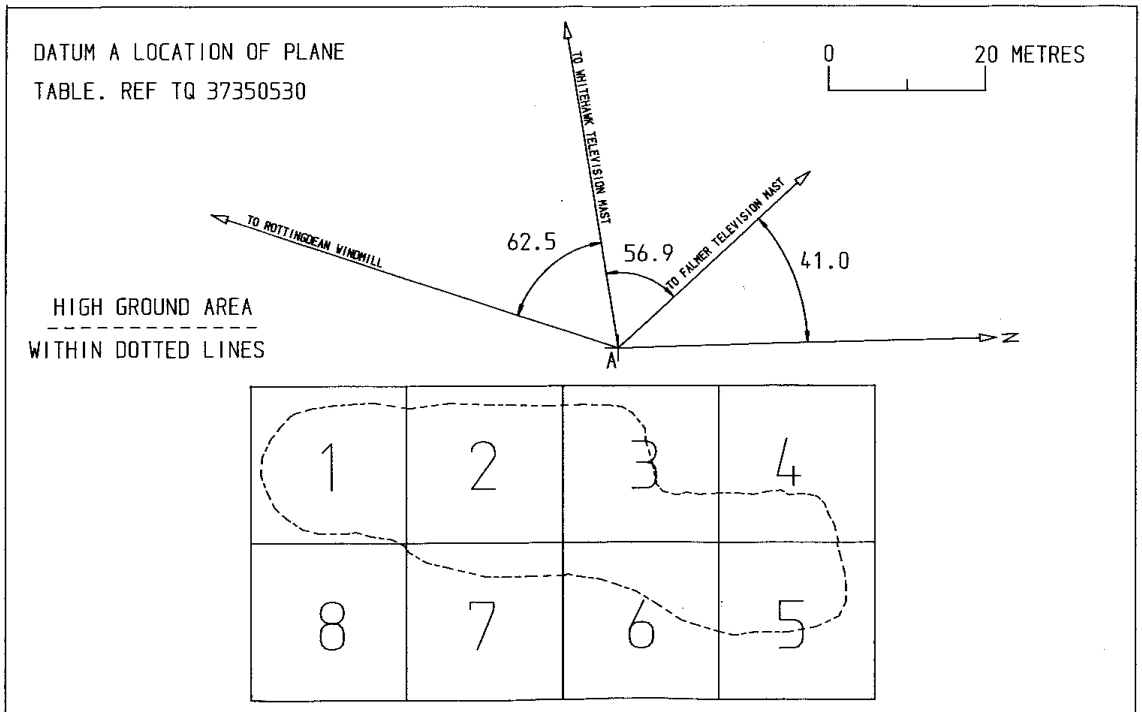
Oyster- 1 Fragment

Reference -

A reference to excavations at the Bostle can be found in a Sussex Notes And Queries (Volume unknown) . The article is included in the Curwen/Burstow Correspondance 1932/1966 Pages 11-14. (pers Comm. Mrs S.Nills Secretary Brightion and Hove Archaeological Society.)

The Brighton and Hove Archaeological Society Field Unit would like to take the opportunity to complete, and where possible, extend the survey after the next crop removal.

John Funnell 13/1/1997



GRID LOCATION FOR GEOPHYSICS AT THE BOSTLE
WOODINGDEAN, BRIGHTON. JULY 1996

FIG 1.

