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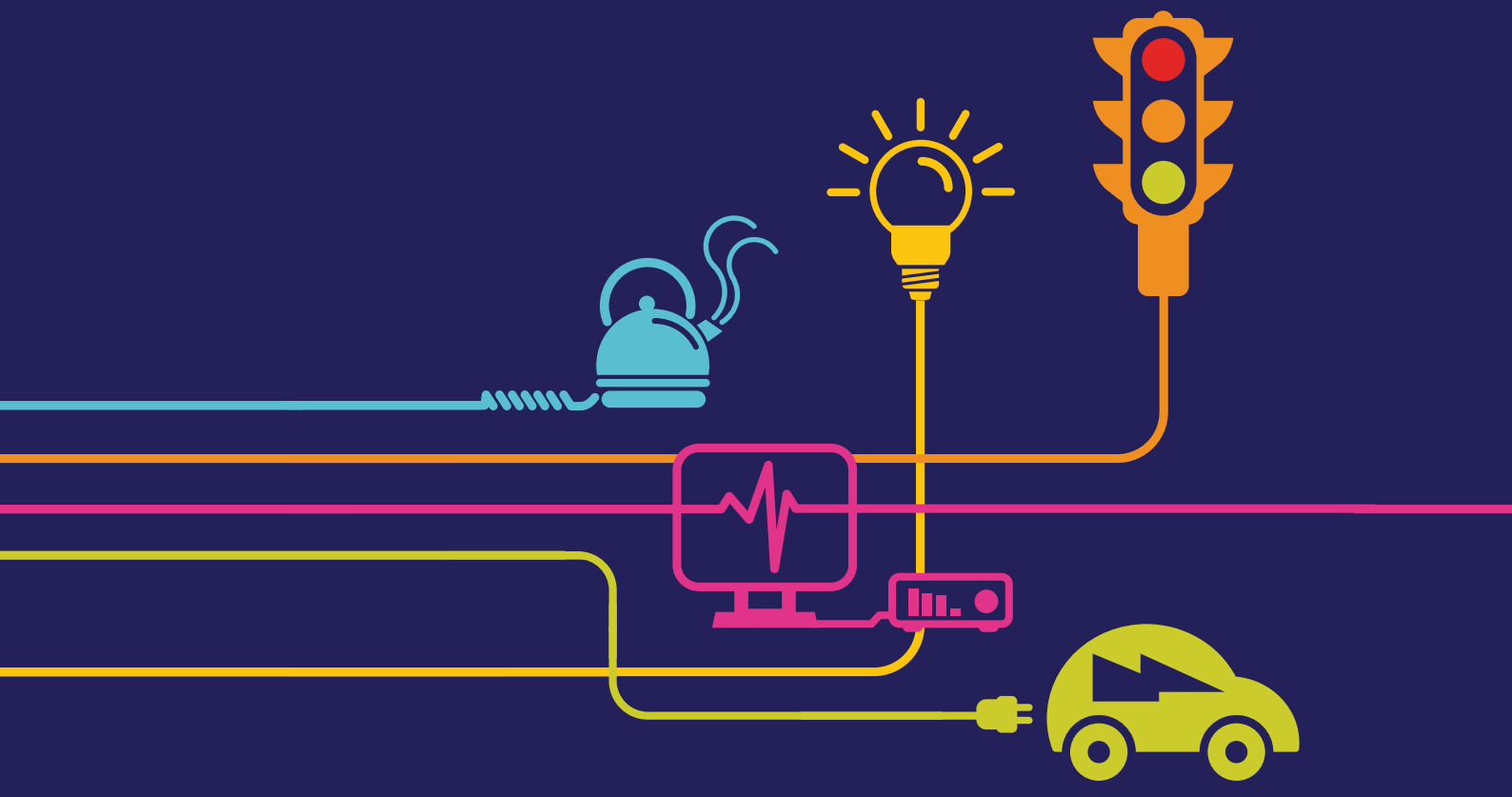
Environmental Statement Ground Environment Appendix 9E Part 2

Hinkley Point C Connection Project

Regulation 5(2)(a) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



Application Reference EN020001

May 2014

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Environmental Statement

Hinkley Point C Connection Project

5.9.2 – Ground Environment– Appendices (orange highlight indicates the contents of this Volume)

