Appendix C

Risk Assessment Classification Definitions

Definition of Potential Consequence

Classification	Human Health	Controlled Waters	Ecological	Built Environment
Severe	Irreversible damage to human health	Substantial pollution of sensitive water resources	Significant change to the number of one or more species or ecosystems	Irreparable damage to buildings, structures or the environment
Moderate	Non-permanent health effects to humans	Pollution of non sensitive water resources or small scale pollution of sensitive water resources	Change to population densities of non sensitive species	Damage to sensitive buildings, structures or the environment
Mild	Slight short term health effects to humans	Slight pollution to non sensitive water resources	Some change to population densities but with no negative effects on the function of the ecosystem	Easily repairable effects of damage to buildings or structures
Negligible	No measurable effects on humans	Insubstantial pollution to non-sensitive water resources	No significant changes to population densities in the environment or in any ecosystem	Very slight non-structural damage or cosmetic harm to buildings or structures

Definition of Probability

Very Unlikely	0 to 5%
Unlikely	5 to 45%
Possible	45 to 55%
Likely	55 to 95%
Almost Certain	95 to 100% (i.e. impact noted during the investigation).

Assignment of Risk Using Consequence / Probability Matrix

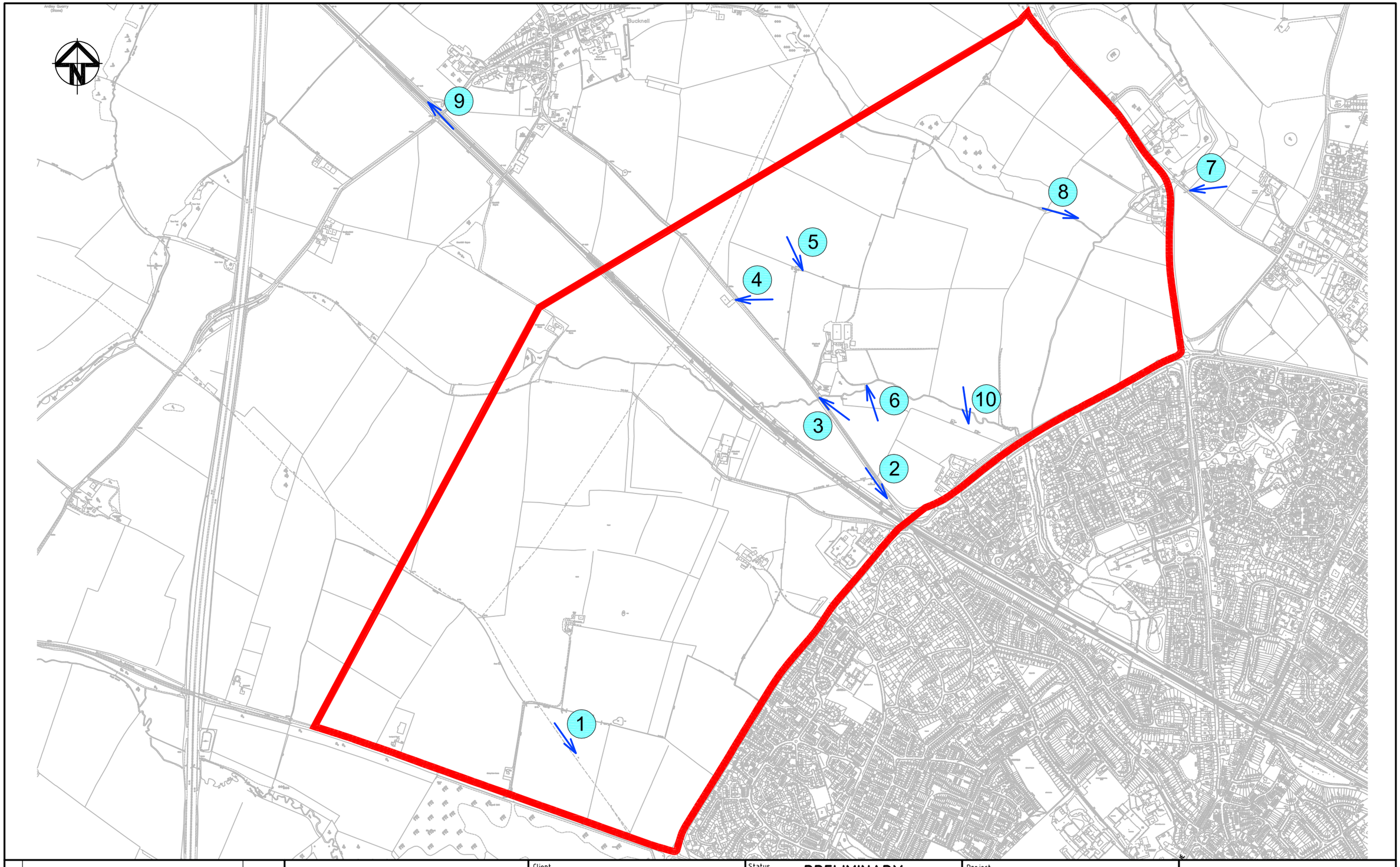
Consequence	Risk				
Severe	Low	Low to moderate	Moderate to high	Very High	Very High
Moderate	Negligible to low	Low	Moderate	Moderate to high	High
Mild	Negligible	Low	Low	Low to moderate	Moderate
Negligible	Negligible	Negligible	Negligible to low	Low	Low
Probability	Very Unlikely	Unlikely	Possible	Likely	Almost Certain

Definition of Overall Risk

Negligible	The presence of the identified source does not give rise to the potential to cause significant harm.
Low	It is possible that harm could arise to a designated receptor from an identified source, however, this is likely to be mild. It is unlikely that the issue will arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the Site.
Moderate	It is possible that harm could arise to a designated receptor from an identified source, but it is likely that such harm would be relatively localised or non permanent -remedial action may be necessary. It is possible that the issue could arise as a liability/cost for the freehold/leasehold owner (as appropriate) of the Site. Further work is usually required to clarify the risk.
High	A designated receptor is likely to experience significant harm from an identified source without remedial action. It is likely that the issue will arise as a liability/cost for the Site freehold/leasehold (as appropriate) owner of the Site.
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified source without appropriate remedial action. It is highly likely that the issue will arise as a liability/cost for the Site freehold/leasehold (as appropriate) owner of the Site.

Appendix D

Site Walkover Photographs



Issue	Description	Date
01	FIRST ISSUE	13/07/10

KEY

1 PLATE NUMBER

PHOTOGRAPH LOCATION AND DIRECTION

Client: a2dominion / P3Eco Ltd

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

		Current Issue Signatures	
Scales	1:12,500	Author S.JONES	
Original Size	A3	Checker D.THOMAS	
Height Datum	-	Approver C.PLUMB	
Grid	GRID	© Copyright reserved	

Filename: 2000-UA001881-UP33D-01.DWG

Project: BICESTER ECO TOWN

Title: SITE WALKOVER PHOTOGRAPH LOCATION PLAN

Hyder Consulting (UK) Limited
29, Bressenden Place
London
SW15 5DZ
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Fax: +44 (0)870 000 3906

Drawing No.	Project No.	Issue
2000	— UA001881 —	01

50mm on Original

13/Jul/2010 4:03 PM K:\UA001881_BicesterEco\E-OurDrawings\2000-UA001881-UP33D-01.dwg V1

Plate 1: View of typical farmers fields at Bicester, with 33kv overhead cable

Plate 2: One of four mobile telecommunications masts (all on Messrs. Malins' land). This one is located near the roundabout at Bicester Road and the A4095

Plate 3: Stone-faced drainage culvert crossing beneath Bucknell Road at a location some 500m NW of the junction (roundabout) with the A4095 (Lord's Lane)

Plate 4: Asbestos clad building along Bucknell Road, located some 950m NW of the junction (roundabout) with the A4095 (Lord's Lane)

Plate 5: Cattle grazing in fields

Plate 6: Most northerly of the two streams that feed the River Bure

Plate 7: Possible location of former quarry (see Reference D5 on the Envirocheck Information drawing in Appendix A)

Plate 8: Bed of the most southerly of the two streams that feed the River Bure

Plate 9: The London to Birmingham railway line as it passes within the cutting beneath Middleton Road to the south-west of Bucknell village

Plate 10: Water Abstraction Point located on Messrs. Malins' land, between two mobile telecommunications masts (see Reference B3 on the Envirocheck Information drawing in Appendix A)

Appendix E

Zetica UXO Datasheet

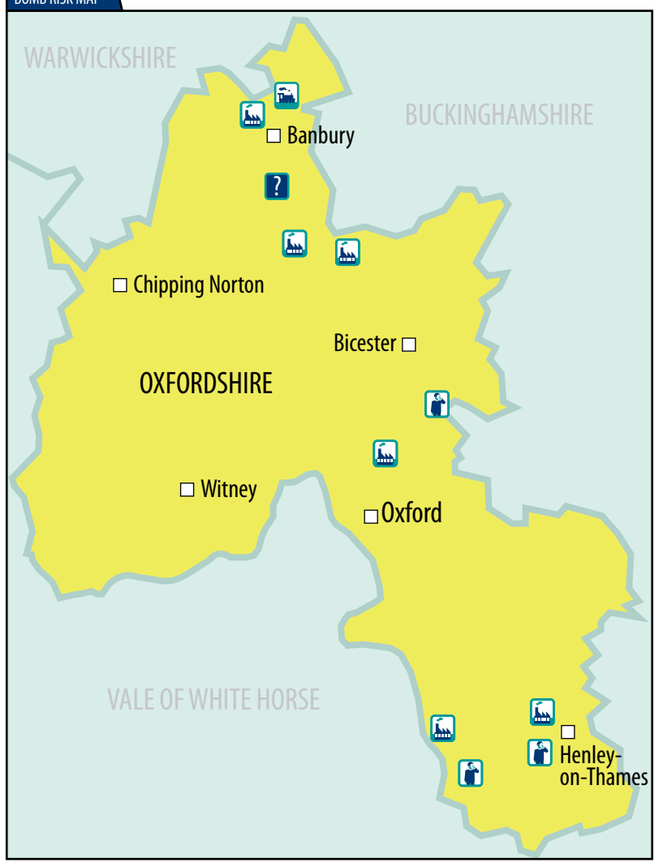
REGIONAL UNEXPLODED BOMB RISK

OXFORDSHIRE

DENSITY OF BOMBS PER BOROUGH

Borough	High explosive	Anti-personnel	Incendiary
Oxford	1	0	1
Banbury	105	0	4
Witney	124	0	4
Bicester	0	0	4
Chipping Norton	187	0	4
Henley on Thames	162	0	4

BOMB RISK MAP



OTHER WWII TARGETS

- military
- transport
- utilities
- industry
- docks
- other

BOMB TONNAGE

- >1000
- >500
- >100
- > 0
- unverified

BOMB RISK

- high
- moderate
- low

The information in this regional UXB risk map is derived from a number of sources and should be read in conjunction with the "Users' Guide" (printed overleaf). Zetica cannot guarantee the accuracy or completeness of the information or data.

This map covers regions of coast with beaches, estuaries and alike. Further consideration of the bomb risk is required in these areas. The often inaccessible nature and changing ground conditions (e.g. movement of silt that may contain ordnance) means that historical bombing records for these areas are often poor or inaccurate and further assessment of the bomb risk may be required as part of a site specific study.

A FOUR-STEP PROCESS

Risk assessment and method statement from a qualified explosive ordnance clearance (EOC) operative.

Surface geophysical survey to allow shallow groundwork.

MAGCONE detects UXBs and obstructions on piling layout to the no-risk depth.

Detected UXBs can be dealt with by our EOC engineers and a Clearance Certificate issued for the site.

BOMB MAP USERS' GUIDE

Sources of information and explanation of bomb risk

Why?

Unexploded bombs (UXB) still present a risk to construction projects long after the end of the Second World War (WWII). UXBs often entered the ground unnoticed at high velocity and penetrated to a depth of several metres. Here they remain – vulnerable to disturbances from construction work. Beyond the depth of shallow excavation work, the greatest risk is to piling, drilling and probing crews. A piling rig could repeatedly hit a UXBs with considerable force before the crew realises an obstruction has been impacted. It could then be up to 72 hours before the detonator activates.

Who?

The responsibility for avoiding UXB risk usually lies with construction companies or house builders particularly those who are redeveloping urban sites. In addition, project engineering or environmental consultants are expected to advise their clients of a site's history. Other interested parties include those organisations whose employees are physically at most risk from intrusive works, normally piling companies, drillers or probing operators.

How?

UXB risk should be assessed for every site, but especially those in known heavily bombed areas or those situated near war-time strategic installations that were priority targets for enemy aircraft, for example, airfields. Zetica's regional bomb risk map is therefore a first point of reference from which the relative, potential abundance of UXBs can be judged. Consultants then advise their clients that an ordnance-risk desk study is required, which they may obtain from external sources. Construction companies or house builders who assess their own risk could choose to come direct to Zetica.

When?

Do not wait for the piling or drilling company to be on site before thinking about UXB risk – it will inevitably cause delays and higher costs. Request the regional bomb risk map from Zetica as soon as a site is being considered, and then use it to help you or your clients to decide if an ordnance-risk desk study is required.

Where?

Maps can be obtained for any county in England, Scotland, Wales or Northern Ireland – or for any London borough. They can help determine the areas that were most heavily bombed – but no part of the country should be considered 100% safe from UXB risk. Even remote rural areas can have a high risk if, for example, they were locations for decoy airfields or beacons that were lit to fool enemy pilots into thinking they had located a burning city that had been successfully hit by others in the raid.

How to use this regional map

This map is designed to give you an indication of the potential risk from UXBs in your area. If you are conducting work that involves excavation, piling or other disturbance of the ground, then you should use the map to identify the category of risk for your site.