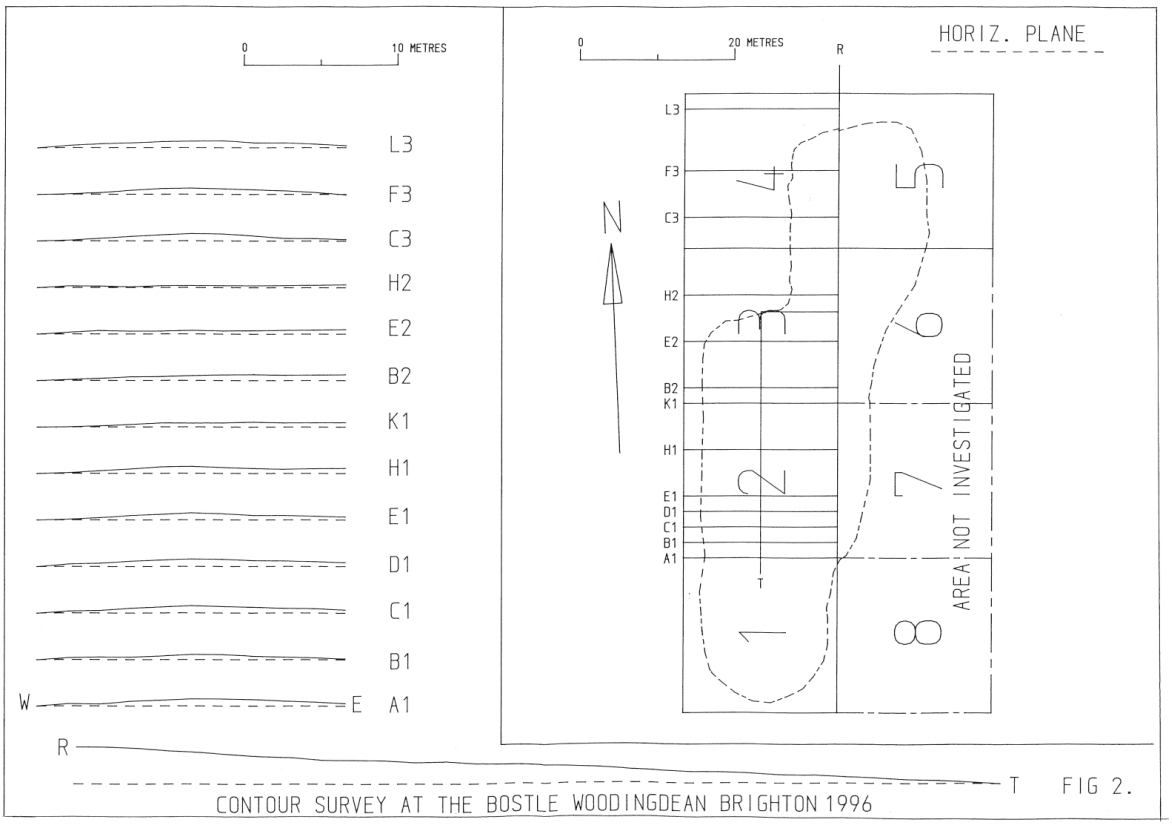
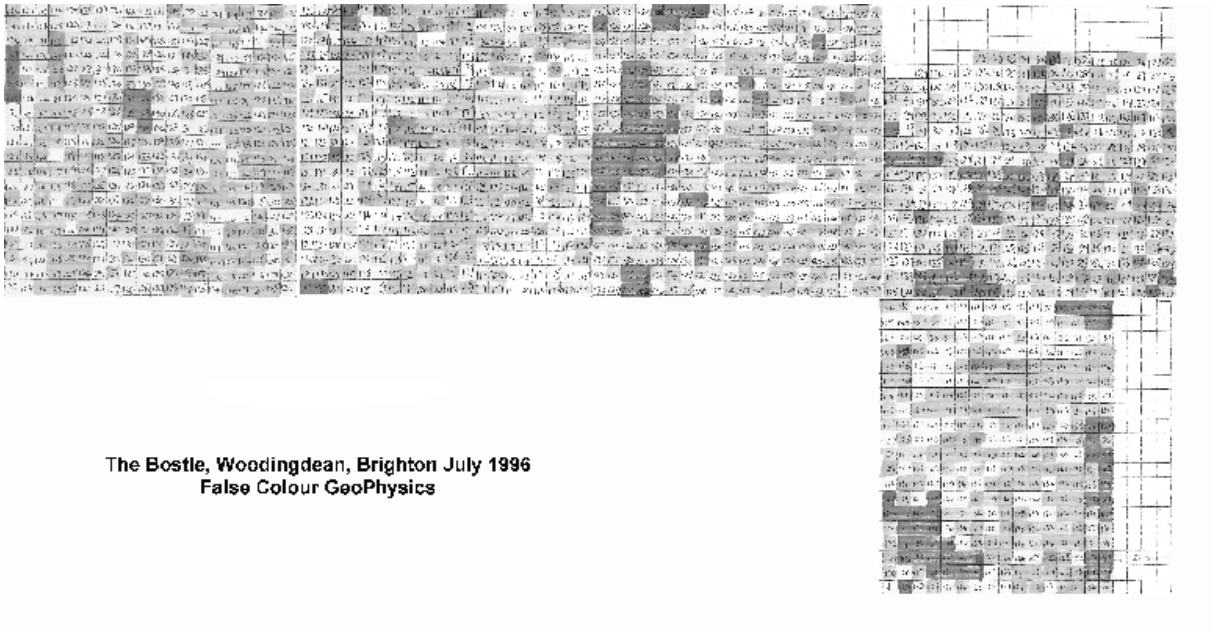


FIG 2.