Appendix	Title
Volume 5.9.2.1	
9A	Preliminary Risk Assessment - Section A (Part 1)
Volume 5.9.2.2	
9A	Preliminary Risk Assessment - Section A (Part 2)
Volume 5.9.2.3	
9B	Preliminary Risk Assessment - Section B (Part 1)
Volume 5.9.2.4	
9B	Preliminary Risk Assessment - Section B (Part 2)
Volume 5.9.2.5	
9C	Preliminary Risk Assessment - Section C (Part 1)
Volume 5.9.2.6	
9C	Preliminary Risk Assessment - Section C (Part 2)
Volume 5.9.2.7	
9D	Preliminary Risk Assessment - Section D (Part 1)
Volume 5.9.2.8	
9D	Preliminary Risk Assessment - Section D (Part 2)
Volume 5.9.2.9	
9D	Preliminary Risk Assessment - Section D (Part 3)
Volume 5.9.2.10	
9D	Preliminary Risk Assessment - Section D (Part 4)
Volume 5.9.2.11	
9E	Preliminary Risk Assessment - Section E (Part 1)
Volume 5.9.2.12	
9E	Preliminary Risk Assessment - Section E (Part 2)
Volume 5.9.2.13	
9F	Preliminary Risk Assessment - Section F (Part 1)
Volume 5.9.2.14	
9F	Preliminary Risk Assessment - Section F (Part 2)
Volume 5.9.2.15	
9G	Preliminary Risk Assessment - Section G (Part 1)
Volume 5.9.2.16	
9G	Preliminary Risk Assessment - Section G (Part 2)
Volume 5.9.2.17	
9G	Preliminary Risk Assessment - Section G (Part 3)
Volume 5.9.2.18	
9H	Preliminary Risk Assessment - Section H
Volume 5.9.2.19	

Appendix	Title
9I	Coal Mining Risk Assessment (Part 1)
Volume 5.9.2.20	
9I	Coal Mining Risk Assessment (Part 2)
Volume 5.9.2.21	
9J	Factual Report on Ground Investigation Hinkley to Seabank 400kV Connection (Part 1)
Volume 5.9.2.22	
9J	Factual Report on Ground Investigation Hinkley to Seabank 400kV Connection (Part 2)
Volume 5.9.2.23	
9J	Factual Report on Ground Investigation Hinkley to Seabank 400kV Connection (Part 3)
Volume 5.9.2.24	
9K	Factual Report on Ground Investigation on New Electricity Substation at Sandford, Somerset

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Appendix 9E – Preliminary Risk Assessment - Section E

APPENDIX F
CONSULTEE RESPONSES

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Andrew Przewieslik

From: [redacted]@somerset.gov.uk]
Sent: 13 June 2013 15:39
To: [redacted]
Cc: [redacted]
Subject: RE: Hinkley C to Seabank grid connection project - request for information

Dear [redacted],

Thank you for your e-mail dated 6th June and further to our recent telephone conversation, I hope the following information is helpful.

Information on contaminated land is held by the District Planning Authorities on the Contaminated Land Register. Therefore in relation to the part of the route which is within the Somerset County area I would advise that you contact West Somerset Council and Sedgemoor District Council. Unfortunately I don't have any direct contact details for contaminated land officers; however the main contact details for the Councils are below.

West Somerset Council: - 01643 703704

Sedgemoor District Council (Environment Protection Unit): - 0845 408 2546

I have also copied in [redacted]; Planning Manager at West Somerset Council and [redacted]; Senior Project Manager at Sedgemoor District Council, as they are both involved in the National Grid project and so may be able to provide you with additional information.

In relation to geological conservation you might find the following information useful: -

1) the British Geological Survey county map which details all geology in Somerset. Available from here:

http://www.bgs.ac.uk/mineralsuk/planning/resource.html#MRM

2) Minerals preferred options document, Appendix 1 details quarries, peat areas, building stone etc. I'd draw particular attention to figure 9-12 which detail the proposed safeguarding areas (covering mineral and infrastructure such as wharves)

http://www.somerset.gov.uk/irj/go/km/docs/CouncilDocuments/SCC/Documents/Environmen
20and%20waste/Minerals%20Preferred%20Options/Minerals_Plan_Jan_13.pdf

There are 208 county geology sites in Somerset, and Somerset Environmental Records Centre hold a GIS dataset of these (http://www.somerc.com/homepage/)

I hope that this if of some help, please don't hesitate to contact me if you require anything additional.

Regards,

[redacted]

[redacted]

Energy Project Manager
Major Programmes

Somerset County Council
County Hall
Taunton
Somerset TA1 4DY
[redacted]
[redacted]@somerset.gov.uk

From: [redacted]@rsk.co.uk [mailto[redacted]@rsk.co.uk]
Sent: 06 June 2013 15:20
To: [redacted]
Subject: Hinkley C to Seabank grid connection project - request for information

Dear [redacted]

RSK has been commissioned by TEP, on behalf of National Grid, to undertake preliminary risk assessments (PRA's); to assist with the production of a preliminary environmental impact report (PEIR) and an environmental statement (ES) for the Hinkley C to Seabank grid connection project. We are specifically reviewing data relating to contaminated land and geological conservation along the proposed route.

As part of our work, we will review a commercially available environmental database (e.g. Envirocheck) and other publically available sources of information. As part of our assessment, we also contact the local planning authority (LPA) for further information. This is also inline with the findings of the scoping opinion report for this project.