The risk boundaries are a guide, compiled from data based on the political areas for which records are held; being just outside a high-risk area does not mean there is no UXB risk. You should use the map to assist in your decision of whether to investigate the UXB risk further.

Information on the regional risk remaining from UXBs in the UK

Zetica has built the largest UXB database of its kind in the UK. It includes a unique digital library of bomb census data, and maps showing key strategic points and bombing densities from the First and Second World Wars. The main sources of information include records from central government (Public Records Office), the Ministry of Defence, and the German Luftwaffe.

Using information from this database, Zetica has published maps of UXB risk on a regional, county and borough scale. The maps indicate relative degrees of UXB risk based on available records for bombing densities and known targeted areas for regions within the UK. The risk is broken down into individual boroughs, towns or cities. The data are based on the historical boroughs and are then overlaid onto the modern map. It is important to note that more-detailed research may be required for individual sites, particularly where proximity to a potential WWII target means the local risk may be higher.

High risk

Areas designated as high risk are those that show a high density of bombing hits (50+ bombs per 1000 acres) and abundant potential WWII targets. In high-risk regions, further action to mitigate UXB risk is considered essential.

Moderate risk

Moderate-risk regions are those that show a bomb density of between 11 and 50 bombs per 1000 acres and that may contain potential WWII targets. Action to mitigate the risk is considered essential, albeit more likely that a reduced scope of work is required compared with that needed for high-risk regions.

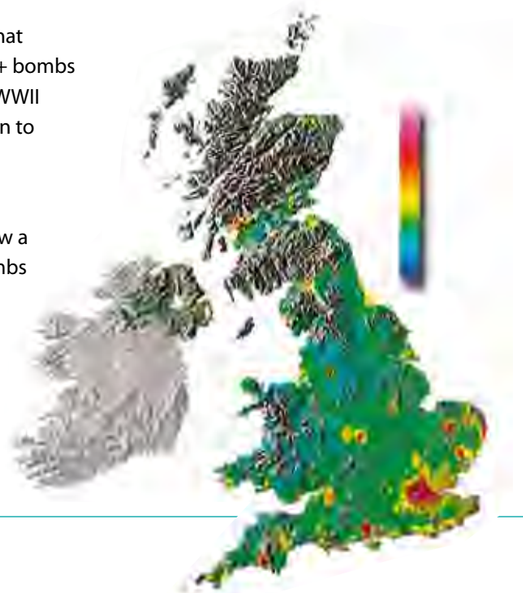
Low risk

Low-risk regions are those with a bombing density of up to 10 bombs per 1000 acres. These areas are considered to have a significant but low UXB risk. In general, further action to mitigate the risk is considered prudent, although not essential. Care is required when assessing the risk for specific sites where the risk may be higher because of local wartime activity.

Other WWII targets

Other regions with the risk of UXBs are key strategic points as defined by the government during WWII as representing potential enemy targets. Where these exist outside areas mapped as high, moderate or low risk, a site-specific assessment of the UXB risk may be required.

Relative UXB risk across UK



What to do if…

…you have a site that has a potential UXB risk

In the absence of current legislation requiring you to address the risk from UXBs, your responsibilities under health and safety legislation and regulations such as construction design and management require that you address all identified risks. The first stage is to request further advice from a professional adviser such as Zetica, or to gain more site-specific information by commissioning an ordnance-risk desk study. Then a strategy to deal with the risk can be established that is tailored to your proposed work.

…you find a suspect item or require advice

If during site works you find a suspect (ordnance-related) item, it is very important that you do not touch or move it (even if it has already been moved by an excavator). If it is clearly ordnance related, then dial 999 and ask for the police. Ensure that the area around the item is kept as clear as possible without placing yourself at risk. If you are unsure and do not wish to cause undue alarm, or you just require some advice, then you can call Zetica. We have experienced qualified UXB specialists on hand who can offer support and advice during any site works.

More-detailed procedures should be established in advance if you are in an area where the risk of finding a UXB is shown to be significant (moderate to high).

Site-specific desktop studies

Zetica is able to provide high-quality, site-specific UXB risk information for any residential, industrial or commercial property in the UK. These desktop studies provide details of the bombing density within an area and for the site itself, in order to indicate the risks of UXBs still being present. A risk assessment is provided to facilitate informed decision making on whether any further risk mitigation measures are required.

Appendix F

BGS Borehole Logs

(Refer to Drawing “Envirocheck Information” in Appendix A for borehole locations)

BGS Geological Site Assessment

ENGINEER: OVE ARUP & PARTNERS
LOGGED BY: JHR
FIELDWORK BY: Exploration Associates
LAB. TESTING BY: Exploration Associates

OXFORD TO BIRMINGHAM NEW ROUTE – OXFORD TO BANBURY SECTION

EXCAVATION METHODS: Rotary Coring – Dando 220 rig. 105 mm diameter Rotary Coring from G.L. to 20.0 m.

GROUND LEVEL: 103.38 m O.D.
COORDINATES: 454914 E 224608 N
DATES: 25.5.79 to 30.5.79

HOLE NO. SP52SW64
SHEET 1 OF 2
FIGURE A

Description of Strata

Reduced Level	Depth	Description of Strata
103.38	0.00	
103.18	0.20	TOPSOIL
101.78	1.60	Firm to stiff orange brown becoming greyish brown initially sandy silty CLAY with an increasing quantity of fine limestone gravel with depth. (Colluvium/Forest Marble)
101.23	2.15	Moderately strong grey and blue hearted very thinly bedded medium to coarse grained very shelly LIMESTONE with small diffuse patches of light greenish grey micritic with very thin interbedded and laminae of stiff brown weathered orange silty clay. (Forest Marble)
100.63	2.75	Very weak light brownish grey fissured and jointed calcareous MUDSTONE faintly weathered orange brown on joints. (Forest Marble)
99.43	3.95	
98.78	4.60	Very stiff becoming hard grey extensively mottled orange and orange brown thinly to very thinly interbedded very silty CLAY and clayey SILT. (Forest Marble) From 3.20 to 3.50m with occasional very thin interbeds of weak and moderately weak grey shelly limestone. Below 3.50m clay dark grey/black carbonaceous with some included very weak micritic limestone pebbles. At 3.95m erosion surface.
		Weak to very weak light greenish grey silty calcareous MUDSTONE initially with some patches and wisps of green clay and carbonized wood fragments. (White Limestone – Bladon) Below 4.10m mudstone with included gravel-size fragments of underlying limestone.
96.38	7.00	Moderately weak light grey mottled mid grey very fine grained micritic LIMESTONE with orange stained conchoidal fractures. (White Limestone – Bladon) Below 4.80m limestone becoming pelletoidal. From 5.15 to 5.30m erosion horizon – surface inclined at 15°. Below 5.30m limestone moderately strong light grey/white thickly bedded fine grained pelletoidal oolitic with well developed vertical stylolites.
		Moderately weak rapidly becoming moderately weak to moderately strong light grey medium bedded fine to medium grained bioturbated oolitic and pelletoidal LIMESTONE with occasional very thin beds of brown silty calcareous clay. (White Limestone – Ardley) From 7.30 to 7.50m limestone moderately fractured.

Water / Casing

Date/Time at Depth	Depth of Casing	Depth to Water
25.5.79		
15.00	3.00	NIL
11.00	3.00	1.20
30.5.79		

Sampling / in situ testing

Depths	No.	Blows	Cr/RQD
0.00	1	(20)	
0.15	2		
0.50	3	(45)	
0.95	4		
1.00	5	(100)	
1.50	6	10*/38	
	7		96/0
2.00			
			95/39
3.50			
			84/78
4.00			
			89/36
5.40			
			96/71
7.00			
			64/47
8.00			
			95/59
10.00			

Lab. Testing

-425 %	W %	PL %	LL %	γ Mg/m³	Cu kN/m²
66	21 / 23	23	40	2.01 / 2.06	90
78	23	21	53		
58	22 / 18	22	49	2.10 / 2.05	105
100	16	16	34		
100	18	16	40		
98	16	36	62		

Additional Tests and Notes

I_h	d_h	I_v	d_v
2.63	75		
2.10	74	0.43	68
1.52	74	0.69	75
0.18	74		

Forest Marble Fm

— 4.60

Bladon Mbr

7.00

Ardley Mbr

(* Point Load Index <0.10 MN/m²)

WATER ▽ First water strike ▼ Subsequent water strikes
PIEZOMETER Upper seal / Response length / Lower seal
SAMPLE AND TEST KEY: D Small disturbed sample; B Bulk disturbed sample; W Water sample; U Undisturbed sample; Rotary core; recovery to scale; V Insitu vane test; S Standard penetration test; C Cone penetration test; K Permeability test; I Insitu density test
Blows: N = N value; 28/150, blows for 150mm drive after seating
V Vane strength kN/m²; Cr Core recovery %; RQD Rock quality designation; -425 Percent % passing 425μm sieve
I Point Load Index MN/m²
DEPTH All depths, levels and thicknesses in metres

J. Tiplady BSc. C.Eng.FICE,FIHE
Director
Eastern Road Construction Unit, 10/83 Goldington Road, Bedford.

ENGINEER OVE ARUP & PARTNERS

LOGGED BY: BHF

FIELDWORK BY: Exploration Associates

LAB. TESTING BY: Exploration Associates

OXFORD TO BIRMINGHAM NEW ROUTE - OXFORD TO BANBURY SECTION

EXCAVATION METHODS: Rotary Coring - Dando 220 rig.
105 mm diameter Rotary Coring from G.L. to 20.0 m.

GROUND LEVEL 105.30 m O.D.

COORDINATES 454914 E 224608 N

DATES 25.5.79 to 30.5.79

HOLE NO. SP52SW64

SHEET 2 OF 2

FIGURE A

Date/Time of Depth	Depth of Casing	Depth to Water	Description of Strata	Leg.	Reduced Level	Depth
			(White Limestone - Ardley as above)			
			Below 12.00m limestone becoming moderately strong and slightly siliceous.			
			AUG. Firm leached fossil shell horizon.		90.93	12.45
			Weak very weathered orange brown silty calcareous SANDSTONE. (Weathered White Limestone - Ardley)		90.83	12.55
			Dense dark grey faintly weathered brown slightly clayey fine sandy SILT becoming more clayey with depth. (White Limestone - Shipton)		90.53	12.85
			Moderately weak to moderately strong mid to dark grey thinly and medium bedded fine to medium grained bioturbated calcitic pelecypodal LIMESTONE. (White Limestone - Shipton)			
30.5.79			From 13.05 to 13.15m, 13.65 to 13.80m and 16.20 to 16.55m very stiff dark grey very silty clay and clayey silt. From 16.50 to 17.25m limestone weak dark grey very fractured with some vertical calcite veining. Below 17.30m limestone moderately weak dark grey very mottled with an increasing number of diffuse patches of intertidal.			
			Weak greenish grey silty MUDSTONE and very stiff greenish grey and dark grey silty CLAY with whole and fragmented oysters. (Blampied Marly Beds)		85.53	17.85
			From 18.35 to 19.75m clay hard greenish grey mottled black and jointed. Below 18.35 clay slightly to very sandy with occasional carbonized wood fragments.			
			Moderately weak to moderately strong limestone green medium bedded very fine grained calcareous SANDSTONE. (Blampied Marly Beds)		83.88	19.50
15.09	3.00	18.00	END		83.38	20.00

Depths	Type	No.	Blows	C/RQD	-425 %	W %	PL %	LL %	γ Mg/m³	C_u kN/m²	Additional Tests and Notes
10.00											I_h 3.65, d_h 74, I_v 3.49, d_v 61
				93/77							Ardley Mbr
12.00											I_h 2.89, d_h 74, I_v 3.57, d_v 71
					89	20	17	39			12.85
				94/36							Shipton Mbr
14.90											
16.00				81/73							I_h 1.73, d_h 74, I_v 2.63, d_v 76
				100/25	100	18	14	43			
17.30											17.85
											I_h 1.01, d_h 73, I_v 0.12, d_v 76
				100/78	100	17	17	43			Ardley Fm
					81	15	16	33			
20.00											I_h 2.05, d_h 74

* Point Load Index < 0.10 MN/m²

19.50 + 0.30

* WATER T First water strike
V Subsequent water strikes

PIEZOMETER Upper seal, Response length, Lower seal

SAMPLE AND TEST KEY: D Small disturbed sample; B Bulk disturbed sample; W Water sample; U Undisturbed sample; Point Load Index I MN/m²; Distance between pistons in mm; V - vertical; H - Horizontal or radial

Rotary core recovery to scale; V Insitu vane test; S Standard penetration test; C Cone penetration test; K Permeability test; I Insitu density test

Blows N = N value; 26/180, blows for 180mm drive after seating; 28*, blows for part or whole of seating drive only; (25) Undisturbed sample blow count

V Vane strength kN/m² Natural, Remould

C/RQD Core recovery %; RQD Rock quality designation; -425 Sample % passing 425µm sieve

DEPTH All depths, levels and thicknesses in metres

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FIG A | SHEET 2 OF 2 | HOLE NO. SP52SW64

ENGINEER: OVE ARUP & PARTNERS	OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION	GROUND LEVEL 90.32 m O.D.	HOLE NO. SP52SW49
LOGGED BY: JHR	EXCAVATION METHODS Rotary Coring – Dando 220 rig.	COORDINATES 454705 E 223333 N	SHEET 1 OF 2
FIELDWORK BY: Exploration Associates	105 mm Rotary Coring from G.L. to 14.5 m.	DATES 4.6.79 to 5.6.79	FIGURE A
LAB. TESTING BY: Exploration Associates			

Strata

Description of Strata	Reduced Level	Depth
	90.32	0.00
TOPSOIL	90.12	0.20
Firm brown mottled grey and orange silty CLAY with a trace of fine to medium angular limestone gravel and with occasional small pockets of fine sand. (Colluvium/Weathered Forest Marble) Below 0.50m clay firm to very stiff with some limestone gravel and fine gravel size calcareous concretions.	88.57	1.75
Very stiff grey streaked orange brown very thinly bedded silty CLAY with very thin interbeds and laminations of weak orange calcareous siltstone and moderately weak fine grained sparry limestone. (Forest Marble) Bedding dip 10°	86.32	4.00
Moderately strong grey fine grained silty finely sparry sandy textured LIMESTONE. (White Limestone – Bladon)	85.92	4.40
Initially weak and very broken becoming moderately weak light greyish green calcareous micritic MUDSTONE with occasional pellets and some worm burrows. (White Limestone – Bladon)	85.37	4.95
Moderately weak very light grey very broken very fine grained micritic LIMESTONE with diffuse algal traces and slightly pyritized stylolites. (White Limestone – Bladon) Below 4.60m limestone light greyish green slightly fossiliferous.	83.92	6.40
Weak greyish brown mottled orange jointed silty calcareous MUDSTONE with carbonized wood fragments and branching rootlets and some clay filled burrows. (White Limestone – Bladon) Below 7.90m mudstone with included subangular gravel size fragments of weak white and light brown limestone.	81.92	8.40
Karstic erosion horizon of moderately weak light orange brown silty LIMESTONE with very irregular lumps becoming interconnecting of moderately weak to moderately strong orange fine grained slightly pelletoidal and shelly micritic LIMESTONE. (White Limestone – Ardley) Below 8.70m limestone grey faintly weathered orange finely pelletoidal with sandy texture.		

