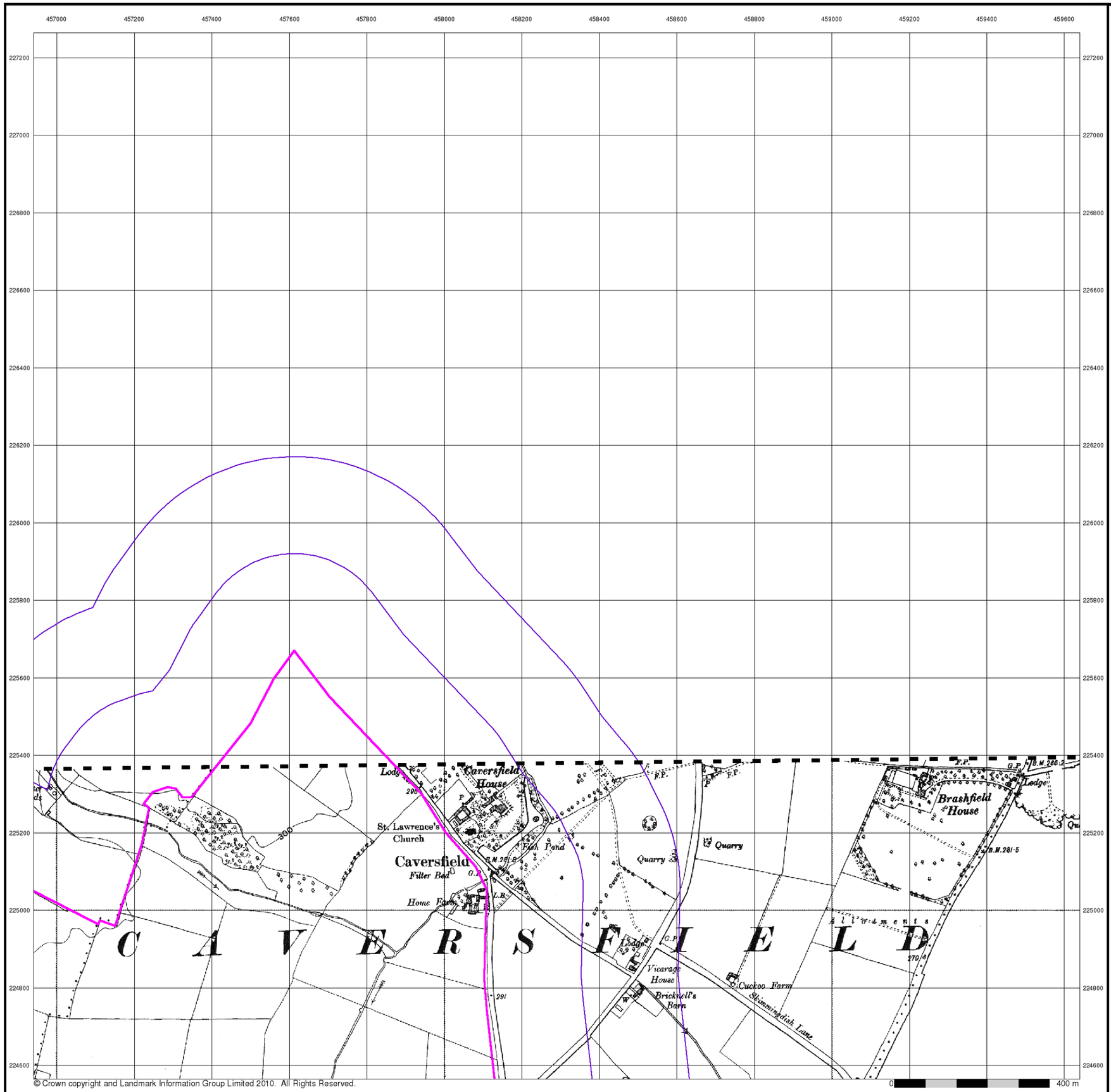

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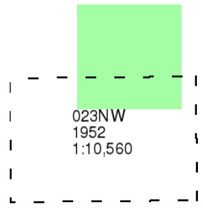
Oxfordshire

Published 1952

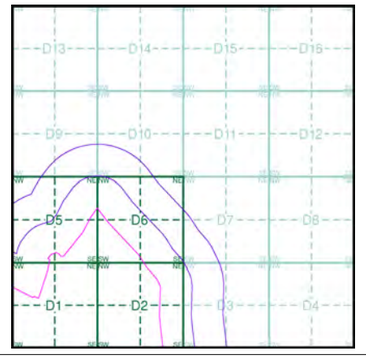
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice D



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Customer Ref:	UA001881
National Grid Reference:	457720, 225250
Slice:	D
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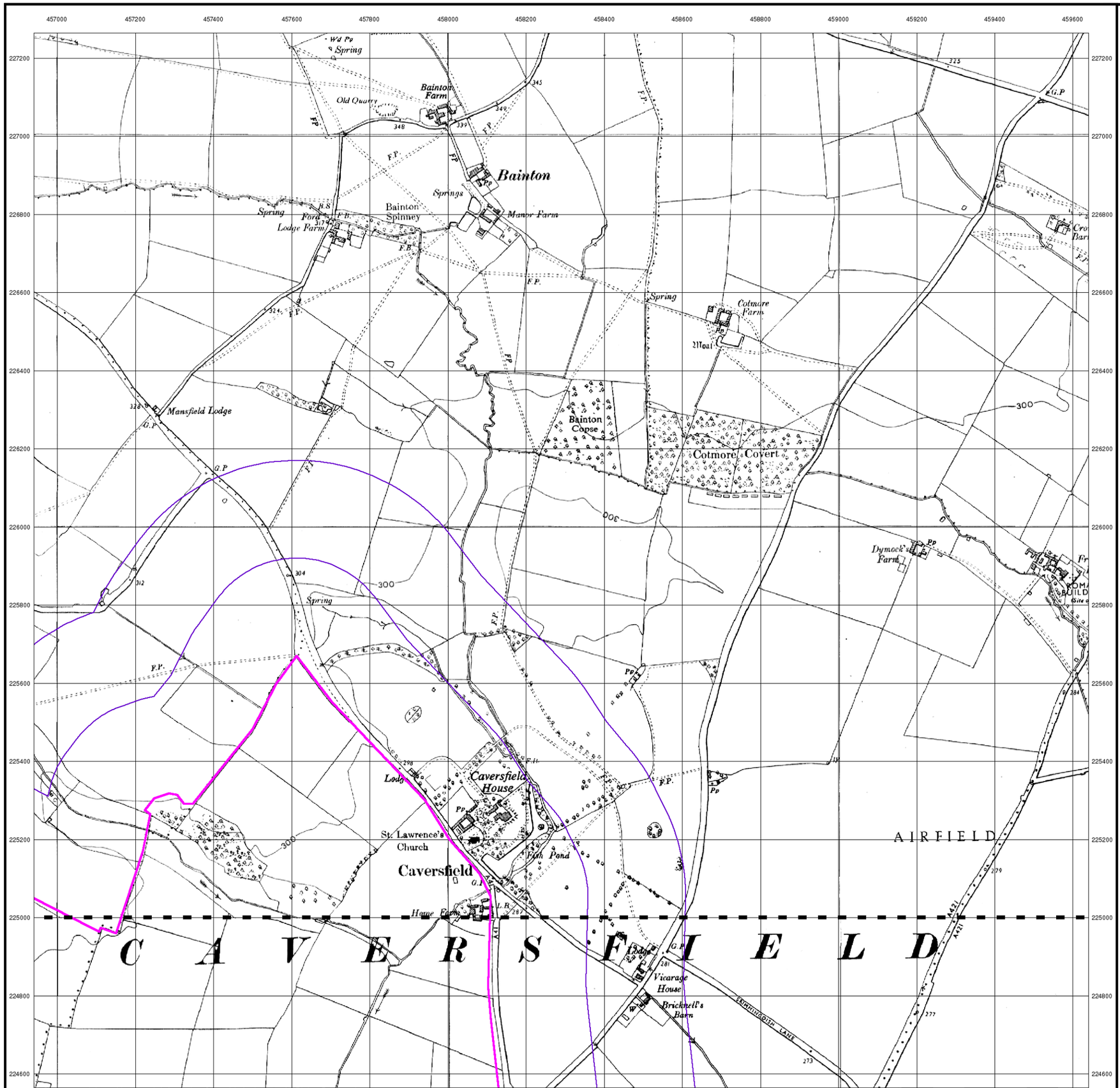
Search Buffer (m):	500

Site Details

Site at, Bicester, Oxfordshire

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Envirocheck®

Ordnance Survey Plan

Published 1955

Source map scale - 1:10,000

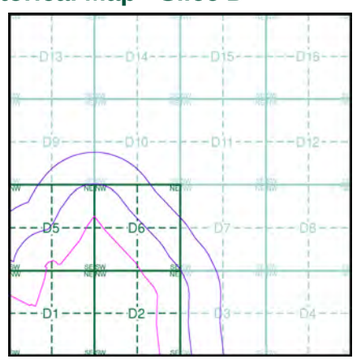
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SP52NE
1955
1:10,560

SP52SE
1955
1:10,560

Historical Map - Slice D



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National Grid Reference:	457720, 225250
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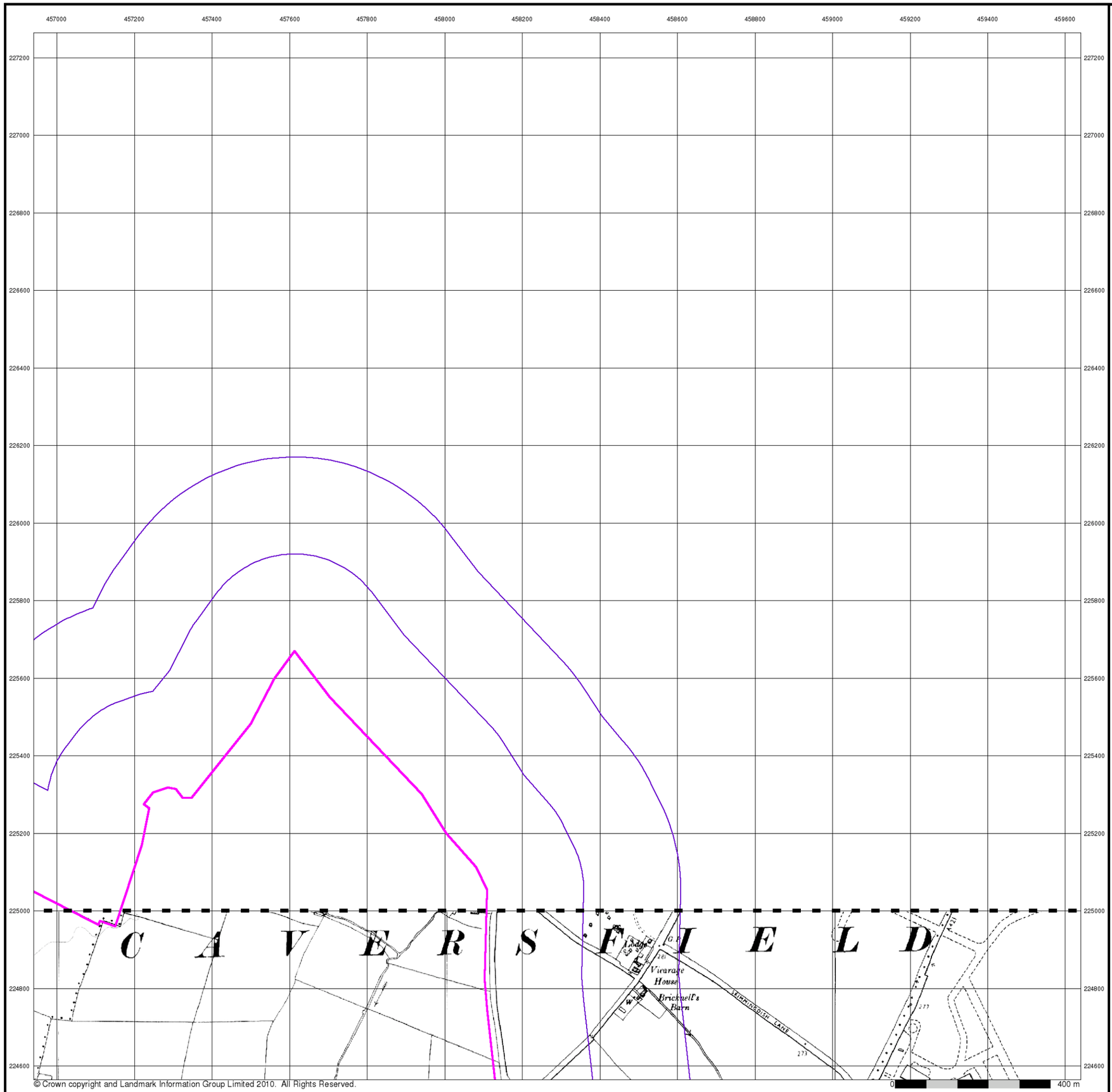

Envirocheck®

Ordnance Survey Plan

Published 1966

Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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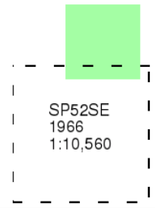

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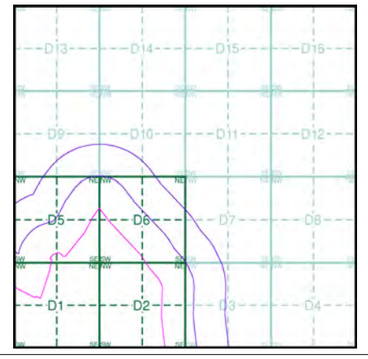

Order Details

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Customer Ref:	UA001881
National Grid Reference:	457720, 225250
Slice:	D
Site Area (Ha):	395.55
Search Buffer (m):	500

Site Details

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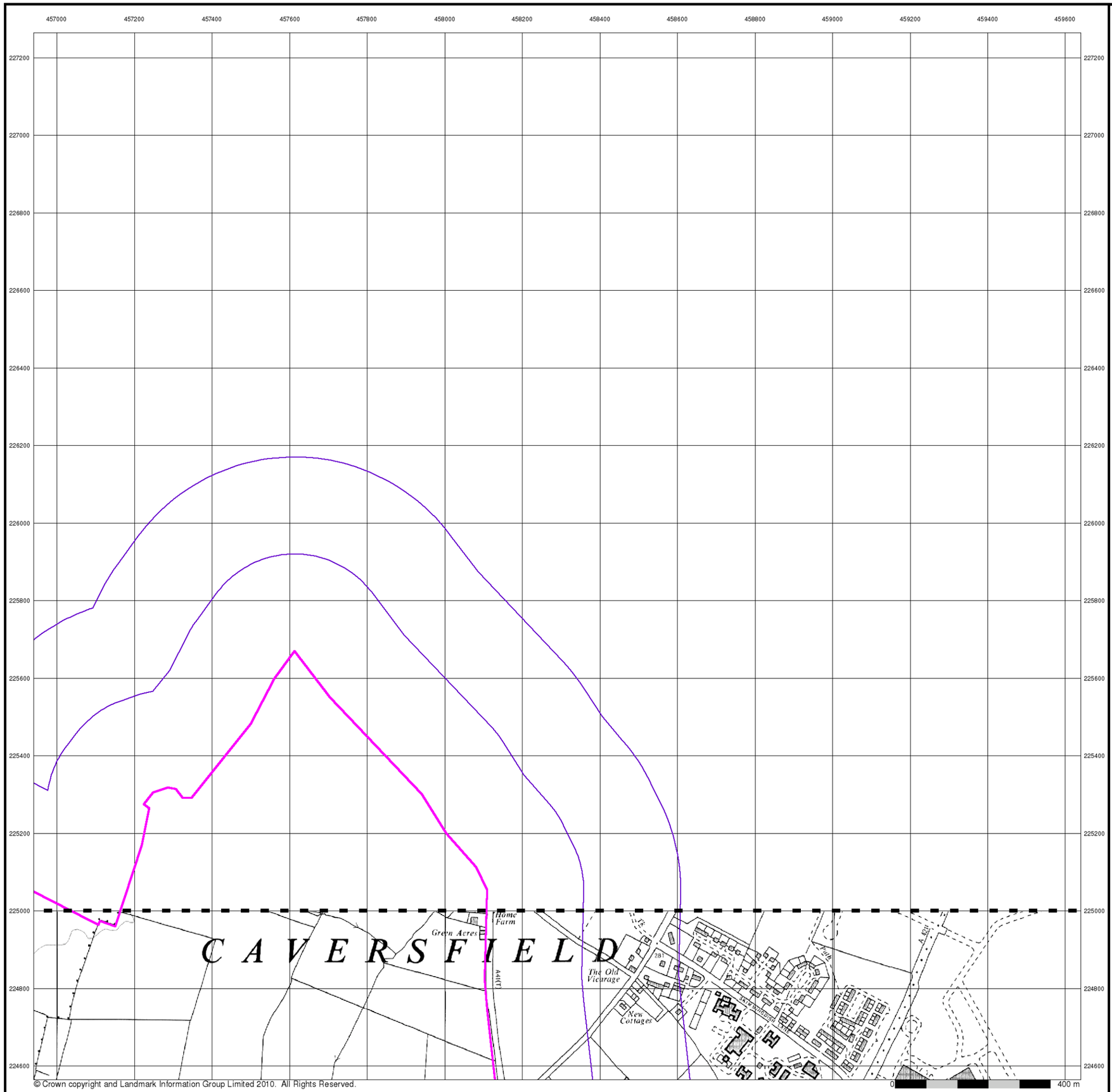


Envirocheck®

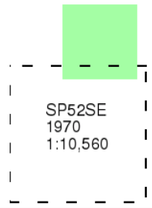
Ordnance Survey Plan

Published 1970

Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



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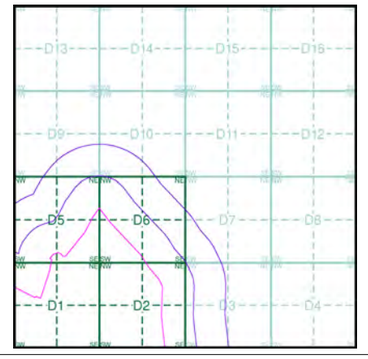

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Customer Ref:	UA001881
National Grid Reference:	457720, 225250
Slice:	D
Site Area (Ha):	395.55
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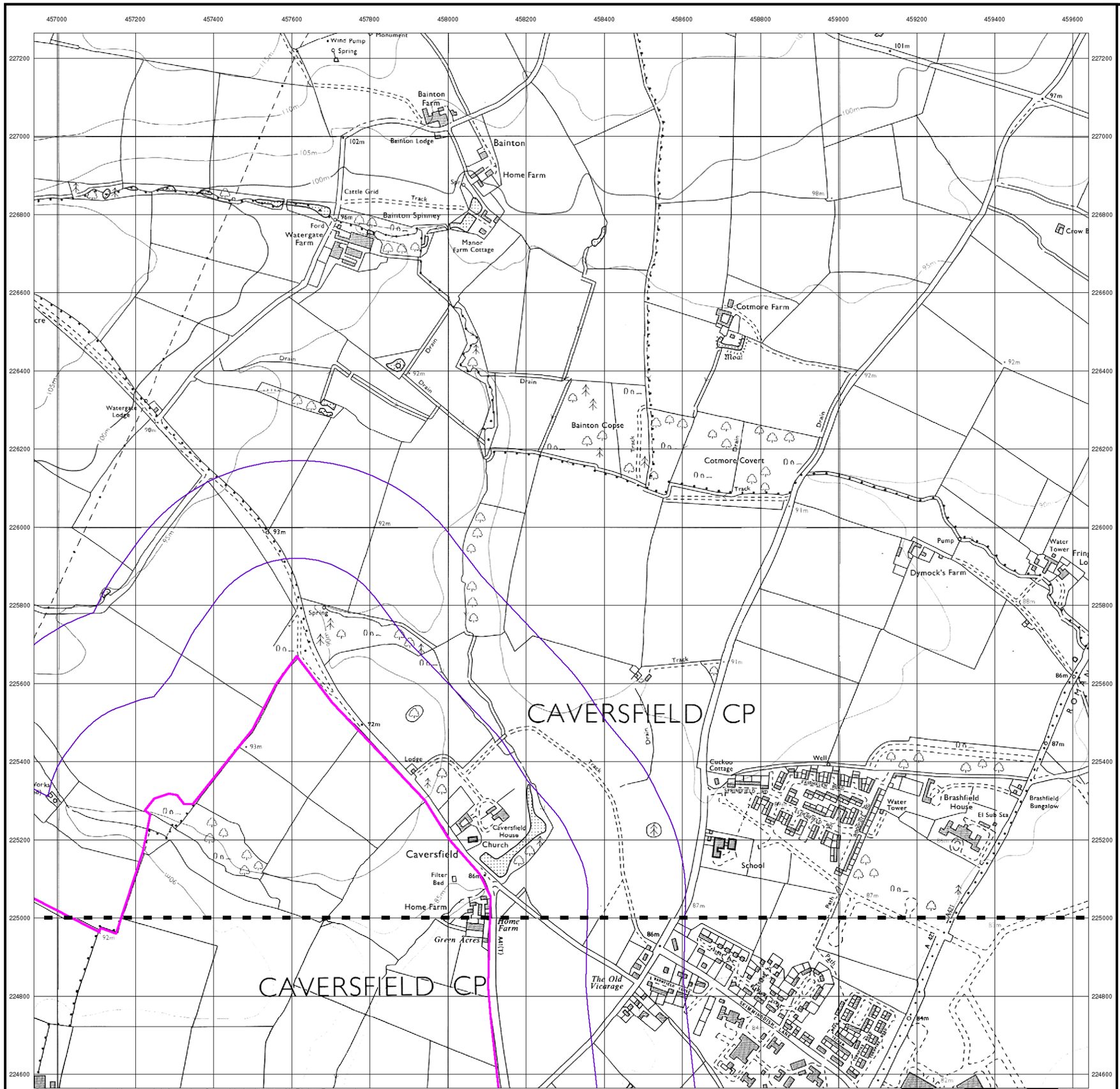