We therefore request any available data Somerset Council may hold for the land along the proposed connection route. This relates to data specifically associated with contaminated land issues, available ground investigation reports and information relating to ground conditions that may affect the proposed development.

Please let me know if you require any further information.

Regards

[redacted]
Senior Geo-Environmental Consultant, MSci, FGS

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Date: 13 June 2013
My ref: RJA/273773
Your ref:
Contact: [redacted]
Direct dial:
Email: [redacted]n-somerset.gov.uk

North Somerset COUNCIL
a unitary authority

[redacted]
RSK
The Old School
Stillhouse Lane
Bedminster
Bristol
BS3 4EB

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17 JUN 2013

Environmental Protection
Development and Environment
North Somerset Council
Floor 1, Town Hall
Weston-super-Mare
Somerset
BS23 1UJ

DX 8411 Weston-super-Mare

Dear [redacted]

Re Hinckley C to Seabank Connection Project

With reference to your email received 12 June 2013, please find enclosed the information you require.

I have identified any potentially contaminated land sites on or in the vicinity of the proposed route from our historical maps or through our planning records. Of course as you will be aware, there is still the potential for unknown contaminated land sites to be discovered during the works.

There are no contaminated land sites determined under Part IIA of the Environmental Protection Act 1990 on or in the vicinity of the proposed route.

Please note that the information provided should not prejudice any further enquiries with other Authorities and is based on that currently available to North Somerset Council. The Council does not guarantee the validity or accuracy of the information and accepts no liability for any loss or damage, costs or claims arising either directly or indirectly from its use or interpretation.

Please do not hesitate to contact me if you require any more information or wish to discuss the enclosed.

Yours sincerely

[redacted]

Environment Officer

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National Grid Hinkley to Seabank Connection Project, Potentially Contaminated Land Sites, North Somerset

Potentially Contaminated Land Site	Grid Reference	Distance from Proposed Route	Comments
Sewage Works	ST 4003 5779	Approx 40m from proposed underground route	No other information held
Disused Railway Line	ST4169 5891 to ST4152 5963	Approx 170m from proposed underground route	No other information held
Former Railway Station	ST 4166 5951	Approx 145m from proposed underground route	Planning permission (07/P/3232) granted in 2008 for the erection of a care village. Copies of the site investigation can be found via our website www.n-somerset.gov.uk using the above reference.
Transport Depot and Scrap Yards	ST4037 6206	150m from proposed 132 kV Overhead Line	Planning records indicate that transport depot used for the maintenance of HGV's. No other information held.
Scrap Yard	ST 4199 6433	240m from overhead power line route	No other information held.
Landfill	ST 4552 7053	On line of proposed 132 kV overhead Line route.	Tipping of inert and general non-putrescible waste.
Sewage Works	ST4610 7105	140m from proposed overhead line	No other information held
Landfill	ST 4963 7563 to ST 5006 7571	On route of overhead powerlines	Waste first received in 1991. No indication what materials were tipped. Portishead Branch line also runs through this area.
Landfill	ST 4999 7645	150m from 400kV proposed route	Planning permission granted in 1978 for the tipping of inert waste.

[redacted]

From: South West Enquiries [SouthWestEnquiries@environment-agency.gov.uk]
Sent: 20 January 2014 13:39
To: [redacted]
Subject: SW/3591 - Hinkley Point C to Seabank connection project
Attachments: Standard Notice.pdf

Dear [redacted]

Request for information under the Environmental Information Regulations 2004 (EIR)

Thank you for your enquiry.

The local authority is the lead regulator for both Part 2A of the Environmental Protection Act 1990 (Contaminated Land) and the Town and Country Planning process (through which most land contamination issues are addressed). The Environment Agency is, in some cases, consulted by local authorities on matters relating to pollution of controlled waters when land is being redeveloped through the planning process, when it is being voluntarily investigated, or when the local authority are inspecting land under Part 2A. Consequently, the more definitive source of land quality information should be the local authority.

The Environment Agency, as a consultee to the local authority, does not necessarily keep information on land quality. The planning sections of most local authority websites illustrate where sites have been subject to planning applications and therefore where there may be information available on land quality. Much, if not all, of this information (e.g. site investigations etc) will be freely available via the local authority website. We can pass your request onto the local authority if you require us to.

We note that the route of the connection will be through, or close to, areas such as Avonmouth and the former Royal Ordnance Factory at Puriton – both of which have a long history of land uses that will have caused land and water contamination.

We would recommend that the desk study and EIA for the development considers historic land use and the potential for land and water contamination on a site-by-site basis.

I hope that we have correctly interpreted your request. Please see the attached Standard Notice or licence for details of permitted use.