Water

Date/Time at Depth	Depth of Casing	Depth to Water
4.6.79		
20.00	NIL	7.00
08.00	NIL	1.20
5.6.79		

Sampling / in situ testing and Lab. Testing

Depths	Type	No.	Blows	Cr/RQD	<425 %	W %	PL %	LL %	γ Mg/m³	Cu kN/m²
0.00	U	1	(10)							
					76	31	27	54		
0.35	D	2								
0.50	U	3	(57)		100	24	21	50	2.01	
					100	23	21	52		
0.75	D	4								
1.00	U	5	(48)		100	23	22	50	2.05	
					77	25	29	53		
1.40	D	6								
1.50	U	7	(100)							
					69	24	19	52		
1.80	D	8			82	18	15	35		
1.83					100	24	23	54		
				51/19						
2.50										
					75	24	22	46		
				92/51						
3.55										
				73/0	71	22	20	47		
4.00									2.59	
				97/64						
4.90					100	18	16	42		
				100/17						
5.50										
				94/33						
6.20										
6.70	S			100/64						
6.90	D	9	N=60							
				49/36		30				
7.50										
						15				
				91/81						
9.00										
				98/65						

Additional Tests and Notes

I_h	d_h	I_v	d_v
1.73	76	3.17	71
*		0.32	53
1.05	81	1.13	63
0.21	76	0.83	72
2.42	76	2.40	77
*		0.51	101
0.10	77		
0.83	76		

(* Point Load Index <0.10 MN/m²)

SP52SW/49
5471 2333

Key

WATER ∇ First water strike; ▼ Subsequent water strikes

PIEZOMETER: Upper seal; Response length; Lower seal

SAMPLE AND TEST KEY: D Small disturbed sample; B Bulk disturbed sample; W Water sample; U Undisturbed sample; Rotary core recovery to scale; V Insitu vane test; S Standard penetration test; C Cone penetration test; K Permeability test; I Insitu density test

Point Load Index I MN/m²; Distance between platens mm; v – vertical h – horizontal

Blows: N – N value; 24/150, blows for 150mm drive after seating; 28*, blows for part or whole of seating drive only; (24) Undisturbed sample blow count

V Vane strength kN/m² Natural / Remould

Cr Core recovery %; RQD Rock quality designation; 425 Sample % passing 425μm sieve

DEPTH All depths, levels and thicknesses in metres

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Eastern Road Construction Unit,
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FIG. A | SHEET 1 OF 2 | HOLE NO. 065

ENGINEER OVE ARUP & PARTNERS

LOGGED BY: JHH
FIELDWORK BY: Exploration Associates
LAB. TESTING BY: Exploration Associates

OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION

EXCAVATION METHODS Rotary Coring – Dando 220 rig.
105 mm Rotary Coring from G.L. to 14.5 m.

GROUND LEVEL 90.32 m O.D.
COORDINATES 454705 E 223333 N
DATES 4.6.79 to 5.6.79

HOLE NO. SP52SW49
SHEET 2 OF 2
FIGURE A

Date/Time at Depth	Depth of Casing	Depth to Water	Description of Strata	Reduced Level	Depth	Sampling Depths	RQD	I_h	d_h	I_v	d_v
			(White Limestone – Ardley – as above)	79.82	10.50		98/65	1.26	76	1.37	87
			Weak dark grey and dark green becoming lighter grey silty calcareous MUDSTONE with laminations of white calcareous siltstone. (White Limestone – Shipton) Striated fault surface dipping at 50°	79.72	10.60	10.60	98/72	1.06	77	2.06	54
5.6.79			Moderately weak to moderately strong grey faintly weathered light orange brown medium to thickly bedded fine to medium grained micritic pelletoidal bioturbated LIMESTONE. (White Limestone – Shipton) At 13.00m slicken sided joint dipping at 60°. Below 13.50m limestone grey slightly muddy very finely pelletoidal with sandy texture.			11.70	89/79	1.39	76	1.28	83
						13.40		1.75	76	3.00	73
							75/53	3.08	76		
18.00	NIL	12.00		75.82	14.50	14.50		3.12	76	0.39	107
			END								

*WATER ▽ First water strike ▼ Subsequent water strikes

PIEZOMETER Upper seal / Response length / Lower seal

SAMPLE AND TEST KEY: D Small disturbed sample; B Bulk disturbed sample; W Water sample; U Undisturbed sample; Point Load Index I MN/m²; d distance between platens mm; v vertical h horizontal I millim

Rotary core recovery to scale; V Insitu vane test; S Standard penetration test; C Cone penetration test; K Permeability test; I Insitu density test

Blows N = N value; 28/150, blows for 150mm drive after seating; 28*, blows for part or whole of seating drive only; (28) Undisturbed sample blow count

V Vane strength kN/m² Natural Remould; Cr Core recovery %; RQD Rock quality designation; <425 Sample % passing 425μm sieve

DEPTH All depths, levels and thicknesses in metres

J. Tiplady BSC. C.Eng.FICE,FIHE
Director
Eastern Road Construction Unit,
59/63 Goldington Road, Bedford.

FIG. A SHEET 2 OF 2 HOLE NO. 065

SP 52 SW/49
5471 2333

ENGINEER OVE ARUP & PARTNERS

LOGGED BY JHR
FIELDWORK BY Exploration Associates
LAB. TESTING BY Exploration Associates

OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION

EXCAVATION METHODS Percussion Boring - Pilcon Wayfarer
150 mm diameter hole cored to 3.5 m
146 mm diameter Rotary Coring from 3.6 to 10.2 m

GROUND LEVEL 81.21 m O.D.
COORDINATES 454711 E 223053 N
DATES 3.7.79 to 4.7.79

HOLE NO. SP52SW38
SHEET 1 OF 1
FIGURE A

Date/Time at Depth	Depth of Casing	Depth to Water	Description of Strata	Leg.	Reduced Level	Depth	Depths	Type	No.	Blows	NI/RQD	%425	W %	PL %	LL %	γ Mg/m³	c_u kN/m²	Additional Tests and Notes
			TOPSOIL		81.21	0.00												
			Soft to firm dark brown silty CLAY. (Alluvium)		81.01	0.20	0.25	U	1	(15)		100	36 32	17	37	1.84 1.86	115	
			Below 0.50m clay becoming yellowish brown very silty very sandy.				0.70	D	2			100	36					
							0.95	S		N-5								
								D	3									
					79.81	1.40	1.25	U		(20)								Failed U102
3.7.79			Loose brown mottled reddish brown very silty clayey SAND with some angular fine to medium limestone gravel. (Alluvium)				1.30	D	4									
							1.70	W	6									
								W	7									
							1.90	S		N=29								
					78.81	2.40		D	5									
			Firm becoming firm to stiff light yellowish brown silty calcareous CLAY and angular GRAVEL and COBBLES of moderately weak light yellowish brown fine grained limestone. (Weathered White Limestone)				2.50	S		N=28								
								D	8									
							3.00	S		N=37								
18.00	3.50	1.70						D	9			74	10	14	20			
08.00	3.50	1.70					3.50	S		24/75								
					77.61	3.60	3.60	D	10									
			Moderately weak to moderately strong light yellowish brown initially highly fractured becoming moderately fractured thinly bedded fine grained micritic pelletoidal LIMESTONE. (White Limestone - Ardley)								78/0							
			From 4.05 to 4.10m dense light orange brown sandy slightly clayey calcareous silt.				4.50			20*/75								
4.7.79			Below 4.50m limestone finely pelletoidal with sandy texture.								83/15							
			Below 5.20m limestone slightly siliceous with abundant thin walled brachiopods and high spined gastropods.															
			At 7.10m horizon of leached fossils.				6.00											
											86/40							
			Initially weak dark grey calcareous SILTSTONE with specks of carbon and oyster shell debris becoming a very dense weakly cemented silty slightly clay fine SAND more clayey with depth. (White Limestone - Shipton)		74.06	7.15												
					73.71	7.50	7.50			16*/75								
			Moderately weak to moderately strong grey thinly becoming thickly bedded fine to medium grained micritic pelletoidal extensively bioturbated LIMESTONE. (White Limestone - Shipton)								100/65							
			From 7.50 to 7.80m limestone highly fossiliferous with green micritic filled burrows.															
			From 8.90 to 8.95m weak dark grey calcareous SILTSTONE.				9.00											
											98/98							
18.00	3.50	0.00		END	71.01	10.20	10.20											

Core diameter 114mm

SP52SW/38
5471 2305

WATER ▽ First water strike ▼ Subsequent water strikes

PIEZOMETER Upper seal / Response length / Lower seal

SAMPLE AND TEST KEY: D Small disturbed sample; B Bulk disturbed sample; W Water sample; U Undisturbed sample; R Rotary core recovery to scale; V Insitu vane test; S Standard penetration test; C Cone penetration test; K Permeability test; I Insitu density test

Blows N = N value 26/150, blows for 150mm drive after seating 26*, blows for part of 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

DEPTH All depths, levels and thicknesses in metres

J. Tipiady BSC. C.Eng.FICE,FIHE
Director
Eastern Road Construction Unit,
59/63 Goldington Road, Bedford.

FIG. A
SHEET 1 OF 1
HOLE NO. TG

LOCATION: Gowell Farm, Bicester. BOREHOLE No - Two

SP52SE209

DATE OF BORING: 06.04.1989.

Description of Strata	STRATA CHANGE LEGEND	DEPTH M	RQD %	TCR %	SCR %	Description of Discontinuities	STATE OF WEATHERING
TOPSOIL		0.54					
CORNBRASH Light brown grey, coarse grained LIMESTONE - moderately strong to strong		0.95					
Light brown slightly sandy CLAY with limestone fragments		1.00	0	37	22	Non - intact with horizontal discontinuities.	W.II
		1.79					
Light grey, weathered light brown fossiliferous LIMESTONE - moderately strong to strong		2.00	0	90	72	I_f = 50mm, non - intact from 2.30-2.90m. Horizontal discontinuities	W.II-W.III
- pitted							
Mid grey, coarse grained LIMESTONE with occasional black lithic fragments - strong		2.58	30	100	100	I_f = 6mm. Horizontal discontinuities.	W.II
		3.00					
		3.32					
Mid, dark grey, medium grained LIMESTONE with a brown weathered sandy lens - strong							
- black with abundant large shells - weak			58	100	88	I_f = 9mm. Horizontal and vertical discontinuities	W.II
- mid grey, clayey - weak to moderately weak		4.00					
		4.22					
		5.00					

BOREHOLE DIAMETER: 46.30mm

GROUND LEVEL :

WATER LEVEL : 0.90m after 22 days

REMARKS : Borehole drilled from existing ground level

DEPTH OF CASING :