CONTOUR SURVEY AT THE BOSTLE WOODINGDEAN BRIGHTON 1996

Aerial Photograph



Composite Geophysical Survey from Original Sheets

Attached:

Levels Sheets	sheet 2-4
Geophysical Sheets	1-5
Geophysical Sheets 1	-5 in colour

GR Geoscan Research GEOPHYSICAL SURVEY

SITE: THE BOSTLE	SHEET NUMBER: 2
	DATE: 31/8/96
	MAP REF.
SOIL	SURVEY TYPE
SUBSOIL	
GROUND COVER	
WEATHER	INSTRUMENT
SHEET ORIENTATION: N	STATION INTERVAL
ADJACENT SHEETS: 1 / X / 3	UNITS
	SURVEYORS

N

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1A	2.84	2.69	2.72	2.53	2.47	2.39	2.38	2.42	2.52	2.58	2.67										A
1B	2.62	2.50	2.46	2.46	2.39	2.29	2.29	2.40	2.46	2.50	2.56										B / C
1C	2.66	2.54	2.49	2.36	2.27	2.19	2.24	2.28	2.36	2.38	2.46										D / E
1D	2.61	2.45	2.39	2.26	2.19	2.13	2.14	2.23	2.25	2.29	2.35										F / G
1E	2.48	2.43	2.33	2.19	2.12	2.03	2.08	2.19	2.19	2.24	2.28										H / I
1F	2.45	2.38	2.25	2.20	2.06	1.98	2.03	2.10	2.21	2.23	2.22										J / K
1G	2.37	2.30	2.20	2.11	1.97	1.86	2.01	2.04	2.05	2.12	2.13										L / M
1H	2.80	2.25	2.13	2.01	1.88	1.85	1.92	1.98	2.03	1.99	1.97										N / O
1I	2.14	2.11	2.03	1.92	1.89	1.77	1.78	1.82	1.86	1.86	1.82										P / Q
1J	2.02	1.99	1.88	1.83	1.67	1.68	1.68	1.78	1.72	1.72	1.71										R / S
1K	1.90	1.89	1.83	1.73	1.64	1.65	1.63	1.58	1.63	1.62	1.61										T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

N

SITE	THE BOSTLE WOODINGDEAN BRIGHTON
SHEET NUMBER	3
DATE	31/8/96
MAP REF.	TQ 373053
SOIL	CHALKY LOAM
SUBSOIL	CHALK
GROUND COVER	AFTER CROP REMOVAL
WEATHER	SUNNY
SURVEY TYPE	CONTOUR
INSTRUMENT	DUMPY LEVEL
SHEET ORIENTATION	N
ADJACENT SHEETS	2
STATION INTERVAL	2 METRES
UNITS	METRES
SURVEYORS	E. BISHOP / TRISH.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	1·85		1·78		1·74		1·63		1·58		1·59		1·57		1·50		1·54		1·56	1·53	A
B																					B
A2 C	1·77		1·77		1·72		1·63		1·53		1·52		1·41		1·45		1·40		1·44	1·46	C
* B2 D	1·69		1·63		1·55		1·45		1·44		1·38		1·32		1·30		1·34		1·33	1·31	D
E																					E
C2 F	1·63		1·51		1·43		1·35		1·34		1·33		1·28		1·29		1·31		1·29	1·25	F
G																					G
D2 H	1·52		1·42		1·35		1·27		1·23		1·18		1·20		1·22		1·21		1·19	1·18	H
I																					I
* E2 J	1·39		1·27		1·16		1·20		1·20		1·15		1·18		1·16		1·14		1·12	1·09	J
K																					K
F2 L	1·21		1·09		1·02		1·11		1·11		1·08		1·09		1·07		1·03		1·00	0·93	L
M																					M
G2 N	1·05		0·97		0·98		0·98		0·96		0·95		0·97		0·96		0·95		0·90	0·89	N
O																					O
* H2 P	1·01		0·90		0·91		0·96		0·89		0·88		0·88		0·87		0·85		0·82	0·80	P
Q																					Q
J2 R	0·88		0·81		0·87		0·85		0·88		0·85		0·81		0·81		0·77		0·75	0·73	R
S																					S
K2 T																					T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

SITE THE BOSTLE	SHEET NUMBER 4
	DATE
	MAP REF.
SOIL	SURVEY TYPE
SUBSOIL	
GROUND COVER	
WEATHER	INSTRUMENT
SHEET ORIENTATION N	STATION INTERVAL
ADJACENT SHEETS	UNITS
	SURVEYORS

N

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A3	A	3·85	3·80	3·74	3·68	3·66	3·62	3·62	3·65	3·68	3·71	3·74										A
B3	B	3·70	3·63	3·55	3·51	3·49	3·45	3·45	3·48	3·54	3·59	3·64										B
	C																					C
* C3	D	3·62	3·57	3·45	3·33	3·23	3·15	3·17	3·30	3·45	3·46	3·52										D
	E																					E
D3	F	3·49	3·44	3·31	3·12	2·99	2·95	2·99	3·14	3·33	3·43	3·47										F
	G																					G
E3	H	3·36	3·32	3·16	3·04	2·93	2·93	2·97	3·04	3·11	3·26	3·42										H
	I																					I
* F3	J	3·26	3·23	3·15	3·00	2·89	2·86	2·90	2·96	3·03	3·14	3·29										J
	K																					K
H3	L	3·10	3·06	2·95	2·85	2·78	2·75	2·77	2·88	2·98	3·07	3·13										L
	M																					M
J3	N	3·02	2·93	2·77	2·66	2·61	2·60	2·63	2·73	2·82	2·89	2·95										N
	O																					O
K3	P	2·98	2·84	2·69	2·59	2·51	2·48	2·48	2·64	2·70	2·76	2·87										P
	Q																					Q
* L3	R	2·86	2·71	2·61	2·55	2·47	2·44	2·42	2·55	2·55	2·64	2·73										R
	S																					S
M3	T	2·81	2·68	2·59	2·52	2·43	2·37	2·34	2·40	2·54	2·57	2·64										T
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