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Yours sincerely

[redacted]
Customer Communications Team
Environment Agency
South West Region, Manley House, Kestrel Way, Exeter, Devon EX2 7LQ
[redacted]
Email: southwestenquiries@environment-agency.gov.uk

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APPENDIX G
EXISTING REPORTS

CARD GEOTECHNICS

Electricity Alliance West

Seabank to Bridgwater and Avonmouth

Desk study and preliminary geotechnical risk rating report

January, 2010

Card Geotechnics Limited,
Windsor House, Cornwall Road, Harrogate, HG1 2PW
Telephone: 01423 276000 Facsimile: 01423 534484
Email: cgl@cardgeotechnics.co.uk
Web: www.cardgeotechnics.co.uk

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Author	Adam Branson, Senior Engineer *MGeol(Hons) FGS* Sarah Key, Environmental Geologist *MSc BSc FGS AIMEnvSci*		[redacted]
Checked	Jo Strange, Regional Director *MEng CEng CEnv MICE MIEnvSc, SiLC*		
Approved	Richard Pennock, Associate Director *MSc BEng (Hons) CEng MIMMM FGS ACSM*		
Reference	CGN/2644	Issue 0	Issue Date January 2010

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Contents

EXECUTIVE SUMMARY **4**

1. INTRODUCTION **6**

1.1 Brief **6**
1.2 Report format **6**
1.3 Assumptions **7**
1.4 Limitations **7**

2. ROUTE LOCATION AND DEVELOPMENT **8**

2.1 Route location **8**
2.2 Route description **8**
2.2.1 OHL 8
2.2.2 Avonmouth Square 10
2.3 Route development **12**
2.3.1 OHL 12
2.3.2 Avonmouth Square 12

3. GEOLOGY **15**

3.1 Published geology **15**
3.1.1 Made Ground and Drift geology 15
3.1.2 Solid geology 16
3.1.3 Structural geology 18
3.2 Unpublished geology **19**
3.3 Economic geology **20**
3.3.1 Coal mining 20
3.3.2 Miscellaneous 20

4. HYDROGEOLOGY AND HYDROLOGY **22**

4.1 Hydrogeology **22**
4.2 Hydrology and flood risk **23**

5. UNEXPLODED ORDNANCE **24**

5.1 Explosive and munitions factories **24**
5.2 WWII defences **24**
5.3 German air-dropped UXO **24**
5.4 Preliminary UXO risk assessment **25**

5.5 UXO Recommendations 25

6. PRELIMINARY GEOTECHNICAL RISK RATING 26

6.1 Perceived geotechnical hazards 26

6.1.1 Ground and groundwater conditions 26

6.1.2 Historical activities 27

6.1.3 Flood risks 27

6.1.4 Concrete durability 27

6.1.5 Shallow coal workings 28

6.1.6 Excavations 28

6.1.7 Geomorphological conditions 28

6.2 Classification of risk 29

6.2.1 High 29

6.2.2 Medium 29

6.2.3 Low 30

6.2.4 Summary 30

7. RECOMMENDATIONS FOR INVESTIGATION 31

7.1 Rationale 31

7.2 Strategy 31

FIGURES

1 Route location maps (a-d)

2 Generalised geological cross sections (a-c)

3 Avonmouth Square land use summary plan

4 Avonmouth landfill site location plan

APPENDICES

A CD with satellite imagery of OHL route and historical maps

B Photo sheets

C BGS borehole logs

D BAE Systems UXO desk study

E Preliminary geotechnical risk rating table

EXECUTIVE SUMMARY

The Bridgwater to Seabank overhead line (OHL) runs for approximately 58km from Dunwear Sub Station near Bridgwater to Seabank Power Station north of Avonmouth and includes 257 no. towers. The Electricity Alliance West (EAW) is planning to purchase and refurbish the OHL from a regional distribution network. Card Geotechnics Limited (CARD) has been appointed to undertake a desk study and provide preliminary geotechnical risk ratings for all the towers forming the route. Additionally, a basic review of information and preliminary risk rating is to be provided for a 19km^2 area at the northern end of the route covering Avonmouth ("the Avonmouth Square"). The CARD desk study also includes an unexploded ordnance (UXO) report covering both the OHL and the Avonmouth Square.

Reference to available historical mapping of the OHL route indicates that sections of the OHL were constructed at different times. The majority of the towers were constructed from the mid 1950's to the late 1970's, with other sections being constructed at a later dates between 1981 and 1982 due to expansion and redirection of the route. Towards the northern end of the route, the OHL splits into two parallel OHLs.

The bulk of the towers are situated in agricultural open fields, much of which have not been subject to development. Some towers are identified as being within woodlands or in close proximity to areas of previous aggregate, quarrying or mine workings. Where the OHL passes through Avonmouth and within the Avonmouth Square itself, the history is more complex with a variety of industrial, commercial and residential uses taking place over the years. In particular, a large number of landfills are located within the Avonmouth Square and towards the northern end of the route, which appear to underlie a number of towers.