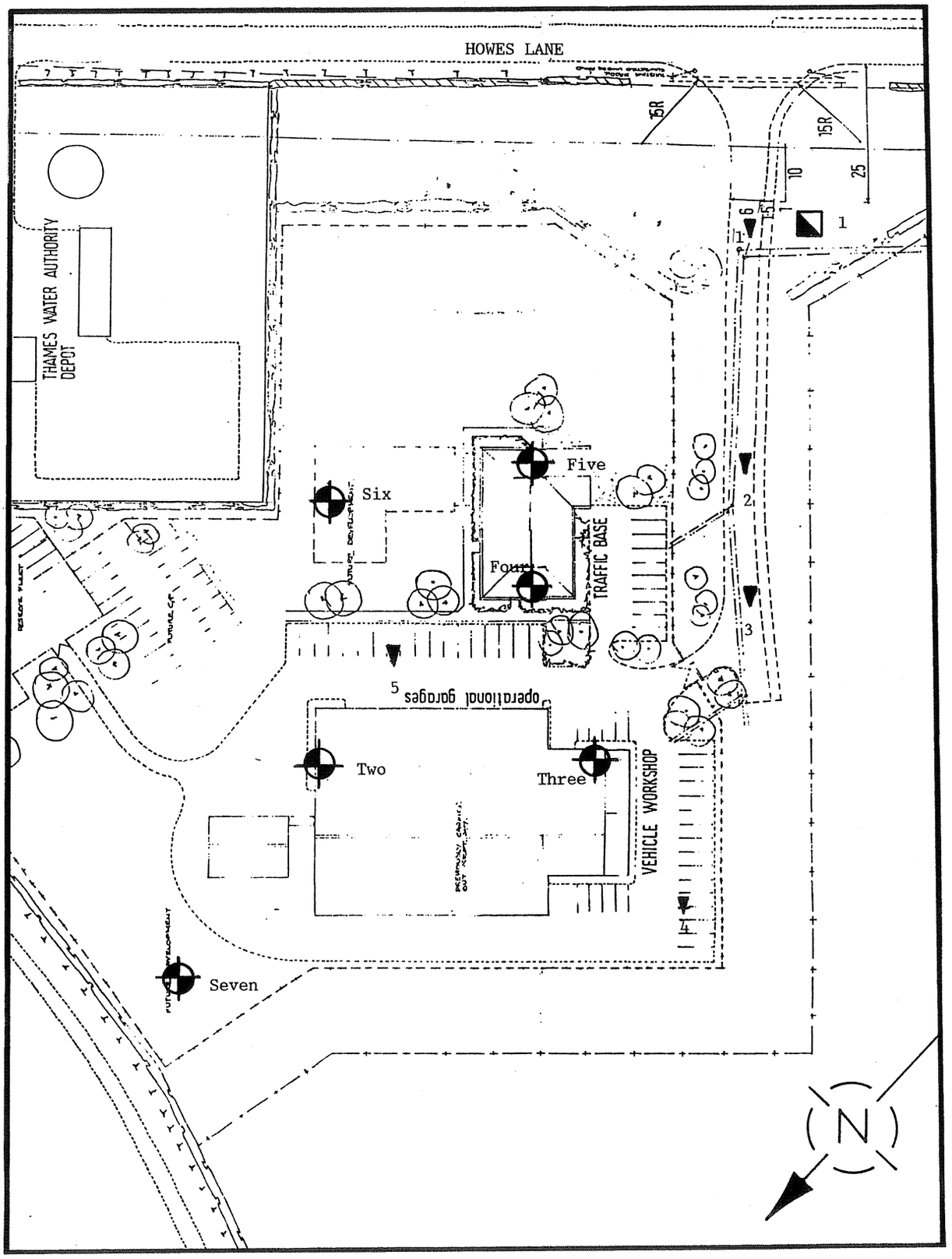
DRILLING METHOD : Rotary/Water Flush

ORIENTATION : Vertical

OS GRID REFERENCE:

DATE	BOREHOLE LOG	REPORT NO.
April 1989		S.929(i)

SP52SE209



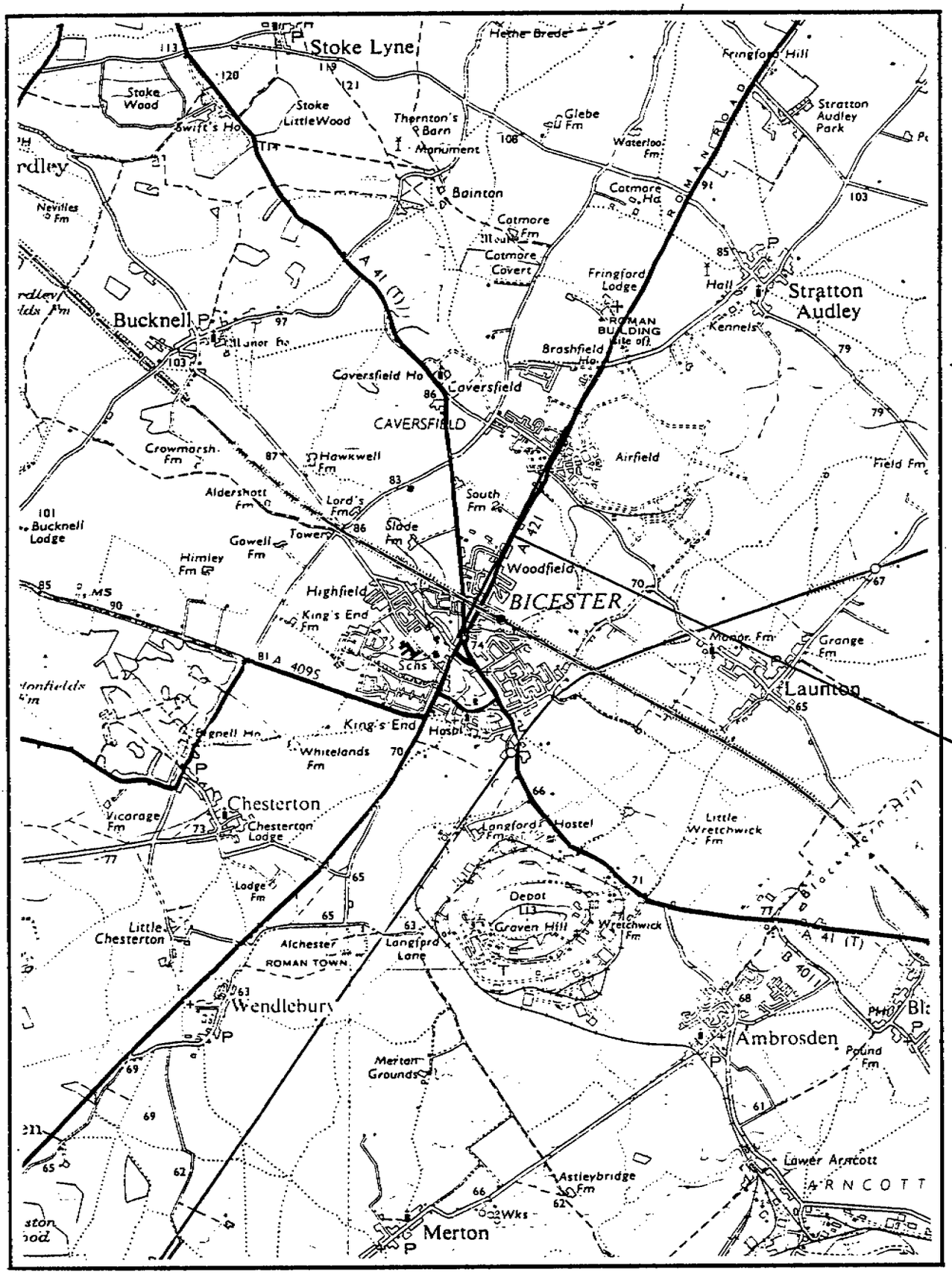
Borehole Location

Trial Pit Location

MEXE Probe Location

Date	BOREHOLE / TRIAL PIT LOCATION PLAN	Report No.
April 1989	TYRONE	S.929(i)

SP52SE55



THE SITE

KEY PLAN

1 : 50 000

SP 52 SE

Location No. 7209/13

Location BICESTER

O.S. Sheet No 7209/13

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SOIL MECHANICS LIMITED
ASKERN ROAD
CARCROFT
DONCASTER

Soil Mechanics

SP52SE55

BOREHOLE No. 370/5
Sheet 1 of 2

Equipment & Methods
Hand dug pit to 1.00m
Cable tool boring, 150mm diameter, 1.00m to 5.50m

Location No. 7209/13 GRID REF: 59080 24550
Location CAVERSFIELD FOUL OUTFALL SEWER

Carried out for
Thames Water Authority

Ground Level
81.61m OD

Coordinates
See site plan

Date
22.10.85

Description	Reduced Level	Legend	Depth and Thickness	Samples/Tests: Depth	Sample: Type	Sample: No.	Test	Field Records
Friable dark brown sandy slightly gravelly TOPSOIL. Occasional rootlets	81.61		0.00 (0.80)	0.50	D	1		
Recovered as subangular to subrounded gravel and cobbles of brown and grey medium grained generally moderately or highly weathered LIMESTONE moderately strong becoming strong with variable amounts of calcareous sand or clay. Completely to highly weathered.	80.81		0.80	0.80 – 1.00	B	2		
				1.00 – 1.45	B	3	C N=44	
			(2.25)	1.80	WS	11		Water struck at 1.80m
(Probably Highly Weathered Limestone with occasional Clay Bands)				1.85 – 3.05	B	4		
	78.50		3.05					
Very stiff grey calcareous CLAY becoming moderately weathered calcareous MUDSTONE weak				3.05 – 3.50	U	5		
				3.55	D	6		
			(2.45 pen)	4.20 – 4.65	U	7		
				4.70	D	8		
Bands of grey strong limestone.				5.00 – 5.075	D	9	S (100)	
				5.40 – 5.475	D	10	S (100)	
BOREHOLE COMPLETE AT 5.50m	76.11		5.50					

Water Level Observations During Boring

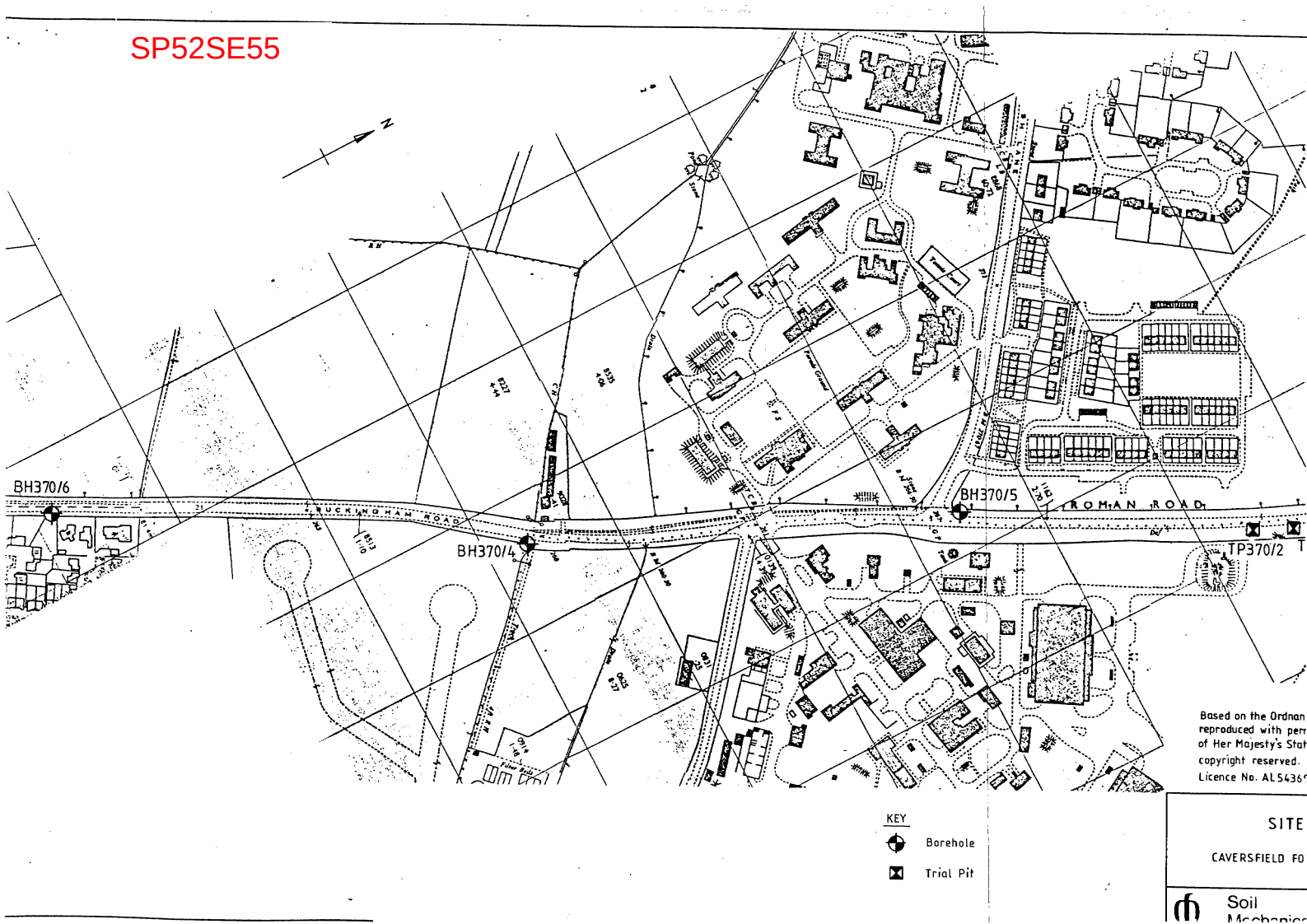
Date 1985	Time	Depth of Hole m	Depth of Casing m	Depth to Water m	Remarks
22.10	1530	1.80	0.00	1.80	Water struck

Remarks
1. Chiselling 1.85m to 3.05m, 4.50 hours; 4.75m to 5.50m, 2.50 hours

Logged by TS
Scale 1:50
Fig. 7

Notes:
Materials are described in accordance with Appendices. For explanation of symbols and abbreviations see Fig. 1.
All depths and reduced levels in metres. Thicknesses given in brackets in depth column.

SP52SE55



[SP52SE BJ 55 .]

5.

BICESTER URBAN DISTRICT COUNCIL

WATER SUPPLY AND IMPROVEMENTS TO HEADWORKS

219/75

Clerk to the Council	From:- Consulting Engineer	Clerk of Works	Contractors
LEONARD V. MURPHY Council Offices The Causeway BICESTER *Tel. : Bicester 49*	W. HERBERT BATEMAN M.C., M.Inst.C.E. Batheaston BATH *Phone : Batheaston 8283-4* 4 VICTORIA ST., S.W.1. *Tel. : Victoria 0093* also ST. MICHAEL'S CHAMBERS, ST. ANDREW ST., NORWICH *Tel. : Norwich 3688*	A. P. BOUGHEN BICESTER WATERWORKS BICESTER *Tel. : Bicester 195*	W. HAI[illegible]S & SO[illegible] *Tel. 239* CAMPDEN, GLOS. & BICESTER WATERWORKS BICESTER *Tel. : Bicester 195*

SP52SE29

My Ref. EB/SM

Tuesday,
7th March,
1939

Dear Sir,

I return herewith a form headed Record of Bore which Messrs Francois Cementation Company fowarded to me and asked me to complete. I have fully completed this form except for the information regarding pumping, which I have no doubt the Council will be able to give you. I believe that the amount pumped daily is 8,000 galls over a 15 hour day.

