

Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three Offshore Wind Farm

Environmental Statement:
Volume 6, Annex 1.1 – Borehole Logs

PINS Document Reference: A6.6.1.1
APFP Regulation 5(2)(a)

Date: May 2018

Hornsea 3
Offshore Wind Farm

Orsted

Environmental Impact Assessment

Environmental Statement

Volume 6

Annex 1.1 – Borehole Logs

Report Number: A6.6.1.1

Version: Final

Date: May 2018

This report is also downloadable from the Hornsea Project Three offshore wind farm website at:

www.hornseaproject3.co.uk

Ørsted

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London, SW1P 1WG

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Front cover picture: Kite surfer near a UK offshore wind farm © Orsted Hornsea Project Three (UK) Ltd., 2018.

Liability

This report has been prepared by RPS, with all reasonable skill, care and diligence within the terms of their contract with Orsted Power (UK) Ltd.

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Approved by: Sophie Banham

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Acronyms

Acronym	Description
BGS	British Geological Survey
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current

Units

Unit	Description
m	Metre (distance)
km	Kilometre (distance)

1. Introduction

1.1 Purpose

- 1.1.1.1 This annex provides details of all borehole logs within the Hornsea Three geology and ground conditions study area as defined in volume 3, chapter 1: Geology and Ground Conditions.
- 1.1.1.2 Table 1.1 and Figure 1.1 (sheets 1 to 9) confirm the location of these boreholes. The logs of all the boreholes listed in Table 1.1 are provided at Appendix A. The borehole logs were obtained from British Geological Survey (BGS).
- 1.1.1.3 The information presented in this annex has been used to inform the baseline and impact assessment presented in volume 3, chapter 1: Geology and Ground Conditions.

Table 1.1: BGS Borehole Logs.

Easting	Northing	Label	BGS reference
610390	343440	R A F Station Weybourne NO 1	TG14SW23
610390	343330	R A F Station Weybourne NO 2	TG14SW24
610390	343250	R A F Station Weybourne NO 3	TG14SW25
610360	343170	R A F Station Weybourne NO 4	TG14SW26
611630	334400	Rifle Range Plumstead	TW13SW19
611300	333200	Great Farm Saxthorpe	TG13SW5
611460	332340	Shrub Farm Saxthorpe	TG13SW17
609980	328780	Red Pit Farm Wood Dalling	TG02NE26
612370	322350	Booton Norfolk	TG12SW1
612260	321620	The Grove Booton	TG12SW27
612030	318780	Hall Road Farm Alderford	TG11NW79
612200	314270	Morton Estate Norfolk 7	TG11SW112
612430	313480	Blackbeck Plantation Ringland	TG11SW12
612710	313300	Morton Estate Norfolk 5	TG11SW114
612800	313300	RW1-Ringland	TG11SW99
612800	313300	RW2-Ringland	TG11SW100

Easting	Northing	Label	BGS reference
612820	313270	Morton Estate Norfolk 6	TG11SW115
612780	313110	Morton Estate Norfolk 4	TG11SW117
612750	310995	A47 Norwich Southern Bypass 7	TG11SW74
612960	309440	Malvern Marlingford	TG10NW33
613560	309440	Cobbs Grove Plantation Marlingford	TG10NW14
614140	308950	North of Algarsthorpe	TG10NW20
614840	307600	Valley Farm; Marlingford	TG10NW76
614680	307580	Valley Farm Barford ABH	TG10NW45
615780	306650	Glenhaven Little Melton	TG10NE87
615310	306570	Church Farm Little Melton	TG10NE43
616440	305810	Burnthouse Lane Hethersett	TG10NE49
616690	304790	Station Lane Hethersett	TG10SE3
617530	304640	Wymondham-Cringleford 28	TG10SE94
617345	304520	Wymondham-Cringleford 27	TG10SE93
617380	304440	Wymondham-Cringleford 35	TG10SE97
617500	304420	East of Hethersett Station	TG10SE7
620750	303700	A47 Norwich Southern Bypass	TG20SW82
621490	303690	A47 Norwich Southern Bypass 148 (T)	TG20SW91
620986	303665	A47 Norwich Southern Bypass 592	TG20SW127
621460	303660	A47 Norwich Southern Bypass 147	TG20SW90
620870	303650	A47 Norwich Southern Bypass 141 (T)	TG20SW83
621360	303650	A47 Norwich Southern Bypass 146 (T)	TG20SW89
620950	303640	A47 Norwich Southern Bypass 142	TG20SW84
620980	303630	A47 Norwich Southern Bypass 144 A	TG20SW87
621160	303630	A47 Norwich Southern Bypass 145	TG20SW88
620950	303620	A47 Norwich Southern Bypass 143	TG20SW85
620970	303600	A47 Norwich Southern Bypass 144 (T)	TG20SW86
618420	303560	South-West of Hall Farm Intwood	TG10SE11
620640	303280	Sports Ground Swardeston	TG20SW166
620640	303280	Sports Ground Lakenham Hewitt	TG20SW112

Easting	Northing	Label	BGS reference
621360	303180	Near Mangreen Hall Swardeston	TG20SW14
620640	303150	Police House Swardeston	TG20SW55
619570	302330	South-West of Hospital Farm Swardeston	TG10SE18

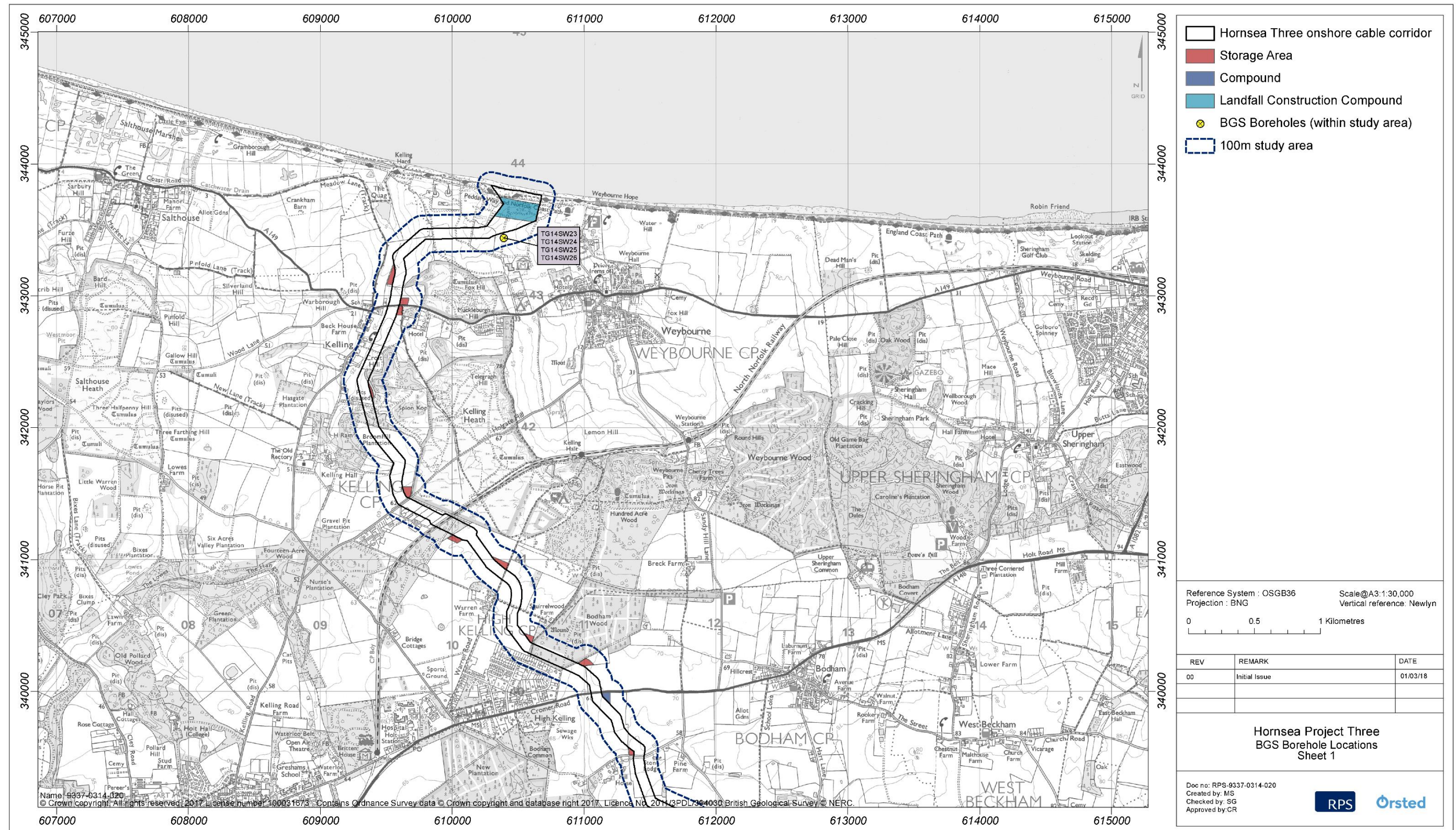


Figure 1.1: BGS Borehole Locations.

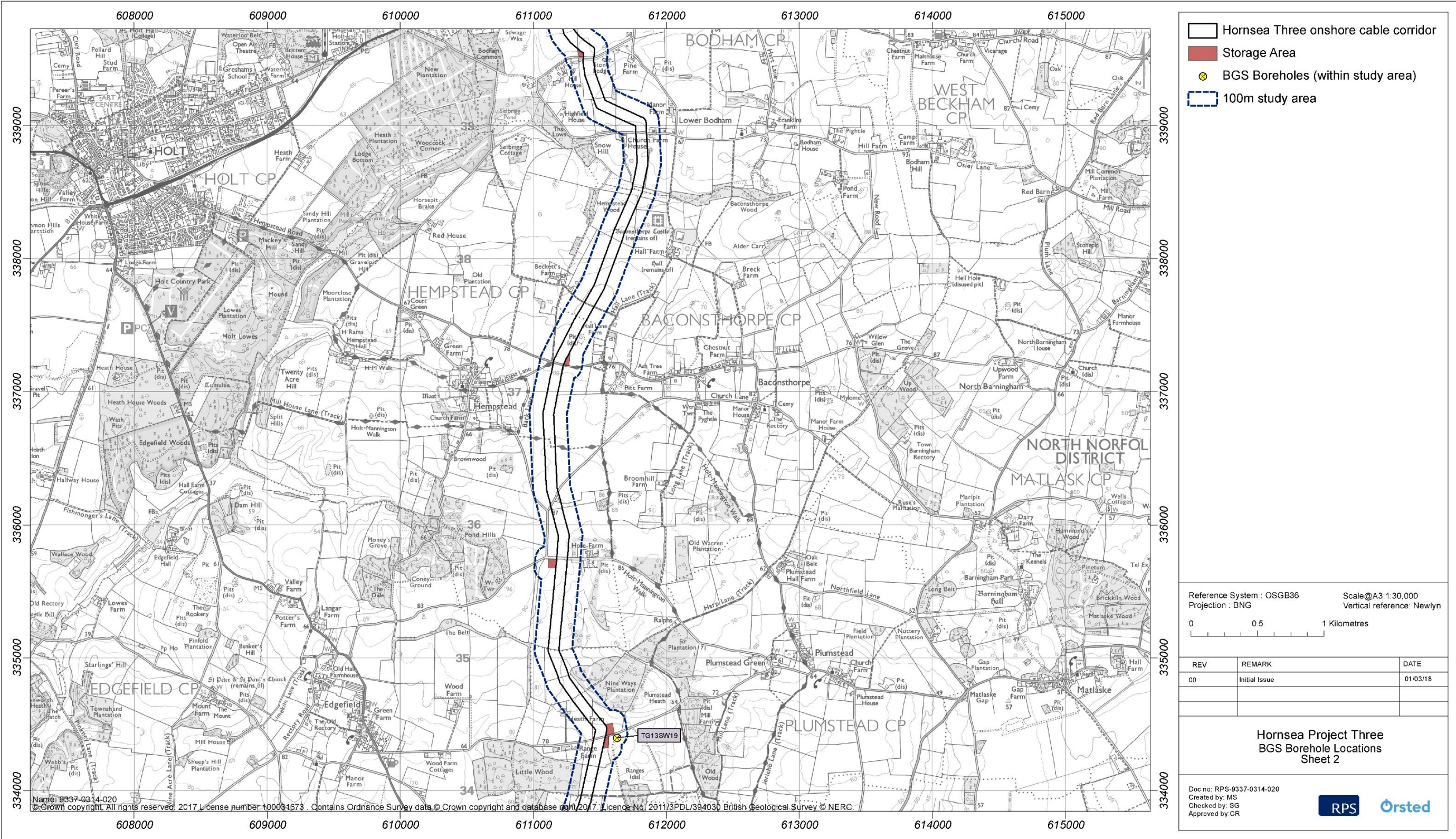


Figure 1.1: BGS Borehole Locations.

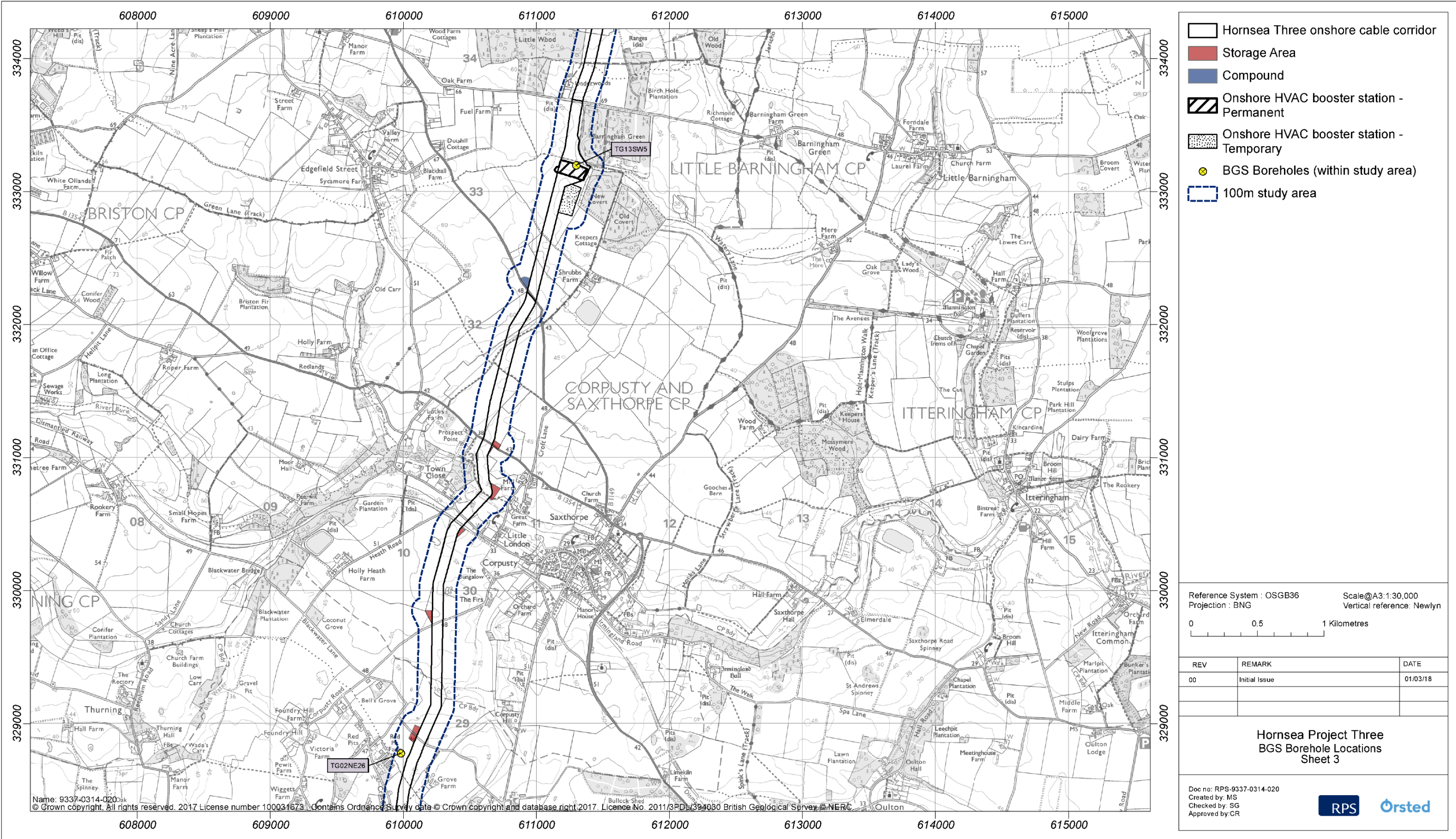


Figure1.1: BGS Borehole Locations.

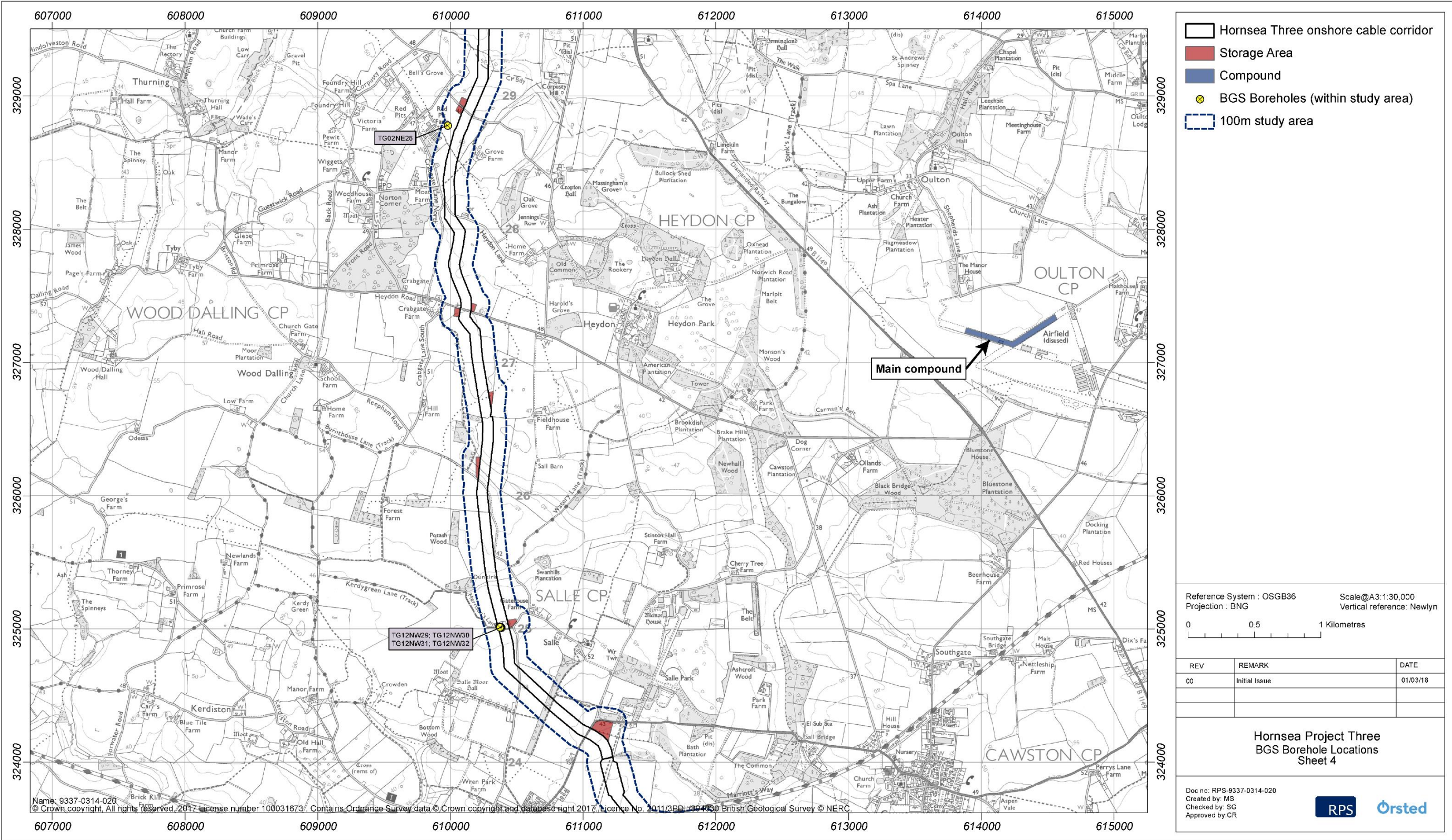


Figure 1.1: BGS Borehole Locations.

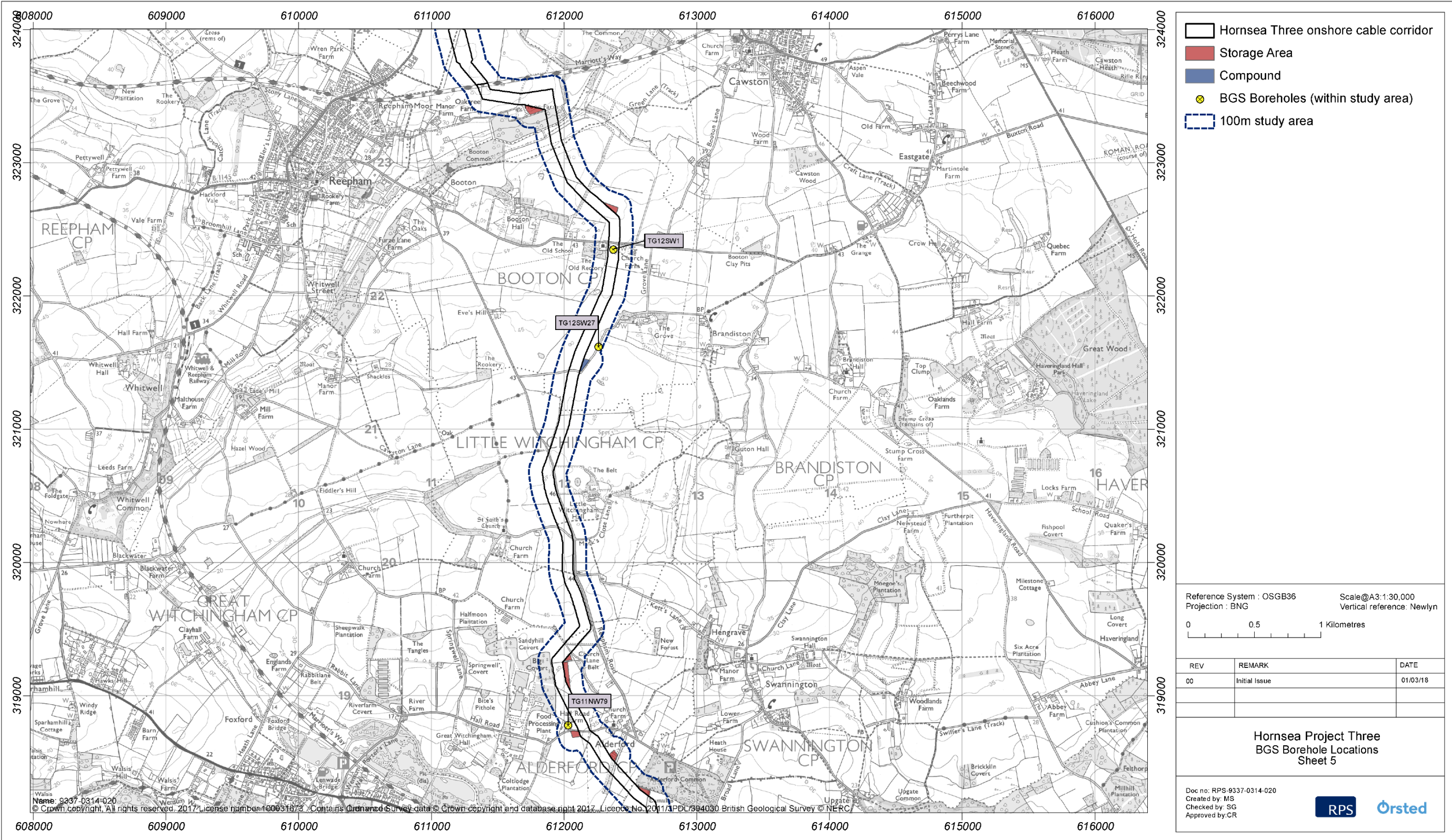


Figure 1.1: BGS Borehole Locations.

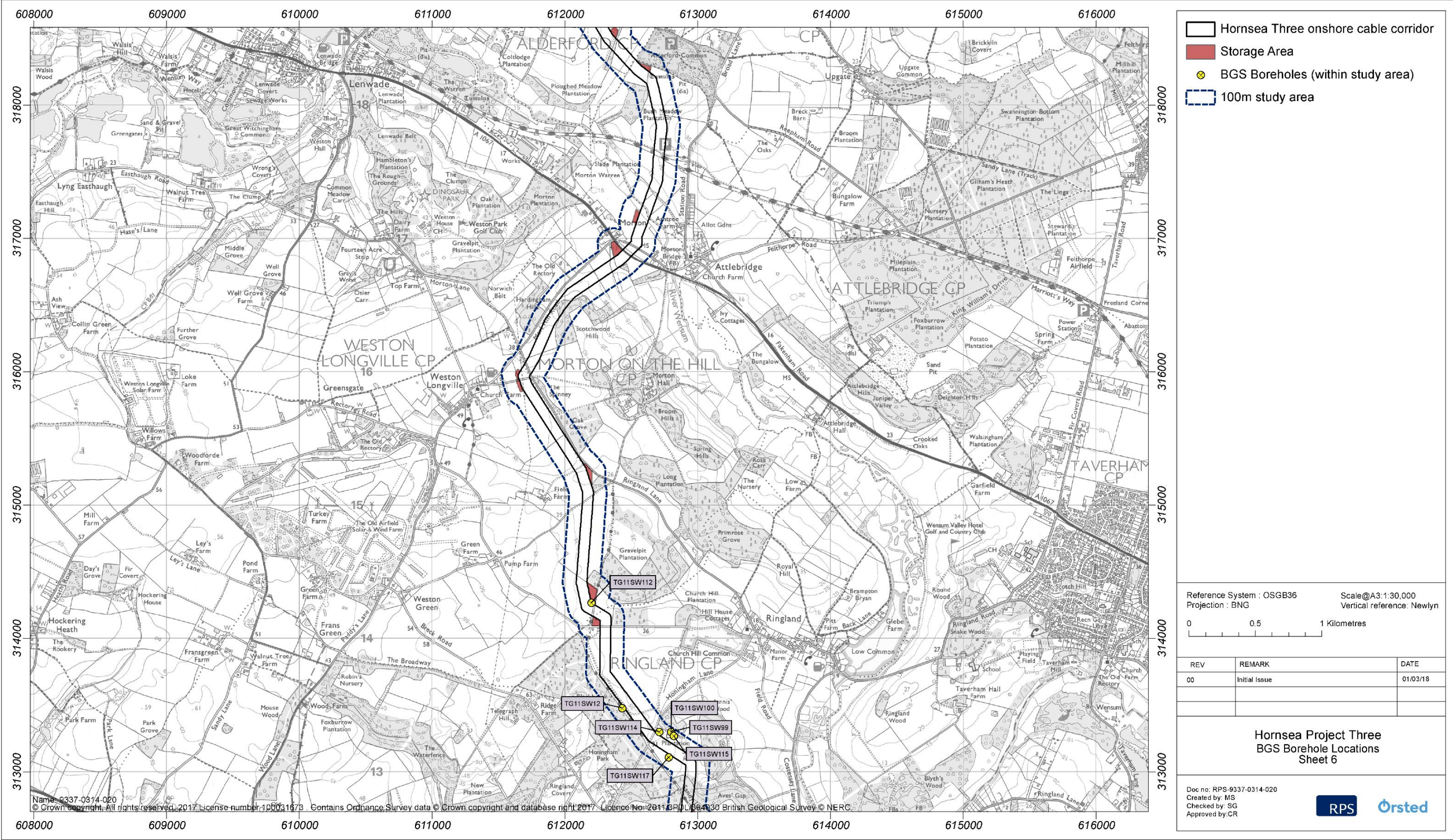


Figure 1.1: BGS Borehole Locations.