The majority of towers are underlain by Estuarine Alluvium or Tidal Flat Deposits with isolated areas of Alluvium, Peat, Head Deposits, Burtle Beds and other drift deposits. Made Ground underlies some towers in the Avonmouth Square or adjacent to the M5 which runs alongside the OHL route along various sections. The solid geology underlying the route can generally be divided between the low-lying land where the Mercia Mudstone Group

underlies the towers, and higher ground areas, such as to the north of Bridgwater and south of Portishead, where the towers are underlain by Carboniferous strata such as the Upper and Lower Coal Measures and the Pembroke Limestone Group. Towards the southern end of the route, the Mercia Mudstone Group is overlain by the Lower and Blue Lias and towards the north, the Mercia Mudstone Group is much thinner and overlies the Portishead Formation.

Most of the towers overly either a minor aquifer, relating to the Mercia Mudstone Group, the Blue Lias and the Coal Measures, or a non aquifer, relating to the Carboniferous Limestone and the Lower Lias. The majority of low lying towers are at high risk from flooding due to the large number of Rivers, streams and land drains that cross the area mainly in the central and northern sections of the OHL.

Based on a review of the available desk study information and the geomorphological conditions identified during the walk through survey, each tower has been given a preliminary geotechnical risk rating, and appropriate intrusive investigation measures are recommended accordingly. The perceived geotechnical hazards identified relate to the risk of foundation instability based on a number of identified conditions including; historical features, flooding and high groundwater, concrete durability and poor ground conditions.

The individual tower risk ratings are detailed within table E2 in Appendix E.

In summary 64 No. towers are perceived to be at high risk and 156 No. towers of medium risk with the remaining towers identified as low risk.

This assessment caters for geotechnical risk only and other structural factors may adversely affect tower instability mechanisms. The combined level of risk from these additional factors will ultimately dictate which towers require further assessment.

1. INTRODUCTION

1.1 Brief

The Bridgwater to Seabank overhead line (OHL) is to be purchased and refurbished by Electricity Alliance West (EAW). Card Geotechnics Limited (CARD) has been appointed by EAW to undertake a desk study and provide a preliminary geotechnical risk rating of all 257 no. towers along the 58km route. Furthermore, a basic review of information and preliminary risk rating is to be provided for a 19km^2 area at the northern end of the route covering Avonmouth (the Avonmouth Square).

In addition to the geotechnical desk based study, a risk assessment for unexploded ordnance (UXO) was requested for both the OHL route and the Avonmouth Square. This has been provided in the form of a UXO desk study report, produced by BAE Systems.

The general route location is presented as Figures 1a to 1d. Exact tower positions were not provided by the EAW, however, a CD containing estimated tower locations, based on satellite imagery, is provided in Appendix A. The final Appendix contains estimated co-ordinates for these towers.

Since no tower locations or tower references were provided, CARD has formulated its own independent tower identification numbers. These have been used throughout the report.

1.2 Report format

The information presented within this report is based on geomorphological observations made during the tower walkover survey, together with a review of available historical, geological and hydrological data for the tower locations. The total body of information has been reviewed in order to identify any potential geotechnical risks or ground hazards from which recommendations for future intrusive ground investigations at specific towers have been made.

The report text summarises the review process undertaken, refers to key pertinent features, and concludes with a Preliminary Geotechnical Risk Rating Table presented within the final Appendix.

1.3 Assumptions

It has been assumed for the purposes of this desk study that:

- All foundations are 'standard pyramid' type foundations.

1.4 Limitations

The recommendations made and opinions expressed in this report are based on the desk study review and the limited information available for the towers from EAW. Due to EAW not owning the OHL in question, no tower specific information was made available during the tender process e.g. tower location coordinates. The towers on the OHL considered within this report were identified through satellite imagery and during the walkover, and labelled according to a CARD specific system. No guarantee can be made than every tower on the route has been considered in this report due to access issues to the location of every tower. This should therefore be taken as a preliminary reconnaissance assessment.

The walkover survey was limited to points of public access and adjacent highways only. Observations were therefore made from distance due to limited access permissions at the time of the walkover survey.

CARD has assessed all the information obtained by them during this investigation, but makes no guarantees or warranties as to the accuracy or completeness of this information.

2. ROUTE LOCATION AND DEVELOPMENT

2.1 Route location

The OHL runs from Bridgwater Substation (approx NGR ST 332346 135809) in Somerset, to Seabank Power Station (approx NGR ST 353589 182275), northwest of Bristol. The total route of the OHL spans approximately 58km.

The Avonmouth Square at the northern end of the OHL route is approximately 19km^2 and is centred on NGR ST 529783.

A list of the individual towers and their approximate grid references is contained within the final Appendix. The OHL route and the Avonmouth Square are shown in Figures 1a to 1e.

2.2 Route description

2.2.1 OHL

The walkover survey for the OHL was undertaken between 17th and 20th November 2009. The walkover survey was limited to points of public access only. Therefore, detailed appraisal of each of the tower settings could not be undertaken.