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Ordnance Survey Plan

Published 1982 - 1988

Source map scale - 1:10,000

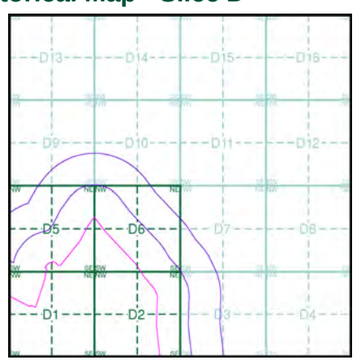
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SP52NE
1982
1:10,000

SP52SE
1988
1:10,000

Historical Map - Slice D



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Slice:	D
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Search Buffer (m):	500

Site Details

Site at, Bicester, Oxfordshire

Landmark Information Group

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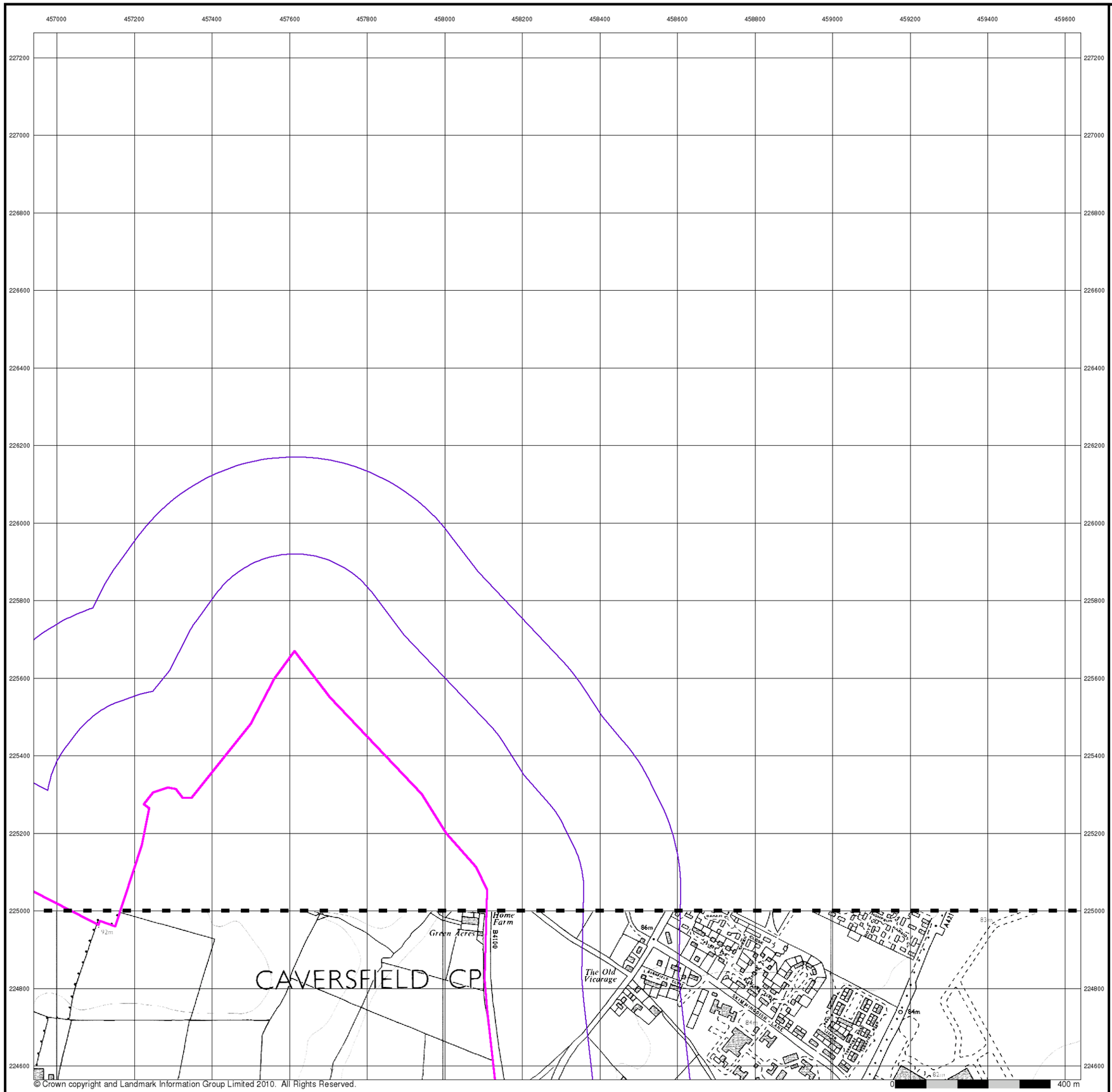
Web: www.envirocheck.co.uk



Envirocheck®

Ordnance Survey Plan

Published 1996

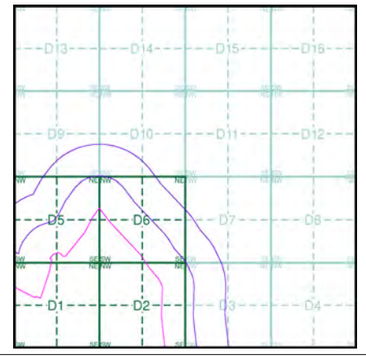
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SP52SE
1996
1:10,000

Historical Map - Slice D



Order Details

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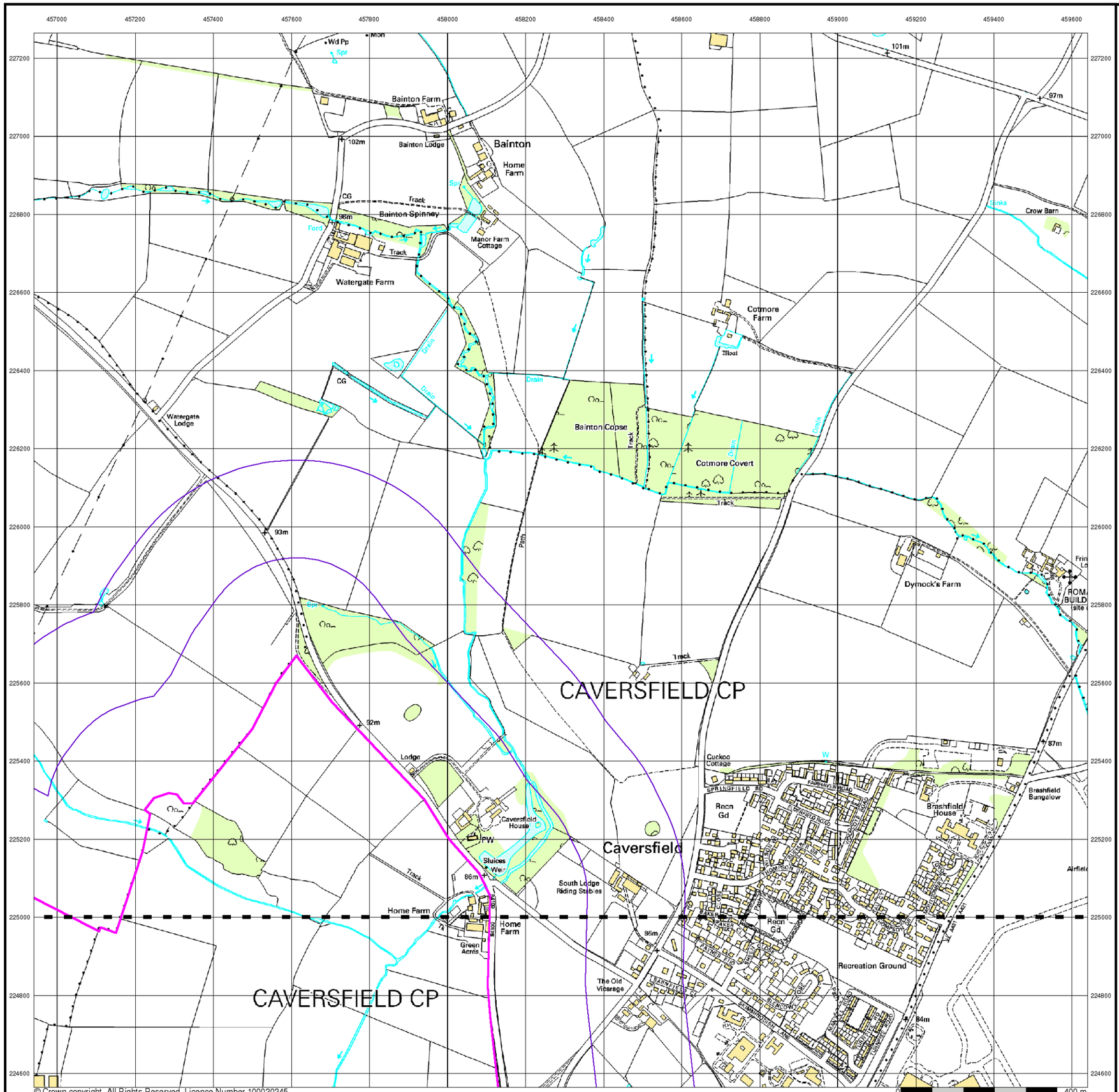
Customer Ref:	UA001881
National Grid Reference:	457720, 225250
Slice:	D
Site Area (Ha):	395.55
Search Buffer (m):	500

Site Details

Site at, Bicester, Oxfordshire

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

10k Raster Mapping

Published 1999

Source map scale - 1:10,000

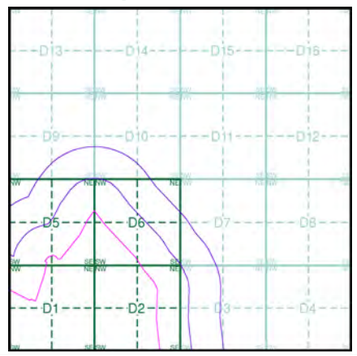
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SP52NE
1999
1:10,000

SP52SE
1999
1:10,000

Historical Map - Slice D



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Order Details

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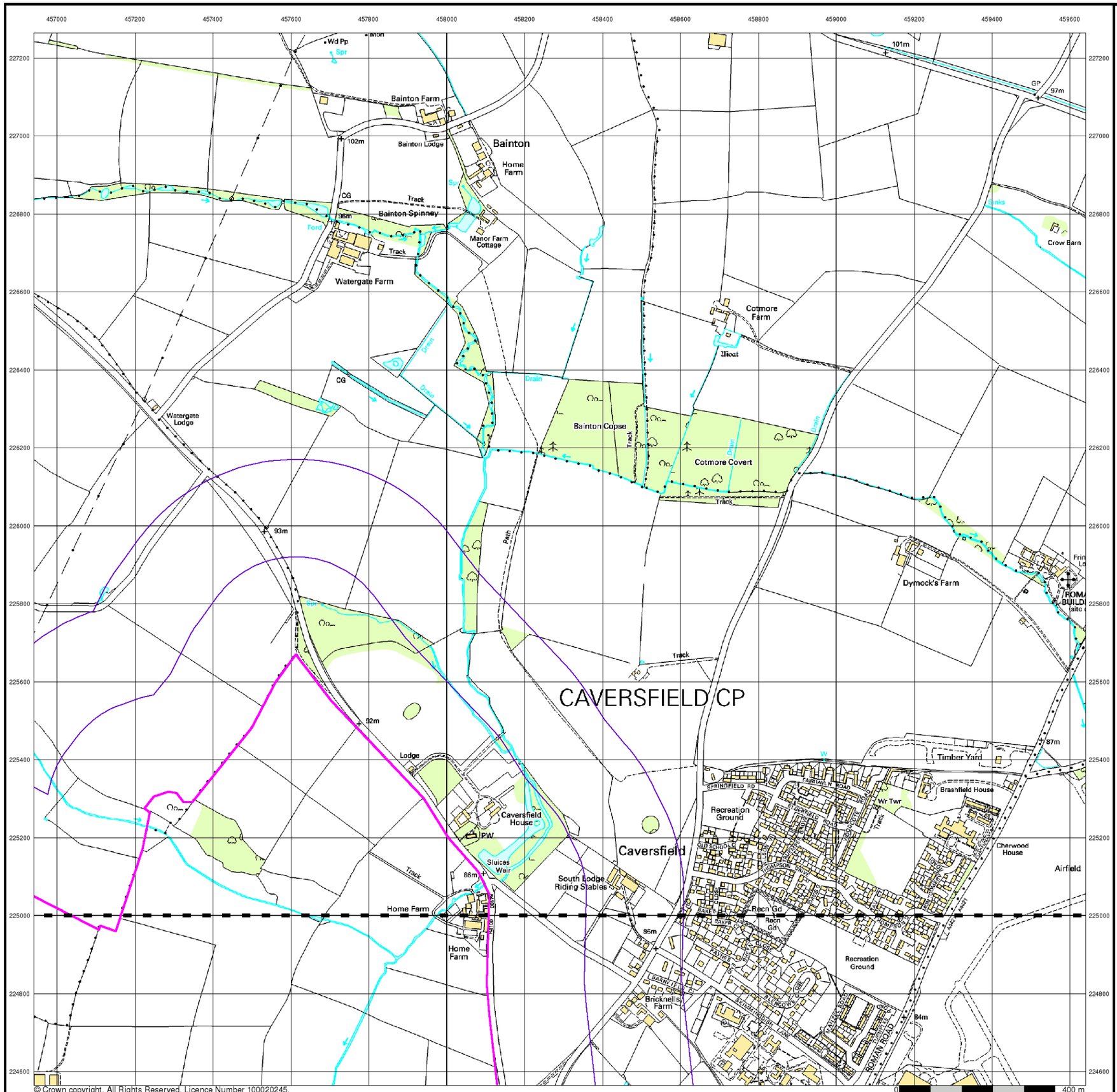
Site Area (Ha):	395.55
Search Buffer (m):	500

Site Details

Site at, Bicester, Oxfordshire

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

10k Raster Mapping

Published 2006

Source map scale - 1:10,000

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SP52SE
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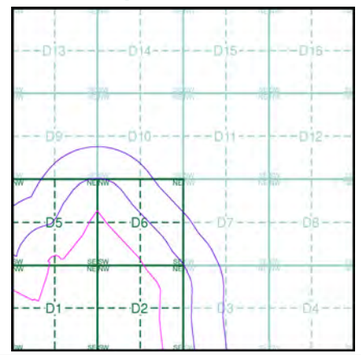

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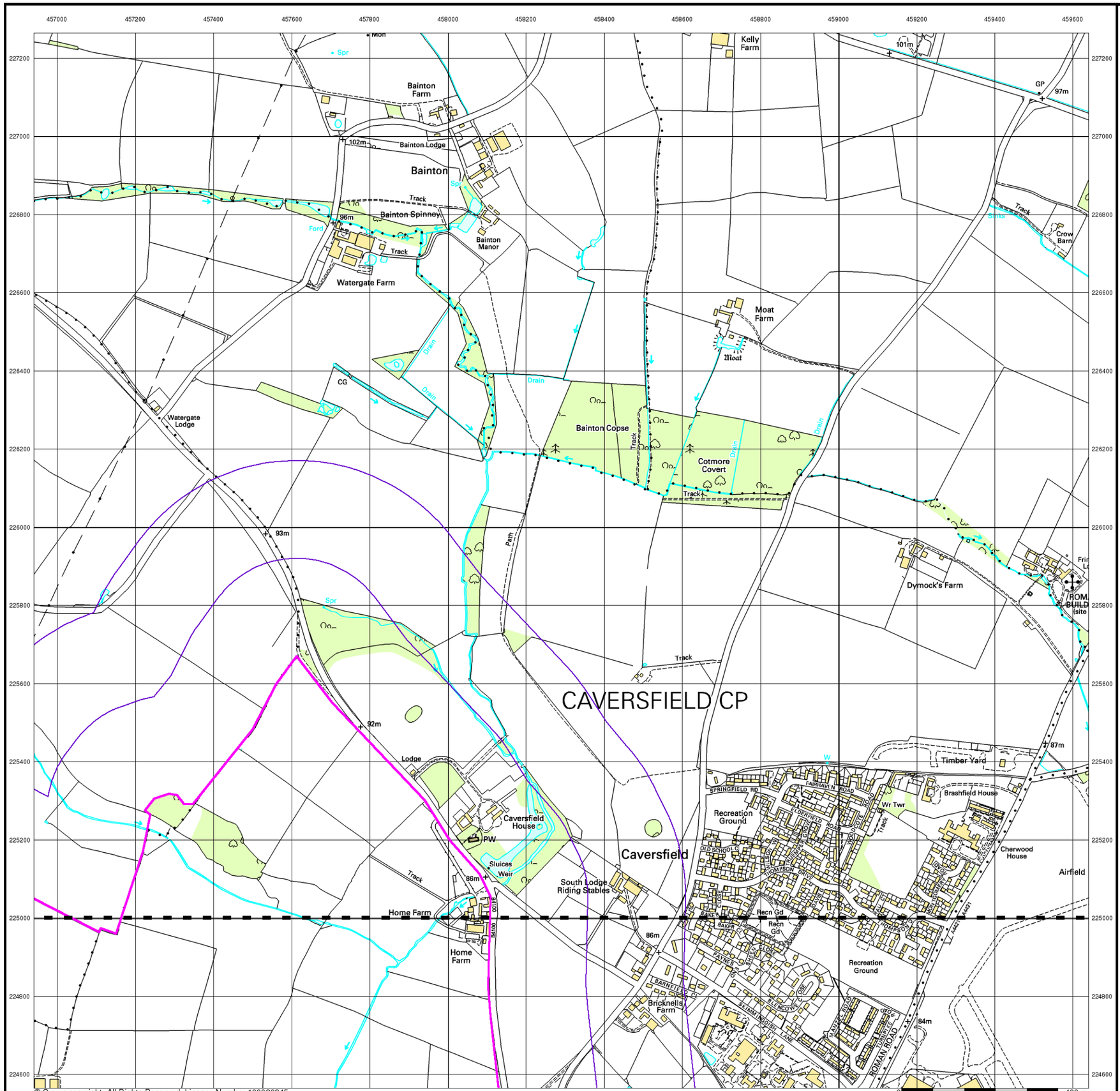
Search Buffer (m):	500

Site Details

Site at, Bicester, Oxfordshire

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Envirocheck®

10k Raster Mapping

Published 2010

Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

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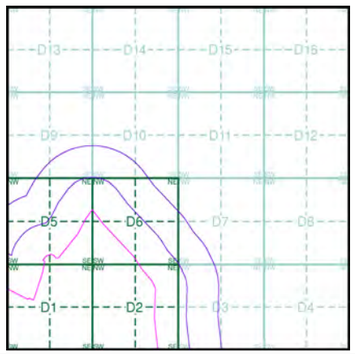
1:10,000

SP52SE
2010
1:10,000

Historical Map - Slice D



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Order Details

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Customer Ref:	UA001881
National Grid Reference:	457720, 225250
Slice:	D
Site Area (Ha):	395.55
Search Buffer (m):	500

Site Details

Site at, Bicester, Oxfordshire

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

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

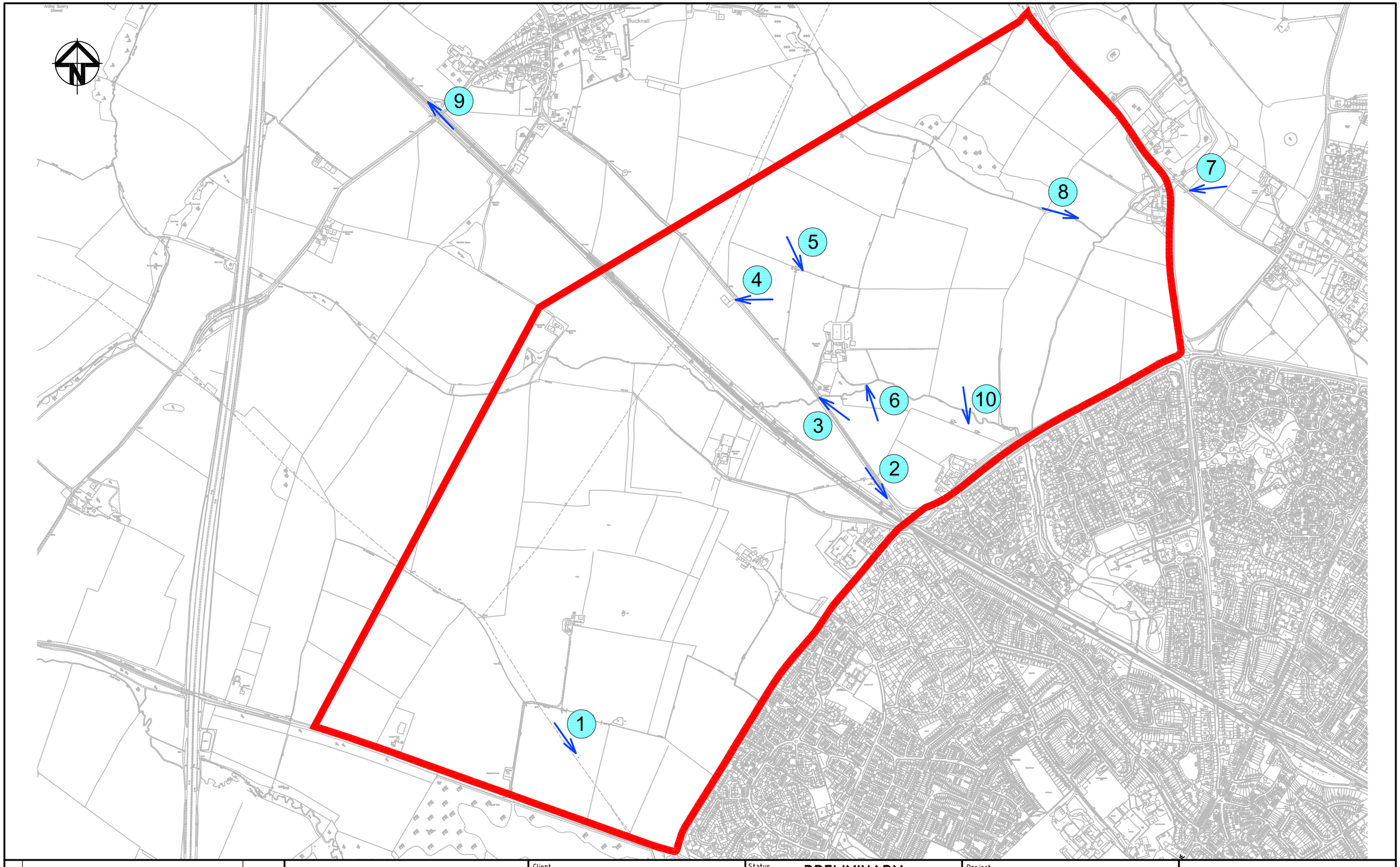
Consequence	Risk				
Severe	Low	Low to moderate	Moderate to high	Very High	Very High
Moderate	Negligible to low	Low	Moderate	Moderate to high	High
Mild	Negligible	Low	Low	Low to moderate	Moderate
Negligible	Negligible	Negligible	Negligible to low	Low	Low
Probability	Very Unlikely	Unlikely	Possible	Likely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