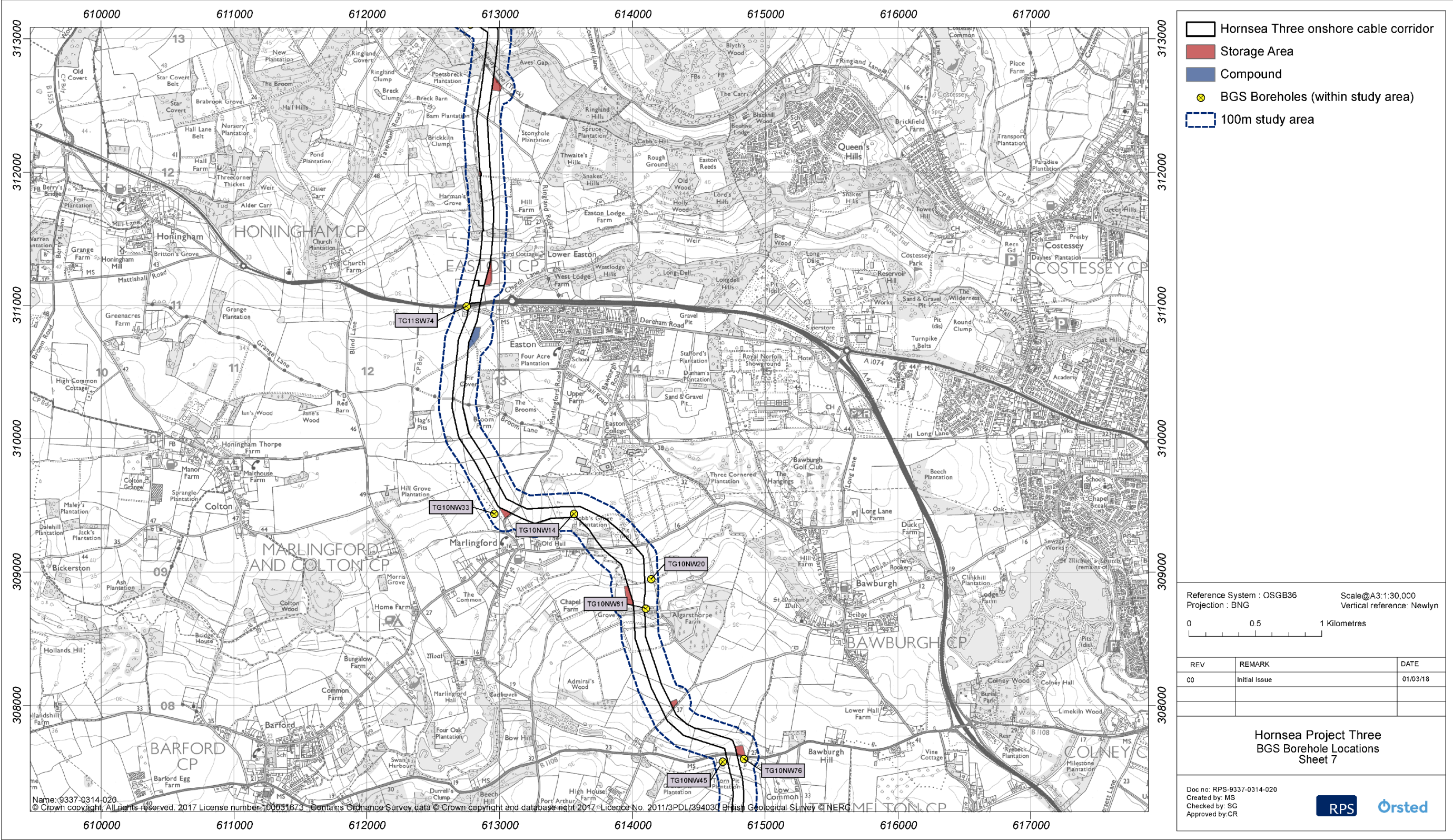


Figure 1.1: BGS Borehole Locations.

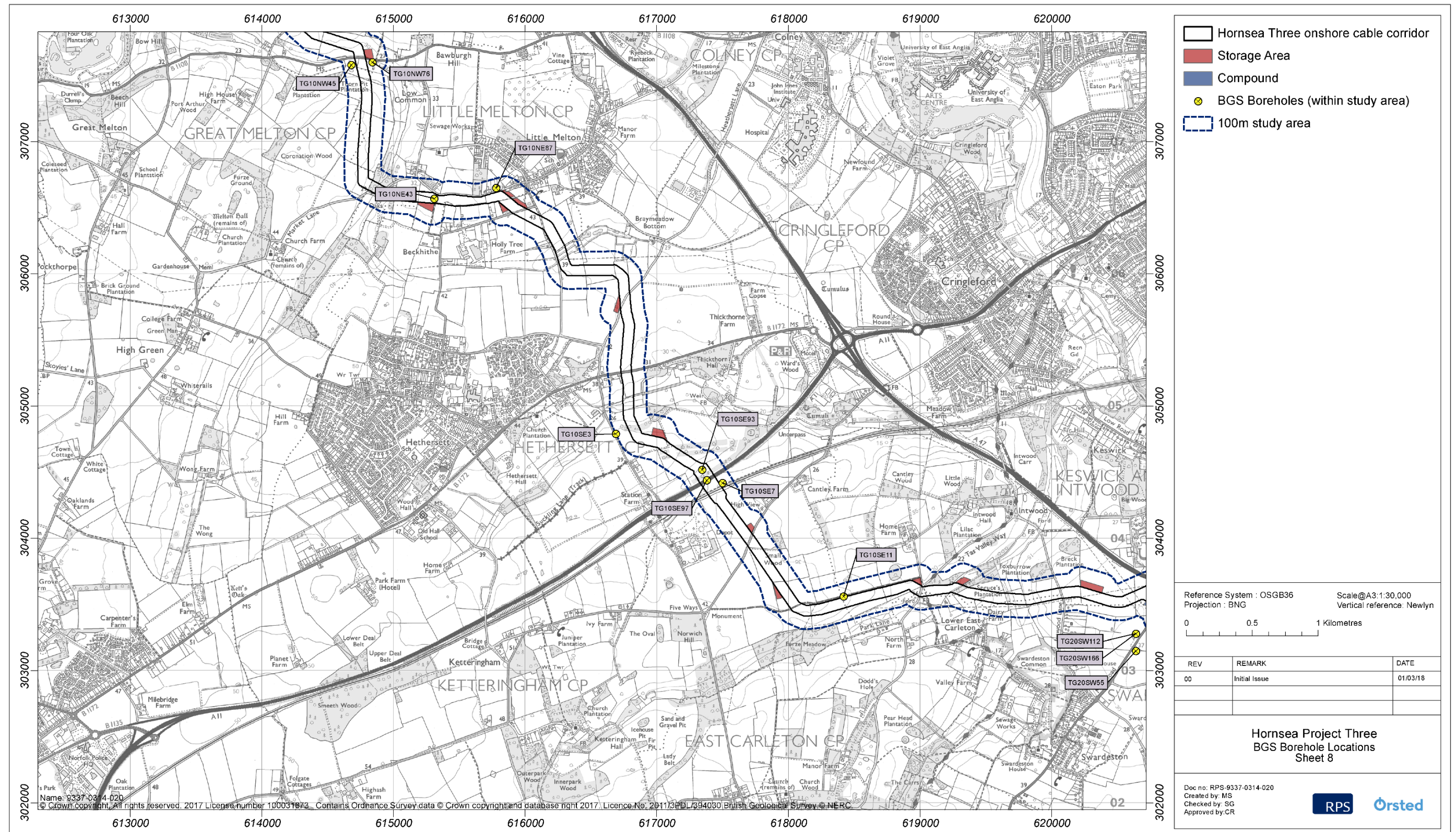


Figure 1.1: BGS Borehole Locations.

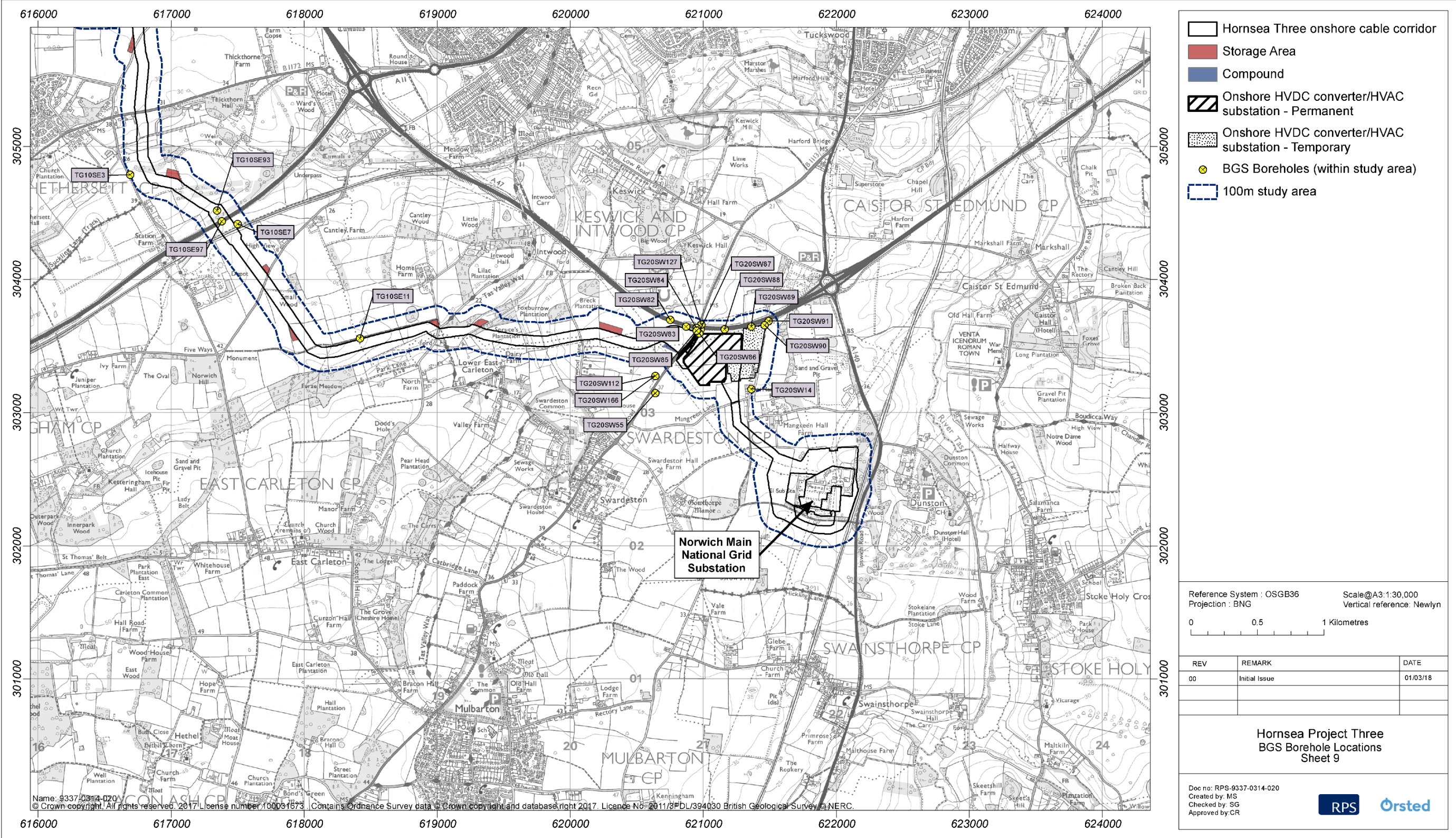


Figure 1.1: BGS Borehole Locations.

A.1.1 TG14SW23

131/47 Ministry of Defence, Royal Air Force Station, Weybourne

T9/4/19

(a) (Disused). Surface +85. Bore 208. Lining tubes: 90 x 6 in; 80 x 4 1/2 in from 65 down. Ck -55. R.W.L. +39. Buckingham, 1937. A T9 1039 4344
Yield 2,000 g.p.h. (72 h. test). Sand entered. 1938.

(b) (Disused). Surface +93. Bore 224. Lining tubes: 197 1/2 x 6 in. Ck -89. R.W.L. +25. Yield 2,350 g.p.h. Buckingham, 1938. B T9 1039 4333
Yield 1,500 g.p.h. Aug. 1947. R.W.L. +34%. P.W.L. +21%. Yield 2,500 g.p.h. Aug. 1953. R.W.L. +34. P.W.L. +7. Yield 1,666 g.p.h. Nov. 1956. R.W.L. +38. P.W.L. +33%. Yield 2,600 g.p.h. Oct. 1960.

(c) (Disused). Surface +100. Bore 222 x 6 in. Ck -83. R.W.L. +28. P.W.L. +16. Yield 1,800 g.p.h. (test). Buckingham, 1939. C T9 1039 4325
Yield 600 g.p.h. Aug. 1947.

(d) Surface +100. Lining tubes: 153 1/2 x 6 in. Ck -22. Water struck at -40. R.W.L. +18. R.E., Mar. 1942. D T9 1036 4317
Yield 1,200 g.p.h. Aug. 1947. R.W.L. +32. P.W.L. +19%. Yield 4,500 g.p.h. Oct. 1952. R.W.L. +38. P.W.L. +19%. Yield 4,000 g.p.h. Oct. 1960. R.W.L. +44. Oct. 1964.

(e) Surface +45. Bore 250 x 10 in reduced to 8 in at depth. Lining tubes: x 15 in to 51 1/2; x 12 in to 128 1/2; x 10 in to 182 1/2; 76 x 8 in from 174 down (perforated). Ck -73. Water struck at -21 and -c.155. R.W.L. -10. P.W.L. -40. Recovered to -10 in 65 min. Suction -112. Yield 7,060 g.p.h. (14 d. test). Dando, Apr. 1952. E T9 1008 4380
R.W.L. -13. P.W.L. -21. Yield 6,300 g.p.h. Nov. 1956. R.W.L. -7%. P.W.L. -12%. Yield 6,000 g.p.h. Oct. 1960.

(d)	Topsoil	...	2	2
British Geological Survey	Boulder Clay	Rubble sandy chalk and flints	8	10
	(Buried channel)	Sandy chalk flints and stones	14	24
	75	Grey chalk flints and stones	41	65
		Light brown clay, chalk stones and flints ...	10	75
	Sand and Gravel	Sand (blowing) and gravel	46 1/2	121 1/2
	(Buried channel)	Flints	1/2	122
British Geological Survey	47			
	UCK	Chalk and flints (top 25 ft very soft)	128	250
	128			

pp. W.M. Edmunds 17.2.67

GEOLOGICAL
CLASSIFICATION

NATURE OF STRATA

THICKNESS
ft.

DEPTH
ft.

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

RECORD OF WELL (SHAFT, OR BORE) Licence No. **131/47**

At **Weybourne Camp R.A.F. Station**
Town or Village **Weybourne** County **Norfolk** Six-inch square sheet **10 N.W.E.**
Exact site **(A rough sketch-map or a tracing from a map is very desirable)**

in parish of _____

Level of ground surface above sea-level (O.D.) **285** ft. If well starts below ground surface, state how far _____ ft.
Shaft _____ ft., diameter _____ ft. Bore _____ ft. Diameter of bore: at top _____ ins.; at bottom _____ ins.
Details of permanent lining tubes (internal diameters preferred) **90 ft. x 6 in.; 80 ft. x 4 in. from 65 ft. down**

Water struck at depths of (feet) _____

Rest-level of water below top of well **46** feet. Suction at _____ feet. Yield on _____ hours' test _____ gallons per _____ (with pump of capacity _____ g.p.h.); depressing water level to _____ feet below top. Time of recovery _____ hrs. Amount normally pumped daily _____ g.p.h. for _____ hours.

Quality (attach copy of analysis if available)
Sunk by **F. H. Buckingham** Date of well **1934**
Information from **Do.**

GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS		DEPTH	
		Feet.	Inches.	Feet.	Inches.
Boulder clay	Yellow clay	12		12	
125	Boulder clay	113		125	40
Sand and gravel	Hard pan of sand & shingle	15		140	55
Uck	Chalk	68		208	

Wp. det. 60 In 1938 this borehole was bored at 2000 ft. per hour after 72 hours' test, line and checked the borehole, an attempt to shut out the sand failed & the bore was abandoned.
a.b.c.d. visited & sealed 24.1.54.

Visited. Checked silt and C.D. Camp deserted 17.9.23/7/60.

For Survey use only
Date received _____ G.S.M. Office File No. _____ Site marked on 1" map (use symbol) _____

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.

ADDITIONAL INFORMATION SHEET Licence No. **131/47**

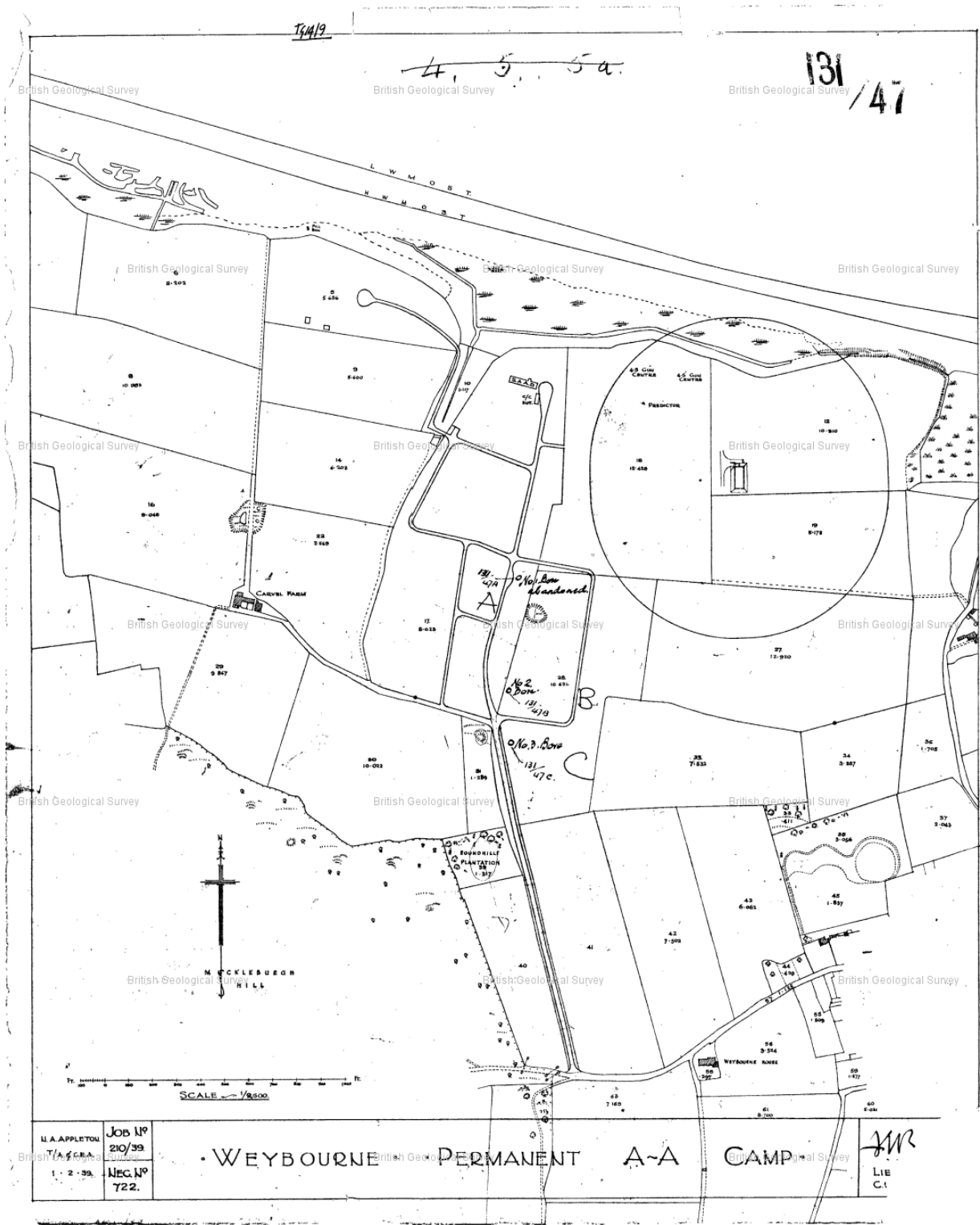
Date of completion of well catalogue _____
Date of publication _____

Additional Sheet No. _____

DATE	*	ADDITIONAL INFORMATION	INIT.
2/10/70	A	Boulder clay (buried channel) Yellow clay 12 12 125 Boulder clay 113 125 Sand and gravel (buried channel) Hard pan of sand and shingle 15 140 15 Uck Chalk 68 208 68	
	B	Soil 4 4 Yellow clay 12 16 Coarse red sand 36 52 Pleist. Drift Yellow clay & sand 8 60 (buried channel) Dark red coarse sand 40 100 182 Light yellow sand 10 110 Fine grey sand 16 126 Boulder clay 39 165 Shingle & big stone 17 182 Uck Chalk, very good channel 42 224 42	
	C	Soil 3 3 Pleist. Drift Clay 16 19 (buried channel) Sand 40 59 183 Dark sand 46 105 Clay mixed with sand 22 127	
FILMED	* INSERT WELL REFERENCE LETTER, IF MORE THAN ONE WELL AT SITE		P.T.O.
Section 6	Pumping test	Observ. well	Recorder
			E.R. log

GEOLOGICAL SURVEY, WATER DEPARTMENT, SOUTH KENSINGTON, LONDON, S.W.7.

A.1.2 TG14SW24



NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET TG 14 SW
BH REGISTRATION NUMBER 23-26

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

131/47 Ministry of Defence, Royal Air Force Station, Weybourne

T94/9

(a) (Disused). Surface +85. Bore 208. Lining tubes: 90 x 6 in; 80 x 4 in from

65 down. Ck -55. R.W.L. +39. Buckingham, 1937.

A T9 1039 4344

Yield 2,000 g.p.h. (72 h. test). Sand entered. 1938.

(b) (Disused). Surface +93. Bore 224. Lining tubes: 197½ x 6 in. Ck -89. R.W.L.

+25. Yield 2,350 g.p.h. Buckingham, 1938.

B T9 1039 4383

Yield 1,500 g.p.h. Aug. 1947. R.W.L. +34%. P.W.L. +21%. Yield 2,500 g.p.h.

Aug. 1953. R.W.L. +34. P.W.L. +7. Yield 1,666 g.p.h. Nov. 1956. R.W.L. +38. P.W.L.

g.p.h. +33%. Yield 2,600 g.p.h. Oct. 1960.

(c) (Disused). Surface +100. Bore 222 x 6 in. Ck -83. R.W.L. +28. P.W.L. +16.

Yield 1,800 g.p.h. (test). Buckingham, 1939.

C T9 1039 4325

Yield 600 g.p.h. Aug. 1947.

(d) Surface +100. Lining tubes: 153¼ x 6 in. Ck -22. Water struck at -40. R.W.L.

+18. R.E., Mar. 1942.

D T9 1036 4317

Yield 1,200 g.p.h. Aug. 1947. R.W.L. +32. P.W.L. +19%. Yield 4,500 g.p.h. Oct. 1952.

R.W.L. +38. P.W.L. +19%. Yield 4,000 g.p.h. Oct. 1960. R.W.L. +44. Oct. 1964.

(e) Surface +45. Bore 250 x 10 in reduced to 8 in at depth. Lining tubes: x 15 in to 51½; x 12 in to 128½; x 10 in to 182½; 76 x 8 in from 174 down (perforated). Ck -73.

Water struck at -21 and -c.155. R.W.L. -10. P.W.L. -40. Recovered to -10 in 65 min.

Suction -112. Yield 7,060 g.p.h. (14 d. test). Dando, Apr. 1952.

E T9 1008 4380

R.W.L. -13. P.W.L. -21. Yield 6,300 g.p.h. Nov. 1956. R.W.L. -7%. P.W.L. -12%.

Yield 6,000 g.p.h. Oct. 1960.

(d)	Topsoil	...	2	2
	Boulder Clay	Rubble sandy chalk and flints	8	10
	(Buried channel)	Sandy chalk flints and stones	14	24
	75	Grey chalk flints and stones	41	65
		Light brown clay, chalk		
		stones and flints ...	10	75
	Sand and Gravel	Sand (blowing) and gravel	46½	121½
	(Buried channel)	Flints	¼	122
	47			
	Uck	Chalk and flints (top 25 ft		
	128	very soft)	128	250

pp. W.M. Edmunds 17.2.67

GEOLOGICAL
CLASSIFICATION

NATURE OF STRATA

THICKNESS
ft.

DEPTH
ft.

RECORD OF WELL (SHAFT OR BORE)

1" N.S. 1949
1" O.S. 478

At R.A. Camp No. 2 Bore.

Town or Village Weybourne County Northfolk Six-inch data 10 N.W.E

Exact site _____

_____ in parish of _____, map is very desirable

Level of ground surface above sea-level (O.D.) 93 ft. If well starts below ground surface, state how far _____ ft.

Shaft _____ ft., diameter _____ ft. Bore _____ ft. Diameter of bore: at top 6 ins.; at bottom _____ ins.

Details of permanent lining tubes (internal diameters preferred) 1 1/2" x 6m

Water struck at depths of (feet) _____

Rest-level of water ^{below} top of well 68 feet. Suction at _____ feet. Yield on _____ hours' test 2250 gallons per hour (with pump of capacity _____ g.p.h.); depressing water level to _____ feet below top. Time of recovery _____ hours. Amount normally pumped daily _____ g.p.h. for _____ hours.

Quality (attach copy of analysis if available)

Sunk by F. H. Buckingham for Mr. _____ Date of well 1935

Information from Do.

GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS		DEPTH	
		Feet.	Inches.	Feet.	Inches.
Soil		11		11	
Yellow clay		12		16	
Coarse red sand		36		52	
Yellow clay round		8		60	
Dark red coarse sand		40		100	
Light yellow sand		10		110	
Fine grey sand		16		126	
Boulder clay		39		165	
Shingle & big stone		17		182	
Chalk, very good chalk		42		224	
Yield 1500 g.p.h. 1941. At 15.5 ft.					
Consumption from b.c. & 40,000 g.p.d. on the average.					
Discarded as from 1963 (see sect. 6 card).					

For Survey use only

Date received	G.S.M. Office File No.	Site marked on 1" map (use symbol)
---------------	------------------------	------------------------------------

(*11815) Wt. 29051/0.369 10,000 0/99
A. & F.W. Ltd. Op. 686

ADDITIONAL INFORMATION SHEET

Licence No. 19419

131/47

Date of completion of well catalogue

Date of publication

Additional Sheet No.

DATE	*	ADDITIONAL INFORMATION	INIT.
2/10/70	A	Boulder clay (Buried channel) Yellow clay	12 12
		125 Boulder clay	113 125
		Sand and gravel (Buried channel) Hard pan of sand and shingle	15 140
		15	
		Vck Chalk	68 208
	68		
	B	Soil	4 4
		Yellow clay	12 16
		Coarse red sand	36 52
		Pleist. Drift Yellow clay & sand	8 60
(Buried channel) Dark red coarse sand		40 100	
182 Light yellow sand		10 110	
Fine grey sand		16 126	
Boulder clay		39 165	
Shingle & big stones	17 182		
C	Vck Chalk, very good & hard	42 224	
	42		
	Soil	3 3	
	Pleist. Drift Clay	16 19	
FILMED	* INSERT WELL REFERENCE LETTER, IF MORE THAN ONE WELL AT SITE	(Buried channel) Sand	40 59
		183 Dark sand	46 105
		Clay mixed with sand	22 127

Section 6

Pumping test

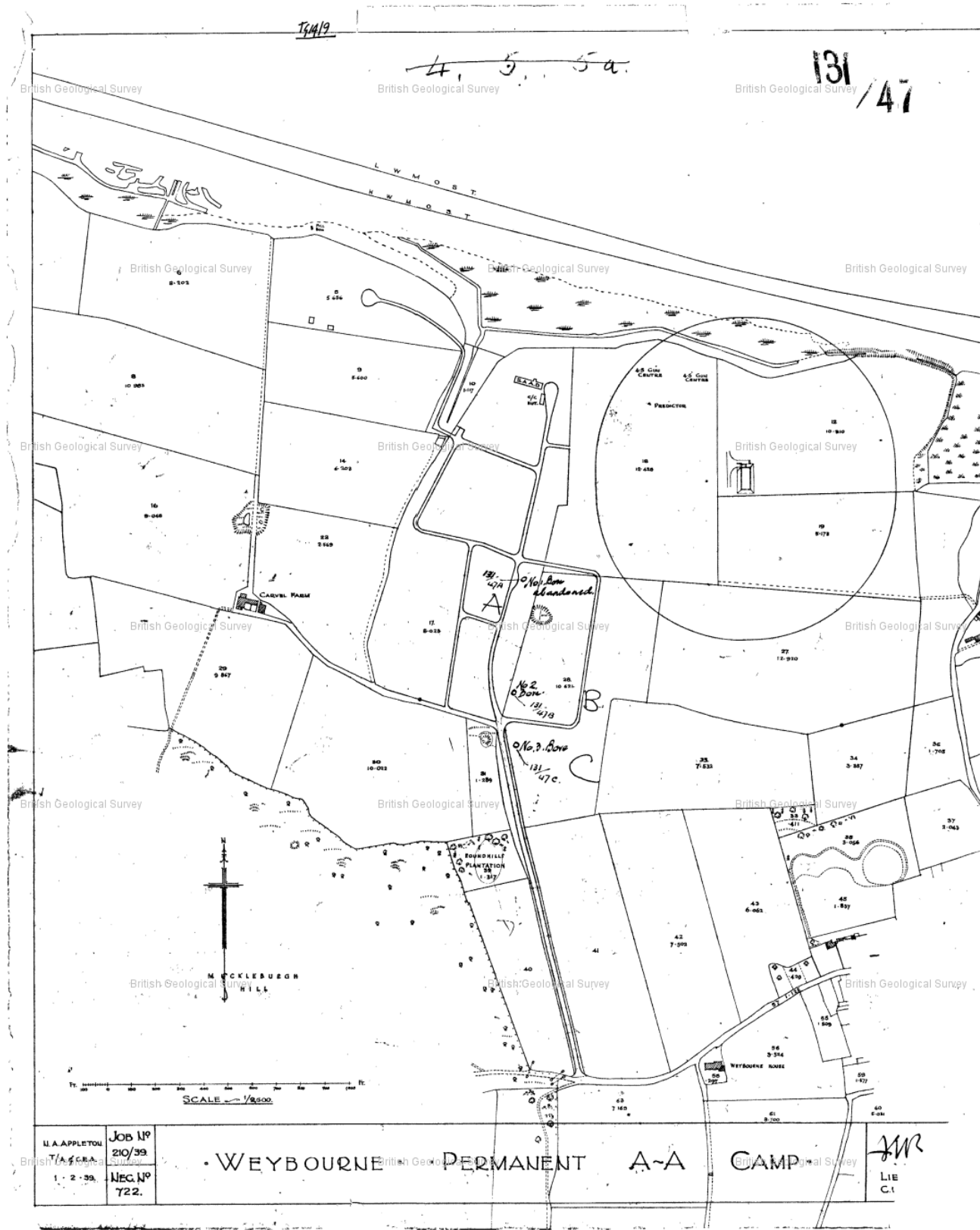
Observ. well

Recorder

E.R. log

GEOLOGICAL SURVEY, WATER DEPARTMENT, SOUTH KENSINGTON, LONDON, S.W.7.