Details of the walkover survey and the findings are included in the final Appendix, with a selection of photographs in Appendix B.

The route commences at Tower CARD Geotechnics (CG)001 (approximate NGR 332350, 135750) situated within the Bridgwater Substation at approximately 0m AOD, 1km south east of Bridgwater. The OHL proceeds in a north-north-easterly direction across flat open agricultural land until reaching Tower CG017 situated adjacent to the King's Sedgemoor Drain. From this point, the OHL ascends gently to approximately 50m AOD at between Tower CG020 and CG021. The OHL then descends gently across further agricultural land to Tower CG025. To the west of the OHL between Towers CG025 and CG028 the urban area of Puriton with the large BAE Systems factory is present with associated reservoirs. To the east is the urban area of Woolavington. Between Towers CG029 and CG030, a west-

east orientated OHL crosses over the study OHL. To enable this cross over two smaller Towers (CG029a and CG029b) carry the western and eastern circuit cables on either side of the Tower associated with the crossing OHL. The OHL proceeds along flat open agricultural land in a north-north-easterly direction crossing the man-made Huntspill River between Towers CG032 and CG033 and passing adjacent to the urban areas of East Huntspill, Bason Bridge, Watchfield and Mark. The land is largely flat, low lying and intersected by many drains, streams and ditches providing drainage. The majority of the fields were noted to be wet and boggy, where access allowed.

The OHL continues in a north alignment crossing the Mark Yeo between Towers CG061 and CG062 and the Old River Axe between Towers CG070 and CG071. The OHL also crossed the River Axe between Towers CG075 and CG076. From angle Tower CG077 the OHL turns and follows the M5 around the base of Compton Hill before turning north east, parallel with the Lox Yeo River to Tower CG090 situated behind a water works at approximately 10m AOD. The OHL ascends slightly through a narrow valley crossing minor and major roads and the Towerhead Brook.

Tower CG102 is a junction tower with a connecting OHL from a north eastern direction. From this point the OHL continues north through open low lying flat agricultural land used for both grazing and crop cultivation at approximately 0m AOD. Again through this open stretch of land to Tower CG143 the OHL crosses many streams, ditches and drains including named watercourses such as the Congresbury Yeo close to Tower CG118, the Little River close to Tower CG123 and the River Kenn close to Tower CG139. Towers CG140 to CG145 run parallel with a stream passing within approximately 5m of the channel at Tower CG145. Tower CG146 is situated on an area of grass amongst a relatively new housing development. The OHL then passes around the western part of Nailsea through playing fields and grazing land before beginning a slight incline to Tower CG152 where it turns north east and inclines further through a shallow valley of grazing and arable land up to approximately 130m AOD at Tower CG158. The OHL passes over further open arable land descending towards to the M5 and crossing the motorway cutting at between Towers CG163 and CG164.

The OHL proceeds in a northerly direction through flat grassland crossing major road junctions and a railway cutting between Towers CG170 and

CG171. Towers CG170 and CG171 are within an area close to newly built residential houses where the land appears to have been recently landscaped with pond features and banks. Towers CG172 to CG174 are within flat land approaching a Substation at Portishead. From this Substation the OHL becoming two parallel OHLs with paired towers proceeding in an easterly direction across flat open land inland from the Severn Estuary. From Tower CG186 the OHLs are passing into an industrial estate with works buildings and depots and the Docks, which were essentially inaccessible during the walkover. The OHLs span the River Avon between Towers CG201 (south) and CG203 (north) closest to the M5 and between Towers CG202 and CG204 away from the M5. Towers CG203 to CG219 are generally passing through flat, low lying, mixed industrial and heavy industrial areas with small residential pockets which is detailed in Section 2.2.2. The OHL between Towers CG220 and CG241 crosses open grassland passing close to a sewage works and industrial estates and passing over the M5 motorway carriageway on a number of occasions as well as a railway embankment.

From Tower CG241 the OHLs turn and proceed north westerly through mainly grassland in amongst industrial estates, past a gas works, scrap yard and to the Seabank Power Station. Towers CG249 to CG252 are noted to be positioned on a landfill named the 'Crooks Marsh Landfill Site'. The OHLs terminate at the Power Station at Towers CG253 and CG254 within approximately 600m of the Severn Estuary.

An assessment of archaeology does not form part of the brief for this study. However, a general review of the historical maps suggests that there are no areas of historical interest along the route.

2.2.2 Avonmouth Square

A walkover of the 19km^2 Avonmouth Square forming part of this study was undertaken on the 20th November 2009. The walkover comprised visually observing accessible areas of the area taking notes of geomorphological features, land uses and any areas of particular interest. Figure 3 provides a general summary of the land uses noted during the walkover and includes residential, public open space and agricultural land and industrial land uses including commercial, heavy and mixed industrial uses.