01	FIRST ISSUE	13/07/10
Issue	Description	Date

KEY

1 PLATE NUMBER

PHOTOGRAPH LOCATION AND DIRECTION

Client

a2dominion

P3Eco Ltd

Status **PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION

Scales	1:12,500	Current Issue Signatures	
		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
Tel: +44 (0)870 000 3006
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

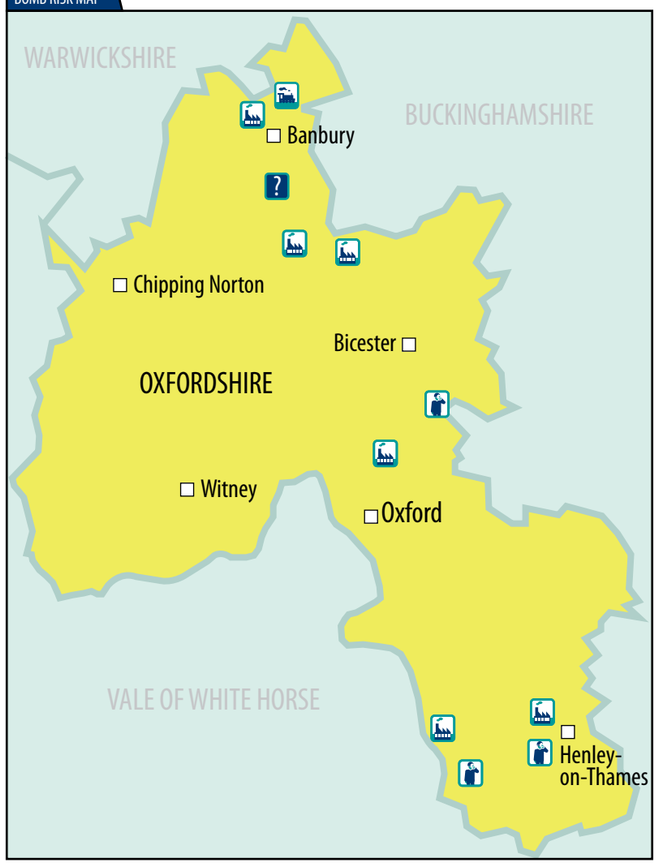
REGIONAL UNEXPLODED BOMB RISK

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.

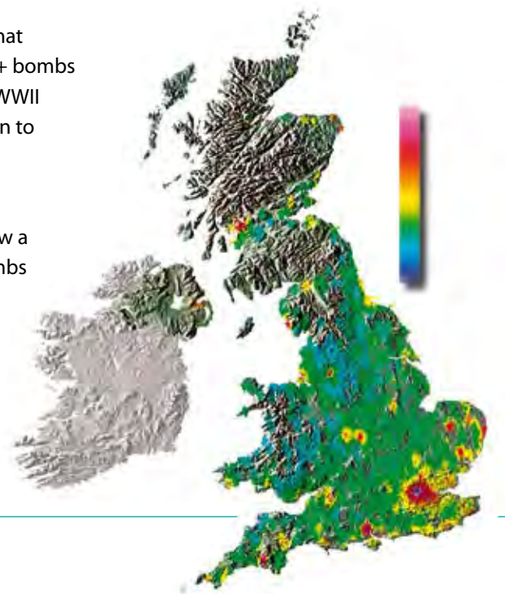
Low risk

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

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		

Description of Strata	Reduced Level	Depth
	103.38	0.00
TOPSOIL	103.18	0.20
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)	101.78	1.60
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)	101.23	2.15
Very weak light brownish grey fissured and jointed calcareous MUDSTONE faintly weathered orange brown on joints. (Forest Marble)	100.63	2.75
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.	99.43	3.95
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.	98.78	4.60
Moderately weak light grey mottled mid grey very fine grained micritic LIMESTONE with orange stained crosscutting fractures. (White Limestone - Bladon) Below 4.85m 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.	96.38	7.00
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.		

Graphical Representation

Sampling/in situ testing

Depths	No.	Blows	TCR/SCR/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 %	MC %	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; Point Load Index I MN/m² of inner between platens; v vertical, h horizontal; C Rotary core; 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; 25/150, blows for 150mm drive after seating; (25), blows for sets of ... drive only; (U) Undisturbed sample.

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

DEPTH: All depths, levels and thicknesses in metres.

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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: 105.39 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.			
			AT 12.45m 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 argillaceous 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 17.20m 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 intertie.			
			Weak greenish grey silty MUDSTONE and very stiff greenish grey and dark grey silty CLAY with whole and fragmental oysters. (Blampton 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. (Blampton Marly Beds)		83.88	19.50
15.09	3.00	18.00	END		83.38	20.00

Depths	Type	No.	Blows	V / C / RQD	-425 %	W %	PL %	LL %	γ Mg/m³	C_u kN/m²	I_h	d_h	I_v	d_v
10.00				93/77							3.65	74	3.40	61
12.00											2.89	74	3.57	71
					89	20	17	39						
				94/36										
14.90														
16.00				81/73							1.73	74	2.63	76
				100/25	100	18	14	43						
17.30														
											1.01	73	0.12	76
					100	17	17	43						
				100/78										
					81	15	16	33						
20.00											2.05	74		

Additional Tests and Notes

Ardley Mbr

12.85

Shipton Mbr

17.85

Ardley Fm

* Point Load Index < 0.10 MN/m²

▼ WATER I First water strike
V Subsequent water strikes

PIEZOMETER: Upper seal / Response tength / 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 25/180, blows for 150mm drive after seating 25*, blows for part of 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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Drawing No. 1343/90/A

ENGINEER: OVE ARUP & PARTNERS

OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION

LOGGED BY: JHR FIELDWORK BY: Exploration Associates LAB. TESTING BY: Exploration Associates	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 1 OF 2 FIGURE A

Strata

Reduced Level	Depth	Description of Strata
90.32	0.00	
90.12	0.20	TOPSOIL
88.57	1.75	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.
86.32	4.00	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°
85.92	4.40	Moderately strong grey fine grained silty finely sparry sandy textured LIMESTONE. (White Limestone – Bladon)
85.37	4.95	Initially weak and very broken becoming moderately weak light greyish green calcareous micritic MUDSTONE with occasional pellets and some worm burrows. (White Limestone – Bladon)
83.92	6.40	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.
81.92	8.40	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.
		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

Depths	Type	No.	Blows	Cr/RQD
0.00	U	1	(10)	
0.35	D	2		
0.50	U	3	(57)	
0.75	D	4		
1.00	U	5	(48)	
1.40	D	6		
1.50	U	7	(100)	
1.80	D	8		
1.83				51/19
2.50				92/51
3.55				73/0
4.00				97/64
4.90				100/17
5.50				94/33
6.20				100/64
6.70	S			
6.90	D	9	N-60	49/36
7.50				91/81
9.00				98/65

Lab. Testing

-425 %	W %	PL %	LL %	γ Mg/m³	Cu kN/m²
76	31	27	54		
100	24	21	50	2.01	
100	23	21	52		
100	23	22	50	2.05	
77	25	29	53		
69	24	19	52		
82	18	15	35		
100	24	23	54		
75	24	22	46		
71	22	20	47		
				2.59	
100	18	16	42		
	30				
	15				

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)

SP 52 SW/49
5471 2333

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; 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

DEPTH All depths, levels and thicknesses in metres

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FIG. A | SHEET 1 OF 2 | HOLE NO. 065

SP52SW49

ENGINEER OVE ARUP & PARTNERS	OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION	GROUND LEVEL 90.32 m O.D.	HOLE NO.
LOGGED BY: JRR	EXCAVATION METHODS Rotary Coring – Dando 220 rig.	COORDINATES 454705 E 223333 N	SHEET 2 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			

Date/Time at Depth	Depth of Casing	Depth to Water	Description of Strata	Reduced Level	Depth	Sampling Depths	Cr / RQD	I_h	d_h	I_v	d_v
			(White Limestone - Ardley - as above)	79.82	10.50		98/65	1.26	70	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								

Column headings also printed: Piez. | Strata: Leg. | Graphical Representation | Sampling/In situ testing: Type, No., Blows | Lab. Testing: <425 %, w %, PL %, LL %, γ Mg/m³, C_u kN/m² | Additional Tests and Notes

SP 52 SW/49
5471 2333

* 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 initial

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
25/150, blows for 150mm drive after seating
25*, blows for part or whole of seating drive only
(25) 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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FIG. A | SHEET 2 OF 2 | HOLE NO. 065

ENGINEER OVE ARUP & PARTNERS

OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION

HOLE NO. SP52SW38

LOGGED BY JHR

FIELDWORK BY Exploration Associates

LAB. TESTING BY: Exploration Associates

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

SHEET 1 OF 1

FIGURE A

Date/Time at Depth	Depth of Casing	Depth to Water	Description of Strata	Strata: Leg.	Strata: Reduced Level	Strata: Depth	Graphical Representation	Sampling/in situ testing: Depths	Type	No.	Blows	N / Cr / RQD	Lab. Testing: -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	B	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									Core diameter 114mm
			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							
					74.06	7.15													
			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)		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		CVD	71.01	10.20		10.20											

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* 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 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. Tipladdy DSC. C.Eng.FICE,FIHE
Director
Eastern Road Construction Unit,
99/83 Goldington Road, Bedford.

FIG. A

SHEET 1 OF 1

HOLE NO. As

LOCATION: Gowell Farm, Bicester. BOREHOLE No. Two

SP52SE209

DATE OF BORING: 06.04.1989.

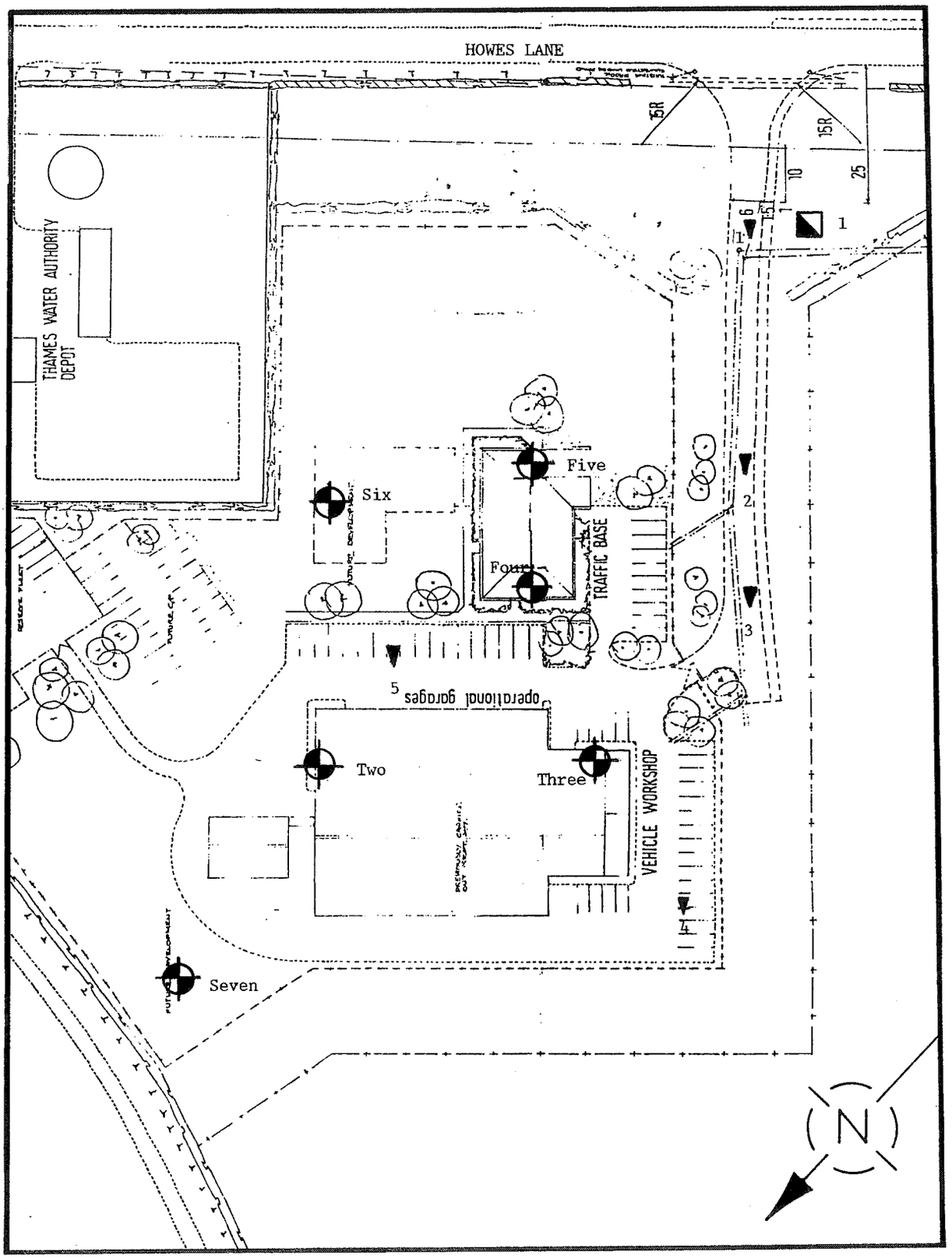
Description of Strata	STRATA CHANGE LEGEND	STRATA CHANGE DEPTH M	RQD %	TCR %	SCR %	Description of Discontinuities	STATE OF WEATHERING
TOPSOIL		0.54					
CORNBRASH Light brown grey, coarse grained LIMESTONE - moderately strong to strong		0.95					
		1.00					
Light brown slightly sandy CLAY with limestone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



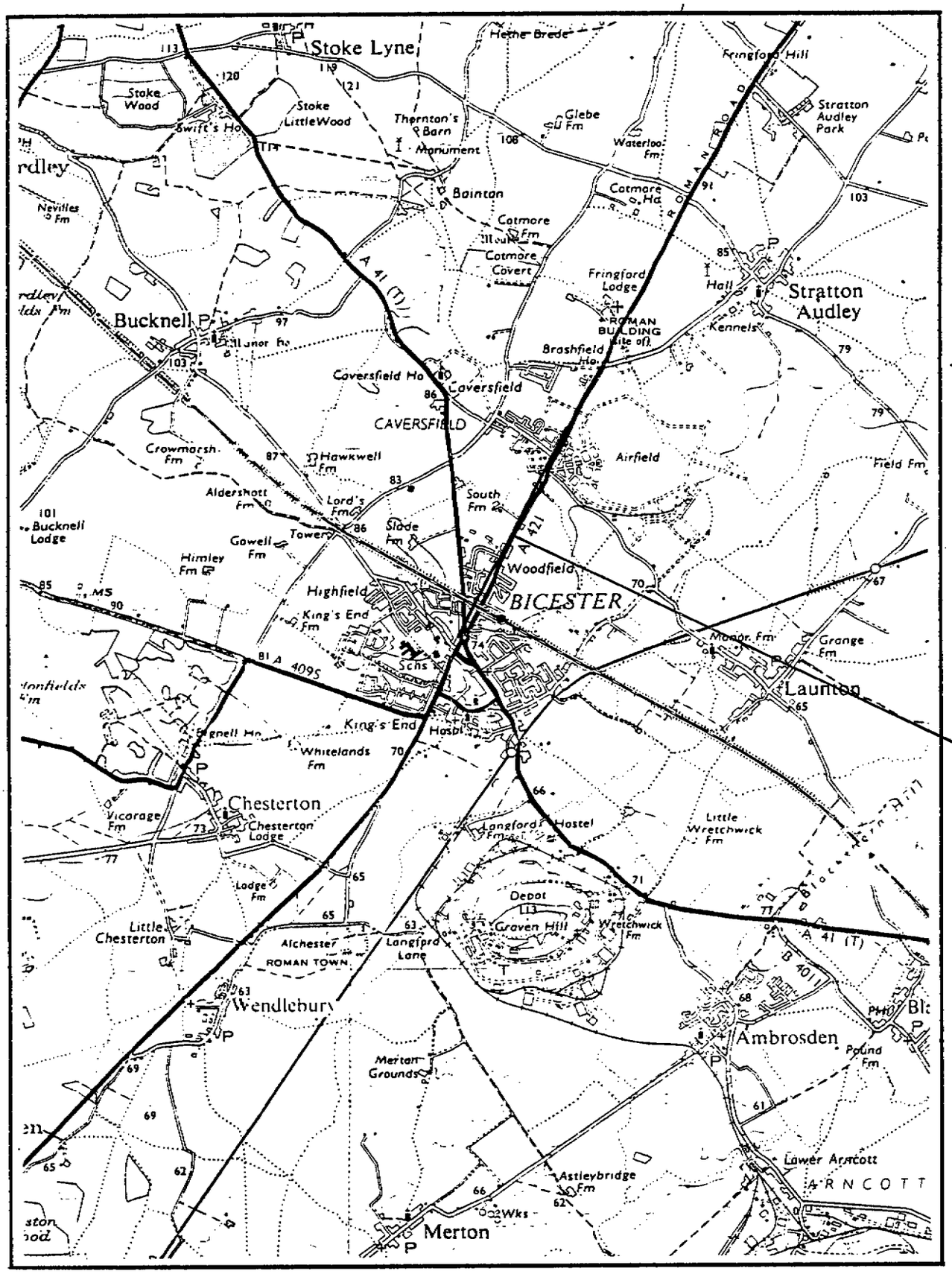
Borehole Location

Trial Pit Location

MEXE Probe Location

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

SP52SE55



KEY PLAN

1 : 50 000

Location No. 7209/13

Location BICESTER

SP 52 SE

O.S. Sheet No 7209/13

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. (Probably Highly Weathered Limestone with occasional Clay Bands)	80.81		0.80 (2.25)	0.80 – 1.00 1.00 – 1.45 1.80 1.85 – 3.05	B B WS B	2 3 11 4	C N=44	Water struck at 1.80m
Very stiff grey calcareous CLAY becoming moderately weathered calcareous MUDSTONE weak Bands of grey strong limestone.	78.50		3.05 (2.45 pen)	3.05 – 3.50 3.55 4.20 – 4.65 4.70 5.00 – 5.075 5.40 – 5.475	U D U D D D	5 6 7 8 9 10	S (100) S (100)	
BOREHOLE COMPLETE AT 5.50m	76.11		5.50					

Water Level Observations During Boring

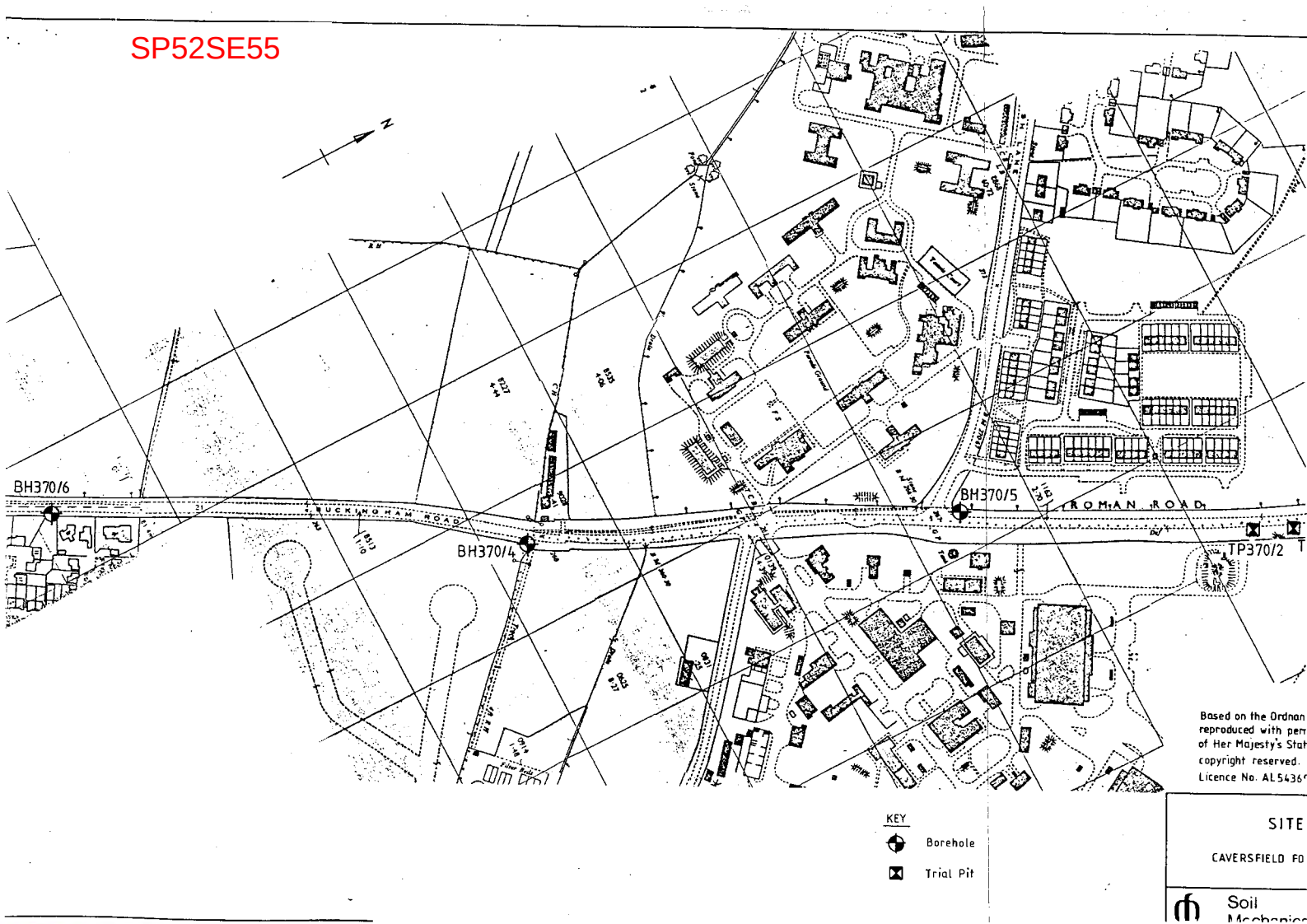
Date 1985	Time	Depth of Hole m	Depth of Casing m	Depth to Water m	Remarks
22.10	1530	1.80	0.00	1.80	Water struck

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.