P.T.O.



A.1.3 TG14SW25



NGRC
Geological Survey
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET

TG 14SW

BH REGISTRATION NUMBER

23-26

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

131/47 Ministry of Defence, Royal Air Force Station, Weybourne

TS/4/9

British Geological Survey

(a) (Disused). Surface +85. Bore 208. Lining tubes: 90 x 6 in; 80 x 4 in from 65 down. Ck -55. R.W.L. +39. Buckingham, 1937. A Tg 1039 4344

Yield 2,000 g.p.h. (72 h. test). Sand entered. 1938.

(b) (Disused). Surface +93. Bore 224. Lining tubes: 197½ x 6 in. Ck -89. R.W.L. +25. Yield 2,350 g.p.h. Buckingham, 1938. B Tg 1039 4333

Yield 1,500 g.p.h. Aug. 1947. R.W.L. +34%. P.W.L. +21%. Yield 2,500 g.p.h. Aug. 1953. R.W.L. +34. P.W.L. +7. Yield 1,666 g.p.h. Nov. 1956. R.W.L. +38. P.W.L. +33%. Yield 2,600 g.p.h. Oct. 1960.

(c) (Disused). Surface +100. Bore 222 x 6 in. Ck -83. R.W.L. +28. P.W.L. +16. Yield 1,800 g.p.h. (test). Buckingham, 1939. C Tg 1039 4325

Yield 600 g.p.h. Aug. 1947.

(d) Surface +100. Lining tubes: 153½ x 6 in. Ck -22. Water struck at -40. R.W.L. +18. R.E., Mar. 1942. D Tg 1036 4317

Yield 1,200 g.p.h. Aug. 1947. R.W.L. +32. P.W.L. +19%. Yield 4,500 g.p.h. Oct. 1960. R.W.L. +38. P.W.L. +19%. Yield 4,000 g.p.h. Oct. 1960. R.W.L. +44. Oct. 1964.

(e) Surface +45. Bore 250 x 10 in reduced to 8 in at depth. Lining tubes: x 15 in to 51½; x 12 in to 128½; x 10 in to 182½; 76 x 8 in from 174 down (perforated). Ck -73. Water struck at -21 and -c.155. R.W.L. -10. P.W.L. -40. Recovered to -10 in 65 min. Suction -112. Yield 7,060 g.p.h. (14 d. test). Dando, Apr. 1952. E Tg 1008 43

R.W.L. -13. P.W.L. -21. Yield 6,300 g.p.h. Nov. 1956. R.W.L. -7½. P.W.L. -12%. Yield 6,000 g.p.h. Oct. 1960.

British Geological Survey

British Geological Survey		British Geological Survey	
(d)	Topsoil ...	2	2
	Rubble sandy chalk and flints	8	10
	Sandy chalk flints and stones	14	24
	Grey chalk flints and stones	41	65
	Light brown clay, chalk		
	stones and flints ...	10	75
	Sand and Gravel	46%	121%
	(Buried channel)	1/4	122
	47		
	Chalk and flints (top 25 ft		
	very soft)	128	250

pp. W.M. Edmunds 17.2.67

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS ft.	DEPTH ft.
------------------------------	------------------	------------------	--------------

RECORD OF WELL (SHAFT OR BORE)

At A.A. Camp No 3 Bore
Town or Village Weybourne, Holt
County Norfolk Six-inch quarter sheet 10 N.W.E.
For Mr. N.O.

Exact site of well _____
Level of ground surface above sea-level (O.D.) 100 feet.
Is well-top at ground level? _____ If not, state how far above; _____ feet.
below; _____ feet.

Shaft _____ ft., diameter _____ ft. Details of headings _____
Bore 222 ft.; diameter of bore: at top 6 ins.; at bottom _____ ins.
Lengths, diameters, perforations, etc., of lining tubes _____
Water struck at depths, below well-top, of (feet) _____

TEST DETAILS
Rest-level of water 72 ft. above well-top. Suction at _____ ft. Yield on _____ hours' days' below well-top.
Month _____ pumping 1800 gallons per hour (max. capacity of pump _____ g.p.h.).
Year _____ with depression of 12 feet. Recovery to 72 in _____ mins. hours.

WORKING CONDITIONS
Rest-level of water in _____ (month), _____ (year), _____ ft. above well-top. below
Highest " in _____ (month), _____ (year), _____ ft. above below
Lowest " in _____ (month), _____ (year), _____ ft. above below
Suction at _____ ft. Rate of pumping _____ galls. per _____ for _____ hours per day.
with average depression of _____ ft. Recovery to _____ in _____ mins. hours

Quality of water (attach copy of analysis if available) _____
Well made by Buckingham Date of well 1939
Information from _____

ADDITIONAL NOTES.
Yield 600 g.p.h. 1947. J.W.S. 17.

LOG OF STRATA OVERLEAF.

Date received.	G.S.M. Office File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (use symbol) on 1" Map.	on 6" Map.

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W.7.
(17208) Wt. 42901/0277 10,000 2/41 A & E.W. Ltd. Op. 686

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far...	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
	Soil	3	-		
	Clay	16	-	19	-
	Sand	40	-	59	-
	Dark sand	46	-	105	-
	Clay mixed with sand	22	-	127	-
	Boulder clay	37	-	164	-
	Shingle & stone	19	-	183	-
	Chalk	39	-	222	-

ADDITIONAL INFORMATION SHEET

Licence No.

TS419

131/47

Date of completion
of well catalogue

Date of publication

Additional Sheet No.

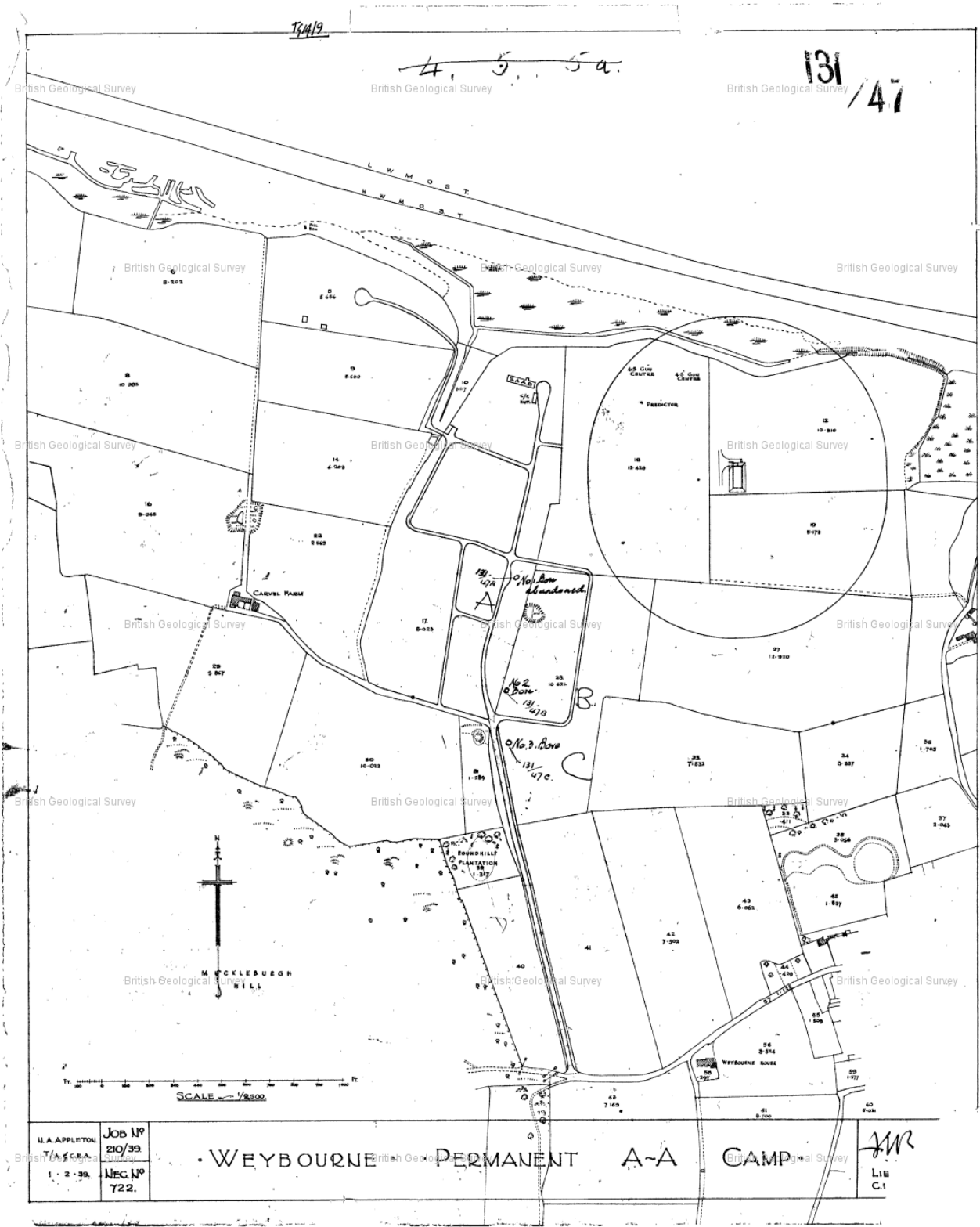
DATE	*	ADDITIONAL INFORMATION	INIT.
2/10/70	A	Boulder clay (Bund channel) Yellow clay 12 12 125 Boulder clay 113 125 Sand and gravel (Bund channel) Hard pan of sand and shingle 15 140 15 Vck Chalk 68 208 68	
	B	Soil 4 4 Yellow clay 12 16 Coarse red sand 36 52 Pleist. Drift Yellow clay & sand 8 60 (Bund channel) Dark red coarse sand 40 100 182 Light yellow sand 10 110 Fine grey sand 16 126 Boulder clay 39 165 Shingle & big stone 17 182 Vck Chalk, very good & hard 42 224 42	
	C	Soil 3 3 Pleist. Drift Clay 16 19 (Bund channel) Sand 40 59 183 Dark sand 46 105 Clay mixed with sand 22 127	
FILMED	*	INSERT WELL REFERENCE LETTER, IF MORE THAN ONE WELL AT SITE	P.T.O.
Section 6	Pumping test	Observ. well	Recorder
			E.R. log
			GEOLOGICAL SURVEY, WATER DEPARTMENT SOUTH KENSINGTON, LONDON, S.W.7.

(4130) W.C.30984/F.S.127 5m 9/63 G.W.B.Ltd. Op.463

DATE	*	ADDITIONAL INFORMATION	INIT.
		Boulder clay 37 164	
		Shingle & stone 19 183	
	Vck 39	Chalk 39 222	
E		Sand and sandy clay 25 25	
		Sand 13 38	
		Sand and sandy clay 13 51	
	Pleist. drift	gravel 7 58	
	(Buried channel)	gravel & some clay 7 65	
	118	sandstone & sand 16 81	
		Sand 9 90	
		Sand & gravel 28 118	
		Stiff grey	
	Vck	Stiff grey plastic chalk 52 170	
	132	Chalk and flints 80 250	mjc
		DATA Bank	
FILMED		INSERT WELL REFERENCE LETTER, IF MORE THAN ONE WELL AT SITE	

Additional Information Sheet No. _____ Commenced _____

A.1.4 TG14SW26



NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET TG14SW
BH REGISTRATION NUMBER 23-26

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

131/47 Ministry of Defence, Royal Air Force Station, Weybourne

TS/4/9

(a) (Disused). Surface +85. Bore 208. Lining tubes: 90 x 6 in; 80 x 4½ in from 65 down. Ck -55. R.W.L. +39. Buckingham, 1937. A T9 1039 4344
 Yield 2,000 g.p.h. (72 h. test). Sand entered. 1938.
 (b) (Disused). Surface +93. Bore 224. Lining tubes: 197½ x 6 in. Ck -89. R.W.L. +25. Yield 2,350 g.p.h. Buckingham, 1938. B T9 1039 4333
 Yield 1,500 g.p.h. Aug. 1947. R.W.L. +34½. P.W.L. +21½. Yield 2,500 g.p.h. Aug. 1953. R.W.L. +34. P.W.L. +7. Yield 1,666 g.p.h. Nov. 1956. R.W.L. +38. P.W.L. +33½. Yield 2,600 g.p.h. Oct. 1960.
 (c) (Disused). Surface +100. Bore 222 x 6 in. Ck -83. R.W.L. +28. P.W.L. +16. Yield 1,800 g.p.h. (test). Buckingham, 1939. C T9 1039 4325
 Yield 600 g.p.h. Aug. 1947.
 (d) Surface +100. Lining tubes: 153¼ x 6 in. Ck -22. Water struck at -40. R.W.L. +18. R.E., Mar. 1942. D T9 1036 4317
 Yield 1,200 g.p.h. Aug. 1947. R.W.L. +32. P.W.L. +19½. Yield 4,500 g.p.h. Oct. 1952. R.W.L. +38. P.W.L. +19½. Yield 4,000 g.p.h. Oct. 1960. R.W.L. +44. Oct. 1964.
 (e) Surface +45. Bore 250 x 10 in reduced to 8 in at depth. Lining tubes: x 15 in to 51½; x 12 in to 128½; x 10 in to 182½; 76 x 8 in from 174 down (perforated). Ck -73. Water struck at -21 and -c.155. R.W.L. -10. P.W.L. -40. Recovered to -10 in 65 min. Suction -112. Yield 7,060 g.p.h. (14 d. test). Dando, Apr. 1952. E T9 1008 4380
 R.W.L. -13. P.W.L. -21. Yield 6,300 g.p.h. Nov. 1956. R.W.L. -7½. P.W.L. -12½. Yield 6,000 g.p.h. Oct. 1960.

(d)	Topsoil ...	2	2
Boulder Clay	Rubble sandy chalk and flints	8	10
(Buried channel)	Sandy chalk flints and stones	14	24
75	Grey chalk flints and stones	41	65
	Light brown clay, chalk		
	stones and flints ...	10	75
Sand and Gravel	Sand (blowing) and gravel	46½	121½
(Buried channel)	Flints	¼	122
47			
Uck	Chalk and flints (top 25 ft		
128	very soft)	128	250

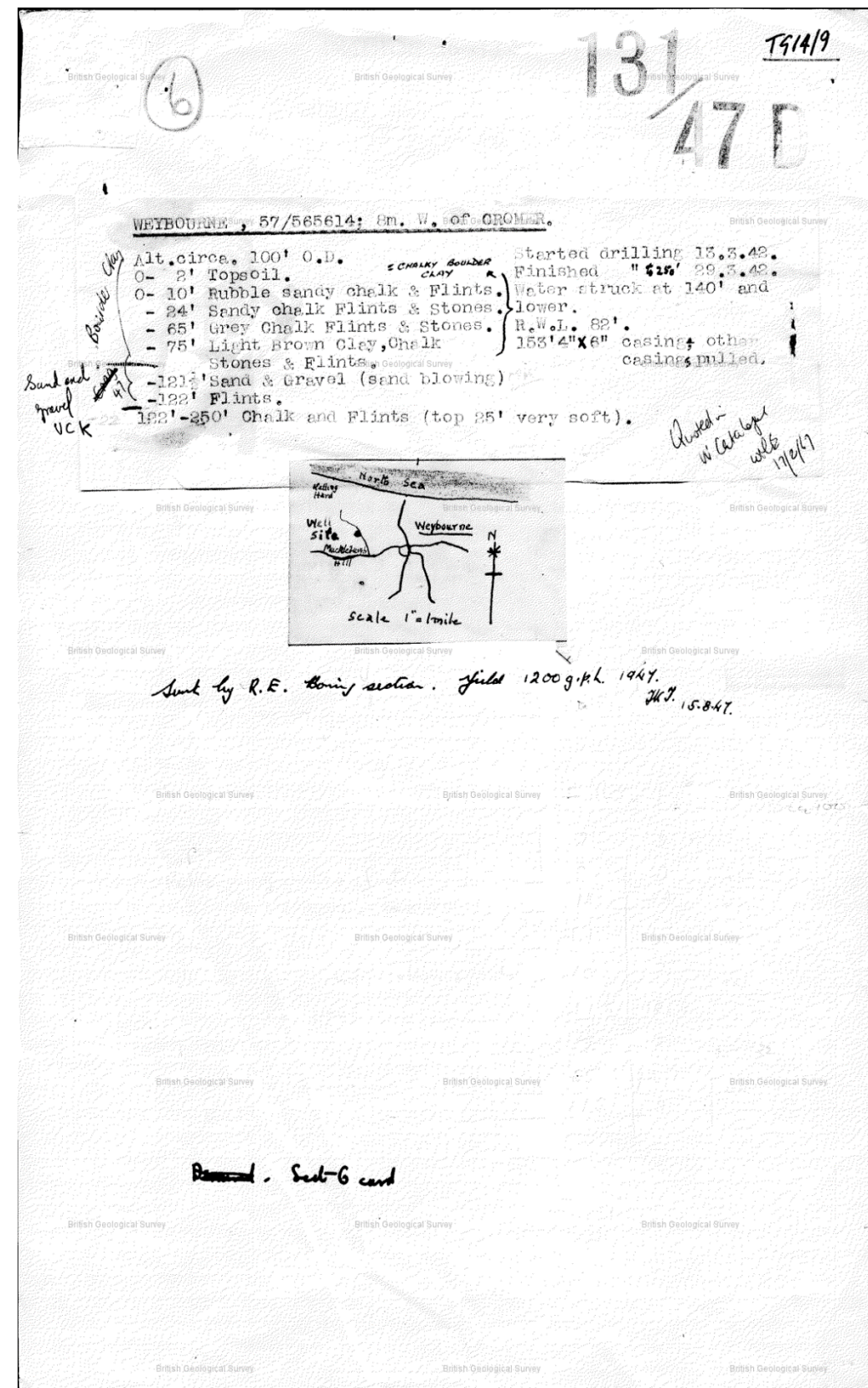
pp. W.M. Edmunds 17.2.67

GEOLOGICAL CLASSIFICATION

NATURE OF STRATA

THICKNESS
ft.

DEPTH
ft.



RECORD of WELL or BORING

Survey No.

1° N.S. 79

1° O.S.

at (house or farm)

Royal Hotel

British Geological Survey

British Geological Survey

Town, Village, &c. RAWCLIFFE

County YORKS:W.R.

Six-inch map

Exact site (unless a tracing from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on maps).

Edition (Sheet

map. Square

Surface level of ground ft. above Ordnance Datum. Well or Bore commenced at ft. surface level of ground.

Sunk ft., diameter ft. Bored ft.; diameter of boring at top ft., at bottom in.

Details of lining tubes (internal diameters preferred)

Water struck at depths of (feet)

Rest-level of water below top of well or bore ft. Pumping level ft. Time of recovery hours.

Suction at ft. depth. Yield: (i) on test galls. per (ii) normal galls. per.

Quantity (attach copy of analysis if available)

Made by for Mr.

Date of boring 1893

Information from

(For Survey use only).
GEOLOGICAL
CLASSIFICATION.

NATURE OF STRATA.
(and any additional remarks)

THICKNESS.

Feet. Inches.

DEPTH.

Feet. Inches.

For record see:-

'Water Supply of E. Riding'
Mem. Geol. Survey, 1906
p. 69

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W. 7.

For Survey use only.

Date
received.

G.S.M.

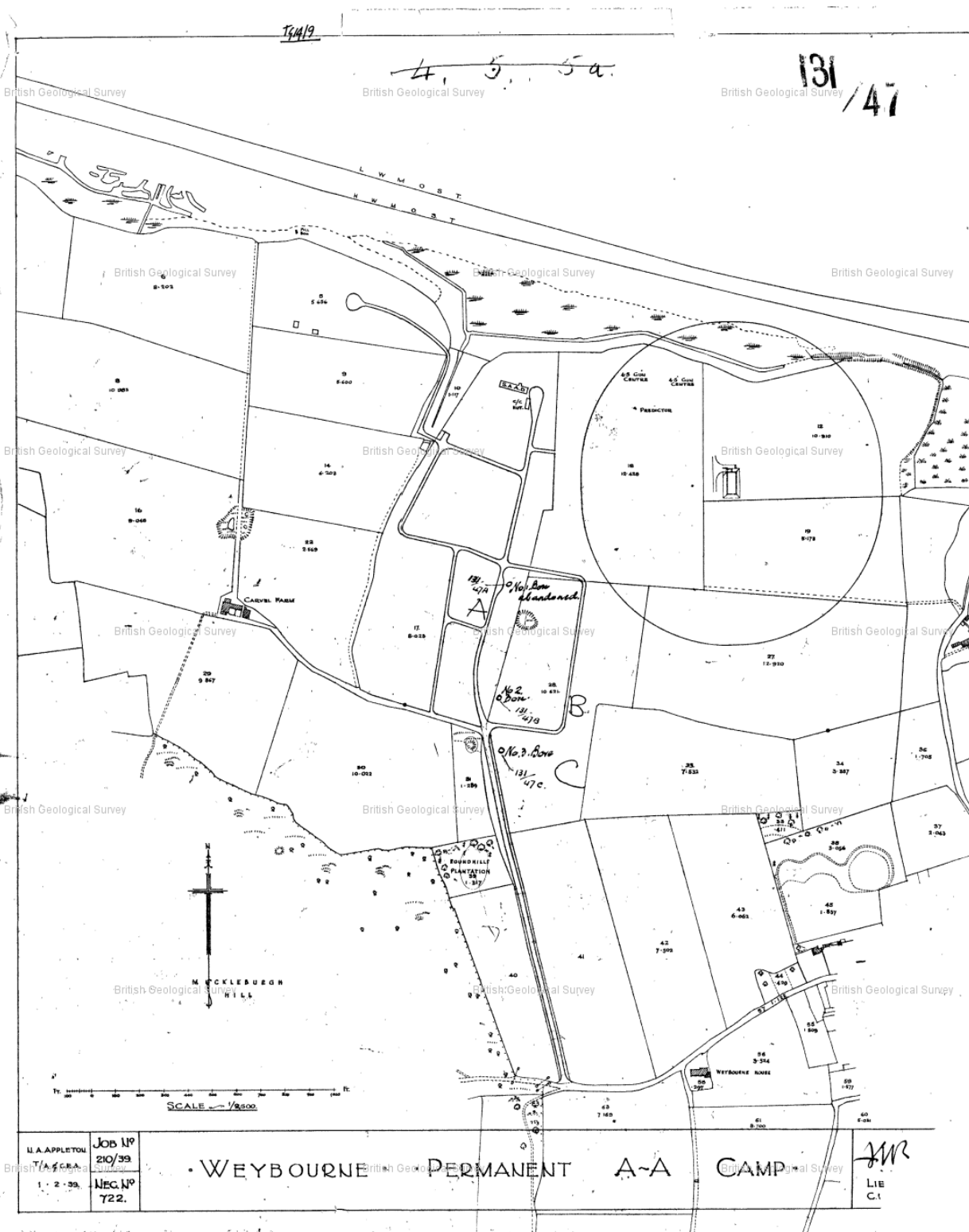
M. of H.
notified.

Site marked
on 1" map.

(24738C) Wt 26030/205 5,000 11/96
H, J, R & L, Ltd Gp 616

DATE	.	ADDITIONAL INFORMATION	INIT.
		Boulder clay 37 164 Shingle & stone 19 183	
	Vck 39	Chalk 39 222	
E		Sand and sandy clay 25 25 Sand 13 38 Sand and sandy clay 13 51 Pleist. Drift gravel 7 58 (Buried channel) gravel & some clay 7 65 118 Sandstone & sand 16 81 Sand 9 90 Sand & gravel 28 118 Stiff grey	
	Vck 132	Stiff grey plastic chalk 52 170 Chalk and flints 80 250	mjk
		DATA Bank	
FILMED		INSERT WELL REFERENCE LETTER, IF MORE THAN ONE WELL AT SITE	

Additional Information Sheet No. Commenced



A.1.5 TW13SW19

GEOLOGICAL CLASSIFICATION		NATURE OF STRATA	THICKNESS ft.	DEPTH ft.
192' { PLEIST DRIFT Crag }		Sand	110	
		Sand and clay	45	155
		Sand	17	172
		Black sand	10	182
		Sand and chalk	10	192
Uchalk 54'		Chalk	5	197
		Chalk & flints	32	229
		Chalk	17	246
p.p. W.M. Edmunds				

RECORD OF WELL (SHAFT OR BORE)

At Rifle Range (Pleached)
Town or Village Walsingham
County Norfolk Six-inch quarter sheet 18 S.E.W.
For Mr. _____

Exact site of well _____

Level of ground surface above sea-level (O.D.) 230 feet.
Is well-top at ground level? Yes. If not, state how far above; _____ feet.
below; _____ feet.

Shaft _____ ft., diameter _____ ft. Details of headings _____

Bore 240 ft.; diameter of bore: at top 4 ins.; at bottom _____ ins.
Lengths, diameters, perforations, etc., of lining tubes _____

Water struck at depths, below well-top, of (feet) _____

TEST DETAILS Rest-level of water 85 ft. above well-top. Suction at _____ ft. Yield on _____ hours' days' pumping 600 gallons per hour (max. capacity of pump _____ g.p.h.),
Month June Year 1939 with depression of 15 feet. Recovery to _____ in _____ mins. hours.

WORKING CONDITIONS Rest-level of water in _____ (month), _____ (year), _____ ft. above well-top.
Highest " in _____ (month), _____ (year), _____ ft. above below "
Lowest " in _____ (month), _____ (year), _____ ft. above below "
Suction at _____ ft. Rate of pumping _____ galls. per _____ for _____ hours per day.
with average depression of _____ ft. Recovery to _____ in _____ mins. hours

Quality of water (attach copy of analysis if available) A. W. BARNHAM,
Well made by WALSINGHAM- Date of well June 1939
Information from DO

ADDITIONAL NOTES.
Coated tube 2 3/4" 16 120'
Visited & cited. Still in use intermittently. No details available. JWS
Visited. Building locked. MGC 14/7/60. 208.47.

LOG OF STRATA OVERLEAF.

Date received.	G.S.M. Office File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (use symbol) on 1" Map.	on 6" Map.
		<u>131</u>			<u>⊙</u>

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.
(17208) Wt. 42901/0877 10,000 2/41 A.S. & W.Ltd. Op. 686

RECORD OF WELL (SHAFT OR BORE)

At Rifle Range (Pleached)
Town or Village Walsingham
County Norfolk Six-inch quarter sheet 18 S.E.W.
For Mr. _____

Exact site of well _____

Level of ground surface above sea-level (O.D.) 230 feet.
Is well-top at ground level? Yes. If not, state how far above; _____ feet.
below; _____ feet.