The Avonmouth Square is noted to be generally flat and low lying across the south, west, north and central areas with the land becoming elevated towards the south east and eastern areas comprising Kings Weston Hill and Blaise Castle where land use is generally public open space and residential.

Limited access was available in the areas of heavy industrial uses due to security and the nature of the commercial activities undertaken. However, it was noted that in the south western and western portions of the Avonmouth Square, land uses included the Avonmouth docks, depots, wharfs, works and scrap yards with intersecting active and disused railway lines. Off Kings Weston Lane a large area has been demolished where former works were situated. Imminent development of this area can be expected, likely to be with office developments. New office developments are present on the opposite side of Kings Weston Lane.

Centrally and to the northern extent of the Square, the land uses are generally mixed and commercial with new office developments, warehousing sites, depots, trading estates and an electricity transmission station. The northern portion includes a sewage treatment works and household waste recycling centre. The sewage works includes an area of reed beds off Kings Weston Lane and an area (inaccessible during the walkover) designated as a 'Wildlife Trust Site' understood to comprise lagoons and surface water features with a high perimeter bund surrounding the southern and western boundaries.

The majority of the southern and eastern area of the Avonmouth Square comprises residential land, agricultural land and areas of parkland, golf courses, woods, recreational grounds and schools. Thirteen schools are noted within the Square, most of which have associated areas of playing fields and open space.

An assessment of archaeology does not form part of the brief for this study. However, a Roman Road is annotated within the north eastern section of the Avonmouth Square. Such features may present additional constraints on tower refurbishment/replacement works.

2.3 Route development

Copies of the historical source maps are contained on a CD within Appendix A. A summary of the historical development at each tower site is presented within the Preliminary Geotechnical Risk Rating Table in the final Appendix. The text below details a summary of the OHLs and Avonmouth Square development as recorded from the available maps reviewed.

2.3.1 OHL

Reference to the historical maps indicates that towers CG001 to CG102 along the route were constructed around 1961 to 1979 due to their appearance in mapping between these dates. Towers CG102 to CG147 appear in mapping between 1981 and 1982 suggesting construction around these dates. Between towers CG147 and CG175 an early OHL route is noted in mapping dated 1961 to 1970 adjacent to the current OHL. The current OHL route is identified in mapping from 1981, but it is possible that some towers from the previous adjacent route were incorporated into the current OHL. From tower CG175 at Portishead Substation to the end of the OHL at Seabank Power Station the OHL splits into two parallel OHLs as it crosses the Avonmouth region. The northern/western towers are identified in mapping from 1955 to 1970, with the southern/eastern towers identified in later mapping from 1982.

Towers CG018, 019, 022, 023, 024, 027, 080, 081, 082, 098, 099, 151, 152, 157, 158, 164, 203, and 204 are all identified as being within or in close proximity to areas of pits or quarrying, although in many cases quarrying works finished prior to the 1940's. Towers CG247 to CG252 are all within or in close proximity to former or active landfills, primarily Crooks Marsh Landfill near Seabank. The remainder of the towers are located in agricultural areas, with the exception of the towers located from Portishead northwards. In these areas the OHL passes through a generally urban area, and as such the towers are typically located within or adjacent to industrial estates, although occasionally the towers are in close proximity to residential areas.

2.3.2 Avonmouth Square

For ease of reference, the historical development of the Avonmouth Square is separated into four sections.

- **North-west**

Maps from 1887 show the Avonmouth Dock to be present adjacent to the River Avon as a single rectangular dock. At this stage, Dumball Island is separated from the mainland by the North Channel. Later maps from 1904 indicate the North Channel to have closed up, linking Dumball Island to the mainland via a marshy area. Industrial and residential development is occurring in and around the Docklands. In addition, a Petroleum Storage Works is present to the southeast of the Dock. Maps from 1921 indicate that the dock has expanded to the northwest with the addition of the Royal Edward Dock approximately over the position of the previous North Channel. This development is combined with significant expansion of local infrastructure including railway lines. Later mapping dated 1938 indicates a further expansion to the docks to incorporate the Eastern Arm Dock, including numerous tanks or gas holders along the waterfront, and the development of the Avonmouth Works to the northeast of the docks. Maps from 1982 show significant industrial expansion to the north of the docks including various warehouses and factories, with expansion continuing through the 1990's.

- **North-east**

The earliest available maps dated 1886-1887 shows the area to be largely agricultural with a Roman Road passing northwest to southeast through the area, and the villages of Laurence Weston and Kings Weston. Maps from 1955 indicate that Laurence Weston has undergone significant residential expansion, approximately quadrupling in size. Maps from 1970 show the M5 to be complete to the north of Laurence Weston, and still under construction to the south, close to the Avon crossing. Later maps from 1982 show the M5 to be complete, with various industrial developments present in Avonmouth.