In addition to the form, I attach a copy of a 6" Ordnance Sheet, a $\frac{1}{8}$th scale plan of the site and also a copy of the analysis of the water.

I trust that the information given meets your requirements.

Yours faithfully,

W. Herbert Bateman

Consulting Engineer
to the Council.

R.V. Melville, Esq.,
Geological Survey and Museum,
Exhibition Road,
South Kensington,
LONDON, S.W.7.

EB/SM. 3. 7.3.39.

COPY.

219/75

SP52SE29

THE COUNTIES PUBLIC HEALTH LABORATORIES,
91. QUEEN VICTORIA STREET, LONDON, E.C.4.

Ref. L. 886

Analysis of a sample of water received on 1.7.37 from Francois Cementation Co. Ltd., per W.H. Bateman, Esq., Bath.

Labelled Discharge main of Borehole via tank.

Taken by D.A. Derry. Witness W.J. Llewellyn. Date.30.6.37. 5.25 p.m.

Chemical Results in Parts per 100,000

Appearance.	Slight film deposit of mineral matter.	
Colour	Faint yellowish white, odour nil. (settles clear and bright).	
Reaction pH	Neutral: 7.4.	Free Carbonic Acid 2.2
Electric Conductivity at 20° C.	6000	
Total Solids, 180 C.	40.0	
Chlorine in Chlorides	1.8	
Nitrogen in Nitrates	nil	Nitrites absent.
Hardness. Permanent.	0.0	
Temporary.	22.0	
Total.	22.0	
Metals Iron	0.022	Nil in solution Manganes, Zinc, Lead, etc. absent
Free Ammonia	0.0360	Ammoniacal Nitrogen. -
Albuminoid Ammonia	0.0360	Albuminoid Nitrogen -
Oxygen absorbed in 4 hrs at 80° F.	0.020	

Bacteriological Results.

No. of Bacteria per c.c. on agar in 3 days at 20° C.	960
1 day at 30° C.	450
2 days at 37° C.	130

The Bacillus Coli Present in - Absent in 100 c.c.

Bacillus Welchii (B Enteritidis Sporogenes) Present in - Absent in 100 c.c.

Report. This is a faintly opalescent water showing deposit in slight amount, of siliceous matter. It is of faint yellow colour, neutral reaction and contains an appreciable trace of free carbonic acid.

The water contains no excess of saline matter and contains only a small trace of iron. It is hard in character, although not unduly so, and the hardness is entirely of a temporary nature.

The water is of a high degree of Organic quality and with the exception of a large number of bacteria, none of which are of an objectionable character, and probably due to recent boring operations, it is of a high degree of bacterial purity.

With the exception of the suspended matter which unless diminution occurs on pumping, will require preliminary removal, we regard the water as pure and wholesome, suitable for drinking and domestic purposes.

(Sgd) John F. ~~Bela~~ Beale.
For Drs. Beale & Suckling.

W. HERBERT BATEMAN,
M.C., M.INST.C.E.,
CONSULTING CIVIL ENGINEER,
BATHEASTON, BATH.
47 VICTORIA ST., S.W.1.
& ST. MICHAEL'S CHAMBERS, NORWICH.
7 MAR 1939

RECORD OF STRATA - BICESTER URBAN DISTRICT COUNCIL'S BOREHOLE.

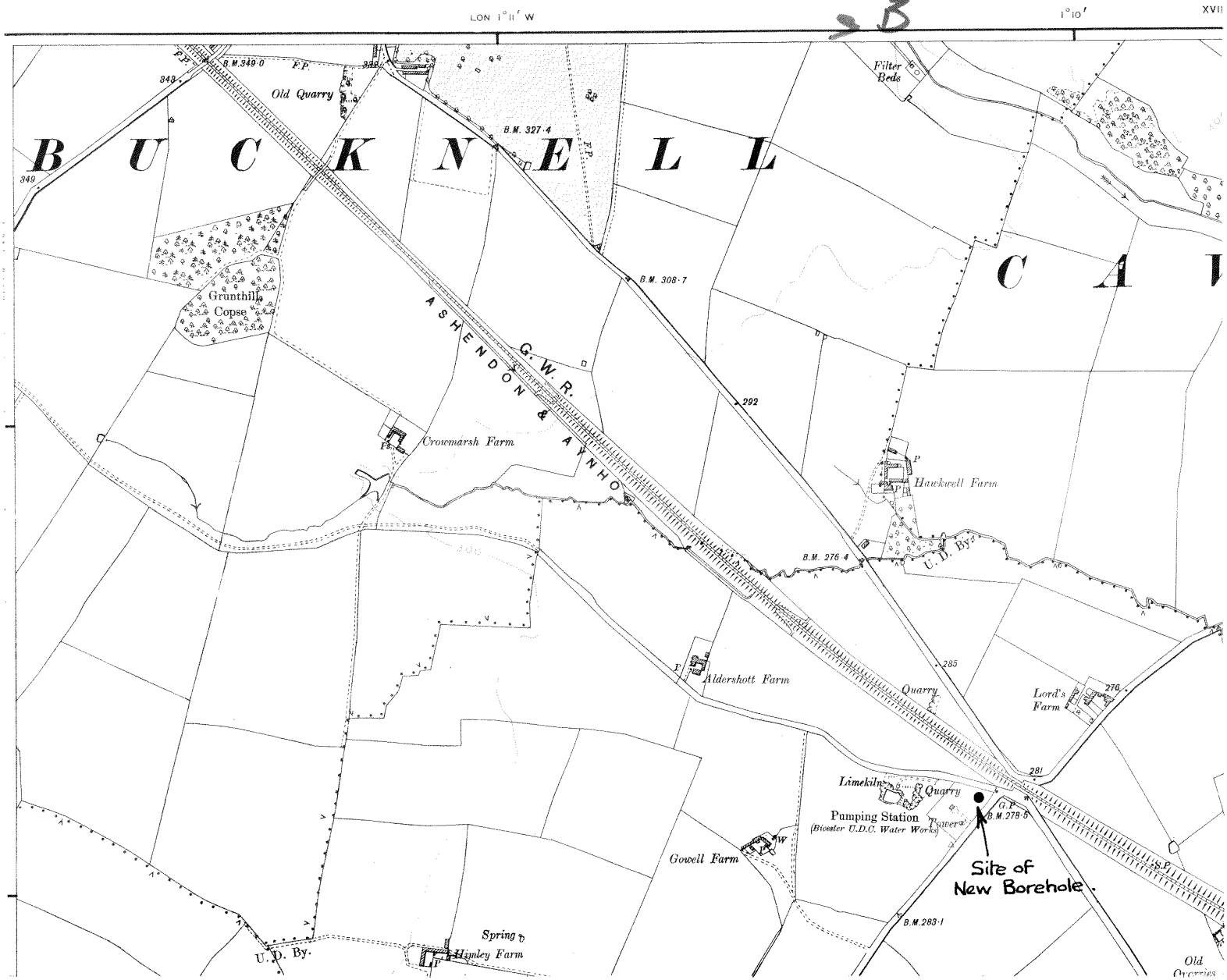
219

SP52SE29

B 75-0

Ft.	ins.	
1.	6	Surface Soil
3.	0	Grey Rock.
8..	0.	Sandy Marl
3.	0.	Blue Rock
2.	6	Light Shale
2.	0	Limestone.
3.	6	Blue Shale.
7.	0	White Rock.
12.	6	Grey Shale with hard beds.
6.	0	Grey Rock.
1.	0	Dark Shale.
	6	Rock
2.	0	Blue Binds.
1.	6	Blue Shale.
3.	0	Grey Rock.
1.	0	Grey Shale.
1.	0	Grey Rock.
3.	6	Variegated Shale.
3.	0	Grey Rock.
7.	0	Dark Shale.
2.	0	Rock.
5.	0	Blue Clay.
2.	6	Blue Rock.
3.	0	Blue Shale with hard ribs.
1.	6	Limestone.
3.	0	Limestone with Shale beds.
1.	0	Blue Shale.
2.	0	Grey Sandy Shale.
2.	6	Grey Rock.
2.	6	Dark Sandy Shale.
2.	0	Light Sandy Shale.
2.	6	Grey Rock.
6.	0	Soft Rock.
1.	3	Peat.
	8	Light Sand.
2.	4	Dark Clay and Sand. Rock.

SP52SE29



RECORD OF WELL (SHAFT OR BORE)

219/75

SP52SE29

At Waterworks, Howes Lane

Town or Village BICESTER

County ..... Six-inch quarter sheet .....

For Mr. Bicester U.D.C.

Exact site of well ..... { Attach a tracing from a map, or a sketch-map, if possible.

Level of ground surface above sea-level (O.D.) ..... feet.

Is well-top at ground level ? ..... If not, state how far above / below ; ..... feet.

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

Bore 140½ ft. ; diameter of bore : at top 26 ins. ; at bottom 23½ ins.

Lengths, diameters, perforations, etc., of lining tubes 24" to 100', 43' x 23½" perforated tubes inserted to bottom of b.h.

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

TEST DETAILS — Month June — Year 1937

Rest-level of water 75 ft. above / below well-top. Suction at 39 ft. Yield on 14 ~~hours~~ days'

pumping 6,500 gallons per ~~h~~ * (max. capacity of pump ..... g.p.h.),

with depression of 20 feet. Recovery to ..... in ..... mins. / hours.

WORKING CONDITIONS

Rest-level of water in ..... (month), ... (year), ... ft. above / below 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*) .....

Well made by Francois Cementation Co Date of well 1937

Information from " " "

ADDITIONAL NOTES.

* At first, yield was 8-9,000, but later dropped to this figure.

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.
June, 1941					

(17208) Wt.42901/0877 10,000 2/41 A.& E.W.Ltd. Gp.686

14

(For Survey use only)
GEOLOGICAL CLASSIFICATION

SP52SE29

NATURE OF STRATA If measurements start below ground surface, state how far... ...	THICKNESS Feet ...	 Inches ...	DEPTH Feet	 Inches
?			13	6
Blue clay	7	-	20	6
Grey rock	11	6	32	-
" " , broken	5	-	37	-
" " " , w. vert. joints	1	6	38	6
Grey rock	37	6	76	-
Rock ; sandy clay	4	-	80	-
Shale w. bands of grey rock	6	-	86	-
Clay	1	6	87	6
Grey rock w. soft joints	2	6	90	-
Grey rock	5	6	95	6
" " , dark	11	-	106	6
Soft rock	5	-	111	6
Soft sand	7	-	118	6
Light grey sand	4	-	122	6
Light sandstone	4	-	126	6
Dark " w. bands of sandy clay	4	-	130	6
Dark clay	10	-	140	6

15

Ins from Isler Feb 1942

219

219

50-52 Highgate St.

Copy

SP52SE29

75

Lab. report No 121135/1 13th Nov. 1935

Sample of water from Bicester Water works — No 3 pumping at 6740 gph.

Total solids	31.6 parts/100,000
Chlorine	2.2 " "

Solids consist of Magnesium bicarbonate & sulphate
Traces of sodium & chlorine. No calcium salts present.

No 3a pumping at 6740 gph

Total solids	39.6 parts/100,000
Chlorine	3.2 " "

Solids as above

No 4 pumping at 7020 gph.

Total solids	39.0 parts/100,000
Chlorine	2.1 " "

Solids as above

No 4a pumping at 7020 gph

Total solids	40.6 parts/100,000
Chlorine	2.3 " "

Solids as above

No 5 pumping at 6420 gph.

Total solids	40.0 parts/100,000
Chlorine	2.2 " "

Solids as above.

(Sgd) John Bell & Croydon

16 Inf from Isler Feb 1942

Copy.

219/75 219

SP52SE29

50 - 52 Wigmore St. W.1.

Laboratory report No 71135/2

Sample of water from Bicester Water Works. (D.W. pump) 21st Oct. 1935.

Results in Parts per 100,000

Appearance —	very slightly opaque
" of solids on ignition —	White
Total solids	30
Chlorine	1.30
Nitrites	nil
Nitrates	0.002
Total hardness	21.4
Poisonous metals	Copper & lead absent
Free ammonia	0.02
Oxygen absorbed	0.56
Albuminoid Ammonia	0.001

Opinion — a perfectly good sample of drinking water

(signed)
John Bell & Croyden

Bacteriological Examination

No. of organisms capable of growth on gelatin plates at 22°C after 72 hrs. incubation 116 per c.c.
" " " " " " agar " " 37°C " 48 " " 40 " "

B. coli absent in 100 c.c

6

RECORD OF WELL (SHAFT OR BORE)

1" N.S. 21 SE
O.S. 45 S.E.
Grid Ref. SP52SE29

219/75

A (Gorell Farm no 2. ~~[illegible]~~)

Town or Village Bicester County Oxon. Six-inch quarter sheet xxi.1 NW.

Exact site See 6 inch & 1/8 inch scale plans attached } (A rough sketch-map or a tracing from a map is very desirable)

in parish of Bicester U.D.C.

Level of ground surface above sea-level (O.D.) 280.50 ft. If well starts below ground surface, state how far ~~[illegible]~~

Shaft ~~[illegible]~~ 13' ft., diameter ~~[illegible]~~ ft. Bore 142½ ft. Diameter of bore: at top 26 ins.; at bottom 23 ins.

Details of permanent lining tubes (internal diameters preferred) 24 inch inside diam. to 187.34 O.D.
Remainder 22⅜ inch inside diam. to 141.00 OD.