N ↑

SITE: THE BOSTLE	SHEET NUMBER: 1
	DATE: 31/8/96
	MAP REF: TQ 373053.
SOIL	SURVEY TYPE
SUBSOIL	
GROUND COVER	
WEATHER	INSTRUMENT
SHEET ORIENTATION: N	STATION INTERVAL
ADJACENT SHEETS: 2	UNITS
	SURVEYORS: GB / CLOUDON

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	134	127	127	124	128	131	129	127	126	122	121	119	122	122	121	119	117	122	118	121	A
B	135	130	126	125	128	128	121	126	130	123	127	123	117	117	117	118	118	114	124	125	B
C	134	123	122	119	122	122	124	129	132	129	125	129	126	127	119	117	111	112	117	114	C
D	137	131	124	120	126	124	124	128	134	129	126	127	138	134	129	127	129	116	116	115	D
E	144	129	125	120	123	123	130	130	133	133	128	126	131	135	129	128	120	118	124	121	E
F	138	135	127	119	123	119	125	128	133	130	132	130	129	128	131	125	117	128	122	116	F
G	136	126	122	121	125	124	127	135	140	140	135	127	130	128	122	124	124	123	123	116	G
H	130	129	121	122	125	125	128	133	138	143	130	129	125	128	124	123	122	129	121	123	H
I	130	130	123	119	116	120	125	129	129	140	130	129	130	126	121	122	120	121	122	121	I
J	127	127	120	119	115	114	124	124	125	131	133	125	127	126	128	125	123	121	121	125	J
K	121	123	119	114	119	120	118	122	129	133	132	130	134	134	122	126	118	116	121	121	K
L	123	120	116	117	119	120	127	124	128	129	135	128	123	130	123	115	124	119	122	119	L
M	126	127	118	119	118	124	133	126	126	126	123	127	127	120	121	115	116	117	120	122	M
N	124	129	116	114	117	122	128	129	124	122	130	130	127	118	116	116	120	115	130	125	N
O	128	126	116	117	118	118	123	124	125	124	122	125	115	119	112	114	114	124	127	129	O
P	128	120	118	119	114	121	121	120	120	124	124	122	119	114	115	118	122	116	130	133	P
Q	131	126	122	123	122	125	127	127	129	122	124	129	121	120	119	122	121	123	129	132	Q
R	131	127	126	125	124	123	129	130	132	130	131	129	120	118	117	120	122	125	130	132	R
S	130	126	124	123	125	124	129	131	127	130	128	125	118	117	116	116	120	126	128	130	S
T	127	126	124	123	125	127	127	127	126	126	127	123	117	115	114	116	121	124	125	128	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

SITE: THE BOSTLE, WOODINGDEAN, BRIGHTON	SHEET NUMBER: 2
	DATE: 31/8/96
	MAP REF: TQ 373053
SOIL: CHALKY LOAM	SURVEY TYPE: RESISTIVITY
SUBSOIL: CHALK	
GROUND COVER: PLOUGHED (AFTER CROP REMOVAL)	
WEATHER: SUNNY WARM	INSTRUMENT: RM 4
SHEET ORIENTATION: ↑ N	STATION INTERVAL: 1 METRE
ADJACENT SHEETS: 3 6 / 7 / 1 8	UNITS: OHMS
	SURVEYORS: FRASER/PLEXIS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	126	130	133	140	131	136	124	121	121	122	122	123	119	119	126	129	122	120	125	125	A
B	130	129	133	137	130	126	132	125	119	121	120	124	129	127	129	128	125	122	128	130	B
C	128	134	127	124	122	117	118	124	113	114	121	124	124	124	130	121	132	123	119	118	C
D	133	129	122	120	119	117	119	122	116	121	123	129	121	118	125	127	120	129	115	115	D
E	131	128	126	121	121	117	117	124	124	123	122	129	113	122	116	118	114	120	112	112	E
F	126	135	125	122	122	114	120	120	127	130	130	128	117	114	114	117	113	113	116	116	F
G	124	127	133	132	121	115	116	116	118	120	125	124	118	116	115	112	127	117	116	112	G
H	123	124	132	129	126	117	117	115	119	120	122	123	120	115	118	116	120	121	121	113	H
I	126	130	128	131	130	127	117	118	123	122	120	119	124	115	120	120	121	122	119	115	I
J	127	126	133	127	123	121	117	115	120	118	121	118	122	120	120	122	120	117	120	117	J
K	131	135	137	135	123	115	115	116	118	120	115	123	116	116	116	120	119	118	118	117	K
L	131	135	138	132	128	125	115	112	119	121	122	130	117	116	122	120	115	114	125	120	L
M	134	135	129	129	121	126	119	117	114	120	123	126	124	123	124	124	114	116	122	111	M
N	132	134	128	126	120	125	122	122	115	118	115	123	121	121	120	122	120	120	119	114	N
O	126	128	130	127	114	114	114	120	123	126	125	121	118	119	119	122	112	120	113	120	O
P	128	130	131	132	119	117	116	116	120	122	123	125	123	120	120	120	120	119	114	114	P
Q	127	127	128	127	124	119	114	115	117	122	125	123	117	119	117	118	117	113	119	122	Q
R	130	134	132	126	120	120	118	114	122	118	125	121	114	113	113	114	114	114	117	121	R
S	131	133	124	125	128	128	120	122	117	124	121	127	117	120	112	112	112	115	112	115	S
T	141	137	131	128	129	129	122	125	120	121	118	125	117	119	111	109	113	117	118	119	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