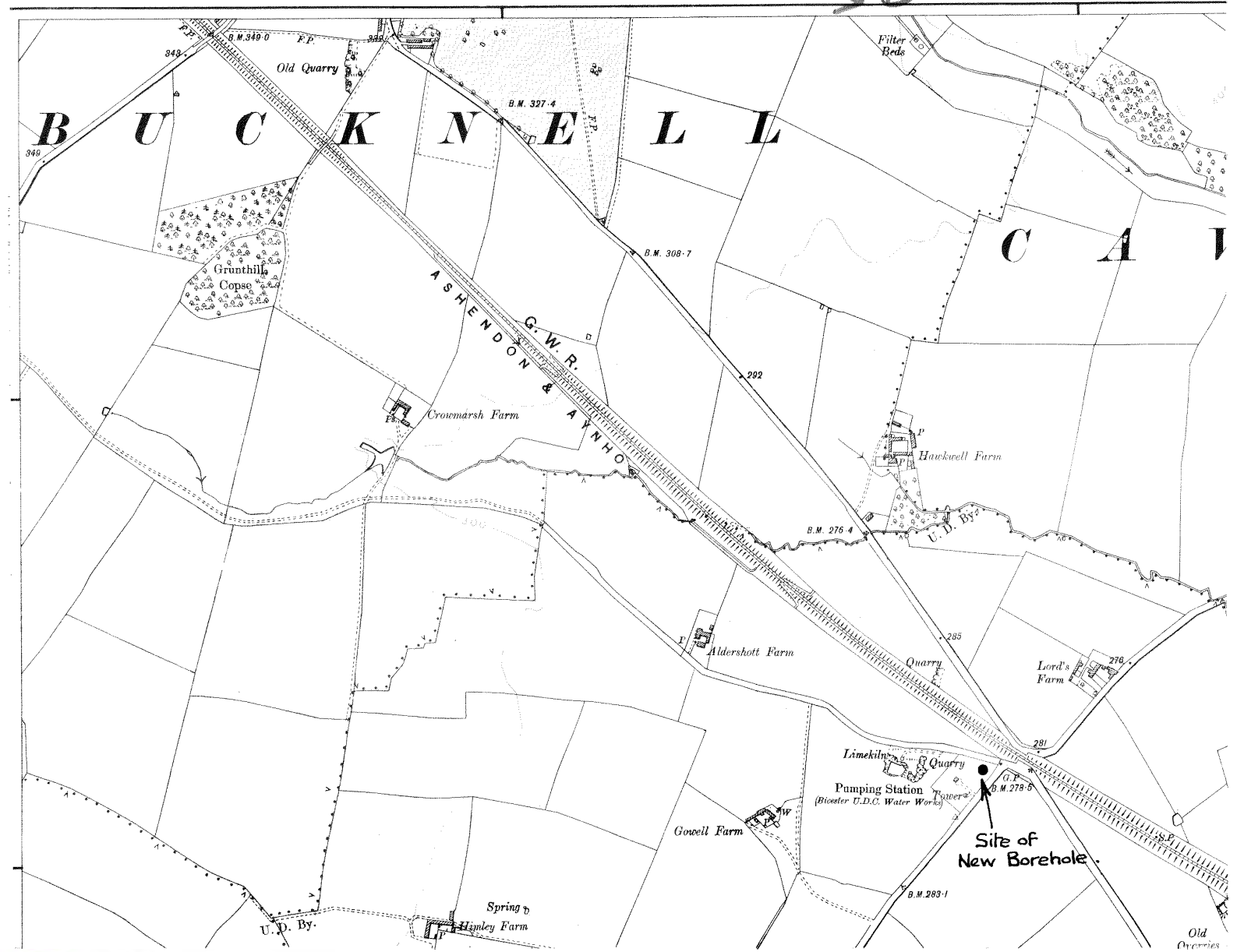
219

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.

(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 29 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 Francis Cementation Co Date of well 1937

Information from " " "

ADDITIONAL NOTES.

* At first, yield was 8-9,000, but rate 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

Int from Isler Feb 1942

219

219

50-52 Highmore 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 Inler Feb 1942

219

219

SP52SE29

Copy.

50-52 Wigmore St. W.1.

75

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 & Croydon

Bacteriological Examination

No. of organisms capable of growth on gelatine 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)

SP52SE29

1" N.S. 2 | 1" O. 4 S.E. | Grid Ref. 219/75

A (Gorell Farm no 2. [redacted])

Town or Village Bicester County Oxon. Six-inch quarter sheet xxxvi 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

Shaft ~~40~~ 13' ft., diameter ~~8ft~~" 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 Francois Cementing Co Ltd for ~~Mr.~~ Bicester U.D.C. Date of well 1936.

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

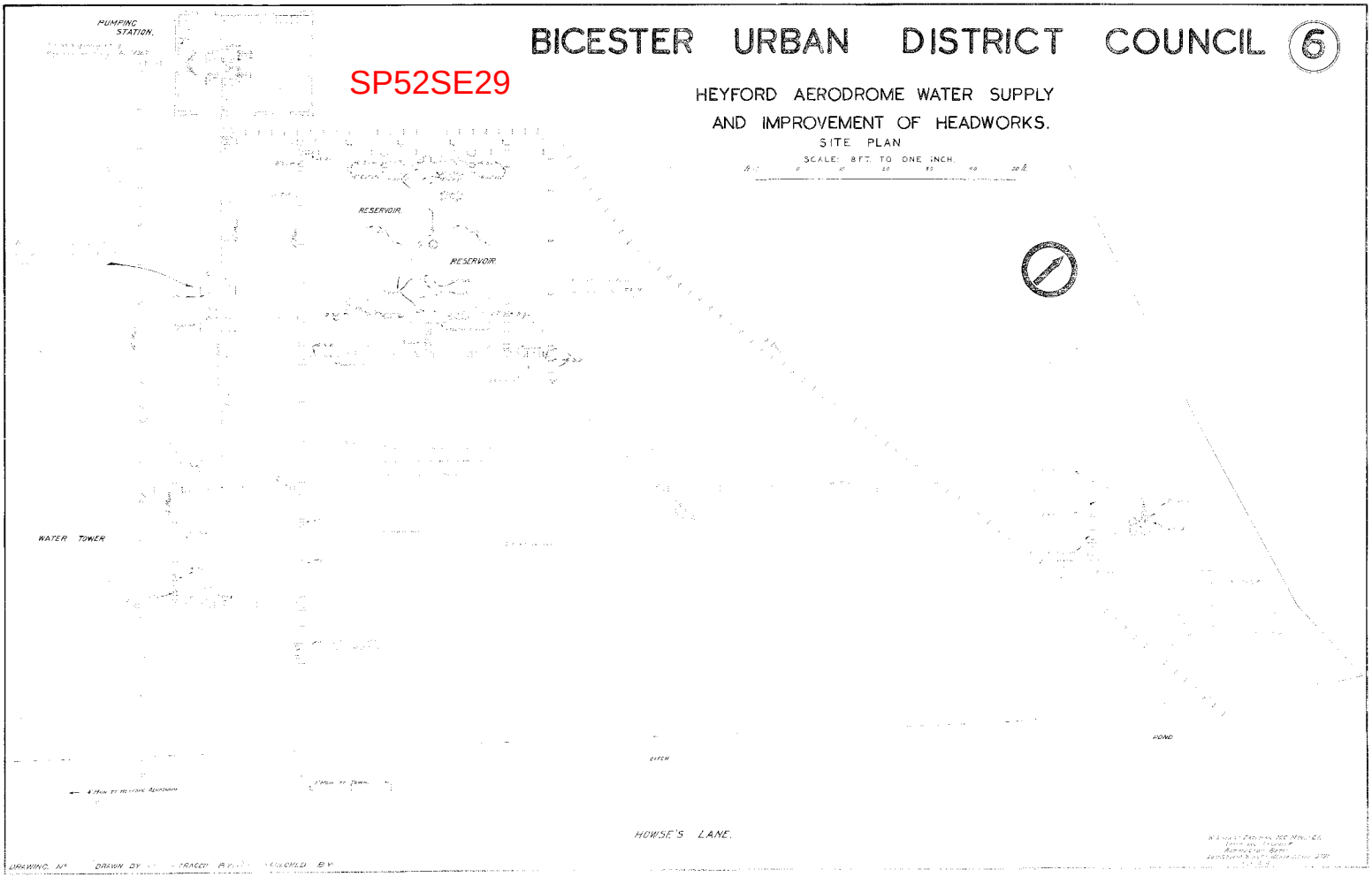
(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS Feet.	THICKNESS Inches.	DEPTH Feet.	DEPTH Inches.
Made ground, dug through clay, on site of old Commonside quarry	Surface soil	1	0	1	0
	Yellow clay	10	0	11	0
	Blue clay	6	0	17	0
? Wychwood Beds 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-waltoni beds 9'	Grey ~~shaly~~ rock	8	0	40	6
	Grey ~~soft~~ clay	1	0	41	6
White Lias 3'6"	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 ~~clay~~ 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.V.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

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.

SP52/19B 219/75

A (Garrett Farm no 2. [redacted])

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

Exact site See 6 inch & ½ inch scale plans attached (A rough sketch-map or a tracing from map is very desirable)

in parish of (SP5314) 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

Shaft ~~140~~ 15' ft., diameter ~~9ft~~" 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 4'						
Trough clay, mixed	Surface soil		1	0	1	0
Gold Compton	Yellow clay	FMb	10	0	11	0
marly	Blue clay	—	6	0	17	0 (5·18)
?Wychwood Beds 2'	White rock		2	0	19	0 (5·79)
	Blue clay		7	0	26	0
Kemble Beds 13'6"	Grey shale	Whh	1	6	27	6 (8·38)
	Grey rock	(Blisworth	3	6	31	0 (9·45)
	Grey shale	Ashby)	1	6	32	6 (9·91)
Fimbriata-waltoni beds 9'	Grey ~~shaly~~ rock		8	0	40	6 (12·34)
	Grey ~~soft~~ clay		1	0	41	6 (12·65)
	Grey rock		7	0	48	6 (14·78)
White Lst 31'6"	Sandy shale	—	1	0	49	6 (15·09)
	Grey rock with bands of shale.	Whh (shyCw)	17	0	66	6 (20·27)
	Grey sandy clay		6	6	73	0 (22·25)
	Grey rock		5	0	78	0 (23·77)
Hampden Marly Beds 13'	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 (31·09)
Sweinford-Forest Marble 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)
U. Lias at 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.					

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA SP52SE29 If measurements start below ground surface, state how far... ...	THICKNESS Feet ...	THICKNESS Inches ...	DEPTH Feet	DEPTH 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.

9

219/122

RECORD OF ~~WELL~~ (SHAFT OR BORE) CONFIDENTIAL

~~Has the site a Ordnance reference number?~~

At Lord Farm SP52 SE 5746 2424

Town or Village Bicester

County Oxfordshire Six-inch quarter sheet 23 NW

For Air Ministry and Bicester RDC

Exact site of well 170 yds N E of Lords Farm, and 20 yds South of a lane

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

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 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

To be used as Air Ministry

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	⊙	⊙

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

2

(For Survey use only)

GEOLOGICAL CLASSIFICATION

SP52SE9

NATURE OF STRATA If measurements start below ground surface, state how far... ...	THICKNESS Feet ...	THICKNESS Inches ...	DEPTH Feet	DEPTH Inches
Clay, limestone fragments	7		7	
Limestone	6	6	13	6
Clay	1		14	6
Limestone	3		17	6
'Marble' rock	2	6	20	
Hard blue clay	2		22	
'Marble' rock	1		23	
Hard clay and rock fragments	5	6	28	6
Limestone	4		32	6
Alternating beds of grey shale rock	33	6	66	
Blue rock	3	6	69	6
Blue clay & bands of rock	4		73	6
Alternating bands of blue rock, shale & clay	17	6	90	
Hard sandstone	5	6	95	6
Alternating band of grey rock & sand	26		121	6
Hard clay and flints	15	6	137	
Blue clay & clay slates	5		142	
Blue clay	16	6	158	6
Blue clay & slates	13	6	172	
"Marls stone"	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	

Clays & THW and Sands.

ϕ. Probably 16-6., a dyke of brs is cored at 262 ft.

*. Mr conglomerate, but muddy limestone: specimen seen in field by H.B.W. 3/3/41

*. Mr. Prof. H.L. Hawkins classifies his cores 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.Surv. or Prof Hawkins. The Survey classification is more in accord with the succession in the

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 ...	THICKNESS Inches ...	DEPTH Feet	DEPTH 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 Civil Engineering and Brewing 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", 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 depths of 137 ft, 1000 g.p.h.

LOG OF STRATA OVERLEAF

[SP52SE BJ 9 .]

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. Sharps Hill & Northampton Sand	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	
	Blue clay & stones	13	6	172	
Middle Lias	"Marlstone"	1		173	
	Hard grey rock	3		176	
	Blue clay	58		234	
	Rock conglomerate *	8		242	
Lower Lias	Blue lias	4		246	
	Conglomerate *	8		254	
Clayton to THW and ??	Blue clay and bands of marl	8		262	

#

φ. Probably the base of the Lias is reached at 262 ft.

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

#. Mr. 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.Sur. or to Prof. Hawkins. The survey classification is more in accord with the succession & 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. Diredtorate 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.~~ Southall. Date of well April ~~1941~~

Information from

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
WS	Dark Grey Rock.	2	0	97	6	29.72
NS	Hard Sandstone.	3	6	101	0	30.78
	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 [illegible]

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

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.

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.

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.

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 ~~Bicester~~ 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.

= O.D Gowell Farm ?

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.

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

SP52SE5

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 Inler Feb 1942

219

219

SP52SE5

Copy.

50-52 Wigmore St. W.1.

75

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 & Croydon

Bacteriological Examination

No. of organisms capable of growth on gelatine plates at 22°C after 72 hrs. incubation 116 per c.c.

" " " " " " agar " " 37°C " 48 " " 40 " "

B. coli absent in 100 c.c

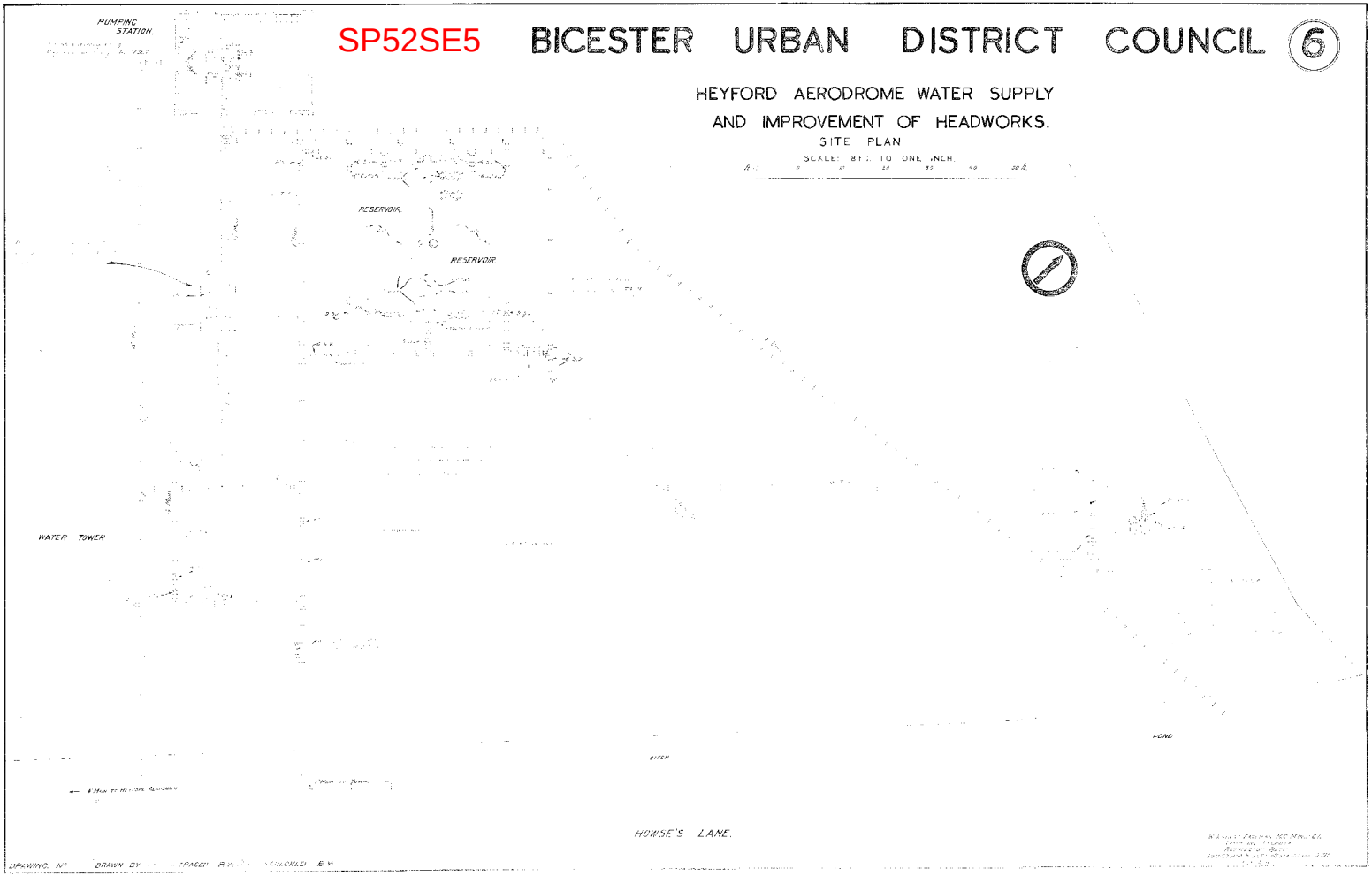
SP52SE5

BICESTER URBAN DISTRICT COUNCIL 6

HEYFORD AERODROME WATER SUPPLY AND IMPROVEMENT OF HEADWORKS.

SITE PLAN

SCALE: 8 FT. TO ONE INCH.



SP52SE5

219/75

SP52/19

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. (84.42m)

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
	Grey rock (Cornbrash)	3	0	4	6
	Sandy marl	8	0	12	6
Forest Marble ~~22ft.~~	Blue rock (Forest Marble)	3	0	15	6
	Light shale	2	6	18	0
	Limestone	2	0	20	0
WhL Blisworth	Blue clay or shale	3	6	23	6
	White rock	7	0	30	6
WhL Ardley	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
WhL Shales	Blue shale	1	6	54	0
	Grey rock	3	0	57	0
Great Oolite ~~84 ft. 6 in.~~	Grey shale	1	0	58	0
	Grey rock	1	0	59	0
Shipton	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
Rutland Fm	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
Tuyalum Lst	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
Shp's Ht. M Fm	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 +277 by H.T. Smith Esq. Surveyor to Bicester U.D.C. See Letter in 9509/28.

Bore cased in; pump removed.

Published in

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.

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.	2			

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 Pumps.

Bored by T. Thom.

SP52SE5

219

75

SP 5709 2384

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

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

219

SP52SE5

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.

See SP52SE/5

SP52SE5

SP 52 SE/6 [5851 2319] Bicester Station Well (19--) Datum +77.7 (Ground level)

	Depth ft	Thickness m	Depth m
Cornbrash Formation	*8.50*	2.59	2.59
Forest Marble Formation and White Limestone Formation: Bladon Member	*29.75*	6.48	9.07
Ardley Member and Shipton Member	*76.00*	14.10	23.16
Rutland Formation and Taynton Limestone Formation	*100.00*	7.32	30.48
Sharp's Hill Formation, 'White Sands' and Northampton Sand Formation	*120.00*	6.10	36.58

Stratigraphical classification by M G Sumbler, May 1999.

ENGINEER OVE ARUP & PARTNERS

OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION

LOGGED BY:
FIELDWORK BY:
LAB. TESTING BY: SP52NW34

EXCAVATION METHODS Percussion Boring - Pilcon Wayfarer 150 mm diameter hole 146 and 100 mm diameter Rotary Coring from 0.4 to 19.4 m

GROUND LEVEL 108.95 m O.D.