Shaft _____ ft., diameter _____ ft. Details of headings _____

Bore 240 ft.; diameter of bore: at top 4 ins.; at bottom _____ ins.
Lengths, diameters, perforations, etc., of lining tubes _____

Water struck at depths, below well-top, of (feet) _____

TEST DETAILS Rest-level of water 85 ft. above well-top. Suction at _____ ft. Yield on _____ hours' days' pumping 600 gallons per hour (max. capacity of pump _____ g.p.h.),
Month June Year 1939 with depression of 15 feet. Recovery to _____ in _____ mins. hours.

WORKING CONDITIONS Rest-level of water in _____ (month), _____ (year), _____ ft. above well-top.
Highest " in _____ (month), _____ (year), _____ ft. above below "
Lowest " in _____ (month), _____ (year), _____ ft. above below "
Suction at _____ ft. Rate of pumping _____ galls. per _____ for _____ hours per day.
with average depression of _____ ft. Recovery to _____ in _____ mins. hours

Quality of water (attach copy of analysis if available) A. W. BARNHAM,
Well made by WALSINGHAM- Date of well June 1939
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ADDITIONAL NOTES.
Coated tube 2 3/4" 16 120'
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Visited. Building locked. MGC 14/7/60. 208.47.

LOG OF STRATA OVERLEAF.

Date received.	G.S.M. Office File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (use symbol) on 1" Map.	on 6" Map.
		<u>131</u>			<u>⊙</u>

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.
(17208) Wt. 42901/0877 10,000 2/41 A.S. & W.Ltd. Op. 686

A.1.6 TG13SW5

[illegible]

DATA ACQUISITION SHEET

British Geological Survey

British Geological Survey

147

CSC/D/163

British Geological Survey

NRA region: ANGLIAN (NORWICH)

7G13/103

P25

File Number: 34/6/G/EN331

7G13 SW/S

Pump Well Identification:

NRA id No: 34/6/G/EN331

BGS (WL) No: 7G13/103

NGR: TG 1155 3320

Elevation: 65.88 m

Measuring Point:

C.J. LEE

Site Name: SHRUB FARM

Locality: EDGE FIELD

British Geological Survey

Well details:

depth of pumping well: 100 m

diameter: 460 mm

casing details: 15" solid to 71.2 m

☒ observation boreholes

number of obs bhs: 4 bhs in CH

1 well in drift

obs bh details:

no detail

British Geological Survey

British Geological Survey

Aquifer Details:

Confined

confined / ~~unconfined~~

If confined, confining layer: Drift

British Geological Survey

British Geological Survey

British Geological Survey

Aquifer Geology	from	to	Aquifer Geology	from	to
<u>Sands to 15.15 m</u>					
<u>Clay 24.2 m</u>					
<u>Calc and Flint Ch 37.8 m</u>					
<u>CH 37.8 to 45.45</u>					
<u>Sand? 45.45 to 76.4?</u>					
<u>CHALK</u>	<u>100 m</u>				

British Geological Survey

British Geological Survey

British Geological Survey

Pumping Test Details:

STEP TEST 19.3.92

date of test: CONSTANT RATE 11.8.92 - 25.8.92

length of test: 14 days

RWL: 7.37 m

PWL: 39.22

Drawdown 32.2 m (at 13 l/s)

pumping rate: 15 l/s

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

Additional Well Information:

- ☐ Well Loss Data: B..... C..... Efficiency.....
☒ Well Acidified
☐ Flow Logs
☐ Other Geophysical Logs
☐ Fissure Information: major inflows from.....to.....
from.....to.....
from.....to.....

Aquifer Parameters:

Analysis Type:

Transmissivity: see tabulation attached

Storage Coefficient:

Analysis Type:

Transmissivity:

Storage Coefficient:

Analysis Type:

Transmissivity:

Storage Coefficient:

Other Data:

values used for predictions

$T = 160 \text{ m}^2/\text{d}$

$S = 2.6 \times 10^{-3}$

Confidence:

excellent



very poor

Notes:

Values for predictive purposes obtained from Jacob II
Distance data because these could be gauged against observed
drawdowns in the area during the test.

TG13/103

P25

RANGE OF VALUES FOR CHALK AQUIFER (EDENFELD)

SOURCE METHOD K_D S

PROD BORE

EDEN & HAZEL STEP

STEP 2

91 m²/d

STEP 3

66 m²/d

STEP 4

42 m²/d

COOPER JACOB PUMPING

91 m²/d, 108 m³/day

COOPER JACOB RECOVERY

75 m²/d

LATE RECOVERY 242 m²/day

SHRUB FARM

OBS BORE

COOPER JACOB EARLY PUMPING

306 m²/d

MIDDLE

LATE

453 m²/d

1053 m³/d

1119 m³/d

COOPER JACOB RECOVERY

578 m²/day

453 m³/day

TYPE CURVE Pumping data

288 m²/d

380 m²/d

Blackhall Farm

Cooper Jacob pumping

1890 m²/d

1977 m³/d

Recovery

494 m³/d

Shrub Farm Agri. bore C.J. Pumping

1987 m³/d

1557 m³/d

Distance/Drawdown

JACOB II

162 m²/d

24/06 2002 MON 12:08 FAX 01159363458

TG135W 5 113-332

DEREHAM WATER SUPPLIES LTD. T913/103

THE WHITE HOUSE, BRADENHAM ROAD, SCARNING, DEREHAM, NORFOLK, NR19 2LA
V.A.T. Reg. No. 304 7022 04

**WATER MAINS LAID
ALL TYPES OF PUMPS
SUPPLIED & REPAIRED
GENERATOR HIRE
PUMP HIRE**

**BOREHOLES DRILLED
ACIDISED & TESTED**

WELL LOG

Tel.: WENDLING (036287) 613
FAX No.: (036287) 612

CUSTOMER'S NAME: P. J. G. SEAMAN SITE: GREAT FARM

GRID REF: FG. 113 332 DATE:

DIA.: LINED TO: 235 FT. 18" DIA.;

[illegible]

CUSTOMER SIGN DEPTH
.....

DRILLER.....

RIG REST WATER LEVEL

REGISTERED OFFICE: ARANHAM ROAD, CHAMPAWAT, NEERAMMA MOOREN P.

A.1.7 TG13SW17

RECORD OF WELL		For Survey use only Licence No. L/31/563	
At 8 Shrub Farm		147/562	
Town or Village Saxthorpe		TG13/1	
County Northfolk			
EXACT SITE OF WELL	Six-inch sheet 18 SE 14	Six-inch National Grid sheet 76 45 323-4	
For Mr. C.J.F. Lee	State whether owner, tenant, builder, contractor, consultant, etc.:—		
Address (if different from above) _____			
Level of ground surface above sea level (O.D.) 9/10 x 175 ft. <small>4.2m C map</small>			
If well top is not at ground level, state how far above: * _____ ft. below: _____ ft.			
SHAFT _____ ft.; diameter _____ ft.; HEADINGS (please attach details—dimensions and directions) _____			
BORE 179 ft.; diameter of bore: at top _____ in.; at bottom _____ in.			
Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.) _____			
Water struck at depths of _____ ft. below well top.			
TEST CONDITIONS	Rest level of water 48 ft. above* well top. Suction at _____ ft. Yield on _____ hours' test pumping at 700 galls. per 7.2 mins. with depression to 62 ft. below well top.		
	Recovery to rest level in 3 mins. Capacity of pump _____ g.p.h. Date of measurements 1965		
DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:			
Make and/or type _____ Motive power _____			
Capacity _____ galls. per hour. Suction at _____ ft. below well top.			
Amount pumped _____ galls. per day. Estimated consumption _____ galls. per week.			
Well made by J. Thorne & Son Ltd Date of sinking _____			
Information from Springton Road, Norfolk			
ADDITIONAL NOTES		ANALYSIS (please attach copy if available)	
For Survey use only			
		Date Received 16.2.66	
		Section 6 _____	
		Pumping test _____	
		Observ. well _____	
		Recorder _____	
		ER. log _____	
		Site marked on	
		1" map Q 10	
		6" map Q 17.2.66 (use symbol)	
		Record forwarded	
		to _____	
		date _____	
GEOLOGICAL SURVEY, WATER DIVISION, SOUTH KENSINGTON, LONDON, S.W.7.			

(For Surveys use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
	If measurements start below ground surface, state how far ...	Feet	Inches	Feet	Inches
			
Glacial Land + Gravel on till.	Top Soil	1	-	1	-
	Loam	3	-	4	-
	Brown Sand	8	-	12	-
	Brown sand & stone	7	-	19	-
	Yellow Clay	32	-	51	-
	Brown sand layers of clay	37	-	88	-
	Slate grey clay	12	-	100	-
	" " Sand.	22	-	122	-
U. block	Stones	8	-	130	-
	Chalk	49	-	179	-
Lg. 18.2.66					

N. 11861

147/562

TA 13/1

MINISTRY OF HOUSING & LOCAL GOVERNMENT

Section 14 of the Water Act 1945

Licence No. L/31/663

The Norfolk and Suffolk Area (Conservation of Water)

Order 1956

In this licence:-

(a) "the Minister" means the Minister of Housing and Local Government;

(b) a group of two letters and eight figures represents the map co-ordinates of the proposed position of the borehole which is the subject of this licence, estimated to the nearest ten metres on the grid of the national reference system used by the Ordnance Survey on its maps and plans.

The Minister, in exercise of his powers under section 14(6) of the Water Act 1945, hereby licenses Mr. C. J. Lee to construct a borehole for the purpose of abstracting underground water at Shrub Farm, Corpusty, in Norfolk, national grid reference TG/11453234, subject to the following conditions:-

1. The depth of the borehole shall not exceed 100 feet.
2. The capacity of the pump to be installed for abstracting water from the borehole shall not exceed 750 gallons per hour.
3. Except with the consent of the Minister given after like proceedings with respect to the publication and service of notices, and the making and hearing of objections, as apply to applications for licences under section 14(6) of the Water Act 1945, not more than 5,000 gallons of water shall be abstracted from the borehole in any one day of 24 hours.
4. If the borehole is not constructed within one year from the date of this licence, the licence shall cease to have effect.

GIVEN under the Official Seal of the

Minister of Housing and Local Government

on 30 November 1964

H. J. RYAN
Assistant Secretary
Ministry of Housing and Local Government

Sited by Norfolk 18 SE/W.

N.B. UNDER THE WATER ACT 1945, IT IS AN OFFENCE PUNISHABLE BY FINE TO CONTRAVENE ANY CONDITION ATTACHED TO THIS LICENCE.

R.F. sent 12.69.

Page 2

A.1.8 TG02NE26



Geological Survey **NGRC**
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET

BH REGISTRATION NUMBER**RECORDS ENTERED AND HELD BY WALLINGFORD**

British Geological Survey
BH REGISTRATION NUMBER(S)

Eastern A.W.A.		RECORD OF WELL		For Institute use only Licence No. N-.....	
		At <u>RED PIT FARM</u>		Tg02/P5	
		Town or Village <u>WOOD DALLING</u>			
		County <u>NORFOLK</u>			
EXACT SITE OF WELL		147		Tg02/NE	
		Six-inch National Grid sheet and reference <u>TG 0998 2878</u>			
		For <u>D.E. WILLIAMS AND RED PIT FARM LTD</u>			
		State whether owner, tenant, builder, contractor, consultant, etc.:			
		Address (if different from above)			
*DELETE AS NECESSARY		Level of ground surface above sea level (O.D.) ft (..... m)			
		If well top is not at ground level state how far above* ft (..... m) below:			
		SHAFT ft (..... m); diameter ft (..... m);			
		HEADINGS (please attach details—dimensions and directions)			
		BORE <u>200</u> ft (<u>60.96</u> m); diameter: at top <u>8</u> in (<u>203</u> mm); at bottom in (..... mm)			
		Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.): <u>Steel lining tubes (115ft) 35.05m</u>			
TEST CONDITIONS		Water struck at depths of ft (..... m) below well top			
		Rest level of water ft (..... m) above* ft (..... m) below well top. Suction at ft (..... m)			
		Yield on hours* test pumping at galls per l/s with depression to days' ft (..... m) below well top. Recovery to rest level in mins*			
		Capacity of pump g.p.h. (..... l/s)			
		Date of measurements			
NORMAL CONDITIONS		DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:			
		Make and/or type Motive power			
		Capacity galls (..... m³) per hour. Suction at ft (..... m) below well top. Amount pumped galls (..... m³) per day. Estimated consumption galls (..... m³) per week			
		Well made by <u>F.H.V. HEUSON & SON</u> Date of sinking <u>JUNE 1988</u>			
		ADDITIONAL NOTES ANALYSIS (please attach copy if available)			
LOG OF STRATA OVERLEAF					

INSTITUTE OF GEOLOGICAL SCIENCES
HYDROGEOLOGY UNIT
EXHIBITION ROAD
LONDON SW7 2DE

Received from A.W.A. Norwich
Division

Date 22.9.88

Observation well

Recorder

ER log

Site marked on
1" map

6" map—Grid Sheet

(use symbol)

Copy to

Date

DATA ACQUISITION SHEET

CSC/D/093

NRA region: **ANGLIAN (NORWICH)**
File Number: **pump test file 34/6 (11)**

P15

7902/95

Pump Well Identification:

NRA id No: **34/6/D/218**
BGS (WL) No: **7902/95**
NGR: **TG 099 287**
Elevation: **c47m00**
Measuring Point:
D.G. WILLIAMS
Site Name: **RED PIT FARM**
Locality: **WOOD DALLING**

Well details:

depth of pumping well: **61.0m**
diameter: **200mm**
casing details: **plain steel to 35m**
☒ observation boreholes
number of obs bhs: **4**
obs bh details: **NA**

Aquifer Details:

confined / **unconfined**

If confined, confining layer: **Boulder clay**

Aquifer Geology	from	to	Aquifer Geology	from	to
clay 25.3 stg 30.0					
CHALK	30.0	61.0			

Pumping Test Details:

date of test: **28 MARCH 1988**
length of test: **5 hours**
RWL: **6.32m bgl**
PWL: **31.26m bgl at end of test**
pumping rate: **Av. 1.96 l/s; 169 m³/d** **END OF TEST**
(max 2.2 l/s min 1.7 l/s) **Q = 1.88 l/s**

Additional Well Information:

☐ Well Loss Data: B..... C..... Efficiency.....
☒ Well Acidified **NO**
☐ Flow Logs
☐ Other Geophysical Logs
☐ Fissure Information: major inflows from.....to.....
from.....to.....
from.....to.....

Aquifer Parameters:

Obs 3 +?
Analysis Type: **JACOBI**
Transmissivity: **233 m²/d 150 m²/d**
Storage Coefficient: **3.32 x 10⁻⁴ 2.14 x 10⁻⁴**

Analysis Type:

Transmissivity:
Storage Coefficient:

Analysis Type:

Transmissivity:
Storage Coefficient:

Other Data:

Values used for assessment
T = 233 m²/d
S = 3.32 x 10⁻³
have also done to those actually observed

Confidence:

excellent ☐ ☐ ☐ ☐ ☒ very poor

Notes: *Massive dlns recorded for v small yield
Initial Q reduced to prevent wL falling to pump inlet
Flow meter u/s after 5min - Q later reduced further
No recovery readings for first 5min complete recovery by 15 hrs
Test bh data unusable for dln etc.*

A.1.9 TG12SW1

RECORD OF WELL		For Institute use only Licence No. E7/34/11/9/489
At		147/606
Town or Village	BOOTON	
County	NORFOLK	
SIX- INCH SITE	Six-inch National Grid sheet and reference	TQ 1237 2235 TQ 12SW
OF WELL	For	BOOTON FARMS LTD
	State whether owner, tenant, builder, contractor, consultant, etc.	OWNER
	Address (if different from above)	OXNEAD HOUSE, OXNEAD, NORWICH
	Level of ground surface above sea level (O.D.)	ft () m
DELETE	If well top is not at ground level state how far above below:	ft () m
AS	SHAFT	ft () m; diameter: ft () m;
NECESSARY	HEADINGS (please attach details—dimensions and directions)	
	BORE	250 ft () m; diameter: at top: 12 in () mm; at bottom: in () mm
	Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.):	LINED WITH 12" DIA. TUBES TO 109 ft
	Water struck at depths of	ft () m below well top
	Rest level of water	ft () m above* below well top. Suction at: ft () m
TEST	Yield on	hours* test pumping at: galls per () l/s with mins* depression to: ft () m below well top. Recovery to rest level in: hours
CONDITIONS	Capacity of pump	g.p.h. () l/s
	Date of measurements	
	DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:	
	Make and/or type	Motive power
NORMAL	Capacity	galls () m ³ per hour. Suction at ft () m
CONDITIONS	below well top. Amount pumped	galls () m ³ per day. Estimated consumption galls () m ³ per week
	Well made by	T. W. PAGE & SON LTD Date of sinking
	ADDITIONAL NOTES	ANALYSIS (please attach copy if available)
LOG OF	Drillers log attached	
STRATA		
OVERLEAF		
INSTITUTE OF GEOLOGICAL SCIENCES HYDROGEOLOGY UNIT EXHIBITION ROAD LONDON SW7 2DE		
Received from A.W.P. Date 19/8/83 Observation well Recorder ER log Site marked on 1" map 6" map—Grid Sheet (use symbol) Copy to E.A.R.S.E. Date		

RECORD OF WELL		For Institute use only Licence No. E7/34/11/9/489
At		147/606
Town or Village	BOOTON	
County	NORFOLK	
SIX- INCH SITE	Six-inch National Grid sheet and reference	TQ 1237 2235 TQ 12SW
OF WELL	For	BOOTON FARMS LTD
	State whether owner, tenant, builder, contractor, consultant, etc.	OWNER
	Address (if different from above)	OXNEAD HOUSE, OXNEAD, NORWICH
	Level of ground surface above sea level (O.D.)	ft () m
DELETE	If well top is not at ground level state how far above below:	ft () m
AS	SHAFT	ft () m; diameter: ft () m;
NECESSARY	HEADINGS (please attach details—dimensions and directions)	
	BORE	250 ft () m; diameter: at top: 12 in () mm; at bottom: in () mm
	Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.):	LINED WITH 12" DIA. TUBES TO 109 ft
	Water struck at depths of	ft () m below well top
	Rest level of water	ft () m above* below well top. Suction at: ft () m
TEST	Yield on	hours* test pumping at: galls per () l/s with mins* depression to: ft () m below well top. Recovery to rest level in: hours
CONDITIONS	Capacity of pump	g.p.h. () l/s
	Date of measurements	
	DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:	
	Make and/or type	Motive power
NORMAL	Capacity	galls () m ³ per hour. Suction at ft () m
CONDITIONS	below well top. Amount pumped	galls () m ³ per day. Estimated consumption galls () m ³ per week
	Well made by	T. W. PAGE & SON LTD Date of sinking
	ADDITIONAL NOTES	ANALYSIS (please attach copy if available)
LOG OF	Drillers log attached	
STRATA		
OVERLEAF		
INSTITUTE OF GEOLOGICAL SCIENCES HYDROGEOLOGY UNIT EXHIBITION ROAD LONDON SW7 2DE		
Received from A.W.P. Date 19/8/83 Observation well Recorder ER log Site marked on 1" map 6" map—Grid Sheet (use symbol) Copy to E.A.R.S.E. Date		

147/606
TG12 SW/1

BRITISH GEOLOGICAL SURVEY

ANGLIAN WATER AUTHORITY - NORFOLK AND SUFFOLK RIVER DIVISION

BRITISH GEOLOGICAL SURVEY

K.A. Buckley. Our Ref. P.O. Box 50,
B.Sc. Tech. C.Eng., Norwich.
M.I.C.E., N.I.W.E.S. Your Ref. NRL 1BR
Divisional Engineer.

- 7 DEC
.....1982

BRITISH GEOLOGICAL SURVEY

The Director,
Institute of Geological Sciences,
Exhibition Road,
South Kensington,
London. S.W.7

BRITISH GEOLOGICAL SURVEY

Notification of new wells and boreholes
for water under the Water Resources Act, 1963

Licence Number E7: 34: 11: 6: 409: dated the 31/1/77
 Consent under Section 24(9) dated the 5/3/76
 has been issued to Boston Farms Ltd
 Oxnard House
 Oxnard
 Norwich
 authorising the construction of a new well/borehole at
 Nat. Grid Ref: TG1237 2235 Depth 250 ft Diameter 6 ins
 by the contractors Messrs T.W. Page & Son
 Buxton Road
 Frettenham

British Geological Survey

British Geological Survey

British Geological Survey

H A Buckley *MR.*

DIVISIONAL ENGINEER

British Geological Survey

British Geological Survey

British Geological Survey

For Institute use only

Geological Classification

| NATURE OF STRATA

If measurements start below ground surface, state how far.

| THICKNESS

DEPTH

<i>r.</i>	Feet	Inches	Metres	Feet	Inches	Metres
-----------	------	--------	--------	------	--------	--------

[illegible]

147/606
TG12SW/1

LICENCE NO. E713411/G1409
TELEPHONE: NORWICH 898071 N.G.R. TG 1237 2235

T. W. PAGE & SON LTD.
DIRECTORS: T. W. PAGE, L. H. PAGE, F. H. PAGE
Water Supply Engineers and Artesian Well Borers
Welding and General Engineers
BUXTON ROAD FRETtenham NORWICH, NR12 7NQ

Anglian Water Authority,
Norfolk & Suffolk Rivers Division,
Yare House,
62/64 Thorpe Road,
Norwich.

May 19th,
1976
GEB/MG

Dear Sirs,

Borehole Log : Booton Farms, Booton

Further to my discussion with Mr. Ashford regarding the bore sunk
at the above, we have pleasure in forwarding details of same, as requested:-

Total depth of bore 250 ft.
Diameter 12"
Lined with 12" dia. tubes to 109 ft.

Details of strata	Depths in feet
Top soil.....	1 ft.
Brown clay.....	5 ft.
Brown sand.....	45 ft.
Sand and stones....	9 ft.
Grey clay.....	10 ft.
Stones.....	9 ft.
Chalk.....	163 ft.
	250 ft.

*C-51G
+ T-11
? have left
ucl.k.*

We trust these details meet with your requirements.

Yours faithfully,
T.W. PAGE & SON LTD.
G. E. Brooke
G. E. Brooke.

19 MAY 1976
62 64/16
12 ft AWH.

Registered in England at 35 Exchange Street, Norwich. Registered No. 756534
V.A.T. Registered No. 105 6983 60

147/606
TG12/92

ANGLIAN WATER AUTHORITY - NORFOLK AND SUFFOLK RIVER DIVISION

K.A. Buckley. Our Ref.
B.Sc. Tech, C.Eng.,
M.I.C.E., M.I.W.E.S. Your Ref.
Divisional Engineer.

P.O. Box 50,
Norwich.
NR1 1BR
- 7 DEC1982

The Director,
Institute of Geological Sciences,
Exhibition Road,
South Kensington,
London. S.W.7

Notification of new wells and boreholes
for water under the Water Resources Act, 1963

Licence Number E7: 34: 11: 6: 409: dated the 31/1/77

Consent under Section 24(9) dated the 5/3/76

has been issued to Booton Farms Ltd.
Oxnead House
Oxnead
Norwich

authorising the construction of a new well/borehole at

Nat. Grid Ref: TG 1237. 2235. Depth 250 ft. Diameter 12 ins.

by the contractors Messrs T.W. Page & Son
Buxton Road
Frettenham

K.A. Buckley M.R.
DIVISIONAL ENGINEER

A.1.10 TG12SW27

British Geological Survey

British Geological Survey

British Geological Survey

147/606

TGR/92

LICENCE NO. E7134/11/G/1409

TELEPHONE: NORWICH 898071 N.G.R. TG 1237 2235

T. W. PAGE & SON LTD.

DIRECTORS: T. W. PAGE I. H. PAGE F. H. PAGE

Water Supply Engineers and Artesian Well Borers

Welding and General Engineers

BUXTON ROAD FRETtenham NORWICH, NR12 7NQ

Anglian Water Authority,
Norfolk & Suffolk Rivers Division,
Yare House,
62/64 Thorpe Road,
Norwich.

May 19th,
1976

GEB/MG

Dear Sirs,

Borehole Log : Booton Farms, Booton

Further to my discussion with Mr.Ashford regarding the bore sunk
at the above, we have pleasure in forwarding details of same, as requested:-

Total depth of bore 250 ft.
Diameter 12"
Lined with 12" dia. tubes to 109 ft.

Details of strata

Depths in feet

1-5-9
Til
P lower
CHK

Top soil.....

Brown clay.....

Brown sand.....

Sand and stones....

Grey clay.....

Stones.....

Chalk.....

1 ft.

5 ft.

45 ft.

9 ft.

10 ft.

9 ft.

163 ft.

250 ft.

We trust these details meet with your requirements.

Yours faithfully,
T.W.PAGE & SON LTD.
G.E. Brooke.

REGISTERED IN ENGLAND AT 35 EXCHANGE STREET, NORWICH. REGISTERED NO. 756534

V.A.T. REGISTERED NO. 105 6983 60



NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET TG12SW

BH REGISTRATION NUMBER 5-34

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

147/72 The Grove, Booton (formerly War Department). (? Filled in) TQ 1226 2162			
Surface +140. Bore 4 in. Lining tubes: 134%. R.W.L. +124. Yield 600 g.p.h. (test). Fake, May 1941.			
TC12/53			
Boulder Clay ...	...	5%	5%
Sand and Gravel...	...	53	58%
Boulder Clay ...	...	26	84%
Uck	...	68%	152%

BOULDER CLAY 5 1/2	TOP SOIL	1' 6"	1' 6"
	BRICK BARTH	4' 0"	5' 6"
SAND AND GRAVEL 53	LOAM SAND	4' 6"	10' 0"
	LIGHT GREY CLAY	8' 0"	18' 0"
	FINE LIGHT GREY SAND	25' 0"	43' 0"
	LIGHT BROWN SAND	12' 6"	55' 6"
BOULDER CLAY 26	SAND AND SHINGLE	3' 0"	58' 6"
	GRAY CLAY	3' 6"	62' 0"
U. CHALK 68 1/4	BLUE CLAY	22' 6"	84' 6"
	SOFT CHALK (TUBED)	50' 1"	134' 7"
	HARD CHALK	18' 3"	152' 10"

RECORD OF WELL (SHAFT OR BORE)
At Searchlight to R.E.
Town or Village Boaton
County Norfolk Six-inch quarter sheet 38 SE/W.
For Mr. War Office
Exact site of well 700 yds SSW of church. Attach a tracing from a map, or a sketch-map, if possible.