SITE	THE BOSTLE WOODINGDEAN BRIGHTON
SHEET NUMBER	3
DATE	31/8/96
MAP REF	TQ 373053
SOIL	CHALKY LOAM
SUBSOIL	CHALK
GROUND COVER	PLOUGHED (AFTER CROP REMOVAL)
SURVEY TYPE	RESISTIVITY
WEATHER	SUNNY WARM
INSTRUMENT	RM 4
SHEET ORIENTATION	↑ N
ADJACENT SHEETS	4 5 X 6 2 7
STATION INTERVAL	1 METRE
UNITS	OHMS
SURVEYORS	FRASER / ALEXIS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	135	133	131	128	138	139	141	141	131	128	127	130	121	127	129	132	130	132	125	131	A
B	136	134	127	126	141	136	131	129	131	126	130	127	119	121	131	130	132	127	133	135	B
C	134	133	135	132	137	133	133	130	129	126	127	130	126	128	134	139	128	132	133	131	C
D	134	133	134	135	135	134	133	131	126	122	121	123	127	125	128	120	129	134	129	134	D
E	130	129	136	139	133	132	132	130	131	125	125	123	122	128	123	125	119	125	134	122	E
F	128	127	138	142	131	131	130	132	129	128	120	115	121	127	128	125	126	130	123	126	F
G	127	128	139	139	131	131	133	133	136	130	124	118	121	133	125	128	125	119	125	128	G
H	132	131	139	134	133	138	132	130	130	127	121	119	126	126	121	122	122	121	120	121	H
I	135	134	141	136	138	136	133	132	130	124	122	123	127	129	128	117	118	124	124	122	I
J	137	140	142	140	138	135	135	132	121	120	123	123	125	122	119	121	119	124	126	122	J
K	140	145	149	143	140	137	130	128	123	123	121	125	120	120	123	116	117	118	122	124	K
L	145	146	136	139	136	133	132	132	127	122	122	124	126	115	122	118	120	112	123	128	L
M	144	140	131	133	133	134	133	132	129	122	122	122	117	117	111	115	114	111	120	121	M
N	138	135	129	132	133	130	138	137	128	124	118	118	112	110	108	114	116	117	116	122	N
O	142	139	130	129	133	125	130	133	127	124	119	114	113	113	113	113	114	118	132	131	O
P	140	136	132	132	134	135	135	131	125	122	115	133	116	115	116	116	118	122	126	131	P
Q	132	131	132	133	131	138	141	136	134	125	119	123	124	121	120	133	127	120	121	125	Q
R	127	131	132	132	133	128	130	137	129	123	124	121	128	124	121	126	125	133	123	122	R
S	129	131	136	140	131	124	128	135	133	130	121	115	117	117	129	121	133	133	133	124	S
T	130	129	141	147	126	133	135	130	128	122	117	120	122	122	119	132	131	126	127	122	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

SITE: THE BOSTLE, NOODINGDEAN, BRIGHTON	SHEET NUMBER: 4
	DATE: 31-4-96
	MAP REF.: TQ 373053
SOIL: CHALKY LOAM	SURVEY TYPE: RESISTIVITY
SUBSOIL: CHALK	
GROUND COVER: PLOUGHED (AFTER CROP REMOVAL)	
WEATHER: SUNNY WARM	INSTRUMENT: RM4
SHEET ORIENTATION: ↑ N	STATION INTERVAL: 1 METRE
ADJACENT SHEETS: 5, 3, 6	UNITS: OHMS
	SURVEYORS: B. SANDER / D. LOBWIG