COORDINATES 454971 E 225919 N

DATES 26.6.79 to 2.7.79

HOLE NO. Y3

SHEET 1 OF 2

FIGURE A

Date/Time at Depth	Depth of Casing	Depth to Water*	Piez.	Description of Strata	Strata Leg.	Reduced Level	Depth	Graphical Representation	Sampling/In situ testing Depths	Type	No.	Blows	Lab. Testing ↓ ROD	<425 %	W %	PL %	LL %	γ Mg/m³	C_u kN/m²	Additional Tests and Notes I_h	d_h	I_v	d_v
27.6.79						108.95	0.00																
18.00	NIL	DRY		TOPSOIL		108.75	0.20																
08.00	NIL	DRY		Subangular to subrounded COBBLES and BOULDERS of white micritic limestone with some firm dark reddish brown silty clay. (Colluvium)					0.40	S													
27.6.79						107.75	1.20		0.60	D	1		75										
				Moderately strong white highly fractured becoming slightly fractured thinly bedded fine grained fined oolitic and calcarenitic sparry LIMESTONE. (White Limestone - Bladon)					1.30				0										
				From 2.75 to 2.85m weak light orange brown conglomeratic calcareous siltstone.					1.60				50										
				From 2.85 to 2.90m Hardground/erosion layer with rolled micritic pebbles and wispy iron staining.									0										
18.00	1.50	0.00											83							2.68	76		
08.00	1.50	DRY							2.60				0							3.46	77	3.34	77
				Moderately weak to moderately strong thinly and medium bedded initially moderately fractured fine grained pelletoidal micritic bioturbated LIMESTONE. (White Limestone - Ardley)		106.00	2.90						77										
				From 3.10 to 4.00m irregular vertical solution weathered joint.									0										
				From 3.40 to 3.90m limestone very fine grained almost porcellaneous with thin walled gastropods.																			
				From 3.90 to 6.50m limestone orange and orange brown fine to medium grained very pelletoidal with some sparry walled shells.					3.80				90										
				Below 6.50m limestone becoming very compact medium to thickly bedded and increasingly siliceous.									19										
28.6.79				From 7.70 to 7.80m limestone moderately weak orange with solution casts of shells.																0.85	75		
				Below 7.80m weak initially weathered orange becoming dark grey very silty calcareous sandstone.					4.80				95							•		1.25	78
													34										
													✓										
													95										
													45										
									5.80											0.20	75		
																				2.63	75	1.97	74
													93										
													64										
									6.80											2.70	72	2.28	75
													98										
18.00	3.00	DRY											97										
08.00	3.00	6.70		Hard dark grey very silty CLAY and clayey SILT becoming black and carbonaceous. (White Limestone - Shipton)		101.05	7.90		8.00											•		•	
						100.65	8.30						95										
29.6.79				Moderately weak to moderately strong grey medium to thickly bedded fine to medium grained pelletoidal micritic LIMESTONE. (White Limestone - Shipton)									40										
				From 8.55 to 8.65m weak to moderately weak clayey pelletoidal calcareous siltstone.					8.80											1.32	77	1.47	67
18.00	3.00	0.00											99										
08.00	3.00	6.70							9.80				91										
2.7.79																							

(*Point Load Index < 0.10 MN/m²)

SP 52NW/34 5496 2592 5497 2592

Additional Tests and Notes: SPT no penetration. Core diameter 114 mm. Core diameter reduced below 1.60m

*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.m⁻²; Distance between platens d mm, v = vertical, h = horizontal loading; R Rotary core, recovery to scale; V Inslitu vane test; S Standard penetration test; C Cone penetration test; K Permeability test; J Inslitu density test

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 %; ROD 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,
99/83 Goldington Road, Bedford.

FIG. A

SHEET 1 OF 2

HOLE NO. Y3

ENGINEER: OVE ARUP & PARTNERS

LOGGED BY:

FIELDWORK BY:

LAB. TESTING BY:

SP52NW34

OXFORD TO BIRMINGHAM NEW ROUTE–OXFORD TO BANBURY SECTION

EXCAVATION METHODS: Percussion Boring - Pilcon Wayfarer 150 mm diameter hole 146 and 100 mm diameter Rotary Coring from 0.4 m to 19.4 m

GROUND LEVEL 108.95 m O.D.

COORDINATES 454971 E 225919 N

DATES 26.6.79 to 2.7.79

HOLE NO. Y3

SHEET 2 OF 2

FIGURE A

Date/Time at Depth	Depth of Casing	Depth to Water	Piez.	Description of Strata	Strata Leg.	Reduced Level	Depth	Graphical Representation	Depths	Sampling/in situ testing Type	No.	Blows	Q/RQD	Lab. Testing <425 %	W %	PL %	LL %	γ Mg/m³	C_u kN/m²	Additional Tests and Notes I_h	d_h	I_v	d_v
2.7.79				(White Limestone - Shiplon as above) From 10.80 to 11.85m alternating weak to moderately weak clayey calcareous siltstone and fine grained silty limestone. From 11.45 to 11.75m hard dark grey silty clayey with very thin limestone interbeds. From 12.50 to 12.80m hard very dark greenish grey jointed moderately carbonaceous very silty clay with silt and fine sand laminae and abundant small oyster shells at base.					11.30				97/75									
									12.80				93/70	100	15	14	39			0.12	77	0.27	69
				Hard green very silty CLAY and clayey SILT with vertical black carbonized rootlets. (Hampen Marly Beds)		95.60	13.35						98/77	100	18	21	48			2.42	76	5.65	58
				Moderately weak greenish grey silty very fine grained calcareous SANDSTONE. (Hampen Marly Beds)		95.30	13.65																
				Hard dark grey becoming dark green very silty in places very fossiliferous CLAY. (Hampen Marly Beds)		95.15	13.80		13.80											2.93	77	3.31	70
				From 13.95 to 14.00m hard black very carbonaceous clay (almost jet). From 14.60 to 14.70m moderately weak greyish green very fine grained silty limestone.									95/62										
									14.80														
													100/83	100	3	20	47						
									15.80														
									15.90			67*/75											
													93/64	100	11	17	48						
				Initially very weak and very muddy becoming moderately weak to moderately strong dark grey medium to thickly bedded fine to medium grained pelletoidal fossiliferous LIMESTONE. (Taynton Stone) From 17.80 to 18.50m limestone thinly to medium false bedded and calcarenitic.		91.95	17.00		16.80															
													100/98							1.40	77	1.65	73
									17.80														
													93/66							1.59	77	2.73	82
18.00	3.00	DRY																					
					END	89.55	19.40		19.40															

(* Point Load Index < 0.10 MN/m²)

SP 52 NW/34 5496 2592

* 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 Distance between platens d mm v = vertical h = horizontal loading

Q 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 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

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 | MCH 13 ON

No 8.

219

March 18th 1925

S635 2625

SP52NE6

90

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD, SOUTHALL

BORED FOR ; Archibald Nicholson Esqre.
Manor Farm,
Bucknell, Nr, Bicester,

DISTRICT : Bicester IN THE COUNTY OF :Oxford.

POSITION OF BORING: At Manor Farm just N.E. of Bucknell
In a field about ½ mile N.W. of the farm.

MAPS: 6" Ordnance Oxford 17
1" Geo. Old Series 45.N.E. O.D.OF SITE : 320'
N.S. 219

WATER LEVEL BELOW SURFACE: 26' 0" YIELD OF WATER: 360 gallons per hour.

TUBING REMAINING IN BOREHOLE. 25' 0" of 4" top 1' 0 below surface
5' 5" of 5" top 1' 6" " "

STRATA	THICKNESS Ft.	Ins.	DEPTH Ft.	Ins.	
Blue Clay.....	5	9	5	9	Forest Marble ? Wychwood Beds ?
Grey Clay.....	3	3	9	0	
Blue Clay.....	1	0	10	0	
Blue Rock.....	4	0	14	0	Kemble Beds ?
Grey Rock.....	4	6	18	6	
Green Clay.....		6	19	0	
Grey Rock.....	5	0	24	0	
Coloured Clays & Rock.....	15	6	39	6	
Grey Rock.....	2	6	42	0	White limestone
Blue Clay.....	2	0	44	0	
Blue Rock.....	3	0	47	0	
Green Clay.....	2	0	49	0	
Blue Rock.....	2	0	51	0	Hampen Marly ? Beds
" Clay.....	5	0	56	0	
" Rock	3	0	59	0	
" Clay.....	5	0	64	0	
" Rock.....	3	0	67	0	
" Clay (dark).....	4	0	71	0	
" Rock.....	3	0	74	0	
Whitish Clay.....	1	0	75	0	Taynton Stone
White Rock.....	5	0	80	0	
Blue Rock.....	3	0	83	0	
Grey Green Clay.....	6	0	89	0	Upper Estuarine Clay & Smarts Hill Beds ?
" " " Stones.....	4	0	93	0	
Black Sandy Clay.....	34	9	127	9	Sherford Hook Norton Beds ?
Black Rock.....		5	128	0	
Blue Rock.....		3	128	3	
Green Rock.....	1	3	129	6	
Gault Clay.....	23	6	153	0	Upper Lias
Gault.....	26	0	179	0	
Rock.....	2	9	181	9	
Clay & Shale.....	2	3	184	0	
Bands of Rock & Loamy Shale	4	6	188	6	Middle Lias
Rock, Clay & Pebbles.....	5	0	193	6	
Loamy Clay & Shales.....	21	6	215	0	
C/F	215	0	215	0	

Great Oolite Series ?

2 ref.

SP52NE6

219/90

March 18th 1925

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD. SOUTHALL

BORED FOR ; Archibald Nicholson Esq.,
Manor Farm,
Bucknell Nr,Bicester.

DISTRICT : Bicester. IN THE COUNTY OF: Oxford.

STRATA	THICKNESS Ft,	Ins.	DEPTH Ft.	Ins.	
C/F	215	0	215	0	
Loamy Clay & Shales, hard bands.....	6	0	221	0	Middle + Lower Lias
Loamy Clay & Shales.....	6	0	227	0	
White Rock.....		6	227	6	
Loamy Clay & Shales.....	12	6	240	0	
Blue Clay ~~(Gault)~~.....	7	0	247	0	
Rock.....	1	0	248	0	
~~Gault~~.....	3	0	251	0	
Total depth of boring.	251	0	251	0	

Great Oolite Series

Lias? Up

A.W.W. 1.VI.39.

Based on Arkell: Jur. Sys. " QJGS 1931 Richardson Geol Mag 1910?

GENERAL REMARKS

Probably not a great deal of water at this site
W.L. dropped considerably during boring about 190-200 ft.

BORING FINISHED: 26th April 1924.

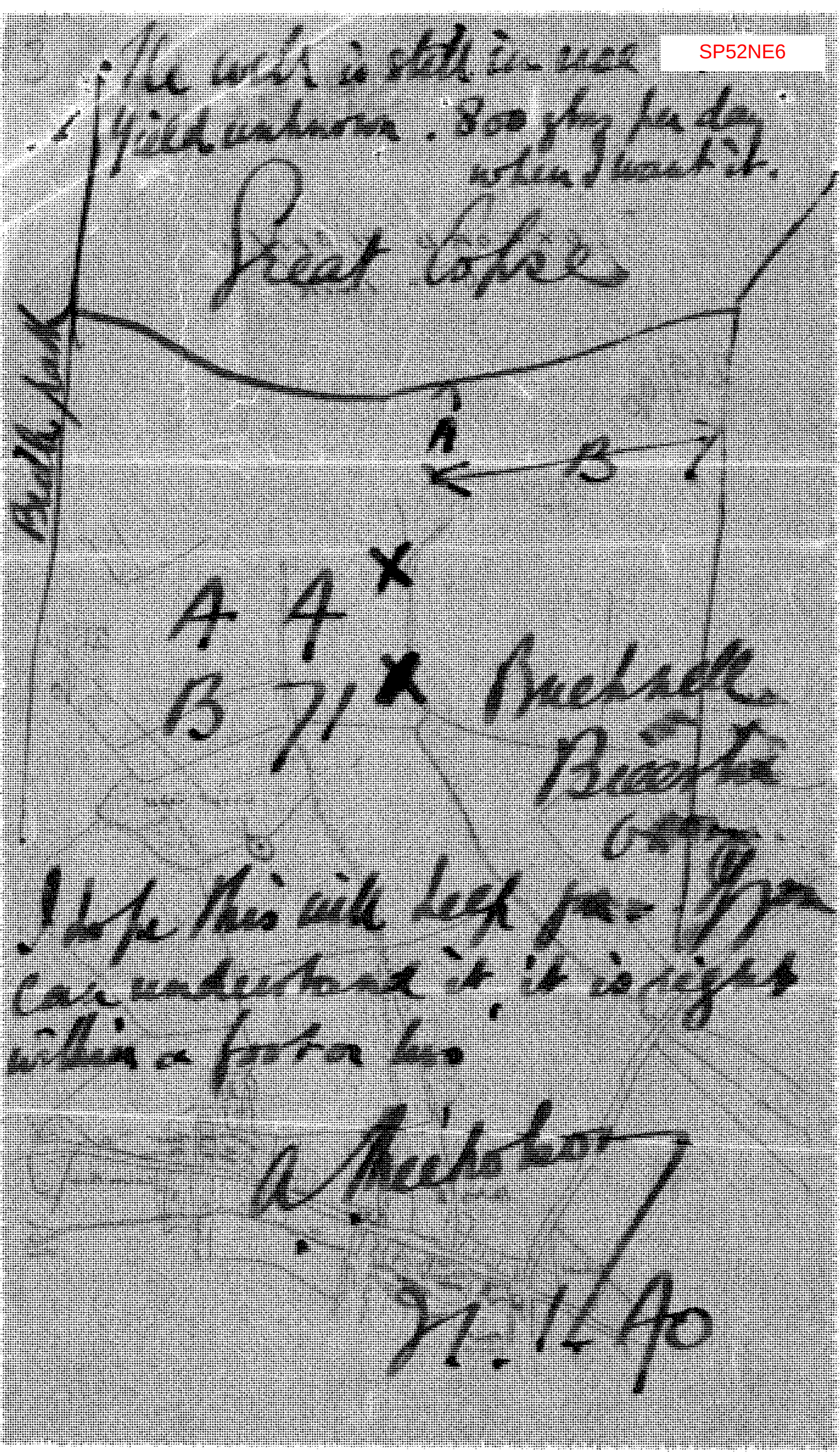
LE GRAND SUTCLIFF & GELL LTD.,

Signature.....

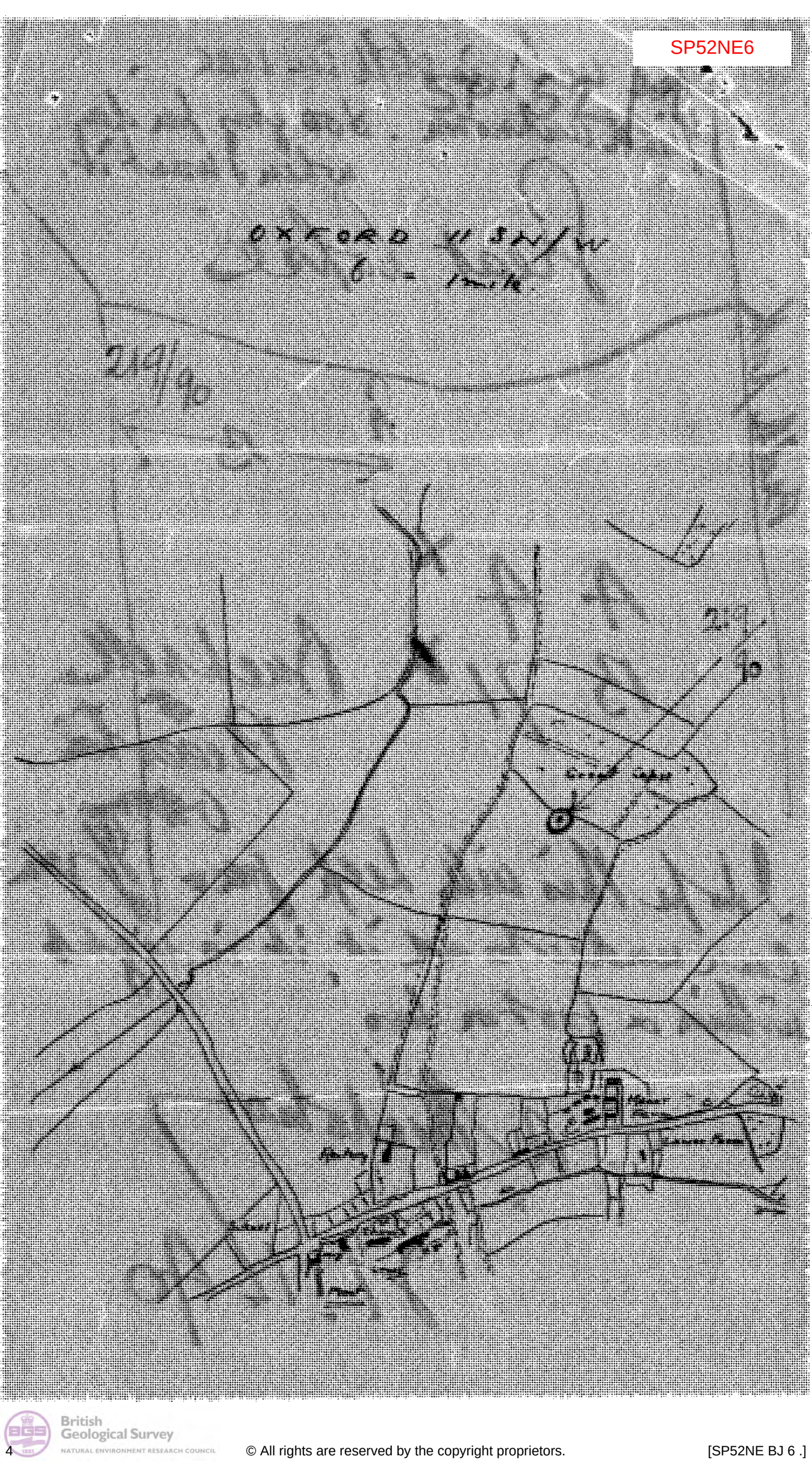
Our Ref,S.B.4/17.
Our Order No. 1150. 23/1/24.

LI/AMP.

SP52NE6



SP52NE6



5635 2625 1901/2925

SP52NE6

90 21

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD, SOUTHALL

BORED FOR ; Archibald Nicholson Esqr. NGR: SP 5635 2625
Manor Farm,
Bucknell, Nr, Bicester,

SP52NE/6.

DISTRICT : Bicester IN THE COUNTY OF : Oxford.

POSITION OF BORING: At Manor Farm just N.E. of Bucknell
In a field about 1 mile N.W. of the farm.

MAPS: 6" Ordnance Oxford 17
1" Geo. Old Series 45.N.E. O.D.OF SITE : 320' (97.53m)
N.S. 219

WATER LEVEL BELOW SURFACE: 26' 0" YIELD OF WATER: 360 gallons per hour.

TUBING REMAINING IN BOREHOLE. 25' 0" of 4" top 1' 0 below surface
5' 5" of 5" top 1' 6" "

STRATA	THICKNESS Ft.	Ins.	DEPTH Ft.	Ins.	
Blue Clay.....	5	9	5	9	Wychwood Be
Grey Clay.....	3	3	9	0	
Blue Clay.....	1	0	10	0	
Blue Rock.....	4	0	14	0	Kemble Bed
Grey Rock.....	4	6	18	6	
Green Clay.....		6	19	0	
Grey Rock.....	5	0	24	0	
Coloured Clays & Rock.....	15	6	39	6	
Grey Rock.....	2	6	42	0	
Blue Clay.....	2	0	44	0	White Limest
Blue Rock.....	3	0	47	0	
Green Clay.....	2	0	49	0	
Blue Rock.....	2	0	51	0	
" Clay.....	5	0	56	0	
" Rock	3	0	59	0	
" Clay.....	5	0	64	0	Hampen Marl Beds
" Rock.....	3	0	67	0	
" Clay (dark).....	4	0	71	0	
" Rock.....	3	0	74	0	
Whitish Clay.....	1	0	75	0	Taynton Ste
White Rock.....	5	0	80	0	
Blue Rock.....	3	0	83	0	
Grey Green Clay.....	6	0	89	0	Upper Estuarine = Sharps Hill B
" " " Stones.....	4	0	93	0	
Black Sandy Clay.....	34	9	127	9	Sherford to
Black Rock.....		3	128	0	
Blue Rock.....		3	128	3	Norton Beds
Green Rock.....	1	3	129	6	
Gault Clay.....	23	6	153	0	Upper Lias
Gault.....	26	0	179	0	
Rock.....	2	9	181	9	
Clay & Shale.....	2	3	184	0	
Bands of Rock & Loamy Shale	4	6	188	6	Middle Lia
Rock, Clay & Pebbles.....	5	0	193	6	
Loamy Clay & Shales.....	21	6	215	0	
C/F	215	0	215	0	

SP52NE6

219/90

March 18th 1925

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD. SOUTHALL

BORED FOR : Archibald Nicholson Esq.,
Manor Farm,
Bucknell Nr,Bicester.

SP52NE6

DISTRICT : Bicester. IN THE COUNTY OF: Oxford.

STRATA	THICKNESS Ft,	Ins.	DEPTH Ft.	Ins.	
O/F	215	0	215	0	
Loamy Clay & Shales,hard bands.....	6	0	221	0	Middle + Lower Lias
Loamy Clay & Shales.....	6	0	227	0	
White Rock.....		6	227	6	
Loamy Clay & Shales.....	12	6	240	0	
Blue Clay ~~(Gault)~~.....	7	0	247	0	
Rock.....	1	0	248	0	
~~Gault~~.....	3	0	251	0	
Total depth of boring.	251	0	251	0	

Great Oolite Series

Lias? Of

A.W.W. 1.VI.39

Based on Arkell: Jur. S. " QJGS 19 Richardson Geol M 19

GENERAL REMARKS

Probably not a great deal of water at this site
W.L. dropped considerably during boring about 190-200 ft.

BORING FINISHED: 26th April 1924.