Level of ground surface above sea-level (O.D.) +140 feet.
Is well-top at ground level? If not, state how far above ; feet.
below ; feet.
Shaft ft., diameter ft. Details of headings
Bore 152' 10" ft.; diameter of bore: at top 4 ins.; at bottom ins.
Lengths, diameters, perforations, etc., of lining tubes
Water struck at depths, below well-top, of (feet)
TEST DETAILS Rest-level of water 16 ft. above well-top. Suction at ft. Yield on hours' days' pumping 600 gallons per hour (max. capacity of pump g.p.h.),
Year 1941 with depression of feet. Recovery to in mins. hours.
WORKING CONDITIONS Rest-level of water in (month), (year), ft. above well-top. below
Highest in (month), (year), ft. above below
Lowest in (month), (year), ft. above below
Suction at ft. Rate of pumping galls. per for hours per day.
with average depression of ft. Recovery to in mins. hours.
Quality of water (attach copy of analysis if available)
Well made by W. & G. Fake, Norwich Date of well May 1941
Information from Do
ADDITIONAL NOTES.
Site visited 20/8/41 V.B.
Discussed.
Surface & well top at 140.
Site in Norfolk 38 SE/W.
Visited. Belongs to The Grove, Booton. Site of bore indicated by farmworker slightly north of site given on 6" map. which is beside the former buildings. No trace of bore now - ? filled in. Site not altered.
(27.60 ASL.
LOG OF STRATA OVERLEAF.
GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.
Date received May 1941 G.S.M. Office File No. 1" N.S. Map No. 147 1" O.S. Map No. Site marked (use symbol) on 1" Map. on 6" Map.
(17208) Wt.42901/0877 10,000 2/41 A.& E.W.Ltd. Gp.686

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far... ..	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
Boulder Clay 5 1/2	Top soil	1	6	1	6
	Brickearth	4	.	5	6
Sand and Gravel 53	Loam sand	4	6	10	-
	Light grey clay	8	.	18	-
	Fine light grey sand	25	.	43	-
	Light brown sand	12	6	55	6
	Sand & shingle	3	.	58	6
Boulder Clay 26	Grey clay	3	6	62	-
	Blue Clay	22	6	84	6
Uck 68 1/4	Soft Chalk (rubbled)	50	1	134	7
	Hard Chalk	18	3	152	10
RA/ 1965					

3. RECORD OF WELL (SHAFT OR BORE)

147
72
TA12/SB2

At _____
Town or Village Bopton, 14 m. S.E. of Fakenham
County _____ Six-inch quarter sheet
For Mr. _____
Exact site of well See tracing Attach a tracing from a map, or a sketch-map, if possible.
Level of ground surface above sea-level (O.D.) 140 feet.
Is well-top at ground level? _____ If not, state how far above; _____ feet.
below; _____ feet.
Shaft _____ ft., diameter _____ ft. Details of headings _____
Bore 153 ft.; diameter of bore: at top _____ ins.; at bottom _____ ins.
Lengths, diameters, perforations, etc., of lining tubes 134 1/2 x
Water struck at depths, below well-top, of (feet) _____
TEST DETAILS Rest-level of water 16 ft. above well-top. Suction at _____ ft. Yield on _____ hours' days' Month _____ pumping 570 gallons per hour (max. capacity of pump _____ g.p.h.), Year _____ with depression of _____ feet. Recovery to _____ in _____ mins. hours.
WORKING CONDITIONS Rest-level of water in _____ (month), _____ (year), _____ ft. above well-top. Highest „ in _____ (month), _____ (year), _____ ft. above „ Lowest „ in _____ (month), _____ (year), _____ ft. above „ Suction at _____ ft. Rate of pumping _____ galls. per _____ for _____ hours per day. with average depression of _____ ft. Recovery to _____ in _____ mins. hours.
Quality of water (attach copy of analysis if available) _____
Well made by _____ Date of well ? 1941.
Information from Garrison Engines, Holt, per Mr. W.H. Macfadyen, R.E.
ADDITIONAL NOTES.
LOG OF STRATA OVERLEAF.
GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.
Date received. G.S.M. Office File No. 1" N.S. Map No. 1" O.S. Map No. Site marked (use symbol) on 1" Map. on 6" Map.
(17208) Wt. 42901/0877 10,000 2/41 A. & E.W. Ltd. Gp. 686

For Survey see only GEOLOGICAL CLASSIFICATION		NATURE OF STRATA If measurements start below ground surface, state how far... ..		THICKNESS Feet Inches		DEPTH Feet Inches	
Boulders clay 5 1/2	Topsoil	1	6				
	Brickearth	4	0	5	6		
	Loam sand	4	6	10	0		
Sand and Gravel 5 3/4	Light grey clay	9	0	18	0		
	Light grey sand	25	0	43	0		
	Light loam sand	12	6	55	6		54 1/2
	Sand and shingle	3	0	58	6		58 1/2 32
Boulder clay 26	Gray clay	3	6	62	0		+78
	Blue clay	22	6	84	6		+55 1/2
Uck	Soft chalk	20	0	104	6		
	Hard chalk	28	6	152	10		
RA/1965		DATA Bank					

A.1.11 TG11NW79



NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET TGIINW

BH REGISTRATION NUMBER 44-97

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

147/553 Hall Road Farm, Alderford (formerly Red House farm)

Surface +95. Shaft x c.3. Brick lined. Date unknown.
R.W.L. +43. Handpump. May 1965. TA11/186

Plast. Drift)
UCR)

Re-classified by

F. Cox.
23.5.71

NO DETAILS KNOWN

For Survey use only Licence No. 147/553 TA11/186

RECORD OF WELL
Hall Road
At Red House Farm,
Town or Village Alderford.
County Norfolk.

EXACT SITE OF WELL
Six-inch sheet 50 NE/W. Six-inch National Grid sheet.

For Mr. & Mrs. Gray
State whether owner, tenant, builder, contractor, consultant, etc.:-

Address (if different from above)
Level of ground surface above sea level (O.D.) + c. 95 ft. If well top is not at ground level, state how far above: * below: *
SHAFT 58 ft.; diameter c. 3 ft.; HEADINGS (please attach details dimensions and directions)
BORE 58 ft.; diameter of bore: at top in.; at bottom in.
Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.)

TEST CONDITIONS
Water struck at depths of ft. below well top.
Rest level of water ft. above* well top. Suction at ft. Yield on hours' test days' test
pumping at galls. per with depression to ft. below well top.
Recovery to rest level in mins.* Capacity of pump g.p.h. Date of measurements hours

NORMAL CONDITIONS
DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:
Make and/or type Motive power
Capacity galls. per hour. Suction at ft. below well top.
Amount pumped galls. per day. Estimated consumption galls. per week.
Well made by Date of sinking
Information from St. Faith's & Aylsham R.D.C. See letter filed under WE147/Gt. Witchingham.
ADDITIONAL NOTES ANALYSIS (please attach copy if available)

For Survey use only
Date Received 18.2.68
Section 6
Pumping test
Observ. well
Recorder
ER. log
Site marked on 1" map 9.10.68 6" map 9.1.68 (use symbol)
Record forwarded to date
GEOLOGICAL SURVEY, WATER DIVISION, SOUTH KENSINGTON, LONDON, S.W.7.

DATA Bank

LOG OF STRATA OVERLEAF.

A.1.12 TG11SW112

[illegible]

LE GRAND ADSCO LIMITED

RECORD OF TEST BORING No. 7 at **Morston Estate.**

For **Mr. J.V. Berney.**

O/No. 2374 Boring Completed on **12.11.62.**

Boring lined to a Depth of **17'6"**

TGHISW/112
1220 1427

O.D. Level

Diameter **7 1/4"**

BORING FOREMAN'S STRATA RECORD

	THICKNESS		DEPTH		WATER OBSERVATIONS			
	Ft	Ins	Ft	Ins	Date	Time	W.S.	SWL
Sand & stones.	5	0	5	0				
Sand & gravel.	7	6	12	6				
Mottled clay.	1	0	13	6			Nil.	
Sand.	4	0	17	6				
TOTAL DEPTH				17	6			

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

SAMPLING DETAILS

Lab Location No. _____

Undisturbed Core Samples Taken at _____

2 Bulk samples taken.

Disturbed Jar Samples Taken at - **2', 7', 12', 17'6".**

Water Samples Taken ~~YES~~ **NO**

Standard Penetration Tests Carried Out

From	To	Blows
From	To	Blows
From	To	Blows

Boring Foreman's Remarks

Signed *J. Handley*

LE GRAND ADSCO LIMITED

A.1.13 TG11SW12

<u>Institute of Geological Sciences</u> Mineral Assessment Unit Sand and Gravel Survey <u>BOREHOLE RECORD SHEET</u>		Borehole Reg. No.: TG 11 SW/12 Temporary designation: <u>3</u> Nat. Grid Ref.: 124/1348 Locality: Blackbreck Plantation, Ringland Date: 31-10-69 Recorded by: A. R. Clayton.																													
Drilled by: Fitzpatrick Drill Type: Wirth B1 Hole diameter: 3" Ground level (O.D.): 128 Water struck at (O.D.): Dry	Horizon Overburden Mineral Basereck	Thickn. m ft. 1 51 9	Nature Sand Soil Sand Clay & Chalk																												
Remarks																															
Grading Curve (from Sampling Analysis Sheet)	Grading percentages:	Fines	Sand																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Fines</td> <td style="width: 25%;">Sand</td> <td style="width: 25%;">Gravel</td> <td style="width: 25%;"></td> </tr> <tr> <td style="text-align: center;">80</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">60</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">40</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">20</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">0</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">1/16</td> <td style="text-align: center;">1/4</td> <td style="text-align: center;">1</td> <td style="text-align: center;">16</td> </tr> </table> <p style="text-align: center;">Mean particle size (mm.)</p>				Fines	Sand	Gravel		80				60				40				20				0				1/16	1/4	1	16
Fines	Sand	Gravel																													
80																															
60																															
40																															
20																															
0																															
1/16	1/4	1	16																												
Description of Strata Topsoil Med. sand w. fine-med. gravel Sand Med. w. tr. co. SA light brown Gravel Fine & med. SA flint LPS 30 Med. sand w. fine & med. gravel Sand Med. w.co. SA dark brown. Gravel Fine & med. SA irreg. flint w. co. SA occ. SR flint tr. fine SR qtz LPS 40 Med. sand w. fine & med. gravel. Sand } As N975 but light brown Gravel } Med. sand w. fine & med. gravel. Sand. As N976 Gravel. As N976 but w. tr. SR irreg. flint cobbles LPS 80	Depth to base ft. 1 7 22 25 31	Thickn. ft. 1 6 15 3 6	Sample Nos. N969-970 N971-975 N976 N977-978																												

[50]

Description of Strata (continued)	Depth to base ft.	Thickn. ft.	Sample Nos.
Med. sand w. fine-med. gravel. Gravel. Fine and med. S. SA irreg. flint w. SR qtz. LPS 45 Sand. Med. w. tr. co. SA lightbrown.	34 co. SA	3 flint &	N979 tr. fine
Med. sand w. fine-med. gravel. Sand. } Gravel. } As N980 but dark brown	37	3	N980
Med. sand w. fine-med. gravel & tr. cobbles. Sand. Med. w. tr. co. SA light brown. Gravel. Fine & med. SA irreg. flint w. co. & fine SR qtz. LPS 120	52 & tr. cobble SA	15 flint	N981-985
Grey Chalky Boulder Clay	58	6	-
Chalk	61	3	

A.1.14 TG11SW114

TG 11 SW 12

1243 1348

Blackbeck Plantation, Ringland

Surface level (+39.0 m) +128 ft

Water not struck

Wirth Bl, 8 inch diam.

October 1969

Overburden (0.3 m) 1 ft

Mineral (15.6 m) 51 ft

Waste (1.8 m) 6 ft

Bedrock (0.9 m+) 3 ft+

Soil.

Glacial Sand and Gravel

Pebby sand. Gravel occasionally absent.
Gravel: coarse with fine, subangular with traces of subrounded, mainly flint with traces of fine subrounded quartz, with occasional flint cobbles in parts.
Sand: fine and medium with traces of coarse, subangular; light to dark brown.

Boulder Clay

Grey chalky clay.

Upper Chalk

Chalk.

Thickness (m) ft

Depth (m) ft

(0.3) 1

(0.3) 1

(15.6) 51

(15.9) 52

(1.8) 6

(17.7) 58

(0.9+) 3+

(18.6) 61

% mm %

Gravel 20

Sand 78

Fines 2

Depth below surface (ft)

Percentage Fines Sand Gravel

+64 : 0

+64+16 : 13

-16+4 : 7

-4+1 : 5

-1+1/4 : 39

-3/4+1/16 : 34

-1/16 : 2

1 - 4

4 - 7

7 - 10

10 - 13

13 - 16

16 - 19

19 - 22

22 - 25

25 - 28

28 - 31

31 - 34

34 - 37

37 - 40

40 - 43

43 - 46

46 - 49

49 - 52

2 76 22

1 62 37

0 63 37

1 78 21

1 74 25

2 98 0

3 83 14

6 94 0

0 67 33

8 62 30

2 98 0

1 64 35

0 72 28

0 100 0

2 67 31

2 94 4

11 64 25

LE GRAND ADCO LIMITED

RECORD OF TEST BORING No. 5 at Morilton Estate.

For Mr. J.V. Berney.

O/No. 2374 Boring Completed on 2.11.62. O.D. Level 1271 1330
Boring lined to a Depth of 23'0"

TCHISW/114
74"

BORING FOREMAN'S STRATA RECORD				THICKNESS				DEPTH				WATER OBSERVATIONS			
				Ft		Ins		Ft		Ins		Date	Time	W.S.	SWL
Loamy sand.				5	0	5	0	1.11.62.						12'0"	
Brown clay.				2	3	7	3								
Sand & gravel.				10	0	17	3								
Loamy sand.				4	9	22	0								
Chalk.				5	0	27	0								
TOTAL DEPTH				27	0										

SAMPLING DETAILS

Lab Location No.

Undisturbed Core Samples Taken at

Disturbed Jar Samples Taken at - 3', 6'6", 7'6", 12'6", 18', 27'.

Two bulk samples taken.

Water Samples Taken ~~YES~~ NO

Standard Penetration Tests Carried Out

From	To	Blows
From	To	Blows
From	To	Blows

Boring Foreman's Remarks

Signed *L. Threlk*
For LE GRAND ADCO LIMITED

A.1.15 TG11SW99

Eastern L.S. Anglian Water Region, NRA 900066
Tg115W 99 128-133 Tg115W 99 128-133 Tg115W 99 128-133

British Geological Survey British Geological Survey British Geological Survey

Reading Road - Henley-on-Thames - RG9 1DX Tg115W

BOREHOLE RECORD

Borehole No: RW 1 Date completed: 24-09-90 161

All depths to be measured below Ground Level

Client: N.R.A. Anglian Region

Exact Site: RW 1 - Ringland (NGR: TG 128 133)

Ground Level (O.D.):m

Depth of Bore: 65 m Diameter: At Top 450 mm. Bottom 300 mm

Details of Permanent Lining Tubes

Diameter	Length Inserted								
450 mm	15.5 m	Plain	..... m	Slotted	Top At	0.5 m	A.G.L.		
300 mm	8 m	"	..... m	"	"	13 m	B.G.L.		
300 mm	..... m	"	36 m	"	"	21 m	B.G.L.		
300 mm	8 m	"	..... m	"	"	57 m	B.G.L.		

Rest Level of Water below Ground Level: 18.10 m

Yield on test 18 hours Pumping: 48 litres/sec Date: 22-09-90

Pumping Water Level: 23 m below G.L.

Time of Recovery:

Remarks:

BRITISH GEOLOGICAL SURVEY		BRITISH GEOLOGICAL SURVEY	
		STRATA RECORD	
GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS METRES	DEPTH METRES
? Glacial Sand and Gravel	light brown sand & stones	2	2
	SAND & CHALK	2	4
	CLAY / CHALK with flints	2	6
	brown puggy CHALK with flints	2	8
Upper Chalk	creamy soft CHALK	7	15
	soft CHALK with flints	24	39
	firm CHALK with flints	26	65

17/4/91

2001

RECEIVED N.G.D.C.
DATE: -5 NOV 1990
SIC: *flans*

Eastern L.S. Anglian Water 900066
Tg11/212A

British Geological Survey British Geological Survey British Geological Survey

**** GEORGE STOW & CO LTD **** **Code: AW016**

Reading Road - Henley-on-Thames - RG9 1DX Tg11SW

BOREHOLE RECORD

Borehole No: RW 1 **Date completed: 24-09-90**
British Geological Survey British Geological Survey 161

All depths to be measured below Ground Level

Client: N.R.A. Anglian Region

Exact Site: RW 1 - Ringland (NGR: TG 128 133)

Ground Level (O.D.):m
British Geological Survey British Geological Survey

Depth of Bore: 65 m Diameter: At Top 450 mm. Bottom 300 mm

Details of Permanent Lining Tubes

Diameter	Length Inserted	
450 mm	15.5 m	Plain m Slotted Top At 0.5 m A.G.L.
300 mm	8 m	" m " " 13 m B.G.L.
300 mm	..... m	" 36 m " " 21 m B.G.L.
300 mm	8 m	" m " " 57 m B.G.L.

Rest Level of Water below Ground Level: 18.10 m

Yield on test 18 hours Pumping: 48 litres/sec Date: 22-09-90

Pumping Water Level: 23 m below G.L.

Time of Recovery:

Remarks:

British Geological Survey British Geological Survey British Geological Survey

GEOLOGICAL CLASSIFICATION	STRATA RECORD	THICKNESS METRES	DEPTH METRES
	NATURE OF STRATA		
	light brown sand & stones	2	2
	SAND & CHALK	2	4
	CLAY / CHALK with flints	2	6
	brown puggy CHALK with flints	2	8
	creamy soft CHALK	7	15
	soft CHALK with flints	24	39
	firm CHALK with flints	26	65

A.1.16 TG11SW100

Eastern L.S. Anglian Water Region, NRA

TG11SW 100 128-133

900066
TG11SW100

*** GEORGE STOW & CO LTD *** Code: AW017

Reading Road - Henley-on-Thames - RG9 1DX

BOREHOLE RECORD

Borehole No: RW 2 Date completed: 4-09-90

All depths to be measured below Ground Level

Client: N.R.A. Anglian Region

Exact Site: RW 2 - Ringland (NGR: TG 128 133)

Ground Level (O.D.): *c. 30m*

Depth of Bore: 65 m Diameter: At Top 450 mm. Bottom 300 mm

Details of Permanent Lining Tubes

Diameter	Length Inserted	Top At	Bottom At
450 mm	20.5 m Plain	0.5 m A.G.L.	
300 mm	8 m " "	17 m B.G.L.	
300 mm	36 m " "	25 m B.G.L.	
300 mm	4 m " "	61 m B.G.L.	

Rest Level of Water below Ground Level: 18.86 m

Yield on test 8 hours Pumping: 55 litres/sec Date: 4-09-90

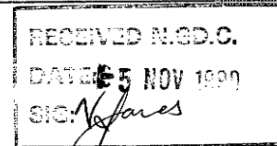
Pumping Water Level: 22.11 m below G.L.

Time of Recovery:

Remarks: Prior to acidising gave 8.6 l/sec with 5m drawdown.
Following acidising gave 55 l/sec with 3.25m drawdown.

STRATA RECORD			
GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS METRES	DEPTH METRES
"Glacial loam and Marl" - possibly Roman Brickwork	brown sandy soil	2	2
	brown clay	4	6
	grey-brown sandy CLAY	4	10
	puggy CHALK, flints at base	10	20
Upper Chalk	CHALK with flints	45	65

AMM
17/4/91



Eastern L.S. Anglian Water.

900066
TG11SW100

*** GEORGE STOW & CO LTD *** Code: AW017

Reading Road - Henley-on-Thames - RG9 1DX

BOREHOLE RECORD

Borehole No: RW 2 Date completed: 4-09-90

All depths to be measured below Ground Level

Client: N.R.A. Anglian Region

Exact Site: RW 2 - Ringland (NGR: TG 128 133)

Ground Level (O.D.):

Depth of Bore: 65 m Diameter: At Top 450 mm. Bottom 300 mm

Details of Permanent Lining Tubes

Diameter	Length Inserted	Top At	Bottom At
450 mm	20.5 m Plain	0.5 m A.G.L.	
300 mm	8 m " "	17 m B.G.L.	
300 mm	36 m " "	25 m B.G.L.	
300 mm	4 m " "	61 m B.G.L.	

Rest Level of Water below Ground Level: 18.86 m

Yield on test 8 hours Pumping: 55 litres/sec Date: 4-09-90

Pumping Water Level: 22.11 m below G.L.

Time of Recovery:

Remarks: Prior to acidising gave 8.6 l/sec with 5m drawdown.
Following acidising gave 55 l/sec with 3.25m drawdown.

STRATA RECORD			
GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS METRES	DEPTH METRES
	brown sandy soil	2	2
	brown clay	4	6
	grey-brown sandy CLAY	4	10
	puggy CHALK, flints at base	10	20
	CHALK with flints	45	65

A.1.17 TG11SW115

LE GRAND ADCO LIMITED

RECORD OF TEST BORING No. 6 at Morston Estate.
For Mr. J.V. Berney.

O/No. 2374 Boring Completed on 7.11.62. O.D. Level *TG11SW/115*
Boring lined to a Depth of 15'0" Diameter 7 1/4" *1282 1327*

BORING FOREMAN'S STRATA RECORD	THICKNESS		DEPTH		WATER OBSERVATIONS			
	Ft	Ins	Ft	Ins	Date	Time	W.S.	SWL
Sand & stones.	2	0	2	0				
Sand.	14	0	16	0				
TOTAL DEPTH					16	0		

SAMPLING DETAILS

Lab Location No. _____

Undisturbed Core Samples Taken at _____

Disturbed Jar Samples Taken at - 1', 6', 11', 16'.

Water Samples Taken ~~YES~~/NO

Standard Penetration Tests Carried Out

From	To	Blows
From	To	Blows
From	To	Blows

Boring Foreman's Remarks _____

Signed *L. J. Smith*
FOR LE GRAND ADCO LIMITED

A.1.18 TG11SW117

LE GRAND ADCO LIMITED

RECORD OF TEST BORING No. 4 at Morston Estate. *TG11SW/117*
For Mr. J.V. Berney. *1278 1311*

O/No. 2374 Boring Completed on 5.11.62. O.D. Level _____
Boring lined to a Depth of 28'0" Diameter 7 1/4"

BORING FOREMAN'S STRATA RECORD	THICKNESS		DEPTH		WATER OBSERVATIONS			
	Ft	Ins	Ft	Ins	Date	Time	W.S.	SWL
Sand & stones.	2	0	2	0				
Sand.	26	0	28	0			Nil.	
TOTAL DEPTH					28	0		

SAMPLING DETAILS

Lab Location No. _____

Undisturbed Core Samples Taken at _____

Disturbed Jar Samples Taken at - 1', 6', 11', 16', 21', 26'.

Water Samples Taken ~~YES~~/NO

Standard Penetration Tests Carried Out

From	To	Blows
From	To	Blows
From	To	Blows

Boring Foreman's Remarks _____

Signed *L. J. Smith*
FOR LE GRAND ADCO LIMITED

A.1.19 TG11SW74

[illegible]

A.1.20 TG10NW33

161/204 <u>Malvern, Marlingford.</u> (Disused) TG 10 NW / 33			
Surface +60. Lining tubes: 121. R.W.L. +57. Yield 300 g.p.h. (test). 1296.0944			
<u>Buckingham, 1936.</u>			
Handpump. Ferruginous. <u>Aug. 1947.</u>			
Boulder Clay (Buried channel)	...	108	108
Sand and Gravel (Buried channel)	...	2	110
UCk	...	23	133
<div>chalky Boulder clay { grey clay + loam 108'</div>			
<div>glacial Sand + gravel { fine grey sand 2'</div>			
<div>upper Chalk { chalk 23'</div>			
pp. F. Gx			
13.1.69			
6" quarter sheet			
62 SE/W			

161/204 <u>Malvern, Marlingford.</u> (Disused) TG 10 / 8			
Surface +60. Lining tubes: 121. R.W.L. +57. Yield 300 g.p.h. (test). Tg 1298.0915			
<u>Buckingham, 1936.</u>			
Handpump. Ferruginous. <u>Aug. 1947.</u>			
Boulder Clay (Buried channel)	...	108	108
Sand and Gravel (Buried channel)	...	2	110
UCk	...	23	133
<div>chalky Boulder clay { grey clay + loam 108'</div>			
<div>glacial Sand + gravel { fine grey sand 2'</div>			
<div>upper Chalk { chalk 23'</div>			
pp. F. Gx			
13.1.69			
6" quarter sheet			
62 SE/W			

A.1.21 TG10NW14

TG10/8

RECORD OF WELL (SHAFT OR BORE)

At Red bell Inn "Malvern" Town or Village Malvern County Worcestershire Six-inch quarter sheet 62 SE 6

Exact site see 6" plan in parish of Malvern (A rough sketch-map or a tracing from a map is very desirable)

Level of ground surface above sea-level (O.D.) 60 ft. If well starts below ground surface, state how far ft.

Shaft ft. diameter ft. Bore ft. Diameter of bore: at top ins.; at bottom ins.

Details of permanent lining tubes (internal diameters preferred) 12" fl.

Water struck at depths of (feet)

Rest-level of water below top of well 3 feet. Suction at feet. Yield on hours' test gallons per hr (with pump of capacity g.p.h.); depressing water level to feet below top. Time of recovery hrs. Amount normally pumped daily g.p.h. for hours.

Quality attach copy of analysis

Sunk by E. H. Buckingham for Mrs Rix Date of well 1936

Information from Do.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS		DEPTH	
		Feet.	Inches.	Feet.	Inches.
Glacial drift { Chalky boulder clay	Grey clay and loam	108		108	
Glacial drift { Glacial sand	Fine grey sand	2		110	
Glacial drift { Chalk	Chalk	23		133	
4664	Visited & site. Operated by hand pump. Supplies 1 burglar. Considerable amount of iron in the water. No. 25847.				
13161	Visited. Disused. 22/8/60 BN.				
	DATA Bank				

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W.7.

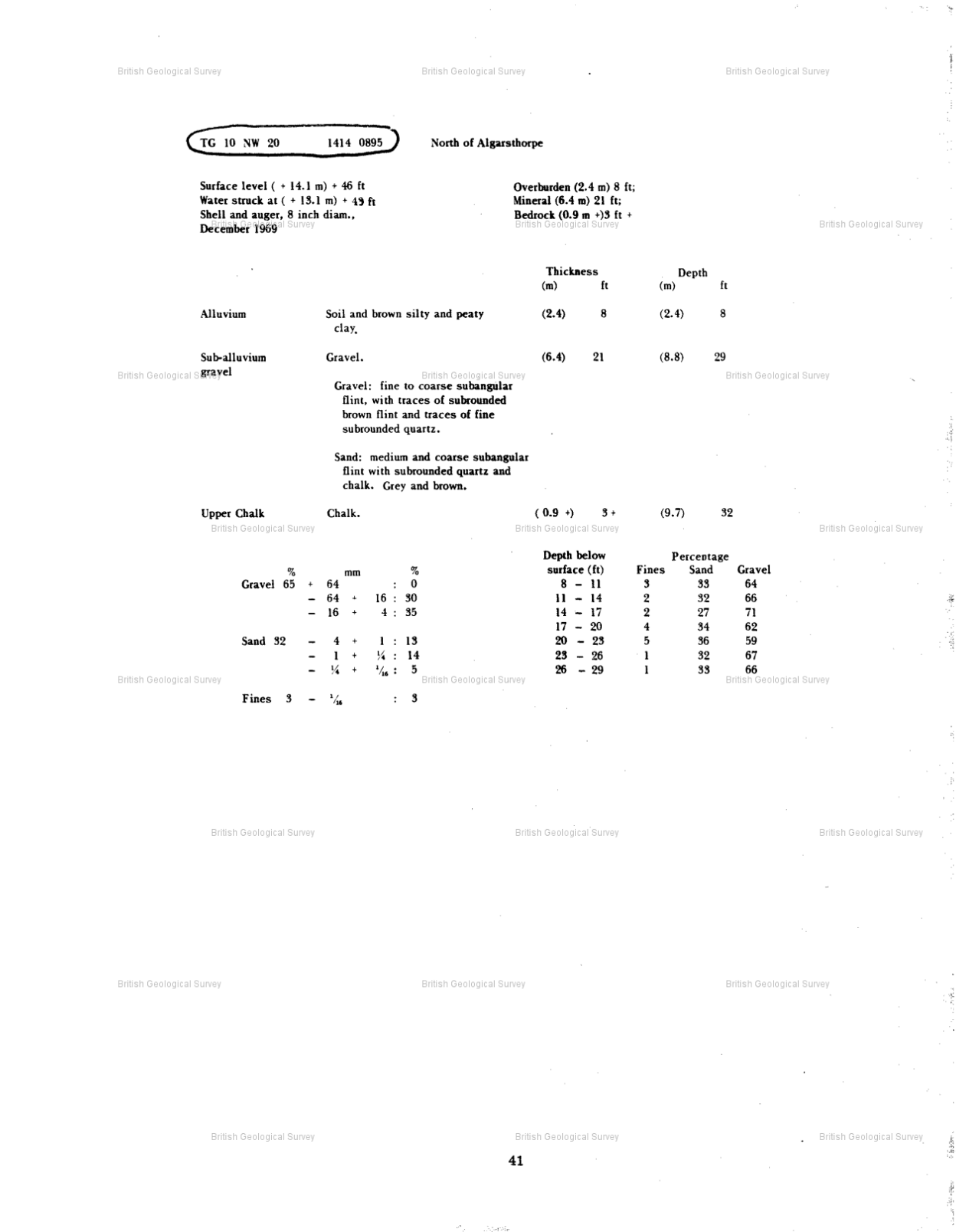
For Survey use only

Date received	G.S.M. Office File No.	Site marked on 1" map (use symbol)
---------------	------------------------	------------------------------------

(*11815) Wt.29051/0.989 10,000 9/39
A.& E.W.Ltd. Gp.886

TG 10 NW 14		1356 0944	Cobb's Grove Plantation, Marlingford	
Surface level (+ 37.9 m) + 124 ft Groundwater conditions not recorded Shell and auger, 8 inch diam., December 1969			Overburden (0.3 m) 1 ft; Mineral (4.9 m) 16 ft; Waste (10.3 m) 34ft; Bedrock (0.9 m +) 3 ft +	
British Geological Survey			British Geological Survey	
			Thickness	Depth
			(m) ft	(m) ft
Glacial Sand and Gravel	Soil.		(0.3) 1	(0.3) 1
	Sandy gravel.		(4.9) 16	(5.2) 17
	Gravel: fine to coarse subangular flint, with traces of fine subrounded quartz.	British Geological Survey		
Sand: medium with coarse, mainly subangular flint. Brown.				
Chalky Boulder Clay	Slightly sandy brown clay with traces of gravel.		(6.4) 21	(11.6) 38
	Light brown chalky clay.		(0.9) 3	(12.5) 41
	Sandy brown clay with traces of gravel.		(3.0) 10	(15.5) 51
Upper Chalk			(0.9 +) 3+	(16.4) 54
			Depth below surface (ft)	Percentage
				Fines Sand Gravel
Gravel	44	mm	1 - 4	6 42 52
	+	64	4 - 7	2 46 52
	-	64 + 16	7 - 10	6 70 24
	-	16 + 4	10 - 13	0 70 30
Sand	53	mm	13 - 17	1 42 57
	-	4 + 1		
	-	1 + 1/4		
	-	1/4 + 1/16		
Fines			3 - 1/16	3

A.1.22 TG10NW20



A.1.23 TG10NW76

DATA ACQUISITION SHEET

TG10/151 CSC/D/138

NRA region: ANGELIAN (NORWICH) 161 P21

File Number: PUMP TEST FILE 34/13 TECHNICAL FILE TG10 NW /76

Pump Well Identification:

NRA id No:

BGS (WL) No: TG10/151

NGR: TG 1484 0760

Elevation:

Measuring Point:

Site Name: VALLEY FARM
MARLINGFORD

Locality: YARE VALLEY

Well details:

depth of pumping well: 80.0m

diameter: 100mm

casing details: plain casing to 30.0m
slotted to 50.0m

☒ observation boreholes NONE

number of obs bhs: N/A

obs bh details:

Aquifer Details:

~~confined~~ / unconfined If confined, confining layer: N/A

Aquifer Geology	from	to	Aquifer Geology	from	to
CHALK	2.1	80.0			

Pumping Test Details:

date of test: 3 JUNE 1987 STEP TEST
CONSTANT RATE 6. JUNE 1993

length of test: 3 steps each 120min, 4th step extended
CONSTANT RATE: 10080 min = 7 DAYS

RWL: 2.1 m bnp

PWL: 9.64 m bnp

pumping rate: STEP TEST:
465 m³/d; 576 m³/d; 804 m³/d; 1140 m³/d AV. 747 m³/d
CONSTANT RATE 1151 m³/d

A.1.24 TG10NW45

British Geological Survey

Additional Well Information:

☐ Well Loss Data: B..... C..... Efficiency.....