Water struck at depths of (feet) SP 5715 2388

Rest-level of water ~~above~~ below top of well 226.00 feet. o.d. Suction at 141.69 feet. o.d. Yield on 14 ~~hours'~~ days' test 7,069 gallons per hour (with pump of capacity – g.p.h.); depressing water level to 92 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 Francis Cementing Co Ltd for ~~Mr.~~ Bicester U.D.C. Date of well 1936.

Information from Bicester U.D.C. + Francis Cementation Co, & W.H. Bateman, Esq. M.E. M.I.C.E.

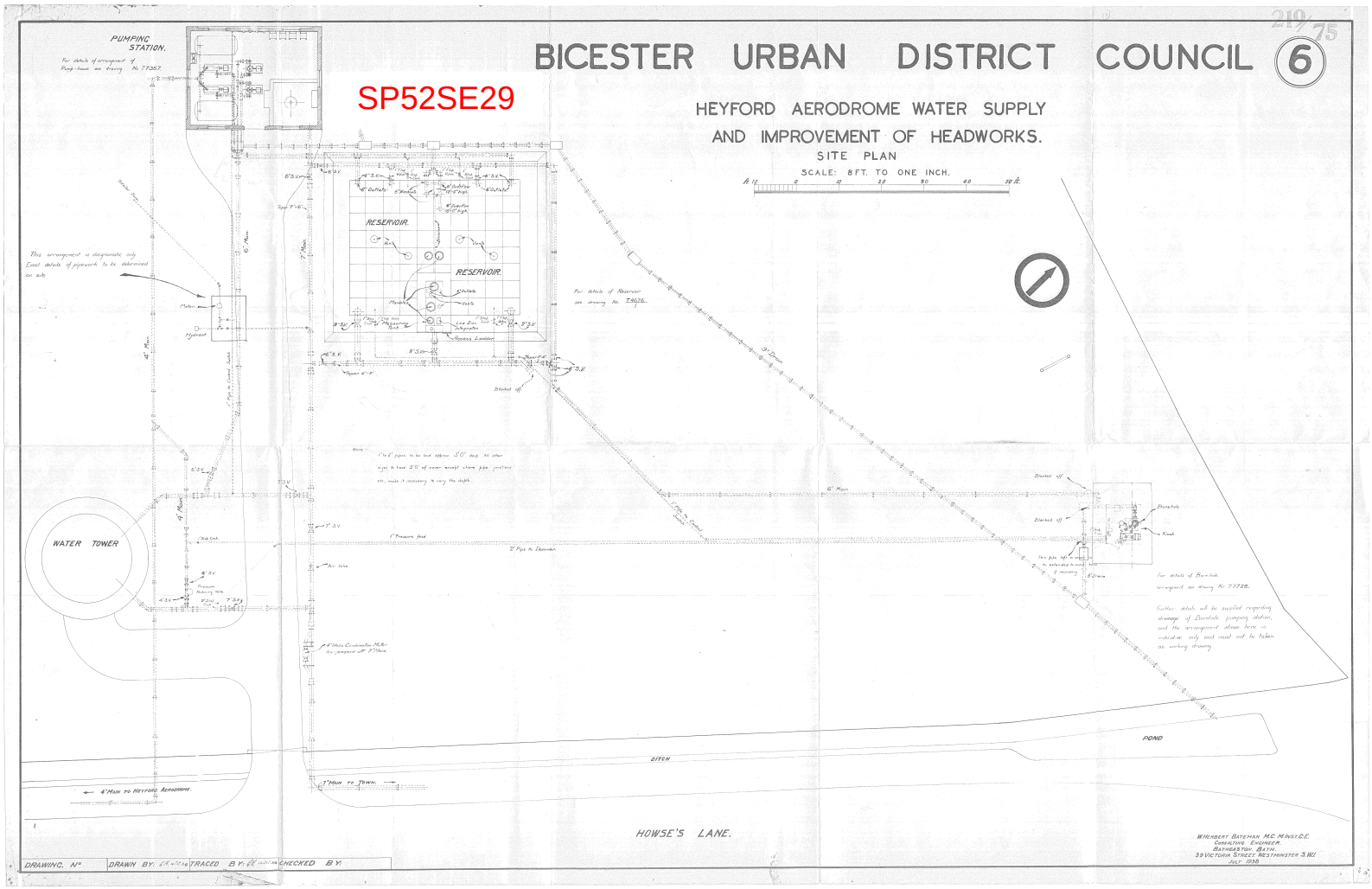
(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
Made ground, dug through clay, on site of old Commons quarry	Surface soil	1	0	1	0
	Yellow clay	10	0	11	0
	Blue clay	6	0	17	0
? Wychwood Beds 2'	White rock	2	0	19	0
Kemble Beds 13'6"	Blue clay	7	0	26	0
	Grey shale	1	6	27	6
	Grey rock	3	6	31	0
	Grey shale	1	6	32	6
Fimbriata-walteri beds 9'	Grey ~~shaly~~ rock	8	0	40	6
	Grey ~~soft~~ clay	1	0	41	6
White Lst 31'6"	Grey rock	7	0	48	6
	Sandy shale	1	0	49	6
	Grey rock with bands of shale.	17	0	66	6
	Grey sandy clay	6	6	73	0
Hampden Marly Beds 13'	Grey rock	5	0	78	0
	Clay	3	6	81	6
	Shale with bands of ~~shaly~~ rock	4	6	86	0
Taynton Stone 16'	Grey rock with bands of shale.	4	0	90	0
	Grey rock	12	0	102	0
Sworford + Hook Norton Beds 25'	Light grey sand.	16	0	118	0
	Light sandstone	6	0	124	0
	Dark sandstone	3	0	127	0
U. Lias 15'6"	Dark clay	15	6	142	6
	See letter from H.T. Smith Esq., Surveyor, Bicester U.D.C.				
R.W.H. 16.3.39	dated 26.VI.40., in 9509/28.				
	P.W.L. 94' Up. Suction 108' Up.				
	AWW 26.VI.40.				

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)

(7993) Wt.36064/0349 5,000 12/38 A.&E.W.Ltd. Gp.686



219/75(1)

SP52/19

SP52SE29 **[5715 2388] Bicester Town No 2 Well (1936)** Datum +85.3 (Ground level)

	Depth ft	Thickness m	Depth m
Forest Marble Formation	*17.00*	5.18	5.18
White Limestone Formation: Bladon Member and Ardley Member	*49.50*	9.91	15.09
Shipton Member	*66.50*	5.18	20.27
Rutland Formation	*90.00*	7.16	27.43
Taynton Limestone Formation	*102.00*	3.66	31.09
Sharp's Hill Formation and 'White Sands'	*124.00*	6.71	37.80
Northampton Sand Formation	*127.00*	0.91	38.71
Whitby Mudstone Formation	*142.50*	4.72	43.43

Stratigraphical classification by M G Sumbler, May 1999.

SP52SE29

RECORD OF WELL (SHAFT OR BORE)

1" N.S. 219
1" O.S. 45 S.E.
Grid Ref.

Gowell Farm no 2.

A ([redacted])

SP52/19B 219/75

Town or Village Bicester County Oxon. Six-inch quarter sheet xxi.1 N

Exact site See 6 inch & ½ inch scale plans attached in parish of (SP5314) Bicester U.D.C. (A rough sketch-map or a tracing from a map is very desirable)

Level of ground surface above sea-level (O.D.) 280.50 ft. If well starts below ground surface, state how far

Shaft ~~140~~ 15' ft., diameter ~~24~~" ft. Bore 142½ ft. Diameter of bore: at top 24 ins.; at bottom 23 ins

Details of permanent lining tubes (internal diameters preferred) 24 inch inside diam. to 137.34 O.
Remainder 22⅔ inch inside diam. to 141.00 O

Water struck at depths of (feet) SP 5715 2388

Rest-level of water ~~above~~ below top of well 226.00 feet. O.D. Suction at 141.69 feet. O.D. Yield on 14 ~~hours'~~ days' tes

7,069 gallons per hour (with pump of capacity – g.p.h.); depressing water level to 92 fee

below top. Time of recovery – hrs. Amount normally pumped daily g.p.h. for hours

Quality (attach copy of analysis if available)

Sunk by Francis Cementing Co Ltd for ~~Mr.~~ Bicester U.D.C. Date of well 1936

Information from Bicester U.D.C. + Francis Cementation Co, & W.H. Bateman, Esq. M.I.C.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).		THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
Made ground & clay						
Trough clay, mixed	Surface soil		1	0	1	0
Gold Compton marly	Yellow clay	FMb	10	0	11	0
	Blue clay	—	6	0	17	0 (5.18)
?Wychwood Beds 2'	White rock		2	0	19	0 (5.79)
Kemble Beds 13'6"	Blue clay		7	0	26	0
	Grey shale	Whb	1	6	27	6 (8.38)
	Grey rock	(Blisworth	3	6	31	0 (9.45)
	Grey shale	Ardley)	1	6	32	6 (9.91)
Fimbriata – walterii beds 9'	Grey ~~shaly~~ rock		8	0	40	6 (12.34)
	Grey ~~soft~~ clay		1	0	41	6 (12.65)
White Lst 31'6"	Grey rock		7	0	48	6 (14.78)
	Sandy shale	—	1	0	49	6 (15.09)
	Grey rock with bands of shale.	Whk (shyle)	17	0	66	6 (20.27)
	Grey sandy clay		6	6	73	0 (22.25)
Hampden Marly Beds 13'	Grey rock		5	0	78	0 (23.77)
	Clay	RM	3	6	81	6 (24.84)
	Shale with bands of ~~clay~~ rock		4	6	86	0 (26.24)
Taynton Stone 10'	Grey rock with bands of shale.	—	4	0	90	0 (27.43)
	Grey rock	TY	12	0	102	0 (31.08)
Sweinford & North Aston Beds 25'	Light grey sand.	WS	16	0	118	0 (35.97)
	Light sandstone	—	6	0	124	0 (37.80)
	Dark sandstone	?WS	3	0	127	0 (38.71)
4 Lias @ 15'6"	Dark clay	WhM	15	6	142	6'
					43	43m
	See letter from H.T. Smith Esq., Surveyor, Bicester U.D.C.					
R.V.M. 16.3.39	dated 26.VI.40, in 9509/28.					
	P.W.L. 94' b/p. Suction 108½' b/p.					
	AWW 26.VI.40.					

[SP52SE BJ 29 .]

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA SP52SE29 If measurements start below ground surface, state how far... ...	THICKNESS Feet ...	Inches ...	DEPTH Feet	Inches
	?			13	6
	Blue clay	7	-	20	6
	Grey rock	11	6	32	-
	" " , broken	5	-	37	-
	" " " , w. vert. joints	1	6	38	6
	Grey rock	37	6	76	-
	Rock ; sandy clay	4	-	80	-
	Shale w. bands of grey rock	6	-	86	-
	Clay	1	6	87	6
	Grey rock w. soft joints	2	6	90	-
	Grey rock	5	6	95	6
	" " , dark	11	-	106	6
	Soft rock	5	-	111	6
	Soft sand	7	-	118	6
	Light grey sand	4	-	122	6
	Light sandstone	4	-	126	6
	Dark " w. bands of sandy clay	4	-	130	6
	Dark clay	10	-	140	6

RECORD OF WELL (SHAFT OR BORE)

SP52SE29

219/75

SP 52/19 B

At Waterworks, House Lane

Town or Village BICESTER

County Six-inch quarter sheet

For Mr. Bicester U.D.C.

Exact site of well { Attach a tracing from a map, or a sketch-map, if possible.

(B)

Level of ground surface above sea-level (O.D.) feet.

Is well-top at ground level ? If not, state how far above ; below ; feet.

Shaft ft., diameter ft. Details of headings

Bore 140½ ft. ; diameter of bore : at top 26 ins. ; at bottom 23½ ins.

Lengths, diameters, perforations, etc., of lining tubes 24" to 100', 43' x 23½" perforated tubes inserted to bottom of b.h.

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

TEST DETAILS
Month June
Year 1937

Rest-level of water 75 ft. above / below well-top. Suction at 39 ft. Yield on 14 ~~hours'~~ days'
pumping 6,500 gallons per 2 * (max. capacity of pump g.p.h.),
with depression of 20 feet. Recovery to in mins. / hours.

WORKING CONDITIONS

Rest-level of water in (month), (year), ft. above / below 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*)

Well made by Francois Construction Co Date of well 1937

Information from " " "

ADDITIONAL NOTES.

* At first, yield was 8-9,000, but later dropped to this figure.

LOG OF STRATA OVERLEAF.

RECORD OF WELL (SHAFT OR BORE)

There for this site a borehole reference number which
No. SP52 SE 5746 2424

At Lords Farm

Town or Village Bicester

County Oxfordshire Six-inch quarter sheet 23 NW

For Air Ministry and Bicester RDC

Exact site of well 170 yds NE of Lords Farm, and 20 yds south of stream

Attach a tracing from a map, or a sketch-map, if possible.

9

2191

122

SP52SE9

Level of ground surface above sea-level (O.D.) 260 feet.

Is well-top at ground level? Yes If not, state how far above; below; .... feet.

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

Bore .... ft.; diameter of bore: at top 15 ins.; at bottom 6 ins.

Lengths, diameters, perforations, etc., of lining tubes 137 ft × 15 in, from surface.

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

TEST DETAILS Rest-level of water .... ft. above/below well-top. Suction at .... ft. Yield on .... hours'/days'

Month .... pumping .... gallons per .... (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/below 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*) ....

Well made by .... Date of well ....

Information from ....

ADDITIONAL NOTES.

Yield from depth of 137 ft, 1000 gph.