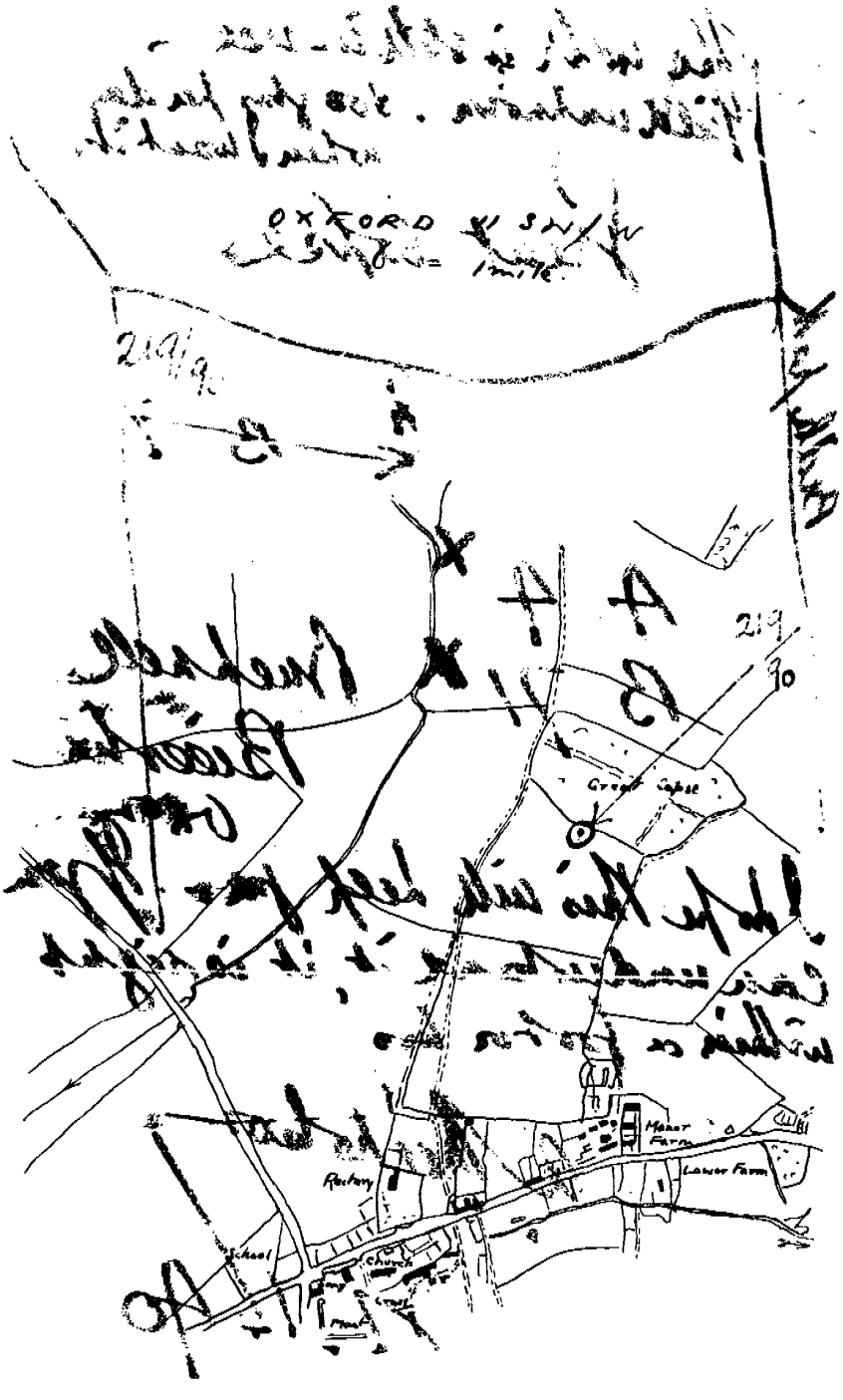
LE GRAND SUTCLIFF & GELL LTD.,

Signature.....

Our Ref,S.B.4/17.
Our Order No. 1150. 23/1/24.

LI/AHP.

SP52NE6



5635 2625 SP52NE6 90

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRANDSUTCLIFF & GELL LTD, SOUTHALL

BORED FOR ; Archibald Nicholson Esqr. NGR SP 5635 2625
Manor Farm,
Bucknell, Nr, Bicester,

SP52NE/6.

DISTRICT : Bicester IN THE COUNTY OF :Oxford.

POSITION OF BORING: At Manor Farm just N.E. of Bucknell
In a field about ¼ mile N.W. of the farm.

MAPS: 6" Ordnance Oxford 17
1" Geo. Old Series 45.N.E. O.D.OF SITE : 320' (97.53m)
N.S. 219

WATER LEVEL BELOW SURFACE: 26' 0" YIELD OF WATER: 360 gallons per hour.

TUBING REMAINING IN BOREHOLE. 25' 0" of 4" top 1' 0 below surface
5' 5" of 5" top 1' 6" " "

STRATA	THICKNESS Ft.	Ins.	DEPTH Ft.	Ins.	
Blue Clay.....	5	9	5	9	FML
Grey Clay.....	3	3	9	0	Wychwood Beds
Blue Clay.....	1	0	10	0	
Blue Rock.....	4	0	14	0	Great Marlstone & L.
Grey Rock.....	4	6	18	6	Kemble Beds
Green Clay.....		6	19	0	
Grey Rock.....	5	0	24	0	
Coloured Clays & Rock.....	15	6	39	6	
Grey Rock.....	2	6	42	0	
Blue Clay.....	2	0	44	0	White limestone
Blue Rock.....	3	0	47	0	
Green Clay.....	2	0	49	0	
Blue Rock.....	2	0	51	0	
" Clay.....	5	0	56	0	
" Rock	3	0	59	0	
" Clay.....	5	0	64	0	Rid Hampen Marly Beds
" Rock.....	3	0	67	0	
" Clay (dark).....	4	0	71	0	
" Rock.....	3	0	74	0	
Whitish Clay.....	1	0	75	0	
White Rock.....	5	0	80	0	Great Oolite Ty Taynton Stone
Blue Rock.....	3	0	83	0	
Grey Green Clay.....	6	0	89	0	ShF
" " " Stones.....	4	0	93	0	Upper Fullers Earth & Forest Marble Beds
Black Sandy Clay.....	34	9	127	9	HYS
Black Rock.....		3	128	0	NS Sherford Hoo
Blue Rock.....		3	128	3	Norton Beds
Green Rock.....	1	3	129	6	
Gault Clay.....	23	6	153	0	Upper Lias
Gault.....	26	0	179	0	
Rock.....	2	9	181	9	
Clay & Shale.....	2	3	184	0	
Bands of Rock & Loamy Shale	4	6	188	6	
Rock, Clay & Pebbles.....	5	0	193	6	Middle Lias
Loamy Clay & Shales.....	21	6	215	0	
C/F	215	0	215	0	

SP52NE6

219/90

March 18th 1925

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD. SOUTHALL

BORED FOR : Archibald Nicholson Esq.,
Manor Farm,
Bucknell Nr,Bicester.

SP52NE 6

DISTRICT : Bicester. IN THE COUNTY OF: Oxford.

STRATA	THICKNESS Ft,	Ins.	DEPTH Ft.	Ins.	
C/F	215	0	215	0	
Loamy Clay & Shales, hard bands.....	6	0	221	0	Middle + Lower Lias
Loamy Clay & Shales.....	6	0	227	0	
White Rock.....		6	227	6	
Loamy Clay & Shales.....	12	6	240	0	
Blue Clay ~~(Gault)~~.....	7	0	247	0	
Rock.....	1	0	248	0	
~~Gault~~.....	3	0	251	0	
Total depth of boring.	251	0	251	0	

Great Oolite Series

Lias? Pp

A.W.W. 1.11.39.

Based on Arkell: Jur. Sys. " QJGS 1931 Richardson Geol Mag 1910

GENERAL REMARKS

Probably not a great deal of water at this site
W.L. dropped considerably during boring about 190-200 ft.

BORING FINISHED: 26th April 1924.

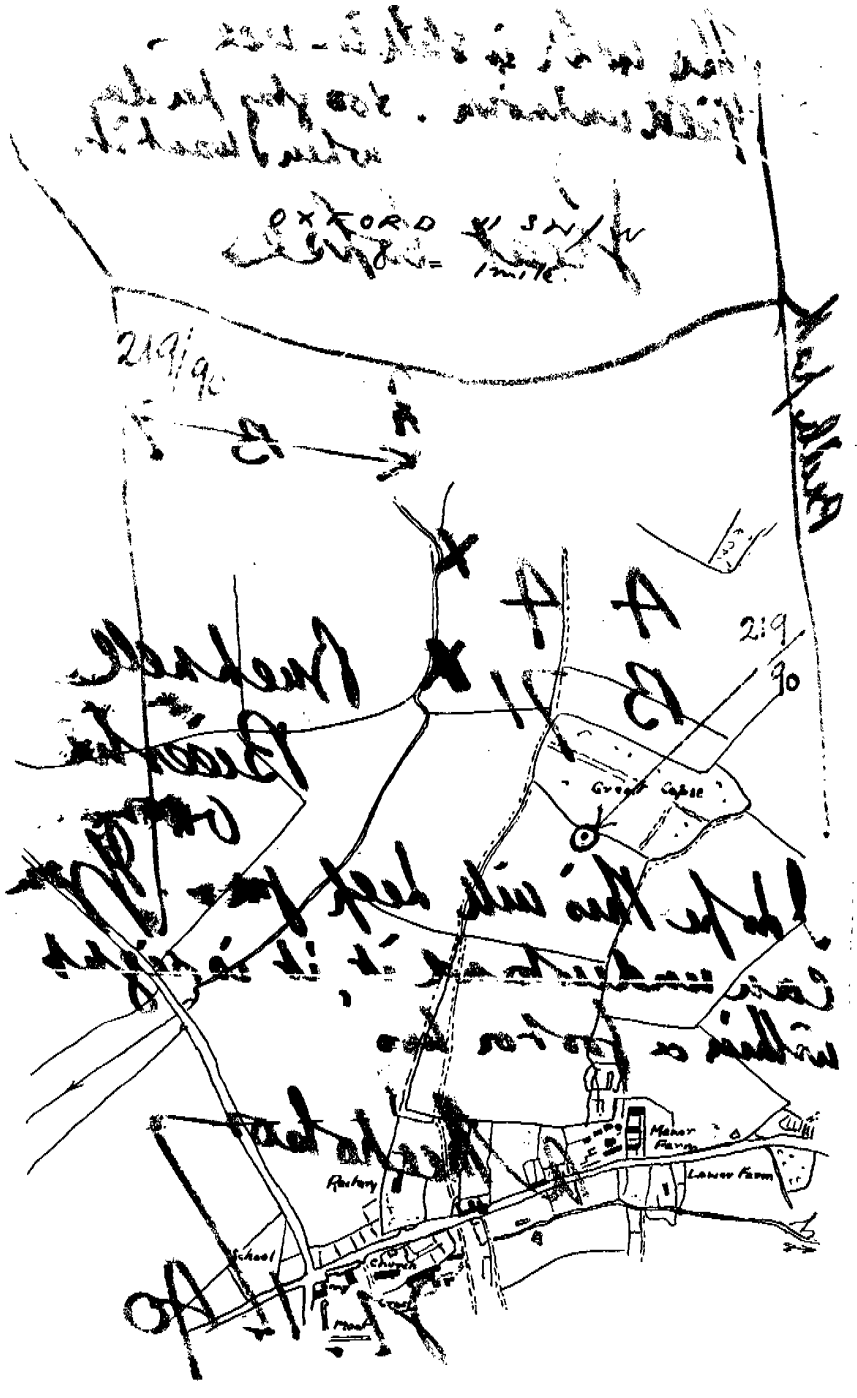
LE GRAND SUTCLIFF & GELL LTD.,

Signature.....

Our Ref,S.B.4/17.
Our Order No. 1150. 23/1/24.

LI/AMP.

SP52NE6



Dr Richard Earl
TurfTrax Ground Management Systems Limited
Unit 1, Highfield Park
Highfield Road
Oakley
Bedfordshire
MK43 7TA

Geological Assessment - Detailed

This report is aimed at customers and clients carrying out preliminary site assessments, who require a detailed assessment of the geology, hydrogeology and any geological hazards around the site.

The report, prepared by BGS geologists, is based on analysis of records and maps held in the National Geoscience Data Centre (NGDC), and includes descriptions of rock types, natural subsidence hazards and mining & quarrying hazard if present. It also contains geological map extracts taken from the BGS Digital Geological Map of Great Britain at the 1:50,000 scale (DiGMapGB-50) and a listing of the key geoscience data sets held in the NGDC for the area around the site. The report also considers radon hazard (in terms of the level of radon protection required in the construction of new dwellings) and the detailed hydrogeology of the site.

Note that for some sites, the latest available records may be quite historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

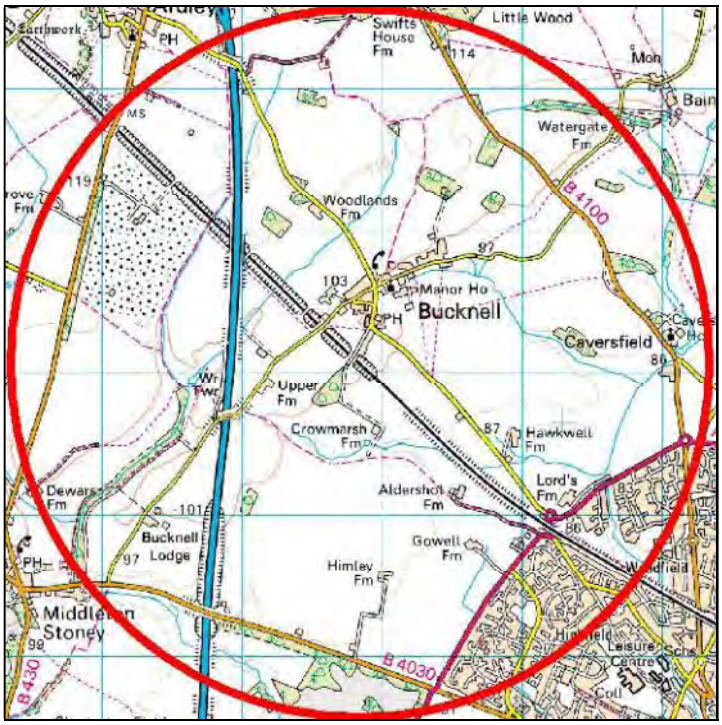
Client's Reference:
NW Bicester

Section 1: Location and extent of report area

Site Address:
Site A: NW Bicester

Area centred at: *455853,225060*
Radius of site area: *2500 metres*

This report is based on the above location details. However, where the client has submitted a site plan, it is used for the assessment in Sections 2, 3 and 4.



Scale: 1:50000 (1cm = 500m)

SITE LOCATION

Section 2: Geological Factors for the site

This table lists some of the principal geological factors that may affect a site, and is based on interpretation of data available to BGS at the time of compilation; additional information may be available in BGS files. The information is designed to act as a checklist and should not be used in place of a detailed site investigation.

Factor	May be significant within site area (Y/N)?	Comments
Shrink-Swell Clay Hazard	No	
Landslide Hazard	Yes	Mudstone beds in the **Bladon Member** and **Forest Marble Formation** may be unstable on steep slopes or in excavations. The **Cornbrash** may be affected by cambering along valley sides, and valley bulging may affect the **Forest Marble** mudstones in valley bottoms.
Ground Dissolution Hazard	Yes	The **White Limestone Formation**, limestone beds in the **Forest Marble Formation** and the **Cornbrash Formation** may be prone to dissolution along joints, leading to minor cavity formation.
Compressible Ground Hazard	Yes	**Alluvium** may include compressible organic-rich layers.
Collapsible Ground Hazard	No	
Running Sand Hazard	Yes	**Alluvium** may include sandy layers with a low running sand hazard potential.
Shallow mining	No	
Aquifer vulnerability		The alluvium and Cornbrash and Forest Marble Formations beneath the site are classified as Minor Aquifers with high soil leaching potential on the Environment Agency's Groundwater Vulnerability map, Sheet 30, Northern Cotswolds. The underlying White Limestone Formation is a Major Aquifer.
Shallow groundwater		Likely within possibly 0.5 m of the ground surface in the Cornbrash; possible artesian conditions in deep boreholes or excavations.
Artificial ground	Yes	Landfill site.
Natural land gas	No	
Level of Radon Protective Measures	Yes	BASIC RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

Section 3: Description of the Geology & Hydrogeology for the site

Topography and surface drainage (see Section 4)**:**
Site elevation ranges from 75 metres above Ordnance Datum (OD) in the stream valley in the south to 120 m in the north-west of the search area.

The slope and principal drainage direction is to the south-east. The drainage is dendritic in pattern and tributaries run in other directions. Two stream networks traverse the search area.

Artificial Ground (see Section 4)**:**
There is an extensive worked ground site in the north-west of the search area, which has been partially backfilled as a landfill site. Elsewhere, there are other small pits, worked mainly for limestone, that are often backfilled. Main roads and railways have cuttings and embankments.

Superficial Deposits (see Section 4)**:**
The streams are flanked by narrow tracts of **alluvium** of late Quaternary age, comprising sandy silty calcareous clay overlying gravelly sandy silty clay, with limestone clasts. The alluvial deposits are up to 150 m wide, are generally between 1 to 2 m in thickness (rarely exceeding 3 m in thickness). They may locally include highly compressible, organic-rich (peaty) layers.

Locally, hollows in these valley sides are floored by thin deposits of **head**, formed by soil creep or hill wash. Their composition reflects that of the local materials from which they were derived, either the bedrock or other types of superficial deposit, or both in combination. Head deposits typically are poorly stratified and poorly sorted, and can be variable in composition. Locally, they are typically composed of variably stony sandy silty clay. Head deposits may be more extensive than shown on the geological map, but if so, probably only as a layer between 0.3 m and 1 m in thickness, and possibly discontinuous.

Rockhead Depth (see Section 4)**:**
Where covered by alluvium or head, rockhead is at 1 to 3 m depth. Its depth beneath the Artificial Ground (especially under landfill sites) is unknown. Over the remainder of the search area, rockhead is close to the surface.

Bedrock Geology (see Section 4)**:**
The search area is underlain at rockhead by various formations and members of the Great Oolite Group, of Mid-Jurassic age, which are dominated by limestones with subordinate mudstone beds.

The oldest exposed formation is the **White Limestone Formation**, forming a broad plateau in the north-west of the search area, and where complete, comprises 10 to 18 m thickness of white to yellow, bedded, peloidal and bioclastic limestone (see **Additional Geological Considerations** below). There may be less than 5 m thickness of beds present in the extreme north-west. Thin calcareous mudstone beds are present in the basal part and dark, carbonaceous mudstones predominate over limestone in the upper part, which is distinguished on the map extracts (see Section 5) as the **Bladon Member**, up to 3 m thick.

The White Limestone Formation is overlain with an erosive contact by the **Forest Marble Formation**, to the extent that the Bladon Member is locally absent. The Forest Marble Formation forms a narrow outcrop between the White Limestone and Cornbrash Formations, and also crops out on the flanks of the stream valleys. The Formation is composed of 3 to 5 m of grey calcareous mudstone with lenticular beds of bioclastic, ooidal limestone, particularly common at the base, where they are widely distinguished on the map extracts.

The **Cornbrash Formation** is the youngest bedrock unit within the site area, cropping out over about half the search area, almost all of the site area, and forming a broad south-east sloping plateau. It comprises about 3 m thick grey to brown bioclastic shelly rubbly-bedded limestone with thin subordinate beds of grey mudstone.

Mudstone beds in the Bladon Member and Forest Marble Formation may be unstable on steep slopes or in excavations.

The limestone-dominated units of the White Limestone, Forest Marble and Cornbrash Formations may be affected by dissolution leading to the widening of joints and the formation of linear vertical voids, which are likely to fill with rubble and soil.

Along valley sides, the Cornbrash Formation outcrops may be affected by cambering. Cambering is a widespread phenomenon in the south and east Midlands, although it is not known whether it affects the strata at this site. Cambering takes place where beds of resistant, permeable rocks such as limestone overlie impermeable clay (or mudstone which weathers and softens to clay) along valley sides and escarpments. The superincumbent load coupled with water movement along the interface causes the soft plastic clay material to squeeze or wash out. Intervening sand beds may exacerbate the effect, but even where such permeable beds are absent, large thicknesses of clay may be lost by squeezing. As a result, the vertical thickness of the clay beds reduces, and the limestone strata are lowered as a 'camber', comprising blocks separated by minor faults parallel to the valley axis. The cambered strata may themselves undergo brittle fracture, so forming blocks separated by vertical joints normal to the direction of movement, on which minor vertical displacements may take place (forming 'dip-and-fault' structures). The displacements on the faults associated with cambering is usually quite small (up to 3 m), and they may be undetectable at the surface other than in excavations. In addition, the spacing may be too close (tens of metres) for them to be distinguishable at 1:10 560 or 1:10 000-scale. Cambering is thought to have been initiated during Pleistocene periglacial conditions. It is probably not an ongoing process here, but may merge into landslide movement downslope and must be considered a potential engineering hazard.

In narrow valleys a consequence of squeezing of the clay strata may be valley bulging, in which the softer material is forced upwards in the floor of the valley, above its normal position, becoming folded and possibly faulted. This may also cause the downslope ends of cambers to be disrupted.

Downhill (lateral) movement of the blocks may cause wide fissures (known as 'gulls') to form. The gulls are likely to fill with loose rock and soil, and in some cases with clay, but can remain as voids. Gulls may also result from the collapse of cavities in limestone formed by dissolution along joints. Such an origin may be evident from a regular pattern or orientation of gulls parallel to local joint sets or not at right angles to the inferred direction of extension. Many gulls develop by a combination of these causes.

Additional Geological Considerations (see Section 4)**:**
The White Limestone Formation is underlain by four further formations of the Great Oolite Group: in ascending order the Horsehay Sand, the mudstone-dominated Sharp's Hill, the Taynton Limestone and the mudstone-dominated Rutland formations, totalling about 20 m in thickness. These are underlain by the 2 to 6 m of the ferruginous sandstones of the Northampton Sand Formation. Beneath these are over 100m of the mudstone-dominated Lias Group.