☐ Well Acidified

☒ Flow Logs No

☒ Other Geophysical Logs No

☐ Fissure Information: major inflows from.....to.....
from.....to.....
from.....to.....

Aquifer Parameters:

Analysis Type: *Recovery Jacob SL*

Transmissivity: *208 m²/d*

Storage Coefficient:

Analysis Type:

Transmissivity:

Storage Coefficient:

Analysis Type:

Transmissivity:

Storage Coefficient:

Other Data:

Confidence:

excellent ☐ ☐ ☐ ☒ ☐ very poor

Notes: *Borehole collapsed on completion of pumping hence not possible to carry out geophysical logging*

British Geological Survey

Ref: A/S 40/91

TG10NW/45

1468 0758

June 92

Tg10/136

161

Tg10NW

F SMITH & SON (GRIMSBY) LIMITED

Record of 762mm (30") nominal dia x 87m deep
Water Abstraction borehole drilled for Anglian Water
Services Ltd Histon Cambridge

1468 0758

VALLEY FARM Nr BARFORD NORLK NGR TG 148 076

STRATA

	Thickness M.	Depth M.
Top soil	0.50	0.50
Grey and brown sandy clay	1.20	1.70
Dry white chalk	1.80	3.50
Firm and soft yellow chalk with flints	1.00	4.50
Firm and soft yellow chalk	3.50	8.00
Harder chalk and flint	2.00	10.00
Chalk and flint	18.00	28.00
Hard chalk and flint with soft seams	49.00	77.00
Hard chalk and flint with soft sticky seams	10.00	87.00

UPPER CHALK

(UPPER CRETACEOUS)

Red Hand 3-2-93

WATER

RWL 2.81m bgl, reading taken 6 December 1991

LINING TUBE

a) 25.50m x 762mm OD plain mild steel lining tube installed to a depth of 25m BGL the top being fitted with a weld-on flange drilled NP16

b) 87.5 x 600mm OD steel casing installed to base of borehole the top being left flush with head flange drilled NP16 casing column made up as follows:-

i) Perforated from base of borehole to 24m BGL (63")

ii) Plain from 24m BGL to top flange.

iii) Slotting pattern:
Rings of 10 No x 300mm long x 12.5 wide slots with 50mm plain tube between rings adjacent rows of slots staggered.
Total No of slots 1773.

Stabiliser Pack

The annular space between the 600mm OD lining and the borehole wall and between the 600mm OD lining and 762mm OD lining was packed with 40mm natural shingle.

12th January 93

9656

British Geological Survey

Eastern L.S. Anglian N.R.A. NN 910097
Ref: A/S 40/91, June 92
F SMITH & SON (GRIMSBY) LIMITED
Record of 762mm (30") nominal dia x 87m deep
Water Abstraction borehole drilled for Anglian Water
Services Ltd Histon Cambridge
VALLEY FARM Nr BARFORD NORLK NGR TG 148 0758
1468 0758
161
TG10NW/45

STRATA	Thickness M.	Depth M.
Top soil	0.50	0.50
Grey and brown sandy clay	1.20	1.70
Dry White chalk	1.80	3.50
Firm and soft yellow chalk with flints	1.00	4.50
Firm and soft yellow chalk	3.50	8.00
Harder chalk and flint	2.00	10.00
Chalk and flint	18.00	28.00
Hard chalk and flint with soft seams	49.00	77.00
Hard chalk and flint with soft sticky seams	10.00	87.00

Quaternary Alluvium
Upper Chalk
Upper
Cretaceous
3.2.93

WATER
RWL 2.81m bgl, reading taken 6 December 1991

LINING TUBE
a) 25.50m x 762mm OD plain mild steel lining tube installed to a depth of 25m BGL. the top being fitted with a weld - on flange drilled NP16.
b) 87.5 x 600mmOD steel casing installed to base of borehole the top being left flush with head flange drilled NP16 casing column made up as follows:-
1) Perforated from base of borehole to 24m BGL (63")
11) Plain from 24m BGL to top flange.
111) Slotting pattern:
Rings of 10 No x 300mm long x 12.5 wide slots with 50mm plain tube between rings adjacent rows of slots staggered.
Total No of slots 1773.

Stabiliser Pack
The annular space between the 600mm OD lining and the borehole wall and between the 600mm OD lining and 762mm OD lining was packed with 40mm natural shingle.

JANUARY 1993

TG10/136

Grouting
The annular space between the 762mmOD lining and the wall of the borehole was packed with stabiliser gravel and smaller grit to make grout retaining seal at 18.50m BGL and the remaining space filled with cement and grout to GL.

TEST PUMPING
The borehole was clearance pumped, step tested and yield tested for a period of 14 days approximately 23.31/sec from approx 21m BGL.

DATES
Commenced: drilling October 1991
Completed: Pumping June 1992

DRILLING MACHINE
Ruston Erie 29T/S Cable Percussion Rig.

DRILLER
C Billings
Pumping
J. Best

NN 910097
Tg10/136

Grouting

The annular space between the 762mmOD lining and the wall of the borehole was packed with stabiliser gravel and smaller grit to make grout retaining seal at 18.50m BGL and the remaining space filled with cement and grout to GL.

TEST PUMPING

The borehole was clearance pumped, step tested and yield tested for a period of 14 days approximately 23.3l/sec from approx 21m BGL.

DATES

Commenced: drilling October 1991
Completed: Pumping June 1992

DRILLING MACHINE

Ruston Erie 29T/S Cable Percussion Rig.

DRILLER

C Billings
Pumping
J.Best

DATA ACQUISITION SHEET

CSC/D/140

NRA region: ANGLIAN (NORWICH)

P21

File Number: PTF 34/13 TECHNICAL FILE(B)

7910/136

Pump Well Identification:

NRA id No:

BGS (WL) No: 7910/136

NGR: TG 1487 0759

Elevation: ^{PROD} +25.038m OD (top head plate)
^{Obs} +24.338m OD (n n n)

Measuring Point: ^{PROD} datum + 0.76m AGL
^{Obs}: HEAD PLATE

Site Name: PRODUCTION BH
VALLEY FARM

Locality: MARLINGFORD
NORFOLK

Well details:

depth of pumping well: 87 m

diameter: 762mm

casing details: 762mm plain steel to 25m bgl
600mm plain steel to 24m bgl
600mm slot steel 24 to 87m bgl

☐ observation boreholes

number of obs bhs: 9

obs bh details: Valley farm obs bh r=37m
earlier pilot bh details CSC/D/138

Aquifer Details:

~~confined~~ / unconfined

If confined, confining layer: NA

Aquifer Geology	from	to	Aquifer Geology	from	to
Crag + brn med clay to 1.7m					
CHALK					

Pumping Test Details:

STEP TEST: 8.5.92

date of test: CONSTANT RATE: 12.5.92 to 26.5.92

length of test: 14 days

RWL: 3.57 mbd

PWL: 20.50 mbd

pumping rate: 24.1 l/s; 2085 m³/d

A.1.25 TG10NE87

British Geological Survey

British Geological Survey

British Geological Survey

Additional Well Information:

☐ Well Loss Data: B..... C..... Efficiency.....

☒ Well Acidified NOT ACIDISED see below

☐ Flow Logs

☒ Other Geophysical Logs inc CCTV

☐ Fissure Information: major inflows from.....to.....

little flow above 33.5m bd from.....to.....

a little below c 63m bd from.....to.....

obs bk showed little flow below 59m

Aquifer Parameters:

Analysis Type: COOPER JACOB

PROD OBS

Transmissivity: 94 114 m²/d

Storage Coefficient: ~ 0.039

Analysis Type: COOPER JACOB RECOVERY

PROD OBS

Transmissivity: 154 162 m²/d

Storage Coefficient: - -

Analysis Type: THEIS

PROD OBS

Transmissivity: - 155 90 m²/d

Storage Coefficient: - 0.0004 0.076

Other Data:

REPRESENTATIVE AQUIFER PARAMETERS:

T = 130 m²/d

S = 0.0004

Sy = 0.04

Confidence:

excellent ☐ ☒ ☐ ☐ ☐ very poor

Notes: Not acidised because Chalk not stable & also there is a fish pond nearby

Since original pilot bh collapsed after test pumping a new obs bh was drilled

39m from prodn bh

STEP TEST	Q (m ³ /d)	Drawdown (m)	Drawdown (m)
686	120	1.93	
1048	"	3.64	
1589	"	8.18	
2505	"	17.57	

Constant rate test - Q was not constant - first 60min Q = 1726 m³/d before being increased

- increased again during 22 hrs before end of test.

Cooper Jacob recovery gives different T from obs - may be better if recovery data corrected

Theis curve fitting probably subject to significant errors

FOR EARLIER TESTING OF VALLEY FARM PILOT B311 see CSC/D/138

TG10NE/87
1578.0665

British Geological Survey

British Geological Survey

British Geological Survey

161/591 Glenhavan, Little Melton

(42.06m)

Surface +138. Shaft. c. 1948.

R.W.L. +128. Electric pump. Aug. 1960.

+ Boulder Clay

Sand and Gravel

? Uck

... .. ? 60 ? 60

Estimated class.

6" quarter sheet pp. Fox. 30.6.69.

62SE/E

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

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British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

161/591 Glenhaven, Little Melton
Surface +138. Shaft c. 1948.
R.W.L. +128. Electric pump. Aug. 1960.
+ Boulder Clay }
? Uck } ... ? 60 ? 60

Estimated classn.
b" quarter sheet
b2SE/E
pp. F. Cox. 30.6.69.

TA10/107

RECORD OF WELL (SHAFT OR BORE)
For Survey use only
TA10/107
161/591
Licence No.

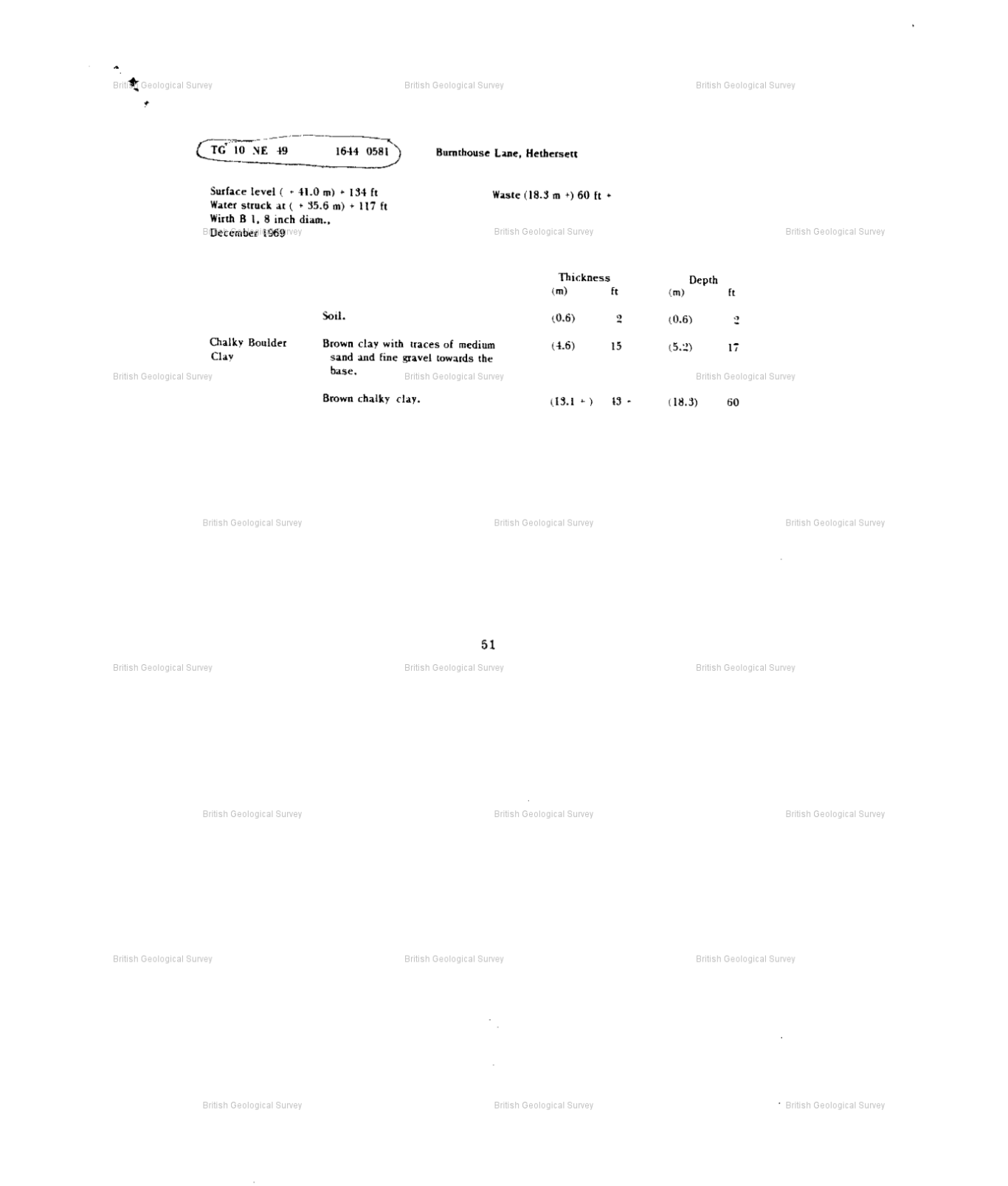
At "Glenhaven"
Town or Village Little Melton
County Norfolk
Six-inch quarter sheet 14 NE 1/4 b2SE/E
For ? Dr. Uckin. State whether owner, tenant, builder, contractor, consultant, etc.:-
Address (if different from above) Tg 158-067
Level of ground surface above sea-level (O.D.) 138 ft. If well-top is not at ground level, state how far { above: ft. below: ft.
SHAFT ? 60 ft.; diameter ft.; Full details of headings (dimensions and directions)
BORE ft.; diameter of bore: at top ins.; at bottom ins.
Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.)
Water struck at depths of ft. below well-top.
Rest level of water ft. above well-top. Suction at ft. Yield on hours' test
pumping at galls. per with depression to ft. below well-top.
Recovery to rest-level in mins. Capacity of pump g.p.h. Date of measurements
DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:
Make and/or type Motive power
Capacity galls. per hour. Suction at ft.
Amount pumped galls. per day. Estimated consumption galls. per week.
Well made by a man from Wymondham (deceased) Date of well 1948
Information from
ADDITIONAL NOTES
ANALYSIS (please attach copy if available)
Visited and Sited on b" map. Electric pump.
R.W.L. 9' 11" b.s. A.S. 19/8/60.
Estimated Section:
Boulder Clay c. 50'-60'
Glacial Gravel c. 10'
Uck
P.P.
F.C. Cox
30/6/69.
DATA Bank
LOG OF STRATA OVERLEAF.
GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.
Section 6. Date Received 1" O.S. Map No. Site marked on 1" Map (use symbol) on 6" Map

[illegible]

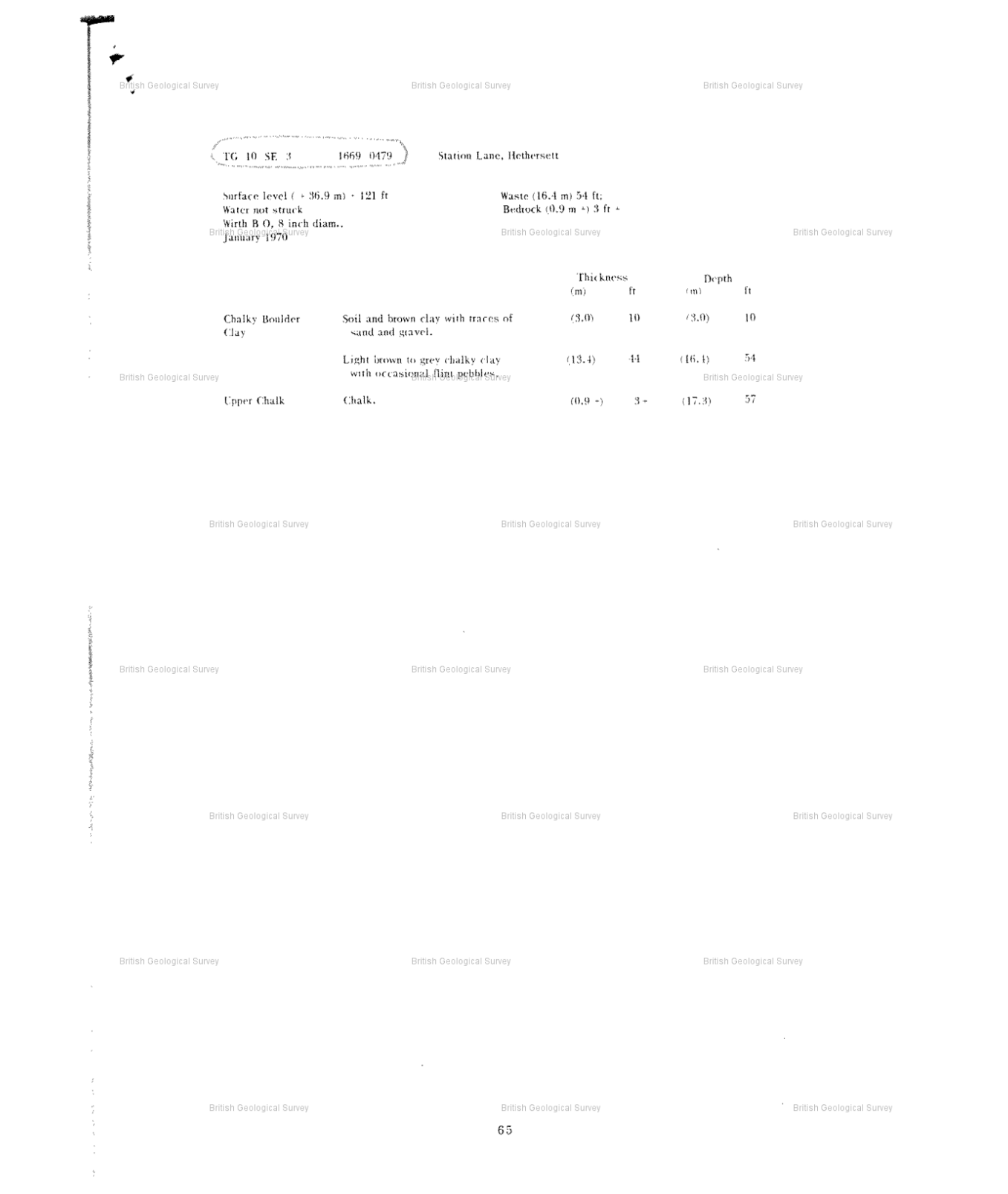
A.1.26 TG10NE43

TG 10 NE 43	1581 0657	Church Farm, Little Melton	
Surface level (+ 37.5 m) + 125 ft		Waste (18.3 m +) 60 ft +	
Water struck at (+ 34.4 m) + 113 ft			
Wirth B 1, 8 inch diam.,			
December 1969		British Geological Survey	British Geological Survey
Chalky Boulder	Soil and slightly sandy brown	Thickness	Depth
Clay	clay with a little chalk.	(m) ft	(m) ft
	Light grey chalky clay with	(3.0) 10	(3.0) 10
	traces of gravel	(6.8) 22	(9.8) 32
	Dark grey chalky clay.	(8.5 +) 28 +	(18.3) 60
Survey	British Geological Survey	British Geological Survey	British Geological Survey

A.1.27 TG10NE49



A.1.28 TG10SE3



A.1.29 TG10SE94

ENGINEER G. RAINFORD & PARTNERS.

LOGGED BY HGR/LMD

FIELDWORK BY SU

LAB TESTING BY S.C.C.

PROJECT A11 IMPROVEMENT

EXCAVATION METHODS

WHEELLED EXCAVATOR (JCB 30)

GROUND LEVEL 24.132

COORDINATES 617530 1 304640 1

DATES 5/5/82

FIGURE A

SHEET 1 OF 1

OTHER TESTS AND NOTES

DATE/TIME	DEPTH OF CASING	DEPTH TO WATER	STRATA	SAMPLING/ IN SITU TESTING					LAB TESTING											
				NO	DEPTH	TYPE	BLOWS	V	W	PL	LL	MLV	N	Cu						
AT	DEPTH	DEPTH	DESCRIPTION	ITG	LEVEL	DEPTH														
			Pale greyish brown LOAM with rounded flints. (TOPSOIL)		24.132	0														
			Orange brown subrounded very gravelly SAND. British Geological Survey (GLACIAL SAND AND GRAVEL)		23.782	0.35	1	0.5	D					4.6						
			Mottled brown gravelly clayey SAND. (GLACIAL SAND AND GRAVEL)		23.932	1.2	2	1.0	B					4.5						
							3	1.5	B					9.7						
							4	2.0	B					9.7		9.1				
							5	2.5	D					8.2						
			Stiff yellow inorganic silty CLAY of low plasticity with pockets of brown fine SAND. (GLACIAL SAND AND GRAVEL)		21.332	2.8	6	3.0	D					100	20	18	31			
			Very stiff greenish grey inorganic silty sandy CLAY with chalk fragments and flint. (BOULDER CLAY)		20.832	3.3	7	3.5	D											
							8	4.0	D					16						
							9	4.5	D											

WATER

1 First water strike

2 Subsequent water strikes

3 Highest water level in open bore

PERFORM TEST

1 Upper soil

2 Response length

3 Lower soil

4 Installation only

5 Readings elsewhere

SAMPLE

1 Small disturbed sample

2 Bulk disturbed sample

3 Water sample

4 Undisturbed sample

5 Piston sample

TEST

1 Robustness

2 Recovery to state

3 In situ wave test

4 Standard penetration test

5 Cone penetration test

6 Permeability test

7 Pressuremeter test

Blows

1 20/150 blows for 150mm drive after seating

2 20 blows for 100mm or whole of seating drive only

3 20 Undisturbed sample blow count

V

Vane strength kN/m²

1 Natural

2 Remould

3 Core recovery %

4 Rock quality designation

5 25 Sample % passing 425um sieve

6 25um sieve

Mr D J Evans B.Sc. Tech. MSc. FRM. FIMed. FRIC

Director (Transport)

Eastern Regional Office (Transport)

49/51 Gillingham Road

Bedford

A.1.30 TG10SE93

TG10SE/93

ENGINEER: G. MAINSILL & PARTNERS.		PROJECT: A11 IMPROVEMENT - WYNDHAM TO CRINGLIPFORD.		GROUND LEVEL: 25.321		HOLE NO: 27	
LOGGERS: British Geological Survey		EXCAVATION METHODS: British Geological Survey		COORDINATES: 617345		FIGURE: A	
FIELDWORK BY: SH		EQUIPMENT: WHEELBARROW (JCB 3C)		DATES: 29/4/82		SHEET: 1 OF 1	
LAB TESTING BY: S.C.C.						OTHER TESTS AND NOTES:	

DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	STRATA		SAMPLING/IN SITU TESTING				LAB TESTING								OTHER TESTS AND NOTES	
			DESCRIPTION	LEG	LEVEL	DEPTH	NO	DEPTH	TYPE	BLOWS	V	W	PL	LI	MCV	W		Cu
			Pale greyish brown silty LOAM. (TOPSOIL.)		25.321	0												
			Pale yellowish brown gravelly SAND. (GLACIAL SAND AND GRAVEL)		24.971	0.35	1	0.5	D									
			British Geological Survey		24.621	0.7	2	1.0	D									
			Orange brown with reddish-brown veining uniformly graded fine-medium SAND to silty SAND. (GLACIAL SAND AND GRAVEL)				3	1.5	D									
			British Geological Survey				4	2.0	D									
			British Geological Survey		23.121	2.2												
			British Geological Survey															
			British Geological Survey															
			British Geological Survey															
			British Geological Survey															
			British Geological Survey															

WATER

1 - First water strike

2 - Subsequent water strikes

3 - Highest water level in open hole

PIEZOMETER

1 - Upper seal

2 - Response length

3 - Lower seal

(Installation only, readings elsewhere)

SAMPLE AND TEST KEY

D - Small disturbed sample

B - Bulk disturbed sample

W - Water sample

U - Undisturbed sample

P - Piston sample

Blows

N - N value

26/150, blows for 150mm drive after seating

24", blows for part or whole of seating drive only

126) Undisturbed sample blow count

V - Vane strength kN/m²

Natural

Remould

Core recovery %

ROD - Rock quality designation

CL25 - Sample to passing 62um sieve

Mr D Evans BSc, Tech, MSC, FICE, FIMM, FIHE

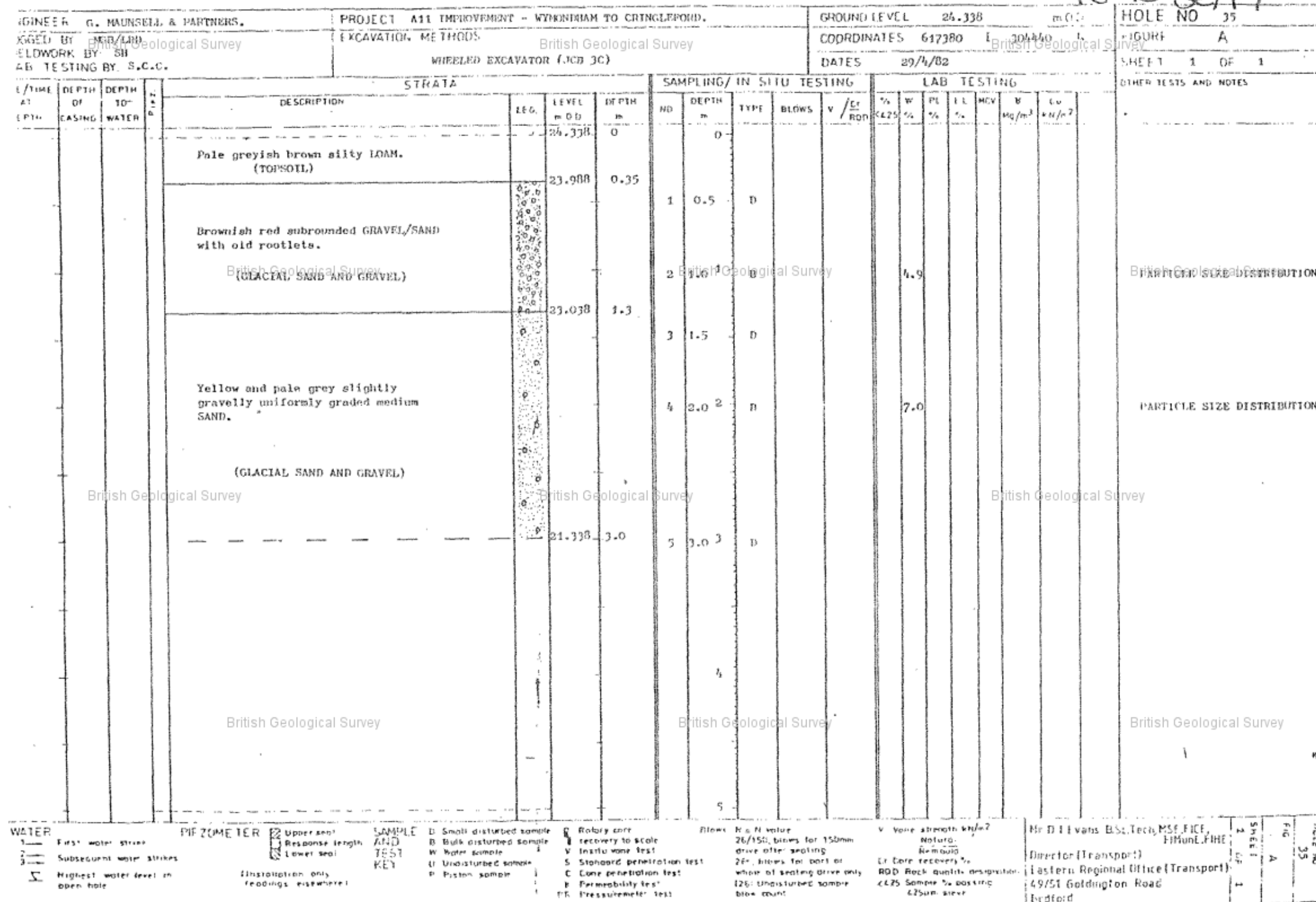
Director (Transport)