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A																					A
B																					B
C																					C
D							125	125	125	131	134	136	131	132	128	128	125	124	128	125	D
E			129	126	127	127	126	126	130	131	136	134	132	128	125	126	130	129	128	126	E
F	132	131	126	130	128	127	130	128	130	133	134	133	133	128	124	124	127	129	127	125	F
G	131	131	130	132	129	126	127	127	128	131	136	134	132	131	125	126	129	127	127	124	G
H	132	129	132	134	132	129	128	126	130	132	138	133	126	132	122	123	123	119	113	116	H
I	136	129	131	130	130	126	126	124	128	130	134	135	136	134	126	127	122	127	128	138	I
J	135	134	130	129	129	125	122	123	123	123	125	127	127	124	124	122	123	129	131	124	J
K	137	137	136	138	133	129	129	129	129	130	132	134	141	134	126	123	123	127	120	122	K
L	134	134	133	130	135	136	136	135	140	138	133	140	127	132	122	123	130	125	125	126	L
M	134	134	129	127	128	129	139	138	145	142	132	136	130	129	124	131	130	116	128	130	M
N	131	134	130	129	128	129	139	135	133	133	136	135	136	127	119	126	127	120	120	124	N
O	129	135	136	134	132	132	136	136	133	134	134	133	130	128	124	121	122	120	122	122	O
P	131	130	132	130	130	133	128	128	123	124	128	133	135	130	125	132	125	122	128	132	P
Q	128	129	133	135	139	135	134	131	128	125	127	123	132	129	135	130	131	130	124	132	Q
R	127	127	132	135	141	140	132	131	126	126	126	124	125	125	126	128	135	118	127	123	R
S	131	133	138	141	145	141	136	134	128	125	124	124	123	117	123	116	122	125	131	136	S
T	135	134	142	145	142	144	148	142	132	130	132	134	129	123	125	121	126	124	138	134	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

GR Geoscan Research GEOPHYSICAL SURVEY

SITE: THE BOSTLE, WOODINGDEAN, BRIGHTON	SHEET NUMBER: 5
	DATE: 31/8/96
	MAP REF: TQ 373053
SOIL: CHALKY LOAM	SURVEY TYPE: RESISTIVITY
SUBSOIL: CHALK	
GROUND COVER: PLOUGHED (AFTER CHIP REMOVAL)	
WEATHER: SUNNY WARM	INSTRUMENT: RM 4
SHEET ORIENTATION: ↑ N	STATION INTERVAL: 1 METRE
ADJACENT SHEETS: 4, 3, 6	UNITS: OHMS
	SURVEYORS: M/H/C GILLINGHAM

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	132	130	126	124	130	127	126	129	129	128	127	130	136	140	139	140					A
B	129	130	131	130	128	127	129	132	131	128	129	129	132	135	139	146					B
C	125	129	128	133	131	129	127	128	129	132	126	127	130	131	132	131					C
D	123	129	125	126	128	129	125	125	129	129	126	126	127	126	125	125					D
E	122	128	128	128	127	122	120	118	119	120	122	123	124	124	121	122					E
F	121	120	126	127	126	126	124	119	118	117	122	123	123	125	124	125					F
G	134	121	128	125	124	125	121	120	116	118	122	122	121	123	128	129					G
H	135	136	125	124	121	121	117	116	123	121	124	123	126	131	133	132					H
I	131	132	130	123	129	135	122	128	124	132	127	125	129	135	146	139					I
J	127	135	129	130	117	123	119	126	126	128	126	127	135	135	136	135					J
K	131	131	134	121	125	122	119	119	122	120	120	123	136	126	140	141					K
L	125	127	132	129	132	128	120	115	119	118	122	119	121	122	131	142					L
M	128	124	125	129	129	134	126	120	123	122	125	132	124	123	133	136					M
N	142	125	127	140	126	130	121	119	121	126	129	121	123	123	136	139					N
O	139	143	136	139	134	131	132	130	121	119	127	126	122	122	133	140					O
P	132	136	138	136	128	134	125	128	120	123	134	132	123	120	127	131					P
Q	132	141	139	137	141	129	132	125	125	134	132	124	121	125	131	134					Q
R	133	136	139	144	142	144	137	121	122	126	122	118	123	127	137	139					R
S	130	128	133	146	134	139	141	126	133	121	123	119	120	125	136	139					S
T	↓	137	129	135	128	134	128	128	127	124	119	113	116	121	134	131					T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Sheet 1 in Colour