The bedrock strata dip very gently (less than 0.5°) to the south-east. Faults have been mapped to the north-east of Bucknell, with displacements of up to about 5 m. It is important to understand the nature of geological faults, and the uncertainties which attend their mapped position at the surface. Faults are planes of movement, along which, adjacent blocks of rock strata have moved relative to each other. They commonly consist of zones, perhaps up to several tens of metres wide, containing several to many fractures. The portrayal of such faults as a single line on the geological map is therefore a generalisation. Geological faults in this area are of ancient origin, are today mainly inactive, and are thought to present no threat to property.

Hydrogeology and groundwater vulnerability:
The areas of worked ground, although not within the site area, may contain groundwater that may have an effect on groundwater beneath the site, albeit at depth. The areas of worked ground occur within the White Limestone Formation (see below).

There are small patches of alluvium, and possibly head, within the site area in the floors and flanks of some of the valleys. These deposits are of variable permeability. Groundwater may be present in limited quantities in the less permeable deposits, otherwise it is likely to be in hydraulic conductivity with the Forest Marble Formation bedrock if the bedrock is relatively permeable, or will be perched and drain out if it is more permeable than the bedrock. The deposits are very small in area and thickness and there is no borehole water level information relating to them. However, the water is likely to be in hydraulic continuity with, and at a similar level to, surface water.

The Great Oolite Group limestones transmit water via fractures that can be enhanced by dissolution; water movement through them can therefore be rapid.

With the exception of the Forest Marble Formation cropping out in the floors and sides of the valleys, the whole of the site area is underlain by Cornbrash Formation bedrock. This is a local aquifer and several water strikes have been recorded in shallow, site-investigation boreholes drilled within the site area. The rest water levels are generally slightly higher than the strike levels; both are generally between about 0.5 and 4.0 m below the ground surface.

The Forest Marble Formation, where present beneath the area, may hold small quantities of water in any limestone bands present, but the upper part generally acts as an aquiclude between the Cornbrash Formation and the underlying White Limestone Formation. There are no boreholes drilled through the Forest Marble Formation in the site area that record water strikes within it.

The White Limestone Formation constitutes a major aquifer in the area, with some sources of public supply. There are several boreholes in the wider area, some within the site area, that penetrate this formation. A 34 m deep borehole at Gowell Farm (SP52/19 at SP 5709 2384), drilled pre-1909 to supply Bicester with water, penetrated the complete 25 m thickness of the White Limestone Formation, underlying about 7.2 m of Forest Marble Formation and terminating in the underlying Rutland Formation. Water was struck at 28 m and 32 m below the ground level in the White Limestone Formation. The rest water level rose to the surface after the first strike, and was artesian, with a rest water level about 1 m above ground level (about 88 m above OD) after the second strike. The yield was over 7 l/s. An 80 m deep borehole at Lords Farm (SP52/18 at SP 5746 2424), drilled in 1941, was drilled through a similar sequence and terminated in the Lias. It struck water in the Cornbrash Formation, which was cased out, and at two levels below the White Limestone Formation. The rest water level was at 11 m below ground level (about 68 m above OD) and it yielded 1.7 l/s. Other records of water levels at Lords Farm (SP52/17A, B and C at about SP 569 245) show that the water level was at within 3.6 m below ground level (about 76 m above OD).

There are no water analyses from the Cornbrash and Forest Marble Formations, but anticipate that water from the limestones will be similar to that from the White Limestone Formation. All of the boreholes in the area that have analyses are deeper ones drilled into, and abstracting water from, the White Limestone Formation. A typical analysis, one from 1905 of the water from the Gowell Farm borehole, records total dissolved solids of 380 mg/l, a chloride ion concentration of 16 mg/l, a hardness of 207 mg/l (as $CaCO_3$), and nitrates of 0.2 mg/l. A 1935 analysis of several samples, taken under pumping conditions, record total dissolved solids of about 300-400 mg/l and a chloride ion concentration of 13-32 mg/l. The outcrop, and thus recharge area, of the White Limestone Formation lies to the north-west of the site area, within the search area. There are areas of worked ground in this formation in the search area. Depending upon the unknown depth of the worked ground areas, the water level in the White Limestone Formation may lie above the floor of any quarry or similar excavation. If any such worked ground has been backfilled and it is unlined, it is possible that the backfill material may affect groundwater flow beneath the site and may be in contact with the water within the White Limestone Formation. It is possible that under these conditions, the water in this formation may be, or become, contaminated and may eventually be transmitted down hydraulic gradient to the water in the formation beneath this site.

There are insufficient data to determine a groundwater flow direction, but locally it will probably be towards the nearest stream and regionally, down-dip towards the south-east.

The alluvium, and Cornbrash and Forest Marble Formations beneath the site are classified as Minor Aquifers with high soil leaching potential on the Environment Agency's Groundwater Vulnerability map, Sheet 30, Northern Cotswolds.

Individual sites will always require more detailed assessments to determine the specific impact on groundwater resources. The maps only represent conditions at the surface and where the soil and/or underlying formations have been disturbed or removed, the vulnerability class may have been changed and site specific data will be required.

Natural Land Gas

Section 2 indicates whether or not there is any potential susceptibility of the report area to surface or near-surface emissions of methane and/or carbon dioxide from natural sources or mining. Where methane and carbon dioxide emissions do occur at the surface most appear to be derived from abandoned shallow coal mines although a number of recorded incidences originate from peat and other natural deposits of organic materials, such as in buried ponds or river channels. It should be noted that the exact extent of potential sources of natural land gas, particularly that of peat and other organic deposits, can be difficult to predict.

An indication of potential for gas emissions does not necessarily indicate that there is a problem. That would depend on (1) the quantity of gases in the source rocks or superficial deposits, (2) whether they have been released and (3) whether there are pathways for transmission and locations for accumulation.

The relatively small number of gas emission incidents from coal mining and natural sources recorded in most areas of the UK suggests that the hazard is relatively minor and of local significance compared, for example, with the extensive problems associated with mining related subsidence or gas problems associated with landfill sites. However, in some parts of the coal fields, such as in parts of Northumberland, a relatively high number of gas emission sites have been identified, so the gas hazard is correspondingly greater. Whereas specific problems with methane and carbon dioxide from natural sources and mining can cause severe and, sometimes, expensive or dangerous problems, most gas emissions from natural sources and mining can usually be dealt with readily if they do arise.

A Residential Property or Non-Residential Property, Commercial or Development Site (maximum of 25 hectares) coal mining search from the Coal Authority (http://www.ppsearches.co.uk/coal_mining_searches.htm) will indicate whether any shafts or adits, which may act as pathways for gas, are located within 20 m of the boundary of the property or site. Where the Coal Authority is aware that a property or site being the subject of a search has been affected by mine gas, this information will be included in the Coal Mining Search Report.

If the report area is potentially susceptible to surface or near-surface emissions of methane and/or carbon dioxide from natural sources or mining, (1) caution should be exercised in forward planning on the basis that hazards from natural methane and carbon dioxide impose a constraint on development by virtue of public health or safety implications; (2) developers need to be aware that potential problems may be associated with gas emissions; (3) employers at some places of work may have responsibilities under the Health and Safety at Work etc Act 1974 to monitor gas levels; and (4) there may be a need to consult an appropriate specialist or to seek further information through desk studies and/or site investigations.

The information in this report should not be used in place of a site investigation. The existence of gas emissions at specific sites can only be established by detailed site investigation. The level of risk from methane or carbon dioxide in a particular building or underground cavity can only be established by monitoring the spaces in which it may accumulate.

Radon

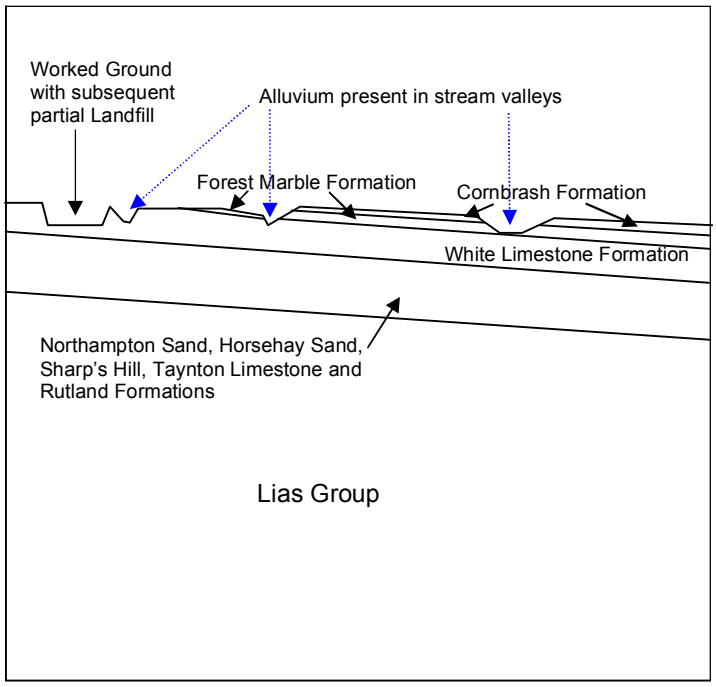
Section 2 describes the level of Radon Protective Measures required during the construction of new buildings or extensions to existing buildings, at the site. This determination complies with information set out in *BR211 Radon: Guidance on protective measures for new dwellings (2007edition)*, which also provides guidance on what to do if the result indicates that protective measures are required (please see BRE Website for more details: www.bre.co.uk/radon). This assessment is based on the Radon Potential Dataset produced jointly by the BGS and the Health Protection Agency (for more information please see the BGS website at www.bgs.ac.uk/radon).

Section 4: Schematic Geological Cross-Section of the Site

Not to scale

grid ref of north-west side of site
^{4}5385 ^{2}2653

grid ref of south-east side of site
^{4}5775 ^{2}2335



This sketch represents an interpretation of the geometrical relationships of the main rock units described in the text. Not to scale.

Section 5: Geological maps

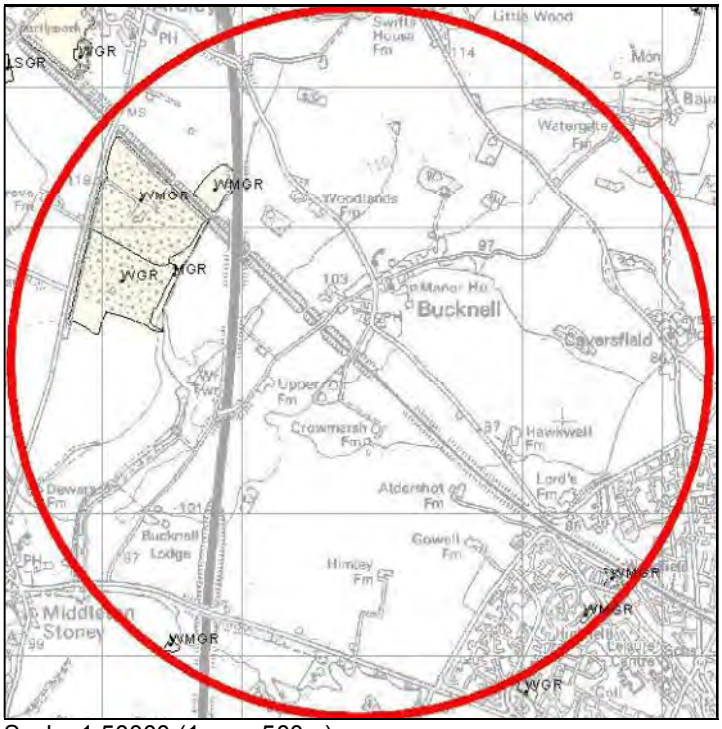
Extracts of geology maps around your site are provided in this section, taken from the BGS Digital Geological Map of Great Britain at the 1:50,000 scale (DiGMapGB-50). The first four maps show separately the four main layers of geology that may be present in an area – **artificial (man-made) deposits**, **landslip deposits**, **superficial deposits** and **bedrock**. The fifth 'combined geology' map shows all four rock layers superimposed on the same map, to show the rocks that occur at the surface just beneath the soil.

More information on DiGMapGB-50 and how the various rock layers are classified can be found on the BGS website (www.bgs.ac.uk), under the DiGMap and BGS Rock Classification Scheme areas. Further descriptions of the rocks listed in the map keys can also be obtained by searching against the Computer Code on the *BGS Lexicon of named Rock Units*, which is also on the BGS Website at by following the 'GeoData' link. The computer codes are labelled on the maps to try and help in their interpretation (with a dot at the bottom left hand corner of each label). However, please treat this with caution in areas of complex geology, where some of the labels may overlap several geological formations. If in doubt, please contact BGS enquiries.

The geological formations are listed broadly in order of age in the map keys (youngest first) but only to the formation level (a formation is a package of related rocks). Within formations, please be aware that individual members may not be ordered by age.

Artificial deposits

These include deposits moved and disturbed by man.



Scale: 1:50000 (1cm = 500m)

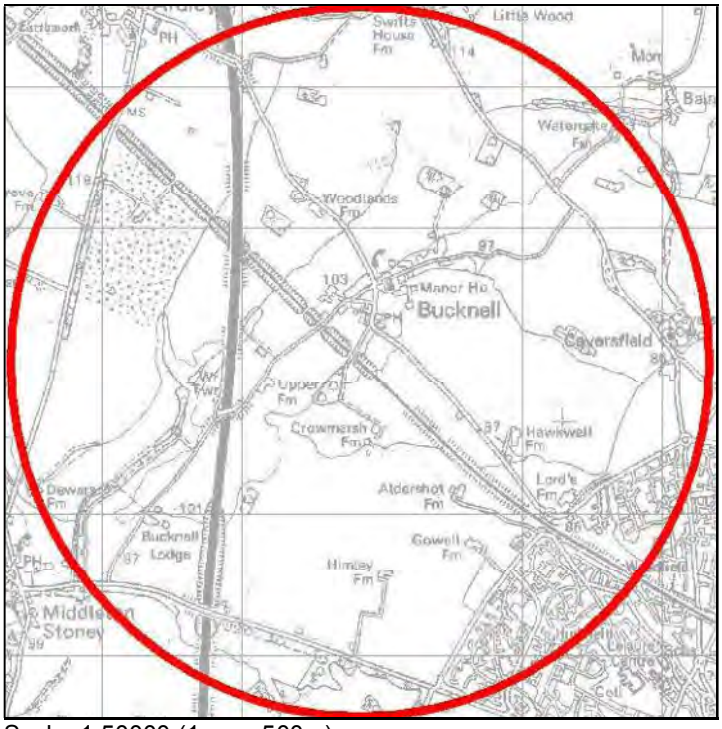
SITE LOCATION

Key to Artificial deposits:

Map colour	Computer Code	Rock name	Rock type
	LSGR	LANDSCAPED GROUND (UNDIVIDED)	UNKNOWN/UNCLASSIFIED ENTRY
	MGR	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
	WGR	WORKED GROUND (UNDIVIDED)	VOID
	WMGR	INFILLED GROUND	ARTIFICIAL DEPOSIT

Landslip deposits

These include natural deposits formed by sliding and mass-movement of soils and rocks on hill slopes (an alternative term for Landslip deposits is 'Mass Movement Deposits')



Scale: 1:50000 (1cm = 500m)

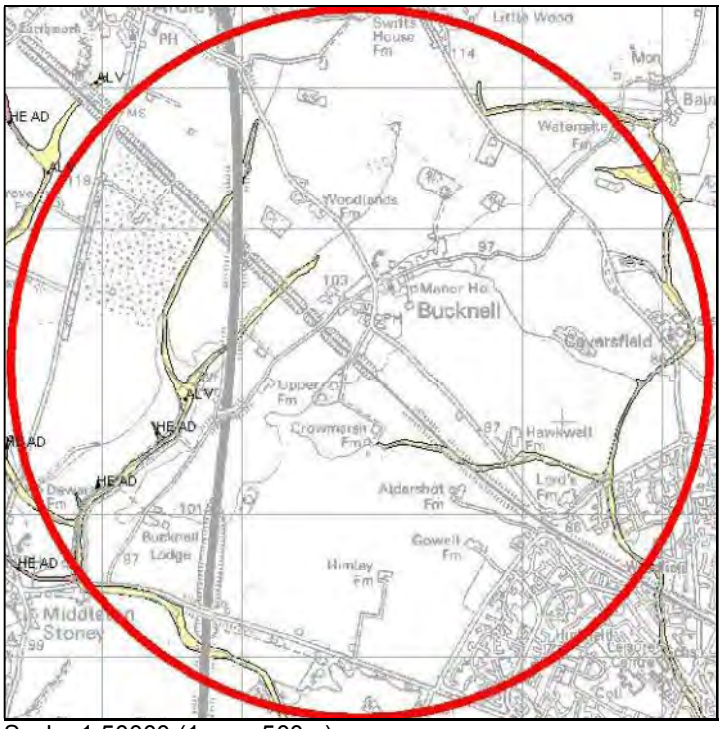
SITE LOCATION

Key to Landslip deposits:

No deposits are mapped in the search area

Superficial deposits

These include fairly recent geological deposits, such as river sands and gravels, or glacial deposits, which lie on the bedrock in many areas (an alternative term for Superficial deposits is 'Drift Deposits')



Scale: 1:50000 (1cm = 500m)

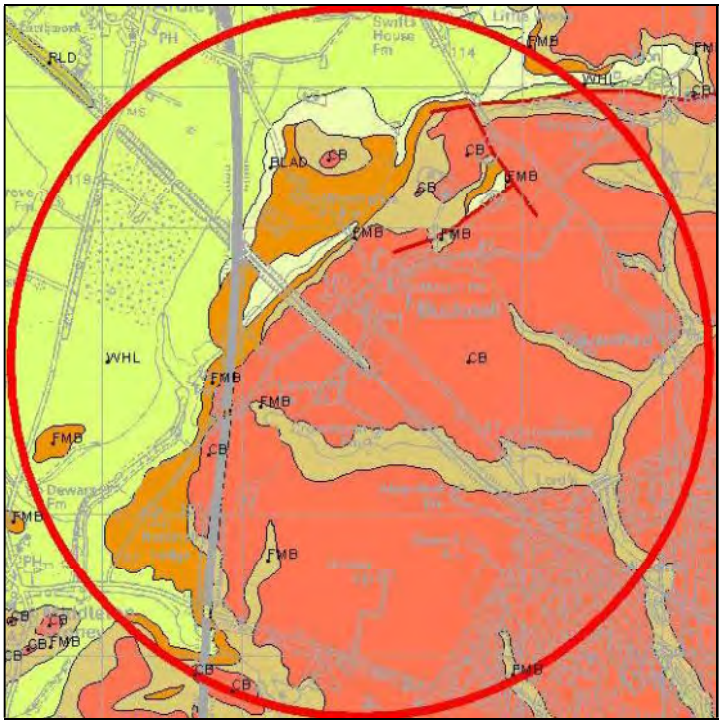
SITE LOCATION

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
	HEAD	HEAD	CLAY, SILT, SAND AND GRAVEL

Bedrock

Bedrock forms the ground underlying the whole of an area, upon which the other geological layers listed above may lie (an alternative term for Bedrock is 'Solid Geology')



Scale: 1:50000 (1cm = 500m)

SITE LOCATION

Fault

Coal, ironstone or other mineral vein

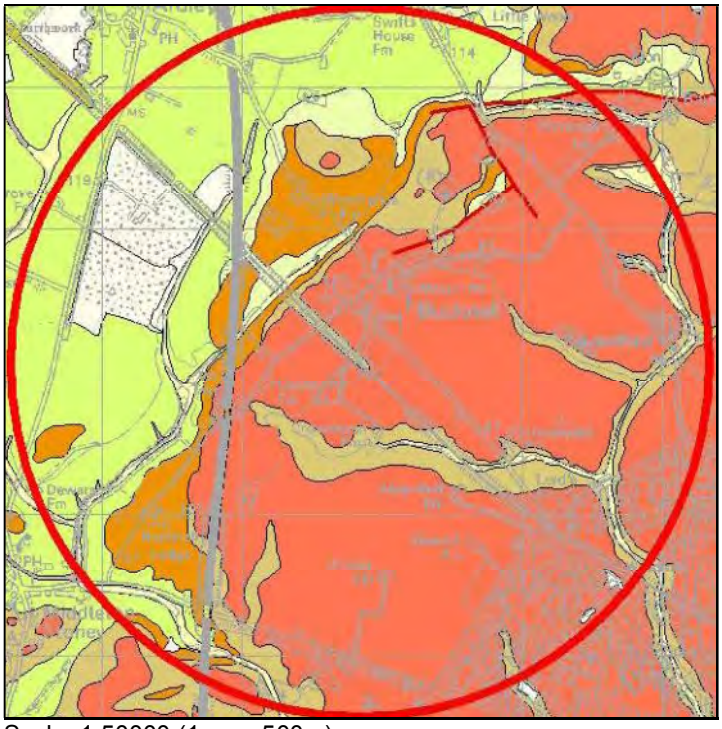
Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	CB	CORNBRASH FORMATION	LIMESTONE
	FMB	FOREST MARBLE FORMATION	LIMESTONE
	FMB	FOREST MARBLE FORMATION	LIMESTONE AND MUDSTONE, INTERBEDDED
	WHL	WHITE LIMESTONE FORMATION	LIMESTONE
	BLAD	BLADON MEMBER	MUDSTONE AND LIMESTONE, INTERBEDDED
	RLD	RUTLAND FORMATION	MUDSTONE

Combined 'Surface Geology' Map

This map shows all four rock layers overlaid from the previous maps.