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.
3/3/41	53/36	219	45SE	o	o

(17208) Wt.42901/0877 10,000 2/41 A.& E.W.Ltd. Gp.686

2

SP52SE9

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA — If measurements start below ground surface, state how far...	Thickness Feet	Thickness Inches	Depth Feet	Depth Inches
Cornbrash	Clay, limestone fragments	7		7	
	Limestone	6	6	13	6
Forest Marble	Clay	1		14	6
	Limestone	3		17	6
	'Marble' rock	2	6	20	•
	Hard blue clay	2		22	
	'Marble' rock	1		23	
White Limestone	Hard clay and rock fragments	5	6	28	6
	Limestone	4		32	6
	Alternating beds of grey shale rock	33	6	66	•
Hampen Marly Beds	Blue rock	3	6	69	6
	Blue clay & bands of rock	4		73	6
Taynton Stone, Sharp's Hill and Hook Norton Beds	Alternating bands of blue rock, grey shale	∅ 17	6	90	•
	Hard Sandstone	5	6	95	6
	Alternating bands of grey rock & sand	26		121	6
Upper Lias	Hard clay and flints	15	6	137	
	Blue clay & clay stone	5		142	
	Blue clay	16	6	158	6
	Blue clay stone	13	6	172	•
Middle & Lower Lias	"Marlstone"	1		173	
	Hard grey rock	3		176	
	Blue clay	58		234	
	Rock conglomerate *	8		242	
	Blue lias	4		246	
	Conglomerate *	8		254	
	Blue clay and bands of marl	8		262	

Classification by THW and AWW.

∅. Probably 16-6, as depth of bore is corrected at 262 ft.

*. Not conglomerate, but muddy limestone: specimens seen in field by T.H.W. 3/3/41

#. Note. Prof. H L Hawkins classifies this record as follows

Drift	6	6	6	6
Cornbrash	7	6	14	•
Gt Oolite	44		58	
U. Estuarine Beds	37	6	95	6
Northampton Sand	24		119	6
Upper Lias	114		233	6
Middle Lias	28		261	6

No good specimens were available either to the G.S.M. or to Prof Hawkins. The Survey classification is more in accord with the succession & thicknesses in the District.

3.

CONFIDENTIAL

RECORD OF WELL (SHAFT OR BORE)

219/122

SP52SE9

BICESTER.

At

Town or Village Bicester. Oxon

County Oxfordshire. Six-inch quarter sheet

For Mr. Air Ministry. Directorate of Works
No.11. Area, Abingdon, Berks.

Exact site of well Lords Farm,
Nr. Bicester.

{ Attach a tracing from a map, or a sketch-map, if possible.

SP52/18

Level of ground surface above sea-level (O.D.) feet.

Is well-top at ground level ? If not, state how far above ; below ; feet.

Pit

~~Shaft~~ 6 ft., diameter 6' x 6' Details of headings

Bore 262 ft. ; diameter of bore : at top 18 ins. ; at bottom 15 ins.

Lengths, diameters, perforations, etc., of lining tubes

33' 6" of 18" top 2' 0" b.s. 89 ' 1" of 15" top 1' 1" b.s.

Water struck at depths, below well-top, of (feet) 13', 90', 246'.

TEST DETAILS
Month April
Year 1941

Rest-level of water 12' 36' ft. above below well-top. Suction at ft. Yield on hours' days'
pumping 1,350 gallons per hour (max. capacity of pump g.p.h.),
with depression of 30' feet. Recovery to in mins. hours.

WORKING CONDITIONS

Rest-level of water in (month), (year), ft. above below 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*)

Well made by ~~LeGrand Sutcliff & Gell Ltd.~~ Southall. Date of well April 1941

Information from

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

4

(For Survey use only)

GEOLOGICAL CLASSIFICATION

SP52SE9

NATURE OF STRATA If measurements start below ground surface, state how far... ...	THICKNESS Feet ...	 Inches ...	DEPTH Feet	 Inches
Clay and Limestone Flints (very hard)	6	6	6	6
Limestone Rock.	6	6	13	0
Hard Clay.	1	0	14	0
Limestone Rock.	3	0	17	0
Marble Rock Formations.	3	0	20	0
Hard Blue clay and flints	2	0	22	0
Marble Rock Formation.	1	0	23	0
Hard Clay and Flints.	5	6	28	6
Limestone Formation.	4	0	32	6
Grey shale.	3	0	35	6
Grey Rock.	2	0	37	6
Greyshale.	2	6	40	0
Grey Rock.	2	0	42	0
Hard Clay.	1	0	43	0
Grey Shale with hard bands.	4	6	47	6
Grey Rock.	2	0	49	6
Hard Clay.	6	0	55	6
Grey Rock.	2	6	58	0
Grey Shale.	4	0	62	0
Hard Clay.	2	0	64	0
Grey Rock.	1	6	65	6
Grey Shale.	1	0	66	6
Blue Rock.	3	6	70	0
Hard blue Clay with hard bands.	4	0	74	0
Blue rock.	2	0	76	0
Greyshale.	4	6	80	6
Hard clay with hard bands	3	6	84	0
Dark Grey Rock(not too hard)	6	0	90	0
Hard sandstone.	5	6	95	6
Dark Grey Rock.	2	0	97	6
Hard Sandstone.	3	6	101	0
Dark Grey Rock.	3	0	104	0
Sandstone.	5	0	109	0
Dark Grey Rock.	2	0	111	0
Sandstone.	2	0	113	0
Dark Grey Rock.	1	6	114	6
Sandstone.	2	6	117	0
Dark grey Rock.	1	0	118	0
Sandstone.	1	6	119	6
Hard Clay and Flints.(small)	0	6	120	0
Clay and flints.	6	0	126	0
Clay and Claystones.	11	0	137	0
Blue Lias Clay & claystones.	5	0	142	0
Blue lias Clay.	16	6	158	6
Blue lias clay and claystones.	13	6	172	0
Marlstone.	1	0	173	0
Hard Grey Rock.	3	0	176	0
Blue Lias Clay	58	0	234	0
Rock formation.	1	0	235	0
Conglomeration of ironstone, rock & clay.	7	0	242	0
Blue Lias Clay.	4	0	246	0
Conglomerate rock, Ironstone, Marlstone & clay	3	0	249	0
Conglomeration of ironstone, marlstone & clay.	5	0	254	0
Blue lias clay & bands of marlstone about every 3"	8	0	262	0
	262	0	262	0

LeGrand, Sutcliff & Gell Ltd.,

RECORD OF WELL (SHAFT OR BORE)

SP52SE9

At Lost Farm 5746 2424

Town or Village Bicester

County Oxfordshire Six-inch quarter sheet 23 NW

For ~~MR~~ Civil Municipality and Brewer Ltd

Exact site of well 170 yds NE of Lost Farm, and 20 yds South of stream

{ Attach a tracing from a map, or a sketch-map, if possible.

Level of ground surface above sea-level (O.D.) 260 (79.24m) feet.

Is well-top at ground level? Yes If not, state how far above ; below ;

Shaft ft., diameter ft. Details of headings

Bore ft. ; diameter of bore : at top 15 ins. ; at bottom 6 ins.

Lengths, diameters, perforations, etc., of lining tubes 137 ft x 15 in, from surface.

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

TEST DETAILS
Month
Year

Rest-level of water ft. above / below well-top. Suction at ft. Yield on hours' / days'
pumping gallons per (max. capacity of pump g.p.h.),
with depression of feet. Recovery to in mins. / hours.

WORKING CONDITIONS

Rest-level of water in (month), (year), ft. above / below 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*)

Well made by Date of well

Information from

ADDITIONAL NOTES.

Yield from depth of 137 ft, 1000 g.p.h.

LOG OF STRATA OVERLEAF

[SP52SE BJ 9 .]

SP52SE9

Geological Classification (For Survey use only)	Nature of Strata (If measurements start below ground surface, state how far...)	Thickness Feet	Thickness Inches	Depth Feet	Depth Inches
Cornbrash	Clay, limestone fragments	7		7	
	Limestone	6	6	13	6
Forest Marble	Clay	1		14	6
	Limestone	3		17	6
	"Marble" rock	2	6	20	
	Hard blue clay	2		22	
	"Marble" rock	1		23	
White Limestone	Hard clay and rock fragments	5	6	28	6
	Limestone	4		32	6
	Alternating beds of grey shale rock	33	6	66	
Hampen Marly Beds	Blue rock	3	6	69	6
	Blue clay & bands of rock	4		73	6
Taynton Stone. [illegible]	Alternating bands of blue rock & grey shale	17	6	90	
	Hard sandstone	5	6	95	6
	Alternating bands of grey rock & sand	26		121	6
Upper Lias	Hard clay and flints	15	6	137	
	Blue clay & clay stones	5		142	
	Blue clay	16	6	158	6
	Blue clay & stones	13	6	172	
Middle Lower Lias	"Marlstone"	1		173	
	Hard grey rock	3		176	
	Blue clay	58		234	
	Rock conglomerate *	8		242	
	Blue lias	4		246	
	Conglomerate *	8		254	
Clanfield? [illegible]	Blue clay and bands of marl	8		262	

#

þ. Probably the base of [illegible] at 262 ft.

*. Not conglomerate, but muddy limestone: specimen seen in field by [illegible] 3/3/41

#. Prof. H. L. Hawkins classifies the record as follows

Drift	6	6	6	6
Cornbrash	7	6	14	
Gt. Oolite	44		58	
U. Estuarine Beds	37	6	95	6
Northampton Sand	24		119	6
Upper Lias	114		233	6
Middle Lias	28		261	6

No good specimens were available either to the G.S.M. or to Prof. Hawkins. The Survey classification is more in accord with the [illegible] thicknesses in the District.

RECORD OF WELL (SHAFT OR BORE)

219/122

SP52SE9

At BICESTER.

Town or Village Bicester. Oxon

County Oxfordshire. Six-inch quarter sheet

For Mr. Air Ministry. Directorate of Works
No.11. Area, Abingdon, Berks.

Exact site of well Lords Farm,
Nr. Bicester.

Attach a tracing from a map, or a sketch-map, if possible.

Level of ground surface above sea-level (O.D.) feet.

Is well-top at ground level? If not, state how far above / below; feet.

Pit
Shaft 6 ft., diameter 6' x 6' Details of headings

Bore 262 ft.; diameter of bore: at top 18 ins.; at bottom 15 ins.

Lengths, diameters, perforations, etc., of lining tubes
33' 6" of 18" top 2' 0" b.s. 89 ' 1" of 15" top 1' 1" b.s.

Water struck at depths, below well-top, of (feet) 13', 90', 246'.

TEST DETAILS

Month April

Year 1941

Rest-level of water 12' / 36' ft. above / below well-top. Suction at ft. Yield on hours' / days' pumping 1,350 gallons per hour (max. capacity of pump g.p.h.), with depression of 30' feet. Recovery to in mins. / hours.

WORKING CONDITIONS

Rest-level of water in (month), (year), ft. above / below 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*)

Well made by LeGrand Sutcliff & Gell Ltd. Date of well April 1941

Information from Southall.

ADDITIONAL NOTES.

LOG OF STRATA OVERLEAF

SP52SE9

Geological Classification	If measurements s... below ground surface, state how far... ...	Feet ...	Inches ...	Feet	Inches	
FML	Clay and Limestone Flints (very hard)	6	6	6	6	1.98
	Limestone Rock.	6	6	13	0	3.96
	Hard Clay.	1	0	14	0	4.27
	Limestone Rock.	3	0	17	0	5.18
	Marble Rock Formations.	3	0	20	0	6.1
	Hard Blue clay and flints	2	0	22	0	6.71
	Marble Rock Formation.	1	0	23	0	7.01
WhL	Hard Clay and Flints.	5	6	28	6	8.69
	Limestone Formation.	4	0	32	6	9.91
	Grey shale.	3	0	35	6	10.82
	Grey Rock.	2	0	37	6	11.43
	Greyshale.	2	6	40	0	12.19
	Grey Rock.	2	0	42	0	12.8
	Hard Clay.	1	0	43	0	13.11
	Grey Shale with hard bands.	4	6	47	6	14.44
	Grey Rock.	2	0	49	6	15.07
	Hard Clay.	6	0	55	6	16.92
	Grey Rock.	2	6	58	0	17.68
	Grey Shale.	4	0	62	0	18.90
	Hard Clay.	2	0	64	0	19.51
	Grey Rock.	1	6	65	6	19.96
	Grey Shale.	1	0	66	6	20.27
RM	Blue Rock.	3	6	70	0	21.34
	Hard blue Clay with hard bands.	4	0	74	0	22.56
	Blue rock.	2	0	76	0	23.16
	Greyshale.	4	6	80	6	24.54
	Hard clay with hard bands	3	6	84	0	25.60
	Dark Grey Rock(not too hard)	6	0	90	0	27.43
SHF,	Hard sandstone.	5	6	95	6	29.11
	Dark Grey Rock.	2	0	97	6	29.72
WS	Hard Sandstone.	3	6	101	0	30.78
NS	Dark Grey Rock.	3	0	104	0	31.70
	Sandstone.	5	0	109	0	33.22
	Dark Grey Rock.	2	0	111	0	33.83
	Sandstone.	2	0	113	0	34.44
	Dark Grey Rock.	1	6	114	6	34.9
	Sandstone.	2	6	117	0	35.66
	Dark grey Rock.	1	0	118	0	35.97
	Sandstone.	1	6	119	6	36.42
	Hard Clay and Flints.(small)	0	6	120	0	
WhM	Clay and flints.	6	0	126	0	
	Clay and Claystones.	11	0	137	0	
	Blue Lias Clay & claystones.	5	0	142	0	
	Blue lias Clay.	16	6	158	6	
	Blue lias clay and claystones.	13	6	172	0	
? MRB	Marlstone.	1	0	173	0	
	Hard Grey Rock.	3	0	176	0	
	Blue Lias Clay	58	0	234	0	
	Rock formation.	1	0	235	0	71.63
ChM	Conglomeration of ironstone, rock & clay.	7	0	242	0	73.76
	Blue Lias Clay.	4	0	246	0	74.98
	Conglomerate rock, Ironstone, Marlstone ' clay	3	0	249	0	75.90
	Conglomeration of ironstone, marlstone & clay.	5	0	254	0	77.42
	Blue lias clay & bands of marlstone about every 3"	8	0	262	0	79.86
		262	0	262	0	

This log differs in minor respects from hand-written version

LeGrand, Sutcliff & Gell Ltd.