Eastern Regional Office (Transport)

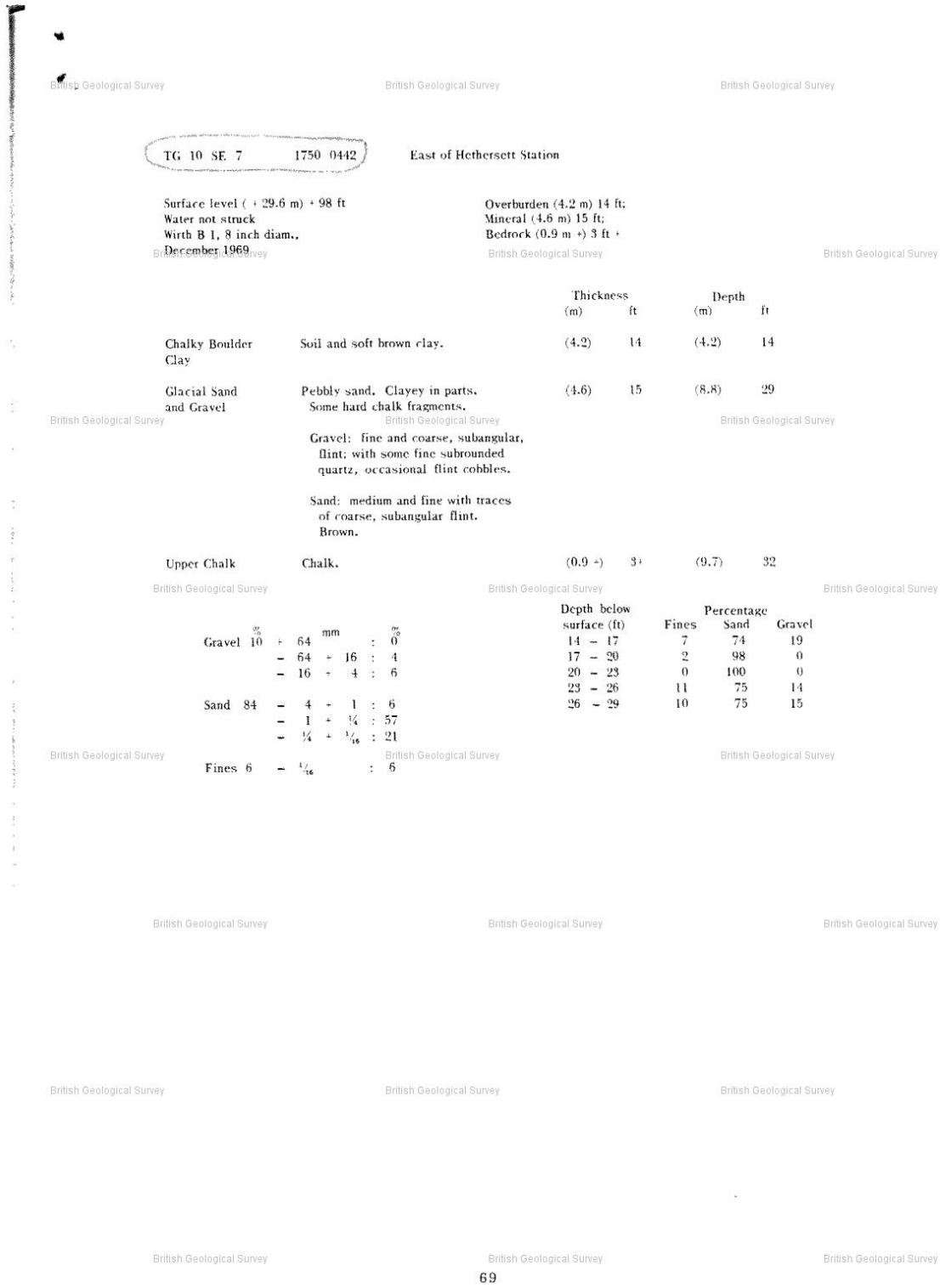
49/51 Goldington Road

Bedford

A.1.31 TG10SE97



A.1.32 TG10SE7



A.1.33 TG20SW82

TG 20 SW 82

ENGINEER G. MAUNSELL AND PARTNERS		PROJECT A47 NORWICH SOUTHERN BYPASS		GROUND LEVEL 30.70 m O.D.		HOLE NO. 140 (T)	
LOGGED BY: GROUND ENGINEERING LIMITED		EXCAVATION METHODS WHEELED HYMAC		COORDINATES 620 750 E 303 700 N		FIGURE A	
FIELDWORK BY: " " "		LAB. TESTING BY: " " "		DATES 30/3/82		SHEET 1 OF 1	

DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	STRATA		SAMPLING/IN SITU TESTING				LAB TESTING						OTHER TESTS AND NOTES			
			DESCRIPTION	LEG.	LEVEL m O.D.	DEPTH m	NO.	DEPTH m	TYPE	BLOWS	V / Cr RQD	% < 425	W %	PL %		LL %	MCV	V Mg/m ³	Cu kN/m^{2}
30.3.82			TOPSOIL (Dark brown silty clayey fine to medium sand with fine to medium subangular gravel and organic remains)		30.70	0.00												
			Firm to stiff brown very silty CLAY with fine to medium rounded to angular chalk and flint gravel and orange brown medium sand pockets (Boulder Clay)		30.40	0.30	1	0.40	D									
							14	0.50	CBR									
							2	0.60	B									
			Stiff brownish grey mottled brown very silty CLAY with orange brown and grey medium sand pockets (Boulder Clay)		29.90	0.80	3	0.90	D									
			British Geological Survey															
			---- becoming grey				4	1.40	D									
							5	1.50	B									
								1.60										
							6	1.90	D									
							7	2.40	D									
							8	2.50	B									
								2.60										
			Loose to medium dense slightly silty slightly clayey medium SAND with small silty clay pockets (Boulder Clay)		28.10	2.60	9	2.60	D									
							10	2.70	B									
								2.80										
			Stiff grey very silty CLAY (Boulder Clay)		27.70	3.00	11	3.00	D									
			British Geological Survey															
							12	3.40	D									
							13	3.50	B									
30.3.82		DRY			27.20	3.50												
			TRIAL PIT COMPLETED															
			British Geological Survey															

WATER

1 First water strike

2 Subsequent water strikes

3 Highest water level in open hole

PIEZOMETER

Upper seal

Response length

Lower seal

(Installation only, readings elsewhere)

SAMPLE AND TEST KEY

D Small disturbed sample

B Bulk disturbed sample

W Water sample

U Undisturbed sample

P Piston sample

Rotary core

Recovery to scale

Insitu vane test

Standard penetration test

Cone penetration test

Permeability test

Pressuremeter test

Blows

N = N value

26/150, blows for 150mm drive after seating

254, blows for part or whole of seating drive only.

(26) Undisturbed sample blow count

V Vane strength kN/m²

Natural

Remould

Cr Core recovery %

RQD Rock quality designation

< 425 Sample % passing 425µm sieve

J. Tiplady BSC. C. Eng. FICE, FIHE

Director (Transport)

Eastern Regional Office

(Transport)

49-51 Goldington Road, Bedford

SHEET 1 OF 1

FIG. A

HOLE NO. 140 (T)

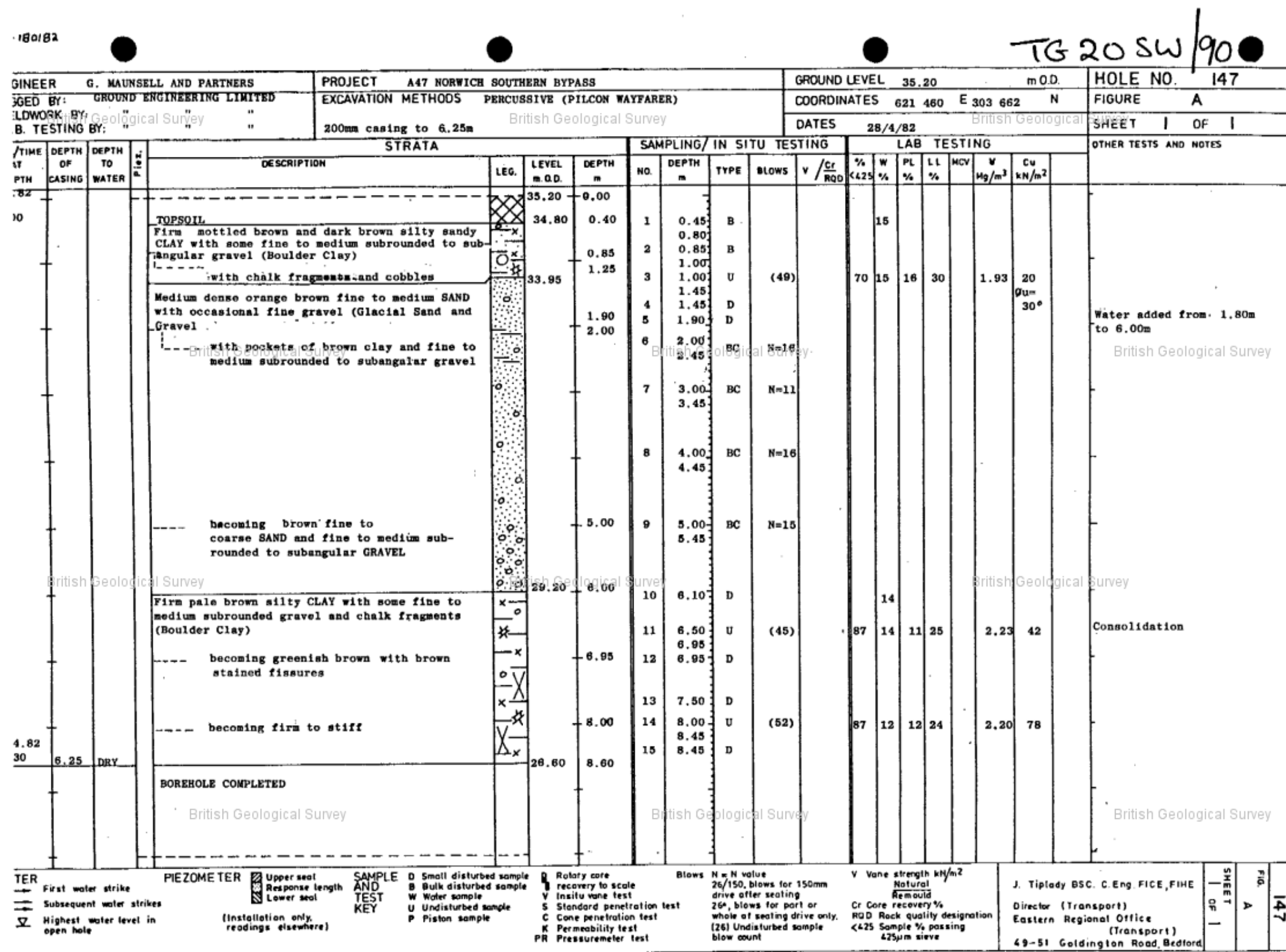
A.1.34 TG20SW91

[illegible]

A.1.35 TG20SW127

[illegible]

A.1.36 TG20SW90



A.1.37 TG20SW83

114-180182

TG20SW/83

ENGINEER G. MAUNSELL AND PARTNERS		PROJECT A47 NORWICH SOUTHERN BYPASS		GROUND LEVEL 28.05 m.O.D.		HOLE NO. 141(T)	
LOGGED BY: GROUND ENGINEERING LIMITED		EXCAVATION METHODS WHEELED HYMAC		COORDINATES 620 870 E 303 654 N		FIGURE A	
FIELDWORK BY: " " "		British Geological Survey		DATES 30/3/82		SHEET 1 OF 1	
LAB. TESTING " "		British Geological Survey					

DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	STRATA		SAMPLING/IN SITU TESTING				LAB TESTING								OTHER TESTS AND NOTES		
			DESCRIPTION	LEG.	LEVEL m.O.D.	DEPTH m	NO.	DEPTH m	TYPE	BLOWS	V / Cr RQD	% <425	W %	PL %	LL %	MCV		V Mg/m ³	Cu kN/m ²
30.3.82			TOPSOIL(Dark brown clayey silty sand with flint gravel)	X	28.05	0.00													1) Pit completed and shored to 3.50m 2) Photographs taken of face 4 British Geological Survey Heavy compaction Seepage at 2.40m British Geological Survey British Geological Survey
			Firm to stiff fissured brown silty CLAY with fine to medium rounded to angular chalk and flint gravel (Boulder Clay)	X	27.65	0.40	1	0.50	D										
				X			2	0.60	B										
				X			13	0.70	U38						2.01	60			
			Firm to stiff fissured brown grey silty CLAY with fine to medium rounded to angular chalk and flint gravel and small to large sand pockets (Boulder Clay)	X	27.15	0.90	3	1.00	D										
				X			4	1.40	D										
				X			5	1.50	B										
				X			6	1.60											
				X			14	2.30	U38										
				X			7	2.40	D						1.94	32			
				X			8	2.50	B										
				X			9	2.60											
				X			12	2.90	D										
				X			10	3.40	W										
30.3.82	3.50	DRY	TRIAL PIT COMPLETED	X	24.55	-3.50	11	3.40	D										
				X			11	3.50	B										
				X				3.60											

WATER

1 First water strike

2 Subsequent water strikes

3 Highest water level in open hole

PIEZOMETER

Upper seal

Response length

Lower seal

(Installation only, readings elsewhere)

SAMPLE AND TEST KEY

D Small disturbed sample

B Bulk disturbed sample

W Water sample

U Undisturbed sample

P Piston sample

Blows

N = H value

26/150, blows for 150mm drive after sealing

26+, blows for part or whole of seating drive only.

(26) Undisturbed sample blow count

V Vane strength kN/m²

Natural

Remould

Cr Core recovery %

RQD Rock quality designation

<425 Sample % passing 425µm sieve

J. Tiplady BSC. C.Eng. FICE, FIHE

Director (Transport)

Eastern Regional Office

(Transport)

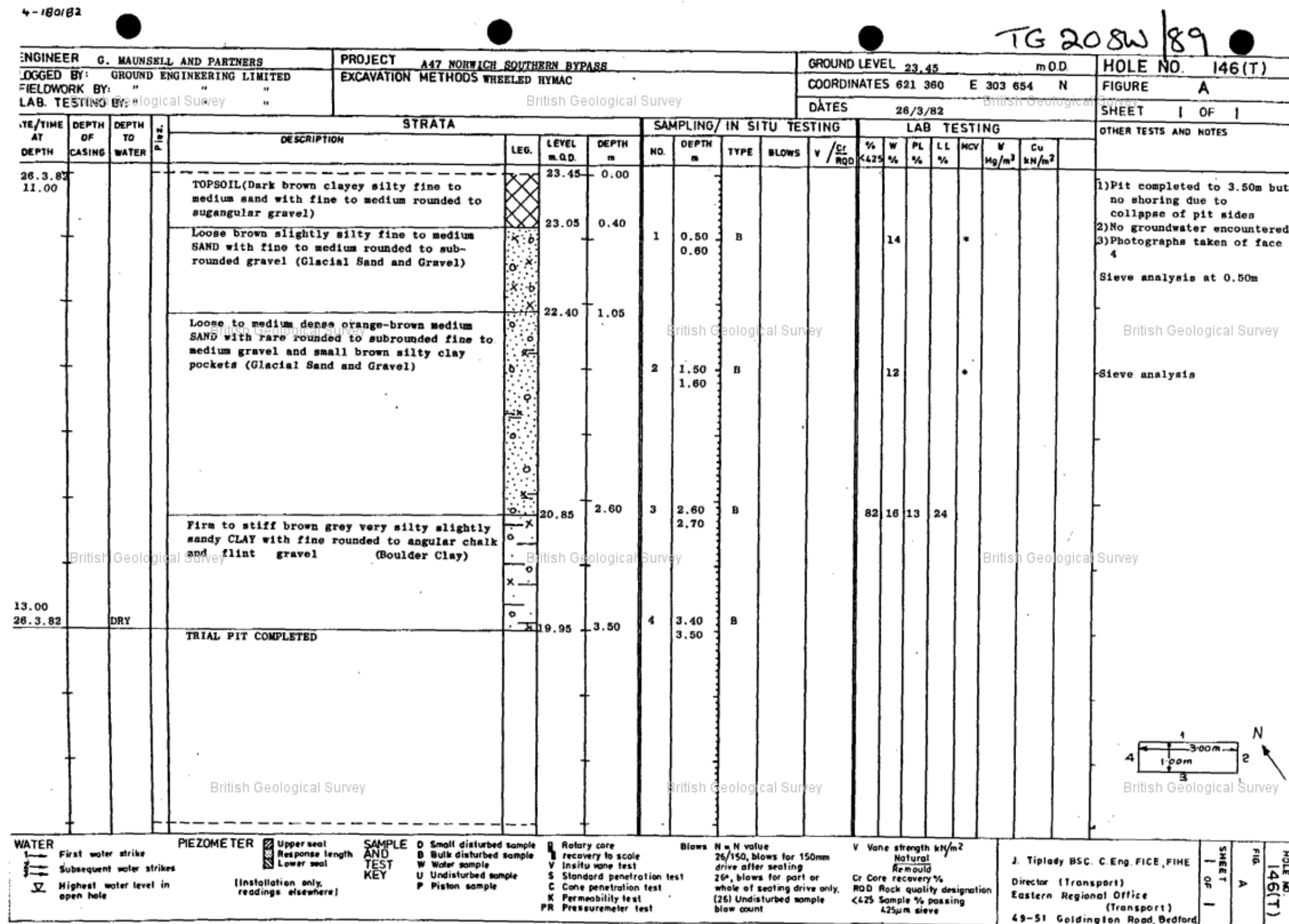
49-51 Goldington Road, Bedford

SHEET 1 OF 1

FIG. A

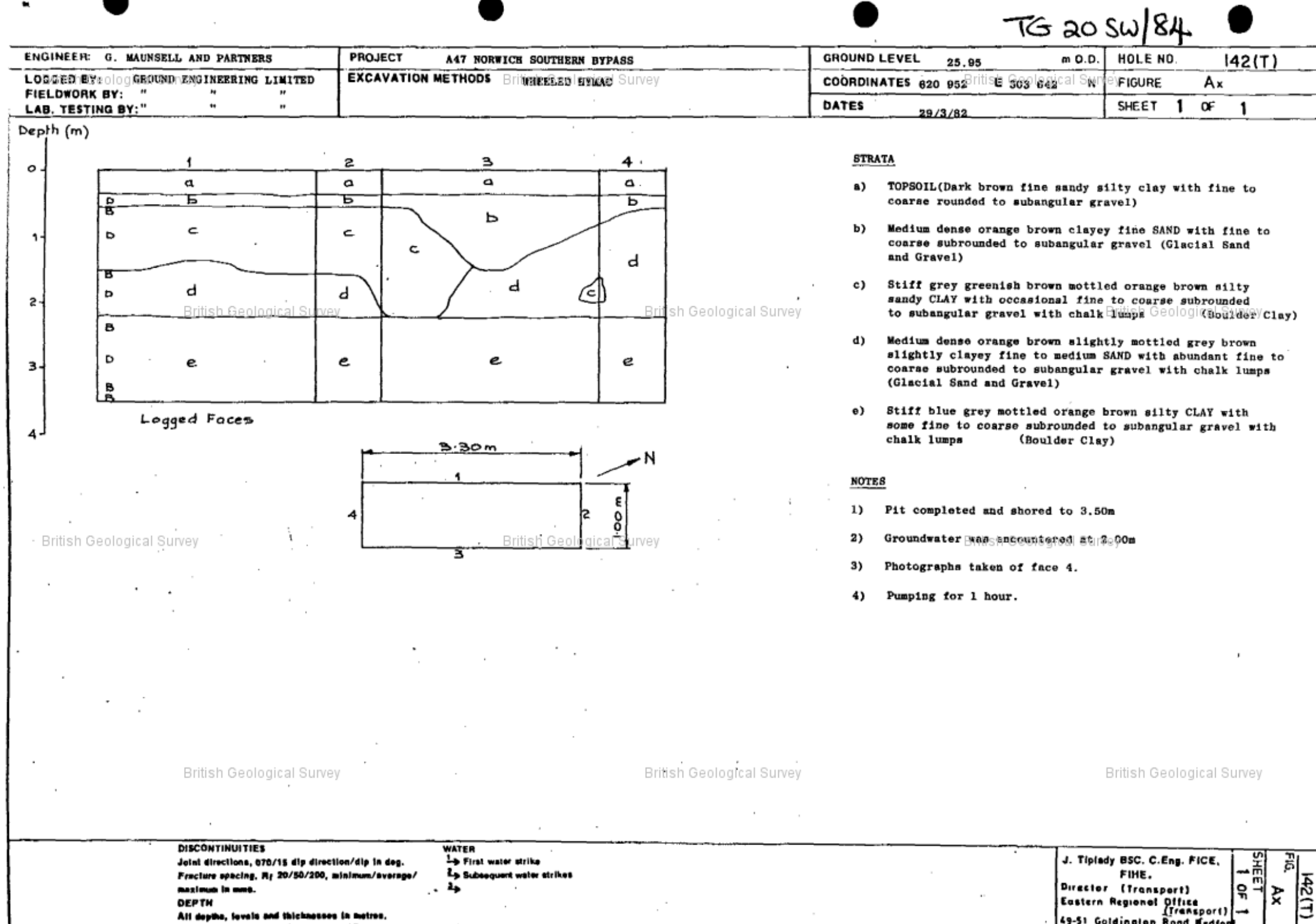
HOLE NO. 141(T)

A.1.38 TG20SW89



A.1.39 TG20SW84

[illegible]



A.1.40 TG20SW87

TG 20SW/87

ENGINEER G. MAUNSELL AND PARTNERS		PROJECT A47 NORWICH SOUTHERN BYPASS		GROUND LEVEL 26.25 m O.D.		HOLE NO. 144 A													
LOGGED BY: GROUND ENGINEERING LIMITED		EXCAVATION METHODS PERCUSSIVE (PILCON WAYFARER)		COORDINATES 620975 E 303630 N		FIGURE A													
FIELDWORK BY: British Geological Survey		200mm casing to 6.00m		DATES 26/4/82-27/4/82		SHEET 1 OF 2													
DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	STRATA		SAMPLING/ IN SITU TESTING				LAB TESTING				OTHER TESTS AND NOTES						
			DESCRIPTION	LEG.	LEVEL m O.D.	DEPTH m	NO.	DEPTH m	TYPE	BLOWS	V / Cr RQD	% <425	W %	PL %	LL %	MCV	V Mg/m ³	Cu kN/m ²	
6.4.82 100			TOPSOIL		26.25	0.00													
			Firm brown silty very sandy CLAY with fine to medium subrounded to subangular gravel (Boulder Clay)		25.95	0.30	1	0.50	D										
			Stiff grey-brown silty CLAY with fine to medium subrounded chalk gravel (Boulder Clay)		25.50	0.75	2	0.85	D										
			----- becoming firm to stiff				3	1.00	U	(71)		70	13	16	32		2.14	105	
			----- with pale brown clay				4	1.45	D										
			----- becoming stiff				5	1.50	D										
			----- with pockets of orange brown clayey sand				6	2.00	U	(59)		77	17	18	28		2.12	80	
			----- becoming stiff				7	2.45	D										
			Stiff dark grey silty CLAY with chalk gravel (Boulder Clay)				8	2.50	D										
			----- becoming firm to stiff				9	3.00	U	(32)									
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				10	3.45	D										
			----- becoming firm to stiff				11	3.50	D										
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				12	4.00	U	(37)		83	16	18	29		2.14	132	
			----- becoming firm to stiff				13	4.45	D										
			Firm cream-white lumps of fissured CHALK in a remoulded chalk matrix with flints (Upper Chalk)		21.45	4.80	14	4.50	D										
			----- becoming firm to stiff				15	4.90	D										
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				16	5.00	U	(58)									
			----- becoming firm to stiff				17	5.45	D										
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				18	6.00	D										
			----- becoming firm to stiff				19	6.50	U	(51)		82	14	14	29		2.11	75	
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				20	6.95	D										
			----- becoming firm to stiff				21	7.00	D										
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				22	7.50	D										
			----- becoming firm to stiff				23	8.00	U	(47)									
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				24	8.45	D										
			----- becoming firm to stiff				25	8.50	D										
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				26	8.90	D										
			----- becoming firm to stiff				27	9.00	U	(37)									
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				28	9.45	D										
			----- becoming firm to stiff				29	9.50	D										
			Firm cream-white lumps of fissured CHALK in a remoulded chalk matrix with flints (Upper Chalk)		17.40	8.85	30												
			----- becoming firm to stiff				31												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				32												
			----- becoming firm to stiff				33												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				34												
			----- becoming firm to stiff				35												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				36												
			----- becoming firm to stiff				37												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				38												
			----- becoming firm to stiff				39												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				40												
			----- becoming firm to stiff				41												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				42												
			----- becoming firm to stiff				43												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				44												
			----- becoming firm to stiff				45												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				46												
			----- becoming firm to stiff				47												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				48												
			----- becoming firm to stiff				49												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				50												
			----- becoming firm to stiff				51												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				52												
			----- becoming firm to stiff				53												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				54												
			----- becoming firm to stiff				55												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				56												
			----- becoming firm to stiff				57												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				58												
			----- becoming firm to stiff				59												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				60												
			----- becoming firm to stiff				61												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				62												
			----- becoming firm to stiff				63												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				64												
			----- becoming firm to stiff				65												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				66												
			----- becoming firm to stiff				67												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				68												
			----- becoming firm to stiff				69												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				70												
			----- becoming firm to stiff				71												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				72												
			----- becoming firm to stiff				73												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				74												
			----- becoming firm to stiff				75												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				76												
			----- becoming firm to stiff				77												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				78												
			----- becoming firm to stiff				79												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				80												
			----- becoming firm to stiff				81												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				82												
			----- becoming firm to stiff				83												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				84												
			----- becoming firm to stiff				85												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				86												
			----- becoming firm to stiff				87												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				88												
			----- becoming firm to stiff				89												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				90												
			----- becoming firm to stiff				91												
			Stiff grey-brown silty sandy CLAY with chalk gravel (Boulder Clay)				92												

TG 20 SW 187

ENGINEER G. MAUNSELL AND PARTNERS		PROJECT A47 NORWICH SOUTHERN BYPASS		GROUND LEVEL 26.25 m O.D.		HOLE NO. 144 A	
LOGGED BY: GROUND ENGINEERING LIMITED		EXCAVATION METHODS PERCUSSIVE (PILCON WAYFARER)		COORDINATES 620975 E 303630 N		FIGURE A	
FIELDWORK BY: British Geological Survey		200mm casing to 8.00m		DATES 26/4/82-27/4/82		SHEET 2 OF 2	

DATE/TIME AT DEPTH	DEPTH OF CASING	DEPTH TO WATER	STRATA			SAMPLING/IN SITU TESTING				LAB TESTING							OTHER TESTS AND NOTES	
			DESCRIPTION	LEG.	LEVEL m O.D.	DEPTH m	NO.	DEPTH m	TYPE	BLOWS	V / Cr RQD	% <425	W %	PL %	LL %	MCV		V Mg/m ³	Cu kN/m^{2}
			<div style="border: 1px solid black; padding: 5px;"> AS SHEET 1 British Geological Survey </div>			23/	10.00	DS/B	N=14									
						24	10.45											
						25	11.00	U	(46)									
						26	11.45											
						27/	11.50	D										
						28	12.00	DS/B	N=12									
						29	12.45											
						30	13.00	U	(39)									
						31/	13.45	D										
						32	13.50											
						33	14.00	DS/B	N=11									
						34	14.45											
						35	15.00	U	(40)									
27.4.82	14.00	6.00		DRY		10.55	15.60	D										
			BOREHOLE COMPLETED															

WATER

1 First water strike

2 Subsequent water strikes

3 Highest water level in open hole

PIEZOMETER

Upper seal

Response length

Lower seal

(Installation only, readings elsewhere)

SAMPLE AND TEST KEY

D Small disturbed sample

B Bulk disturbed sample

W Water sample

U Undisturbed sample

P Piston sample

Blows

N = N value

26/150, blows for 150mm drive after seating

26*, blows for part or whole of seating drive only.