Scale: 1:50000 (1cm = 500m)

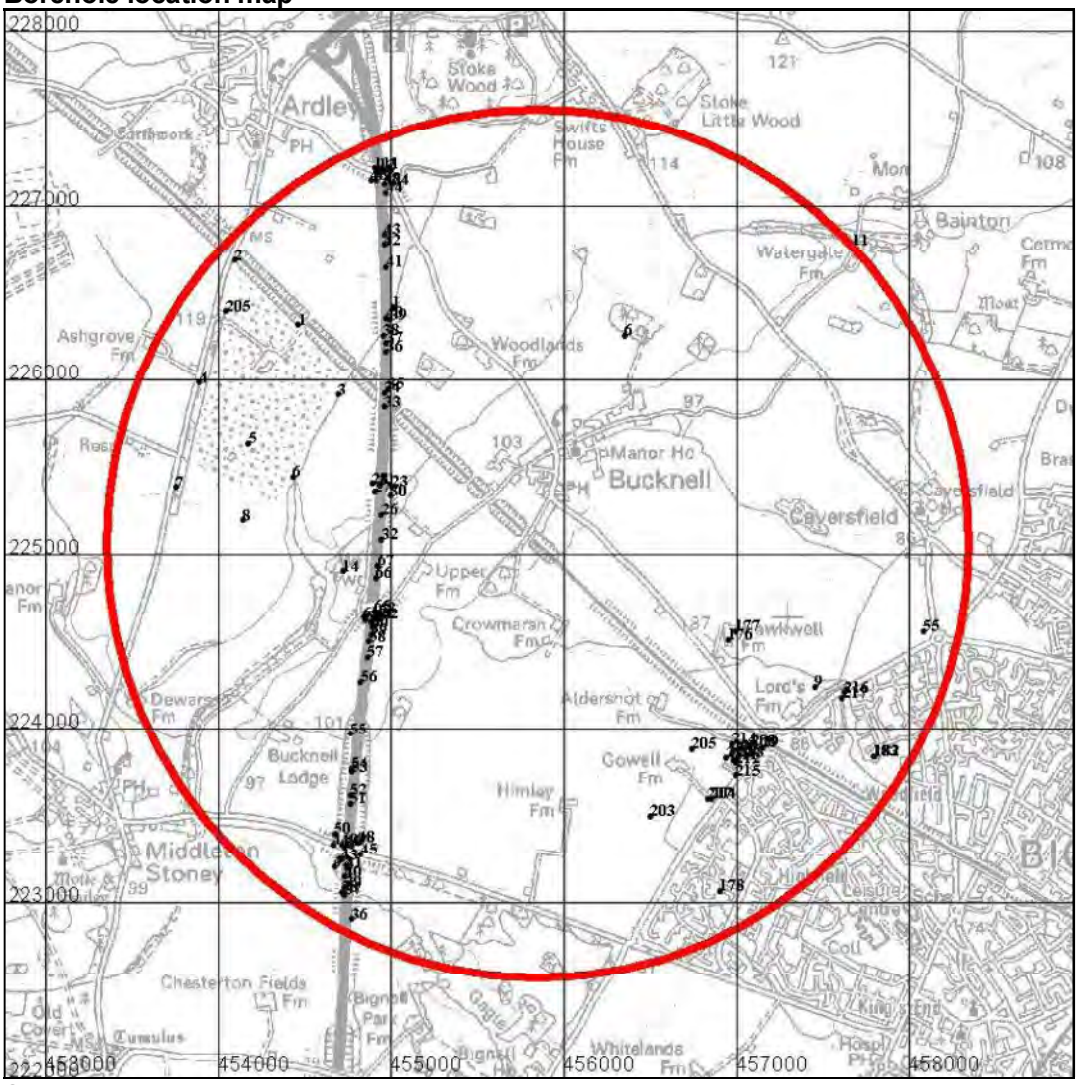
SITE LOCATION

Please see the Keys to the Artificial, Landslip, Superficial and Bedrock geology maps.

Section 6: List of geological data available around the site

This section lists the principal data sets held in the National Geoscience Records Centre that are relevant to the site. Descriptions of the data sets and how to obtain copies of records from them are given in Sections 7 and 8. Users with access to computing facilities can make their own index searches using the BGS Internet Geoscience Data Index, accessible through the BGS website at www.bgs.ac.uk

Borehole location map



Scale: 1:40000 (1cm = 400m)

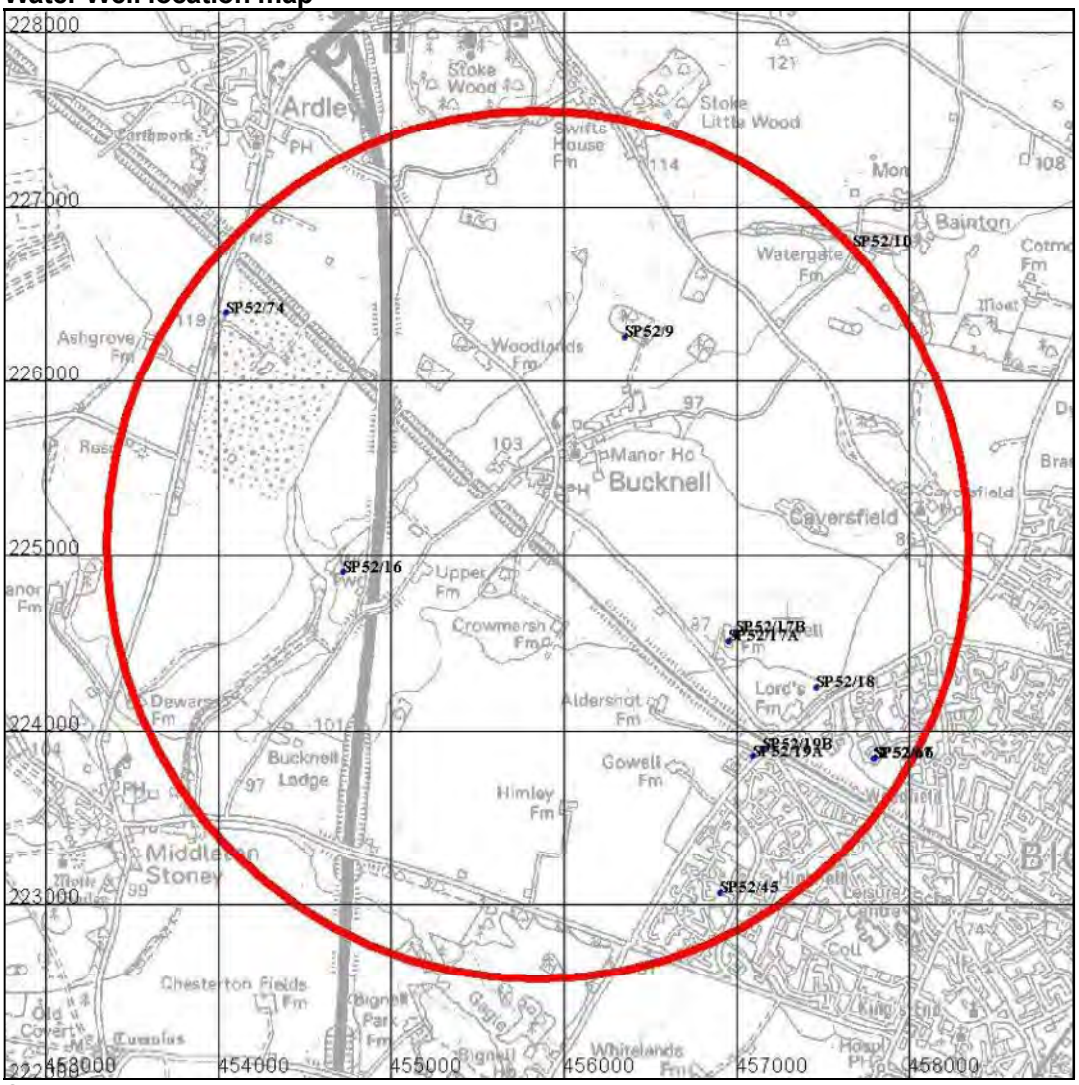
Borehole records
(A blank Length field indicates the borehole is confidential or no depth has been recorded digitally.)
Total number of records: 98

The 'Office' column shows the office at which the records are held and from where copies can be obtained (see contact details later in the report). KW=Keyworth, MH & MW=Murchison House, WL=Wallingford, EX=Exeter

Regno	Grid_reference	Name	Length	Office	SIR
SP52NE1	SP 55010 26410	ARDLEY FIELDS NO.10		KW	
SP52NE6	SP 56350 26250	MANOR FARM BUCKNELL	76.50	WLKW	
SP52NE11	SP 57670 26770	LODGE FARM BAINTON	40.84	WLKW	
SP52NE23	SP 55000 25381	OXFORD-BANBURY SECTION 529	1.00	KW	
SP52NE24	SP 55004 27117	OXFORD-BANBURY SECTION 547	1.00	KW	
SP52NW1	SP 54460 26310	ARDLEY FIELDS NO.1		KW	
SP52NW2	SP 54090 26680	ARDLEY FIELDS NO.2		KW	
SP52NW3	SP 54690 25910	ARDLEY FIELDS NO.3		KW	
SP52NW4	SP 53890 25980	ARDLEY FIELDS NO.4		KW	
SP52NW5	SP 54170 25630	ARDLEY FIELDS NO.5		KW	
SP52NW6	SP 54430 25440	ARDLEY FIELDS NO.6		KW	
SP52NW7	SP 53750 25380	ARDLEY FIELDS NO.7		KW	
SP52NW8	SP 54140 25190	ARDLEY FIELDS NO.8		KW	
SP52NW12	SP 54930 27200	M40 ARDLEY 274P	4.00	KW	
SP52NW26	SP 54940 25220	BUCKNELL EMBKMENT E11 24000-24570 TP527	2.30	KW	313
SP52NW27	SP 54900 25350	BUCKNELL EMBKMENT E11 24000-24570 TP525	2.90	KW	313
SP52NW28	SP 54890 25400	BUCKNELL EMBKMENT E11 24000-24570 TP528	3.40	KW	313
SP52NW30	SP 54996 25329	BUCKNELL EMBKMENT E11 24000-24570 TP526	1.00	KW	313
SP52NW31	SP 54930 25390	BUCKNELL EMBKMENT E11 24000-24570 BHY2	20.00	KW	313
SP52NW32	SP 54940 25080	BUCKNELL EMBKMENT E11 24000-24570 TP524	1.00	KW	313
SP52NW33	SP 54960 25840	BUCKNELL EMBKMENT E11 24000-24570 TP531	4.00	KW	313
SP52NW34	SP 54960 25920	BUCKNELL EMBKMENT E11 24000-24570 BHY3	19.00	KW	313
SP52NW35	SP 54980 25940	BUCKNELL EMBKMENT E11 24000-24570 TP534	1.00	KW	313
SP52NW36	SP 54970 26160	BUCKNELL EMBKMENT E11 24000-24570 BH069	20.00	KW	313
SP52NW37	SP 54970 26210	BUCKNELL EMBKMENT E11 24000-24570 TP537	1.00	KW	313
SP52NW38	SP 54950 26250	BUCKNELL EMBKMENT E11 24000-24570 TP536	1.00	KW	313
SP52NW39	SP 54990 26340	BUCKNELL EMBKMENT E11 24000-24570 TP540	1.00	KW	313
SP52NW40	SP 54970 26350	BUCKNELL EMBKMENT E11 24000-24570 TP538	1.00	KW	313
SP52NW41	SP 54970 26640	BUCKNELL EMBKMENT E11 24000-24570 TP541	1.00	KW	313
SP52NW42	SP 54960 26770	ARDLEY CUTTING C10 25780-27040 TP542	1.00	KW	313
SP52NW43	SP 54960 26830	ARDLEY CUTTING C10 25780-27040 TP543	1.00	KW	313
SP52NW44	SP 54970 27070	ARDLEY CUTTING C10 25780-27040 TP545	2.00	KW	313
SP52NW45	SP 54880 27140	ARDLEY CUTTING C10 25780-27040 TP544	1.00	KW	313
SP52NW46	SP 54920 27180	ARDLEY CUTTING C10 25780-27040 TP546	1.00	KW	313
SP52NW48	SP 54960 27120	ARDLEY CUTTING C10 25780-27040 BH070	25.00	KW	313
SP52NW49	SP 54910 27140	ARDLEY CUTTING C10 25780-27040 BH070A	15.00	KW	313
SP52NW111	SP 54903 27210	M40 OXFORD-BIRMINGHAM M/W BH075	12.00	KW	3322
SP52NW205	SP 54040 26390	ARDLEY FIELDS	10.20	WLKW	
SP52SE5	SP 57090 23840	GOWELL FARM BICESTER	43.28	WLKW	
SP52SE9	SP 57450 24230	BICESTER	79.85	WLKW	
SP52SE29	SP 57150 23880	GOWELL FARM 2	43.00	WLKW	
SP52SE55	SP 58080 24550	CAVERSFIELD SEWER BICESTER BH370/5	6.00	KW	
SP52SE176	SP 56950 24500	LORDS FARM		WL	
SP52SE177	SP 56990 24550	LORDS FARM		WL	
SP52SE178	SP 56900 23060	KINGS END FARM BICESTER		WL	
SP52SE182	SP 57800 23830	SLADE FARM CAVERSFIELD	28.96	WL	
SP52SE183	SP 57790 23830	WRETCHWICK FARM BICESTER		WL	
SP52SE203	SP 56500 23490	GOWELL FARM BICESTER 1	2.25	KW	37679
SP52SE204	SP 56850 23590	GOWELL FARM BICESTER 2	1.75	KW	37679
SP52SE205	SP 56740 23870	GOWELL FARM BICESTER 3	1.37	KW	37679
SP52SE206	SP 56970 23850	GOWELL FARM BICESTER 4	1.75	KW	37679
SP52SE207	SP 56830 23590	GOWELL FARM BICESTER TP 2	1.65	KW	37679
SP52SE208	SP 57080 23890	GOWELL FARM BICESTER TP 4	1.61	KW	37679
SP52SE209	SP 56980 23860	GOWELL FARM BICESTER 2	4.22	KW	37680
SP52SE210	SP 56940 23820	GOWELL FARM BICESTER 3	4.06	KW	37680
SP52SE211	SP 56980 23810	GOWELL FARM BICESTER 4	3.49	KW	37680
SP52SE212	SP 56990 23790	GOWELL FARM BICESTER 5	4.10	KW	37680
SP52SE213	SP 57010 23820	GOWELL FARM BICESTER 6	3.66	KW	37680
SP52SE214	SP 56970 23900	GOWELL FARM BICESTER 7	3.56	KW	37680

Regno	Grid_reference	Name	Length	Office	SIR
SP52SE215	SP 56990 23720	GOWELL FARM BICESTER TP 1	0.88	KW	37680
SP52SE216	SP 57620 24200	LORDS LANE BICESTER OXFORDSHIRE 1	2.95	KW	37773
SP52SE217	SP 57610 24170	LORDS LANE BICESTER OXFORDSHIRE 2	2.80	KW	37773
SP52SW1	SP 54880 24600	M40 CARDINGTON 248P	6.00	KW	
SP52SW5	SP 54730 23310	M40 BUCKNELL LODGE 235P	8.00	KW	
SP52SW14	SP 54720 24900	TROWPOOL WELL BICESTER	7.62	WLKW	
SP52SW36	SP 54770 22900	MIDDLETON STONEY SOUTH CUTTING C8 TP495	1.00	KW	313
SP52SW37	SP 54730 23040	EAGLE BROOK EMBANKMENT E10 TP496	3.00	KW	313
SP52SW38	SP 54710 23050	EAGLE BROOK EMBANKMENT E10 BHY5	10.20	KW	313
SP52SW39	SP 54730 23080	EAGLE BROOK EMBANKMENT E10 TP498	2.00	KW	313
SP52SW40	SP 54730 23140	EAGLE BROOK EMBANKMENT E10 TP499	1.00	KW	313
SP52SW41	SP 54740 23190	EAGLE BROOK EMBANKMENT E10 TP500	2.00	KW	313
SP52SW42	SP 54670 23200	EAGLE BROOK EMBANKMENT E10 TP501	2.00	KW	313
SP52SW43	SP 54710 23240	MIDDLETON STONEY NORTH CUTTING C9 TP502	2.00	KW	313
SP52SW44	SP 54660 23330	MIDDLETON STONEY NORTH CUTTING C9 TP503	1.00	KW	313
SP52SW45	SP 54820 23270	MIDDLETON STONEY NORTH CUTTING C9 TP504	0.00	KW	313
SP52SW46	SP 54740 23330	MIDDLETON STONEY NORTH CUTTING C9 TP505	3.00	KW	313
SP52SW47	SP 54770 23320	MIDDLETON STONEY NORTH CUTTING C9 BH066	19.00	KW	313
SP52SW48	SP 54810 23340	MIDDLETON STONEY NORTH CUTTING C9 TP507	1.00	KW	313
SP52SW49	SP 54710 23330	MIDDLETON STONEY NORTH CUTTING C9 BH065	14.00	KW	313
SP52SW50	SP 54670 23390	MIDDLETON STONEY NORTH CUTTING C9 TP506	2.00	KW	313
SP52SW51	SP 54760 23560	MIDDLETON STONEY NORTH CUTTING C9 TP508	2.00	KW	313
SP52SW52	SP 54760 23610	MIDDLETON STONEY NORTH CUTTING C9 TP509	3.00	KW	313
SP52SW53	SP 54770 23740	MIDDLETON STONEY NORTH CUTTING C9 TP510	2.00	KW	313
SP52SW54	SP 54770 23760	MIDDLETON STONEY NORTH CUTTING C9 BHY1	2.00	KW	313
SP52SW55	SP 54760 23960	MIDDLETON STONEY NORTH CUTTING C9 TP511	3.00	KW	313
SP52SW56	SP 54820 24260	BUCKNELL EMBANKMENT E11 TP513	3.00	KW	313
SP52SW57	SP 54860 24400	BUCKNELL EMBANKMENT E11 TP514	3.00	KW	313
SP52SW58	SP 54870 24490	BUCKNELL EMBANKMENT E11 TP515	3.00	KW	313
SP52SW59	SP 54880 24530	BUCKNELL EMBANKMENT E11 TP516	3.00	KW	313
SP52SW60	SP 54890 24570	BUCKNELL EMBANKMENT E11 TP517	2.00	KW	313
SP52SW61	SP 54840 24630	BUCKNELL EMBANKMENT E11 TP518	3.00	KW	313
SP52SW62	SP 54940 24620	BUCKNELL EMBANKMENT E11 TP519	2.00	KW	313
SP52SW63	SP 54850 24610	BUCKNELL EMBANKMENT E11 BH067	10.00	KW	313
SP52SW64	SP 54910 24620	BUCKNELL EMBANKMENT E11 BH068	20.00	KW	313
SP52SW65	SP 54900 24670	BUCKNELL EMBANKMENT E11 TP520	1.00	KW	313
SP52SW66	SP 54910 24860	BUCKNELL EMBANKMENT E11 TP522	0.00	KW	313
SP52SW67	SP 54920 24930	BUCKNELL EMBANKMENT E11 TP523	0.00	KW	313
SP52SW68	SP 54928 24655	M40 OXFORD-BRMHAM OXFORD-BANBURY BH0685	10.00	KW	3322

Water Well location map



Scale: 1:40000 (1cm = 400m)

Water Well Records
Total number of records: 12

All these records are registered in the main Borehole Records collections (see Borehole Records Table and map above), and duplicate, or partial duplicate copies may be held at other sites (at Keyworth KW, Exeter EX or Murchison House MH). These represent records that are held in the National Well Record Archive of water wells and boreholes held at Wallingford (WF) or Murchison House (MW). The Well Registration number is used to index records in the National Well Record Archive please quote this if applying for copies of water wells (see contact details later in the report).

Additional index information may be held for the Water Well Records as indicated below, indicating the information that can be found on the well record itself. If fields are blank, then the well record has not been examined and its contents are unknown. A Yes or a No indicates that the well record has been examined and the information as indicated is, or is not, present. This information should help you when requesting copies of Records.

KEY:
Aquifer = The principal aquifer recorded in the borehole
G = Geological Information present on the log
C = Borehole construction information present on the log
W = Water level or yield information present on the log
Ch = Water chemistry information present on the log

Well Reg No.	BH Reg No.	Name	Grid Easting	Grid Northing	Depth (m)	Date	Aquifer	G	C	W	Ch
SP52/74	SP52NW205/BJ	ARDLEY FIELDS (LAND FILL SITE)	454040	226390	10.20		GREAT OOLITE GROUP	Yes	Yes	Yes	No
SP52/9	SP52NE6/BJ	MANOR FARM BUCKNELL	456350	226250	76.50	1924	UNKNOWN	Yes	Yes	Yes	No
SP52/10	SP52NE11/BJ	LODGE FARM BAINTON	457670	226770	41.00	1949	UNKNOWN	Yes	Yes	Yes	No
SP52/16	SP52SW14/BJ	BUCKNELL P.S.	454720	224900	7.60		GREAT OOLITE GROUP	Yes	Yes	Yes	Yes
SP52/19A	SP52SE5/BJ	BICESTER P.S.	457090	223840	34.20	1905	GREAT OOLITE GROUP	Yes	Yes	Yes	Yes
SP52/17A	SP52SE176/BJ	LORDS FARM, BICESTER	456950	224500	3.70		GREAT OOLITE GROUP	No	Yes	No	No
SP52/67	SP52SE183/BJ	WRETCHWICK FARM BICESTER	457790	223830			UNKNOWN	No	Yes	No	No
SP52/17B	SP52SE177/BJ	LORDS FARM, BICESTER	456990	224550	3.70		GREAT OOLITE GROUP	No	Yes	No	No
SP52/45	SP52SE178/BJ	KINGS END FARM BICESTER	456900	223060			UNKNOWN	No	Yes	No	No
SP52/66	SP52SE182/BJ	SLADE FARM CAVERSFIELD	457800	223830	29.00	1909	GREAT OOLITE GROUP	Yes	Yes	Yes	No
SP52/18	SP52SE9/BJ	LORDS FARM BICESTER	457460	224240	79.90		UNKNOWN	Yes	Yes	Yes	No
SP52/19B	SP52SE29/BJ	BICESTER P.S.	457150	223880	42.80	1936	UNKNOWN	Yes	Yes	Yes	Yes