SP52SE9 **[c. 5919 2048] Graven Hill Well (1941)** Datum +88 (Ground level)

	Depth ft	Thickness m	Depth m
Oxford Clay Formation	*128.00*	39.01	39.01
Kellaways Formation	*146.00*	5.49	44.50
Great Oolite Group and Inferior Oolite Group undifferentiated	*281.00*	72.24	85.65
Whitby Mudstone Formation	*290.00*	2.74	88.39

Stratigraphical classification by M G Sumbler, May 1999.

219

75

~~BUCKNELL~~
~~BICESTER~~

BICESTER TOWN SUPPLY.

Gowell Farm, near Bicester, 1¼ miles N.W. of Market Place.

Communicated by Mr. Edgar F. WILLSON, Surveyor to the Urban District Council.

Height above O.D. 277 feet.

A pit, 8 feet square and 11 feet deep, was lined with brickwork and floored with concrete 1 ft. 6 in. thick. A steel tube 11 inches diam. was taken to 112 ft. 4 in. from surface, with perforation at 77 feet. No water worth mentioning was met with until 92 feet, when it rose to the surface. At 105 feet the bulk was struck, and overflowed at the rate of 6,000 gallons per hour when not pumping. The water will rise 3 feet above the surface.

		Thickness. Ft.	Ins.	Depth. Ft	In.
	Surface soil	1	6	1	6
Forest Marble 22ft.	Grey rock (Cornbrash)	3	0	4	6
	Sandy marl	8	0	12	6
	Blue rock (Forest Marble)	3	0	15	6
	Light shale	2	6	18	0
	Limestone	2	0	20	0
	Blue clay or shale	3	6	23	6
Great Oolite 84 ft. 6 in.	White rock	7	0	30	6
	Grey shale with hard beds	12	6	43	0
	Grey rock	6	0	49	0
	Dark shale	1	0	50	0
	Rock	0	6	50	6
	Blue binds	2	0	52	6
	Blue shale	1	6	54	0
	Grey rock	3	0	57	0
	Grey shale	1	0	58	0
	Grey rock	1	0	59	0
	Variegated rock	3	6	62	6
	Grey rock...	3	0	65	6
	Dark shale	7	0	72	6
	Rock	2	0	74	6
	Blue clay	5	0	79	6
	Blue rock	2	6	82	0
	Dark shale with hard beds	3	0	85	0
	Limestone	1	6	86	6
	Limestone with shale beds	3	0	89	6
	Blue shale	1	0	90	6
	Grey sandy shale with water	2	0	92	6
	Grey rock	2	6	95	0
	Dark sandy shale	2	6	97	6
	Light sandy shale	2	0	99	6
	Grey rock	2	6	102	0
	Soft rock, water, bulk here	6	0	108	0
Estuarine Beds 4 ft. 4 in. (penetrated)	Peat	1	3	109	3
	Light sand	0	8	109	11
	Dark clay and sand	2	4	112	3
	Rock, 1 inch only into it	0	1	112	4

Analysis by Mr. W. W. Fisher in "The Salinity of Water from the Oolites" "*The Analyst*," *February, 1904.* *See* p. 92.

Mr. E. Foster Tanner, Clerk to the Urban District Council, has kindly added the following particulars :—

"The deep well pump has been fixed. Motive power supplied by Crossley's 13-h.p. gas engines in duplicate, either capable of driving the pumping plant, which has the capacity for raising 8,000 gallons per hour. The water is pumped into tanks, constructed of steel, on the top of a tower, immediately adjoining the well. The tanks are in duplicate, *i.e.*, an inner and an outer tank. Their combined holding capacity is about 45,000 gallons. Height from ground to bottom of tanks, 40 feet. There is a 7-inch main from the water tower to the town, and the distribution mains in the town are respectively 6-inch, 5-inch, 4-inch, and 3-inch. The cost of the works was £7,000."

O.D. given as +287 by H.T. Smith Esq. Surveyor to Bicester U.D.C. See Letter in 9509/28.

Bore cased in; pump removed.

Published in
'The Water Supply
of Oxfordshire',
Page 29, 30

219/75

This site has a grid reference which is SP 52 SE

Bicester Water Works.

Well at Gowell Farm. Present supply, 1909.

Yield.—140,000 to 212,000 gallons per day. Water reduced by 14 days test-pumping to 70 feet from surface, but rose again to surface in two hours after cessation of pumping.

Report on analysis of water received 30th September, 1905, at end of pumping test. By Mr. W. W. Fisher, F.I.C.

Description.—The sample is slightly cloudy and contains a little sand. The residue left on evaporation is alkaline and contains a little sodium carbonate.

Odour.—None.

Appearance in two-foot tube.—Pale-yellowish.

The results of the analysis are stated in grains per gallon.

Total dissolved solid matter	26·6
Chlorine in chlorides	1·1
Ammonia, free and saline	·028
„ albuminoid	·003
Nitrogen in nitrates	·014
„ in nitrites	0
Oxygen required to oxidise organic matter (in 3 hours)	·007
Hardness in Clark's degree	14·5

Remarks.—The total dissolved solid constituents are normal for water from the Oolite. The chlorides are not in excess of the natural amount; the nitrates are small, and the proportion of organic matter is extremely small. The water is of a moderate degree of hardness.

Published in
'The Water Supply
of Oxfordshire',
Pages 92, 93

No. 17. 2,000. L. D. 2/18.

C. ISLER & Co., Ltd.,
ARTESIAN & CONSULTING WELL ENGINEERS,
BEAR LANE, SOUTHWARK, S.E.1.

Telegraphic Address: "ISLER, LONDON."
Telephone No.: Hop 4460 (3 Lines).

BIRMINGHAM BRANCH: 58 Summer Row.

Orow. 219

SP52SE5

1" 219 A 75

CHART

Showing the Soils passed through at

Messrs The Bicester Waterworks

Surface Soil	1	6	1	6
Grey Rock.	3		4	6
Sandy Marl	8		12	6
Blue Rock.	3		15	6
Light Shale	2	6	18	
Limestone	2		20	
Blue Shale	3	6	23	6
White Rock.	7		30	6
Grey Shale with hard Beds	12	6	43	
Grey Rock.	6		49	
Dark Shale	1		50	
Rock		6	50	6
Blue Binds	2		52	6
Blue Shale	1	6	54	
Grey Rock.	3		57	
Grey Shale	1		58	
Grey Rock	1		59	
Variegated Shale	3	6	62	6
Grey Rock	3		65	6
Dark Shale	7		72	6
Rock	2		74	6
Blue Clay	5		79	6
Blue Rock.	2	6	82	
Dark Shale with hard ribs	3		85	
Limestone	1	6	86	6
Limestone with Shale beds	3		89	6
Blue Shale.	1		90	6

This must agree with report.

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BIRMINGHAM BRANCH: 58 Summer Row.

CHART

Showing the Soils passed through at

M Bicester Waterworks
Gowell Farm Bicester

Grey Sandy Shale (with water)	2	0	92	6
Grey Rock.	2	6	95	0
Dark Sandy Shale	2	6	97	6
Light " "	2	0	99	6
Grey Rock.	2	6	102	0
Soft Rock	6	0	108	0
Peat	1	3	109	3
Light Sand		8	109	11
Dark Clay & Sand	2	4	112	4
Rock.				

15'6" of 15" 8ft below
97ft 11" Tubes level with surface
15 " 10½" " 97ft below
perforated from 77ft below
perforations ½" on 3½" pitch covered
with fine mesh brass wire gauze

W.L Overflow
12,000 g.p.h. at P.W.L. of 70ft
Dug Well Pump.

Bored by T. Thom.

Inland Water Survey for Great Britain

SP52SE5

Name or Description of Authority or Undertaking ~~Banbury~~ Bicester Urban District

Postal Address The Causeway,
Bicester, Oxon.

(A) OVER-GROUND WATER.

(I) (*a*) Do you take systematic records of levels of water in :—

(1) rivers ... ...

(2) streams ... ...

(3) reservoirs ... ...

(4) lakes ... ...

(5) canals or navigable rivers ... ...

(*b*) If so, please give a short description of the method used.

(*c*) How often are the readings taken?

(*d*) Exact points at which the records are taken. (A map or sketch would be helpful.)

(*e*) Have the levels been related to Ordnance Datum Level or to some other standard (in the latter case please specify standard)?

(*f*) Are all the levels (*e.g.*, highest and lowest) covered satisfactorily by the records taken?

(*g*) Are arrangements made for extra readings during rise and fall of floods, etc.?

(II) What types of systematic records of discharge other than records of levels are kept as regards :—

(1) rivers ... ...

(2) streams ... ...

(3) reservoirs ... ...

(4) lakes ... ...

(5) canals or navigable waterways ... ...

Form K268

(385) Wt. 31991/G5745 9M 3/35 S.E.R. Ltd. **Gp. 662.**

SP52SE5

(III) (*a*) Have measurements been made from which the data for levels can be converted to records of discharge of :—

(1) rivers and streams ... ...

(2) reservoirs ... ...

(3) lakes ... ...

(4) canals or navigable waterways ... ...

(*b*) If so, how have these measurements been made (*e.g.*, by current meters, velocities of floats, surveys of sections, calibration of weirs, records of water used for locking, etc.)?

(IV) (*a*) Are records kept in the case of springs breaking overground of the amount of water yielded?

(*b*) If so, what form of recording is used?

(*c*) How often are readings taken?

(*d*) Exact location of the spring. (A map or sketch would be helpful.)

(V) Since when have the records under I, II, III and IV been kept?

(VI) Are past records available?

(VII) REMARKS.

(Please indicate here any further information or particulars which may be thought likely to assist in the survey.)

219

75 (A)

SP52SE5

(B) UNDERGROUND WATER—(WELLS AND BORINGS).

(In each case please state whether a well and/or boring is in question.)

I. General.

1. Exact site of well or boring ... ... — Well and boring at Gowell Farm, Near Bicester, Oxon.
   (A map or sketch showing position would be useful.)

2. Surface level of ground above Ordnance Datum .. .. — 277 ft.

3. Date of construction ... ... — 1905.

Wells.

4. Depth of well from surface level of ground (i.e., 2 above). If top of well is below the surface level of the ground (*i.e.*, 2 above) state how much ... ... — 268.25 ft.

5. Depth of floor of galleries at site of well: also dimension and direction of galleries ... ... — None. ft.

Borings.

6. Depth of boring from surface level of ground (*i.e.*, 2 above). If boring is in bottom of well, state depth of well ... ... — 164.66 ft. = O.D Bottom of Boring

7. (*a*) Diameter of top of boring (8'0" b.s. to 97' b.s.) — 11 in.

   (*b*) Diameter of bottom of boring... (97' b.s. to 112'0" b.s.) — 10½ in.

8. Tubed from top of boring to ... ... — full depth. ft.

9. Lining tubes perforated at depths of ... ... — 77'0" ft.

10. Water struck during boring at depths of ... ... — 105 ft.

11. What was rest level on completion of boring? ... ... — 3'0" above surface.

Wells and Borings.

12. Is the water raised by pump or air lift? ... ... — Pump.

13. Depth from top of well or boring to bottom of suction pipe ... — 95 ft.

12

SP52SE5

II. If systematic measurements of water levels are made, state whether these include :—

(*a*) Pumping levels 75'0" Test 70'0" (*b*) Rest levels ... overflowed.

(*c*) Time of recovery to rest level on cessation of pumping ... 4 hours - September, 1934. Test 2 hours.

(*d*) Changes in pumping level, if rate of pumping is altered. ... ... Not altered.

Also state : (*e*) at what intervals records are taken (*i.e.*, daily, weekly, etc.) ... ... Daily.

Please furnish a specimen graph of records taken over as long a period as available (up to 1 year). Taken by hour's pumping.

III. If measurements are made only occasionally, please indicate what is, or has been, done in this respect and furnish examples of any graphs or figures available. Test taken twice in one day in July last - average per hour 6563 gallons

Test taken twice in one day in March last - 7854 gallons.

IV. YIELDS.

(1) Number of gallons pumped per hour ... ... At present 7854 gallons.

(2) Is pumping continuous? ... ... No. ... ...

(3) If not, how many hours pumping per day? ... Average - 9 hours.

(4) Maximum daily yields available (Test 140,000 to 212,000) in 1905. See above (With old pump

Estimated 300,000 gallons per day.

Based on actual tests Further test proposed in near future.

V. If a section or record of strata can be given please attach to this form. Herewith.

VI. (1) If a chemical analysis can be given please attach. ---

(2) If not state hardness ... ... (1920) 15.5

(3) For what purpose is the water used? ... ... Mainly Domestic.

15

Inf from Isler Feb 1942

219

50-52 Highgate St.

219

Copy

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75

Lab. report No 121135/1 13th Nov. 1935

Sample of water from Bicester Water works — No 3 pumping at 6740 gph.

Total solids	31.6 parts/100,000
Chlorine	2.2 " "

Solids consist of Magnesium bicarbonate & sulphate
Traces of sodium & chlorine. No calcium salts present.

No 3a pumping at 6740 gph

Total solids	39.6 parts/100,000
Chlorine	3.2 " "

Solids as above

No 4 pumping at 7020 gph.

Total solids	39.0 parts/100,000
Chlorine	2.1 " "

Solids as above

No 4a pumping at 7020 gph

Total solids	40.6 parts/100,000
Chlorine	2.3 " "

Solids as above

No 5 pumping at 6420 gph.

Total solids	40.0 parts/100,000
Chlorine	2.2 " "

Solids as above.

(Sgd) John Bell & Croydon