(26) Undisturbed sample blow count

V Vane strength kN/m²

Natural

Remould

Cr Core recovery %

RQD Rock quality designation

<425 Sample % passing 425µm sieve

J. Tiplady BSC. C. Eng. FICE, FIHE

Director (Transport)

Eastern Regional Office

(Transport)

49-51 Goldington Road, Bedford

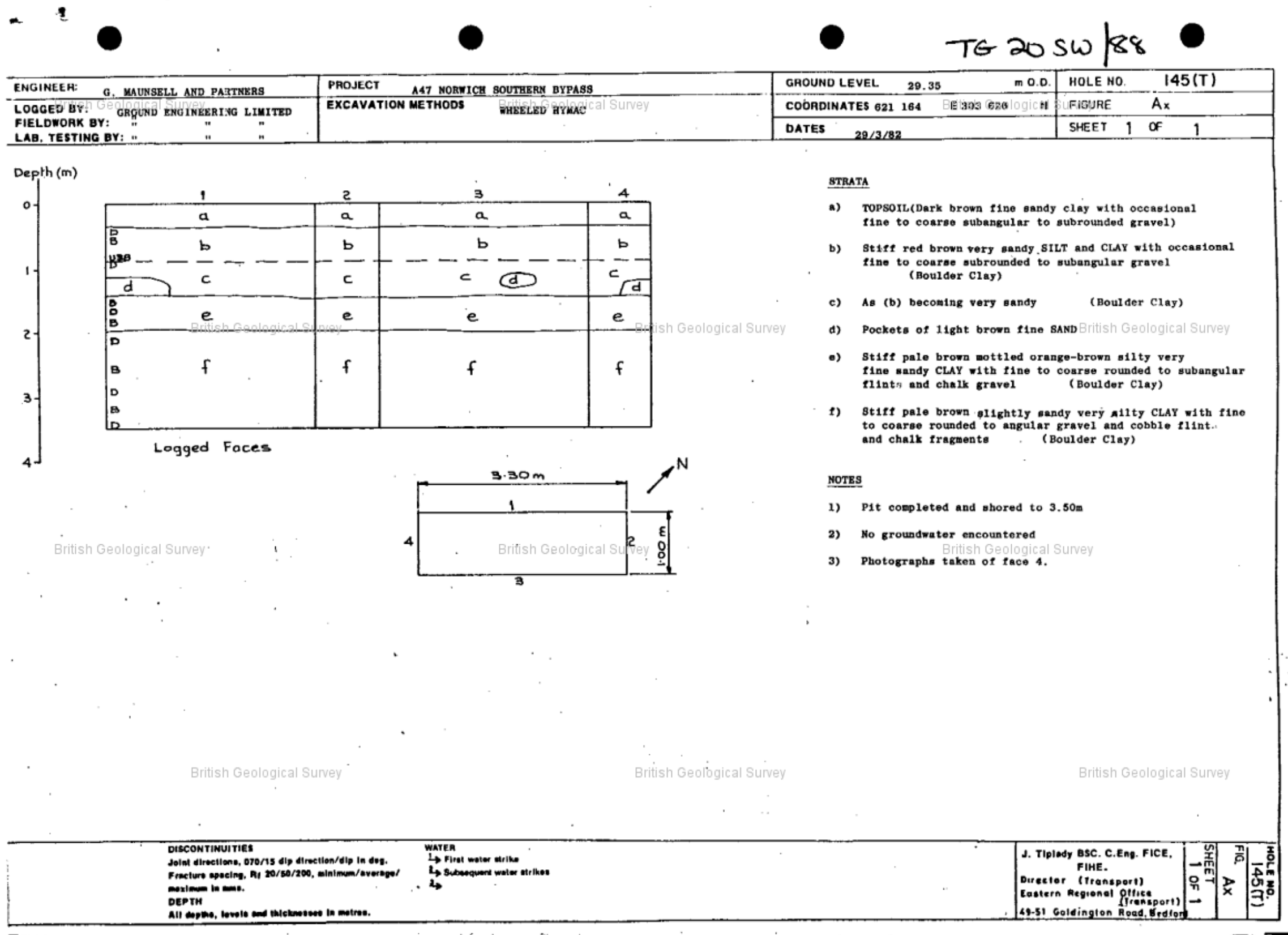
HOLE NO. 144A

FIG. A

SHEET 2 OF 2

A.1.41 TG20SW88

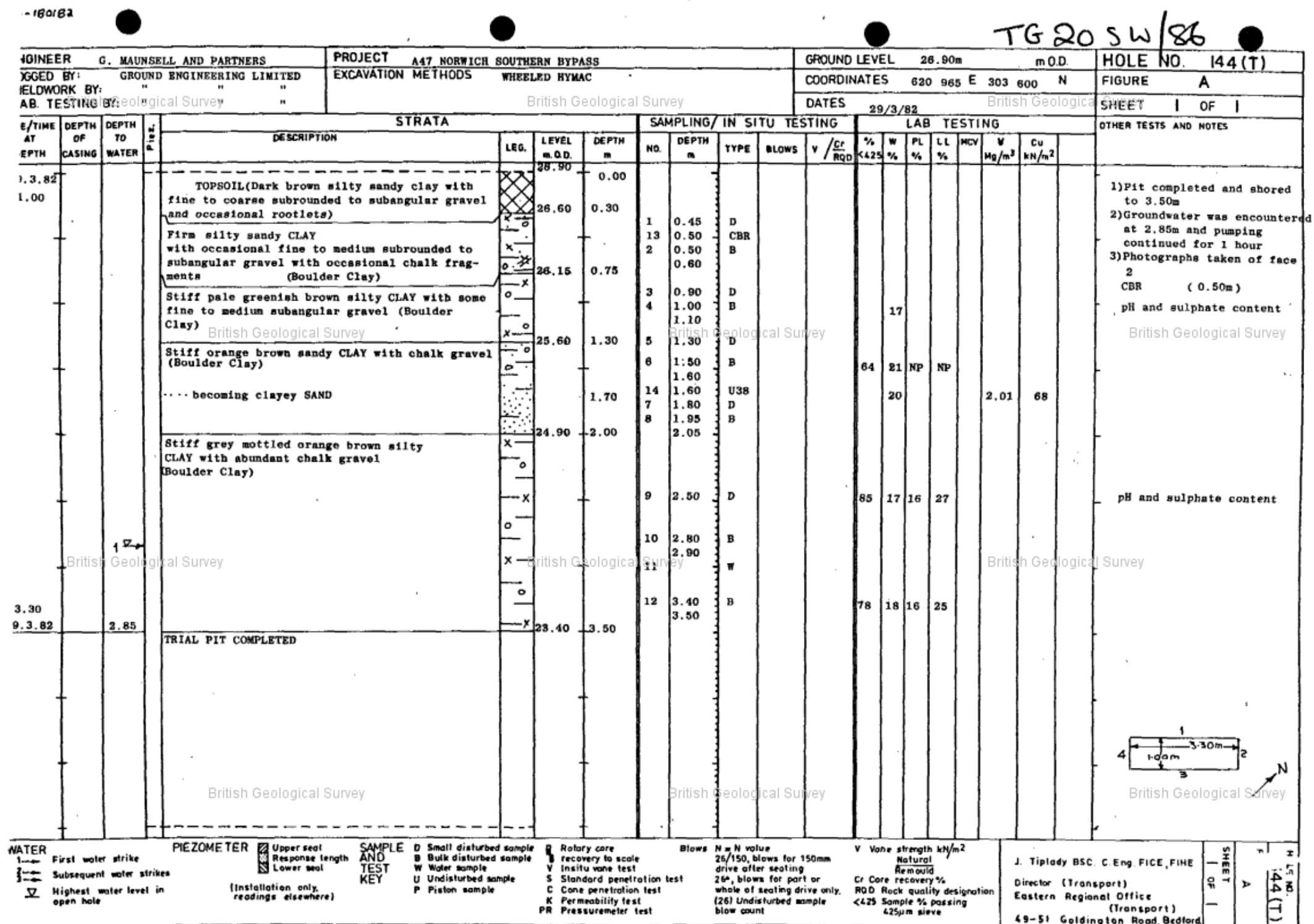
[illegible]



A.1.42 TG20SW85

[illegible]

A.1.43 TG20SW86



A.1.44 TG10SE11

British Geological Survey

British Geological Survey

British Geological Survey

TG 10 SE 11 1842 0356

South-west of Hall Farm, Intwood

Surface level (+ 31.5 m) + 103 ft
 Water not struck
 Wirth B O, 8 inch diam.,
 January 1970

Overburden (0.9 m) 3 ft;
 Mineral (0.9 m) 3 ft;
 Waste (16.4 m +) 54 ft +

British Geological Survey

British Geological Survey

British Geological Survey

		Thickness		Depth	
		(m)	ft	(m)	ft
	Soil.	(0.9)	3	(0.9)	3
Glacial Sand and Gravel	Gravel.	(0.9)	3	(1.8)	6

Gravel: coarse with fine,
 subangular flint with some
 subrounded quartz.

Sand: medium with coarse,
 subangular. Brown.

Very 'clayey' pebbly sand

Gravel: fine to coarse, mainly
 subangular to subrounded flint.

Sand: fine to coarse, subangular.
 Light brown.

British Geological Survey

British Geological Survey

British Geological Survey

Chalky Boulder Clay	Brown sandy clay with occasional flint pebbles.	(7.7)	25	(10.4)	34
	Light brown chalky clay.	(3.0)	10	(13.4)	44
	Brown sandy clay with thin sand bands.	(1.8)	6	(15.2)	50
	Light brown-orange clay, slightly sandy, with occasional quartz and chalk pebbles.	(3.0 +)	10 +	(18.2)	60

British Geological Survey

British Geological Survey

		mm	%	Depth below surface (ft)	Fines	Percentage Sand	Gravel
Gravel	61	64	0	3 - 6	7	32	61
	-	64 + 16	42				
	-	16 + 4	19				
Sand	32	4	1				
	-	1 + 1/4	21				
	-	1/4 + 1/16	3				
Fines	7	1/16	7				

British Geological Survey

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A.1.45 TG20SW166



NGRC
National Geological Survey
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET TG 20SW

BH REGISTRATION NUMBER 164-172.

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

<h1>RECORD OF WELL</h1>		For Institute use only Licence No.
		N
EXACT SITE OF WELL	At <u>Sports Ground</u>	<div style="font-size: 2em; margin-bottom: 10px;">TG 20 / 139</div> <div style="border: 1px solid black; width: 40px; height: 40px; margin: auto; display: flex; align-items: center; justify-content: center;">161</div>
	..... <u>Lakenham Heath</u>
	Town or Village .. <u>Swandeston</u>	
	County <u>Norfolk</u>	
	Six-inch National Grid sheet and reference <u>TG 2064 0328</u>	
	For ... <u>Lakenham F.C. Rugby Football Club and C.E.Y.M.S.</u>	
	State whether owner, tenant, builder, contractor, consultant, etc.: ... <u>Licence No. E7 34 13 G 211</u>	
	Address (if different from above)	
	Level of ground surface above sea level (O.D.) ft (..... m)	
	DELETE If well top is not at ground level state how far above: ft (..... m) below: ft (..... m)	
NECESSARY AS HEADINGS	SHAFT ft (..... m); diameter ft (..... m);	
	HEADINGS (please attach details—dimensions and directions)	
	BORE... <u>20D</u> ft (..... <u>60.96</u> m); diameter: at top.... <u>nk</u> in (..... mm); at bottom..... in (..... mm)	
	Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.): <u>not known</u>	
TEST CONDITIONS	Water struck at depths of ft (..... m) below well top	
	Rest level of water ft (<u>24.0</u> m) above* well top. Suction at ft (..... m) below	
	Yield on hours* test pumping at galls per (..... l/s) with days*	
	depression to ft (..... m) below well top. Recovery to rest level in mins* hours	
	Capacity of pump g.p.h. (..... l/s)	
	Date of measurements <u>1986</u>	
NORMAL CONDITIONS	DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:	
	Make and/or type	Motive power
	Capacity galls (..... m³) per hour. Suction at ft (..... m) below well top. Amount pumped galls (..... m³) per day. Estimated consumption galls (..... m³) per week	
	Well made by <u>T.W. Page & Son Ltd</u> Date of sinking ? <u>11/1986</u>	
	ADDITIONAL NOTES ANALYSIS (please attach copy if available)	
LOG OF STRATA OVERLEAF		

INSTITUTE OF GEOLOGICAL SCIENCES
HYDROGEOLOGY UNIT
EXHIBITION ROAD
LONDON SW7 2DE

Received from Anglian W.A.
Norwich District

Date 1.4.87

Observation well.....

Recorder

ER log

Site marked on
1" map

6" map—Grid Sheet.....
(use symbol)

Copy to British Geological Survey

Date

[illegible]

DATA ACQUISITION SHEET

CSC/D/128

P19

NRA region: ANGLIAN (NORWICH)

7920/139

File Number: PTF 34/13 (4)

Pump Well Identification:

NRA id No: 34/13/G/211

BGS (WL) No: 7920/139

NGR: TG 2064 0329

Elevation: 37.2m OD

Measuring Point:

Site Name: LAKENHAM & HEWITT RFC

Locality: SWARESTON

Well details:

depth of pumping well: 60.96m

diameter: 100mm

casing details: plain ts ?

☒ observation boreholes NONE

number of obs bhs: ~

obs bh details: ~

Aquifer Details:

SEMI ?

confined / ~~unconfined~~

If confined, confining layer: Boulder Clay? Marl!

Aquifer Geology	from	to	Aquifer Geology	from	to
CLAY to 7.31 S + stones to 12.07 Marl to 25.0					
CHALK	25.0	61.0			

Pumping Test Details:

date of test: 3.12.86

length of test: 5.5 hours

RWL: 24.6m bgl

PWL: 26.6m bgl

Drawdown: 2.0m

pumping rate: mean 1.02ls (70.5m³/d)

the yield dropped off towards end of test
but not reflected in ddn.

Additional Well Information:

- ☐ Well Loss Data: B..... C..... Efficiency.....
- ☐ Well Acidified
- ☐ Flow Logs
- ☐ Other Geophysical Logs
- ☐ Fissure Information: major inflows from.....to.....
from.....to.....
from.....to.....

Aquifer Parameters:

Analysis Type: SACOB I

Transmissivity: 56.1m²/d (enter data)
EARLY DATA = 21.5m²/d

Storage Coefficient: ~

Analysis Type: THEIS RECOVERY

Transmissivity: 21.8m²/d (virtually all
good data fit
at line)

Storage Coefficient:

Analysis Type:

Transmissivity:

Storage Coefficient:

Other Data:

Confidence:

excellent ☐ ☒ ☐ ☐ ☐ very poor

Notes: No obs bhs: not possible to calc S value.

A.1.46 TG20SW112

		For Institute use only		Licence No.
RECORD OF WELL				N.....
EXACT SITE OF WELL	At	Sports Ground	TG 20 SW 112	2064 0328
	.....	Lakenham Heath	TG 20 / 139	
	Town or Village	Swardston		
	County	Norfolk		
TEST CONDITIONS	Six-inch National Grid sheet and reference	TG 2064 0328		
	For	Lakenham F.C. Heath Rugby Football Club and C.F.Y.M.S.		
	State whether owner, tenant, builder, contractor, consultant, etc.:	Lianu No. E7:34:13:6:211		
	Address (if different from above)			
	Level of ground surface above sea level (O.D.)			
	*DELETE If well top is not at ground level state how far above: *			
	AS SHAFT	ft (.....m); diameter.....ft (.....m);		
	NECESSARY HEADINGS (please attach details—dimensions and directions)			
	BORE	200 ft (.....60.96 m); diameter: at top.....in (.....mm);		
	at bottom	in (.....mm)		
TEST CONDITIONS	Full details of permanent lining tubes (position, length, inner and outer diameters, plain slotted etc.):	not known		
	Water struck at depths of	ft (.....m) below well top		
	Rest level of water	ft (.24.0 m) above well top. Suction at.....ft (.....m)		
	Yield on.....hours' test pumping at.....galls per	(.....l/s) with		
	depression to.....ft (.....m) below well top. Recovery to rest level in	mins*		
	Capacity of pump.....g.p.h. (.....l/s)			
	Date of measurements.....	1986		
	DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:			
	Make and/or type	Motive power.....		
	Capacity.....galls (.....m³) per hour. Suction at	ft (.....m)		
NORMAL CONDITIONS	below well top. Amount pumped.....galls (.....m³) per day. Estimated			
	consumption	galls (.....m³) per week		
	Well made by	T.W. Page & Son Ltd.	Date of sinking.....?	11/1986
	ADDITIONAL NOTES ANALYSIS (please attach copy if available)			
LOG OF STRATA OVERLEAF				

Received from

Anglian W.A.
Norwich Division

Date

1-4-87

Observation well.....

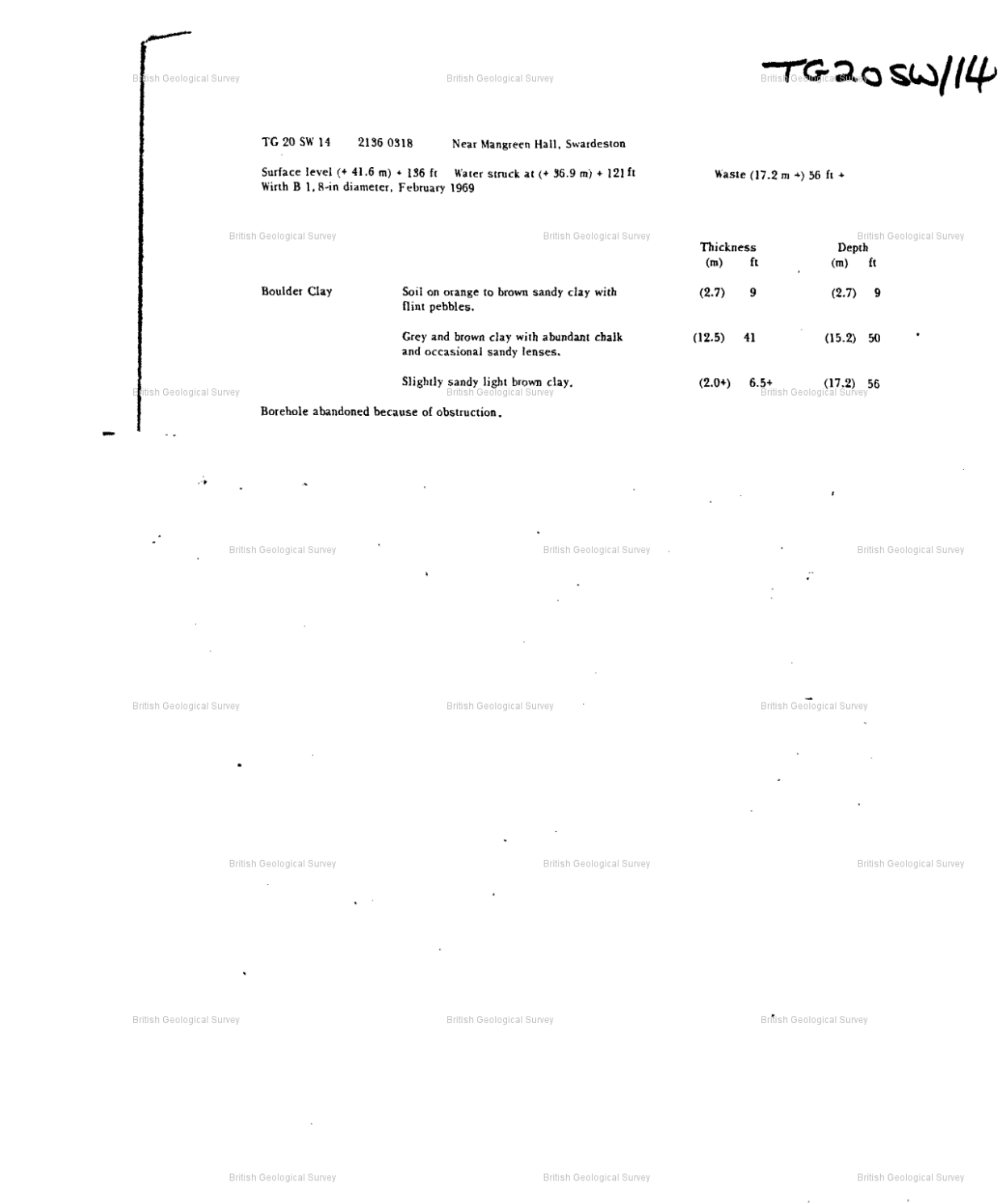
Recorder

ER log

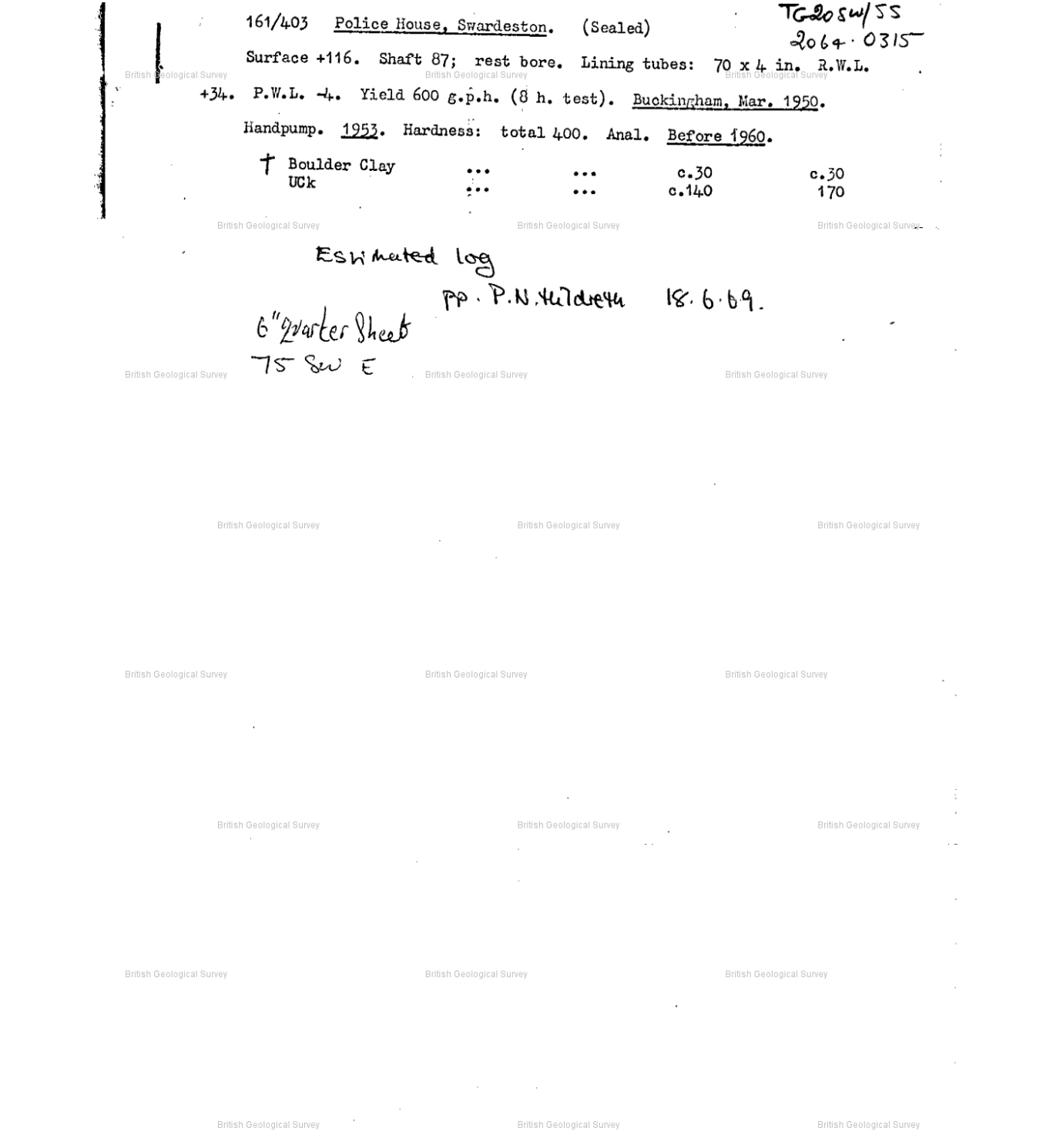
Site marked on

[illegible]

A.1.47 TG20SW14



A.1.48 TG20SW55



161/403 Police House, Swardston. (Scaled) **TQ20/50**

Surface +116. Shaft 87; rest bore. Lining tubes: 70 x 4 in. R.W.L.

+34. P.W.L. 4. Yield 600 g.p.h. (8 h. test). Buckingham, Mar. 1950.

Handpump. 1953. Hardness: total 400. Anal. Before 1960.

† Boulder Clay	...	...	c.30	c.30
UCk	...	...	c.140	170

Estimated log TQ 2066 0315

PP. P.N. Hildreth 18.6.69.

6" quarter sheet

75 SW E

1.

RECORD OF WELL (SHAFT OR BORE)
(attach copy of analysis if available)

At Police House.

Town or Village Swardston, Norwich

County Norfolk Six-inch quarter sheet 75 SW 16

For Mr. Norfolk County Council State whether owner, tenant, builder, contractor, consultant, etc. :-

Address (if different from above) Hope Road, Norwich

Level of ground surface above sea-level (O.D.) _____ ft. If well-top is not at ground level, state how far ... (above; ... below; _____ ft.)

SHAFT 87 ft.; diameter _____ ft.; Details of headings _____

BORE 82 ft.; diameter of bore: at top 4 ins.; at bottom _____ ins.

Details of permanent lining tubes 70' x 4"

Water struck at depths of _____ ft. below well-top.

Rest-level of water 82 ft. above well-top. Suction at _____ ft. Yield on 8 hours' test _____ galls. per _____ hour with depression to 120 ft. below well-top.

Recovery to rest-level in _____ mins. Capacity of pump _____ g.p.h. Date of measurements _____

Description of permanent pumping equipment :

Make and/or type _____ Motive power _____

Capacity _____ gallons per hour. Suction at _____ ft.

Amount pumped _____ galls. per day. Estimated consumption _____ galls. per week.

Well made by J.A. Buckingham Date of well March 1950

Information from do.

ADDITIONAL NOTES

Police house visited - no one in.

Site marked of handpump outside back door.

O.D. 116'

Combined chlorine 1.8 gms/l. gal.

Total Hardness 38°

Very slight trace iron.

Visited -

Discovered & sealed.

24/5/60 B.N.

LOG OF STRATA OVERLEAF.

M. Chanderam

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W.7.

Date Received 9.6.55.

1" O.S. Map No. _____ Site marked on 1" Map _____ (use symbol) on 6" Map _____

[illegible]

A.1.49 TG10SE18

TG 10 SE 18		1957 0233		South-west of Hospital Farm, Swardeston	
Surface level (+ 33.2 m) + 109 ft		Waste (15.5 m) 51 ft.			
Water not struck		Bedrock (0.9 m +) 3 ft +			
With B O. 8 inch diam.,					
January 1970					
		Thickness		Depth	
		(m) ft		(m) ft	
Made ground and soil.		(1.2) 4		(1.2) 4	
Glacial Sand and Gravel	Very clayey sand. Traces of hard chalk fragments.	(0.6) 2		(1.8) 6	
	Gravel: fine, subangular traces subrounded, mainly flint, some quartz.				
	Sand: medium and fine, subangular. Light brown.				
Chalky Boulder Clay	Brown sandy clay with some gravel.	(2.1) 7		(3.9) 13	
	Gravel: mainly fine, subangular flint.				
	Sand: medium and coarse.				
Upper Chalk	Light brown clay with traces of chalk.	(11.6) 38		(15.5) 51	
	Chalk.	(0.9 +) 3 +		(16.4) 54	