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	134	127	127	124	128	131	129	127	126	122	121	119	122	122	121	119	117	122	118	121
B	135	130	126	125	128	128	121	126	130	123	127	123	117	117	117	118	118	114	124	125
C	134	123	122	119	122	122	124	129	132	129	125	129	126	127	119	117	111	112	117	114
D	137	131	124	120	126	124	124	128	134	129	126	127	138	134	129	127	129	116	116	115
E	144	129	125	120	123	123	130	130	133	133	128	126	131	135	129	128	120	118	124	121
F	138	135	127	119	123	119	125	128	133	130	132	130	129	128	131	125	117	128	122	116
G	136	126	122	121	125	124	127	135	140	140	135	127	130	128	122	124	124	123	123	116
H	130	129	121	122	125	125	128	133	138	143	130	129	125	128	124	123	122	129	121	123
I	130	130	123	119	116	120	125	129	129	140	130	129	130	126	121	122	120	121	122	121
J	127	127	120	119	115	114	124	124	125	131	133	125	127	126	128	125	123	121	121	125
K	121	123	119	114	119	120	118	122	129	133	132	130	134	134	122	126	118	116	121	121
L	123	120	116	117	119	120	127	124	128	129	135	128	123	130	123	115	124	119	122	119
M	126	127	118	119	118	124	133	126	126	126	123	127	127	120	121	115	116	117	120	122
N	124	129	116	114	117	122	128	129	124	122	130	130	127	118	116	116	120	115	130	125
O	128	126	116	117	118	118	123	124	125	124	122	125	115	119	112	114	114	124	127	129
P	128	120	118	119	114	121	121	120	120	124	124	122	119	114	115	118	122	116	130	133
Q	131	126	122	123	122	125	127	127	129	122	124	129	121	120	119	122	121	123	129	132
R	131	127	126	125	124	123	129	130	132	130	131	129	120	118	117	120	122	125	130	132
S	130	126	124	123	125	124	129	131	127	130	128	125	118	117	116	116	120	126	128	130
T	127	126	124	123	125	127	127	127	126	126	127	123	117	115	114	116	121	124	125	128
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Sheet 2 in Colour

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	126	130	133	140	131	136	124	121	121	122	122	123	119	119	126	129	122	120	125	125	A
B	130	129	133	137	130	126	132	125	119	121	120	124	129	127	129	128	125	122	128	130	B
C	128	134	127	124	122	117	118	124	113	114	121	124	124	124	130	121	132	123	119	118	C
D	133	129	122	120	119	117	119	122	116	121	123	129	121	118	125	127	120	128	115	115	D
E	131	128	126	121	121	117	117	124	124	123	122	129	113	122	116	118	114	120	112	112	E
F	126	135	125	122	122	114	120	120	127	130	130	128	117	114	114	117	113	113	116	116	F
G	124	127	133	132	121	119	116	116	118	120	125	124	118	116	115	112	127	117	116	112	G
H	123	124	132	129	128	117	117	115	119	120	122	123	120	115	118	116	120	121	121	113	H
I	126	130	128	131	130	127	117	118	123	122	128	119	124	115	120	120	121	122	119	115	I
J	127	126	133	127	123	121	117	115	120	118	121	118	122	120	120	122	125	117	120	117	J
K	131	135	137	135	123	115	115	116	118	120	115	123	116	116	116	120	119	118	118	117	K
L	131	135	138	132	128	125	115	112	119	121	122	130	117	116	122	120	115	114	125	120	L
M	134	135	129	129	121	126	119	117	114	120	123	128	124	123	124	124	114	116	122	111	M
N	132	134	128	126	120	125	122	122	115	118	115	123	121	121	120	122	118	120	119	114	N
O	126	128	130	127	114	114	114	120	123	126	125	121	118	119	119	122	112	120	113	120	O
P	128	130	131	132	119	117	116	116	120	122	123	125	123	120	120	120	126	117	114	114	P
Q	127	127	128	127	124	119	114	115	117	122	124	123	117	119	117	118	117	113	119	122	Q
R	130	134	132	126	120	120	118	114	121	118	125	121	114	113	113	114	114	114	117	121	R
S	131	133	124	125	128	128	120	122	117	124	121	127	117	120	112	112	112	115	112	115	S
T	141	137	131	128	129	129	122	125	120	121	118	125	117	119	111	109	113	117	118	119	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Sheet 3 in Colour

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	135	133	131	128	138	139	142	141	131	128	127	130	121	127	129	132	130	132	125	131	A
B	136	134	127	126	141	136	131	129	131	126	130	127	119	121	131	130	132	127	133	135	B
C	134	133	135	132	137	133	133	130	129	126	127	130	126	128	134	139	128	132	133	131	C
D	134	133	134	135	135	134	133	131	126	122	121	123	127	125	128	120	129	134	129	134	D
E	130	129	136	139	133	132	132	130	131	125	125	123	122	128	123	125	119	125	134	122	E
F	128	127	138	142	131	131	130	132	129	128	120	115	121	127	128	125	126	130	123	126	F
G	127	128	139	139	131	131	133	133	136	130	124	118	121	133	125	128	125	119	125	128	G
H	132	131	139	134	133	138	132	130	130	127	121	119	126	126	121	122	122	121	120	121	H
I	135	134	141	136	138	136	133	132	130	124	122	123	127	127	128	117	118	124	124	122	I
J	137	140	142	140	138	135	135	132	121	120	123	123	125	122	119	121	119	124	126	122	J
K	140	145	149	143	140	137	130	128	123	123	121	125	120	120	123	116	117	118	122	124	K
L	145	146	136	139	136	133	132	132	127	122	122	124	126	115	122	113	120	112	123	123	L
M	144	140	131	133	133	134	133	132	129	132	122	122	117	117	111	115	114	111	120	121	M
N	138	135	129	132	133	130	135	137	128	124	118	118	112	110	108	114	116	117	116	122	N
O	142	139	130	129	133	125	130	133	127	124	119	114	113	113	113	113	114	118	132	131	O
P	140	136	132	132	134	135	135	131	125	122	115	133	116	115	116	116	118	122	126	131	P
Q	132	131	132	133	131	138	141	136	134	125	119	123	124	121	120	133	127	120	121	125	Q
R	127	131	132	132	133	128	130	137	129	123	124	121	128	124	121	126	125	133	123	122	R
S	129	131	136	140	131	124	128	135	133	130	121	115	117	117	129	121	133	133	133	124	S
T	130	129	141	147	126	133	135	136	128	122	117	120	122	122	119	132	131	126	127	122	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Sheet 4 in Colour

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A																					A
B																					B
C																					C
D							125	125	125	131	134	136	131	132	128	128	125	124	128	125	D
E			129	126	127	127	126	126	130	131	136	134	132	128	125	126	130	129	128	126	E
F	132	131	126	130	128	127	130	128	130	133	134	133	133	128	124	124	127	129	127	125	F
G	131	131	130	132	129	126	127	127	128	131	136	134	132	131	125	126	128	127	127	124	G
H	132	129	132	134	132	129	128	126	130	132	138	133	126	132	112	123	123	119	113	116	H
I	136	129	131	130	130	126	126	124	128	130	134	135	136	134	126	127	122	127	128	138	I
J	135	134	130	129	129	125	122	123	123	123	125	127	127	124	124	122	123	129	131	124	J
K	137	137	136	138	133	129	129	129	129	130	132	134	141	134	126	123	123	127	120	122	K
L	134	134	133	130	135	136	136	135	140	138	133	140	127	132	122	123	130	125	125	126	L
M	134	134	129	127	128	129	139	138	145	142	132	136	130	129	124	131	130	116	128	130	M
N	131	134	130	129	128	129	139	135	133	133	136	135	136	127	119	126	127	120	120	124	N
O	129	135	136	134	132	132	136	136	133	134	134	133	130	128	124	121	122	120	122	122	O
P	131	130	132	130	130	133	128	128	123	124	128	133	135	130	125	132	125	122	128	132	P
Q	128	129	133	135	139	135	134	131	128	125	127	123	132	129	135	130	131	130	124	132	Q
R	127	127	132	135	141	140	132	131	126	126	126	124	125	125	126	128	135	118	127	123	R
S	131	133	138	141	145	141	136	134	128	125	124	124	123	117	123	116	122	125	13	136	S
T	135	134	142	145	142	144	148	142	132	130	132	134	129	123	125	121	126	126	138	134	T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Sheet 5 in Colour

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	132	130	126	124	130	127	126	129	129	128	127	130	136	140	139	140					A
B	129	130	131	130	128	127	129	132	131	128	129	129	132	135	139	146					B
C	125	129	128	133	131	129	127	128	129	132	126	127	130	131	132	131					C
D	123	139	125	126	128	129	125	125	129	129	126	126	127	126	125	125					D
E	122	123	128	128	127	122	120	118	119	120	122	123	124	124	121	122					E
F	121	120	126	127	126	126	124	119	118	117	122	123	123	125	124	125					F
G	134	121	128	125	124	125	121	120	116	118	122	122	121	123	128	129					G
H	135	130	125	124	121	121	117	116	123	121	124	123	126	131	133	132					H
I	131	132	130	123	129	135	122	128	124	132	127	125	129	135	140	139					I
J	127	135	129	130	117	123	129	126	126	128	126	127	135	135	136	135					J
K	131	131	134	121	125	122	119	119	122	120	120	123	136	126	140	141					K
L	125	127	132	129	132	128	120	115	119	118	122	119	121	122	131	142					L
M	128	124	125	129	129	134	126	120	123	122	125	132	124	123	133	136					M
N	142	125	127	140	126	130	121	119	121	126	129	121	123	123	136	139					N
O	139	143	136	139	134	131	132	130	121	119	127	126	122	122	133	140					O
P	132	136	138	136	128	134	125	128	120	123	134	132	123	120	127	131					P
Q	132	141	139	137	141	129	132	125	125	134	132	124	121	125	131	134					Q
R	133	136	139	144	142	144	137	121	122	126	127	118	123	127	137	139					R
S	130	128	133	146	134	139	141	126	133	121	123	119	120	125	136	139					S
T	↓	137	129	135	128	134	128	128	127	124	119	113	116	121	134	131					T
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	