- **South-east**

The earliest available maps dated 1886-1887 indicate the area to comprise the town of Shirehampton, with various agricultural fields and areas of woodland surrounding it on all sides. Maps dated 1904 show the Great Western and Midland Joint Railway to cross the area from west to east, passing to the south of Shirehampton. Later maps, dated 1938, indicate the land immediately to the south and east of Shirehampton to have been developed with residential areas a network of roads replacing much of the

fields. Maps from the 1970's show the town of Shirehampton to have expanded significantly to meet Avonmouth in the west and Laurence Weston in the east.

- **South-west**

The earliest available maps dated 1884 show the Gordano region on the banks of the River Avon to comprise agricultural land, with the Bristol to Portishead Railway running east to west across the area. Later maps from 1981-1999 show *coal stockyards* in the Easton-In-Gordano area, together with the M5 motorway and Avon crossing. The Portbury Dock is also constructed on the northern tip of the Gordano area. In addition, the town of Pill is expanding towards the west. Maps from 1992 show industrial expansion in the Gordano region north of the M5, including various warehouses and Works.

3. GEOLOGY

3.1 Published geology

To aid in the interpretation of the complex geology beneath the OHL route simplified geological conceptual ground models are presented as Figures 2a to 2c and the general findings are summarised below.

3.1.1 Made Ground and Drift geology

In general, either Estuarine Alluvium or Tidal Flat Deposits are noted to underlie the majority of towers. Where these deposits are recorded, the land is noted to be low-lying and along the edge of the Severn Estuary. Localised deposits of Burtle Beds, Peat, Head Deposits, Alluvium, Higher Estuarine Alluvium and First and Second River Terrace Deposits are found scattered along the route and within the Avonmouth Square.

Towards the northern end of the route, particularly where the towers pass through Avonmouth or where they join a substation, Made Ground is indicated overlying the drift deposits. A large proportion of the land within the Avonmouth Square, particularly alongside the estuary, is Made or Worked Ground. Additional isolated areas of Made Ground occur alongside the River Avon or where roads/railways have been constructed.

Soft ground and potentially aggressive ground conditions comprising alluvium/tidal flat deposits and peat, have been identified at a number of tower locations.

Where recorded, the type of drift at each OHL tower has been tabulated within the final Appendix and summarised in Table 1 below.

Table 1: Summary of drift geology

Published Drift Geology[1,2,3,4,5,6,7,8]	**CG Tower numbers**
Estuarine Alluvium	027-078, 091, 105, 106, 108-129, 131-134
Tidal Flat deposits	165-179, 184-194, 199-254, Avonmouth Square
Head Deposits	082- 084, 103, 104, 180,181, Avonmouth Square
Alluvium	001-009, 016, 017, 085, 093, 094
Burtle Beds	010-014
Peat	135-143, 145
Higher Estuarine Deposits	086- 088, 090, 130
First River Terrace Deposits	182, 183, Avonmouth Square
Second River Terrace Deposits	Avonmouth Square

3.1.2 Solid geology

In general, much of the route is underlain by the flat lying Triassic age Mercia Mudstone Group which can be up to 350m thick, particularly to the south of the Mendips, which lie directly east of Towers CG071-100. North of Chedzoy, the route is underlain by either the Lower or Blue Lias rocks, with the Mercia Mudstone at depth, until Biddisham (i.e. Towers CG018-071). Where the OHL passes north over the western end of the Mendips, the Mercia Mudstone Group lies flat, but unconformably, over steeply dipping rocks from the Carboniferous era, including the Upper and Lower Coal Measures and the Pembroke Limestone Group.

At Nailsea, the route is underlain by the Pennant Sandstone Formation of the Upper Coal Measures or the Lower Coal Measures, which sit unconformably over the Carboniferous Limestones. The Limestone Group underlies much of

[1] British Geological Survey, 1984, Sheet 295, Taunton, 1:50,000, Solid and Drift Edition.
[2] British Geological Survey, 1980, Sheet 279, Western-Super-Mare, 1:50,000, Solid and Drift Edition
[3] British Geological Survey, 1984, Sheet 280, Wells, 1:50,000, Solid and Drift edition.
[4] British Geological Survey, 1962, Bristol District, Special Sheet, One-Inch Series, Solid and Drift edition
[5] British Geological Survey, 2003, Sheet ST47SE (Clapton-in-Gordano), 1:10,000, Solid and Drift
[6] British Geological Survey, 2003, Sheet ST47NE (Portishead), 1:10,000, Solid and Drift edition
[7] British Geological Survey, 2003, Sheet ST57NW (Avonmouth), 1:10,000, Solid and Drift edition

the route on the higher ground north of Nailsea, though slightly further north the route is again underlain by the Pennant Sandstone Formation. As the route passes back onto the low lying land alongside the Severn Estuary the towers are again underlain by the Mercia Mudstone Group, though here the mudstones are only a maximum 60-80m thick. As the route passes north towards Portishead and east towards Avonmouth, the Mercia Mudstone Group lies flat and unconformably over both the Portishead and the Pennant Sandstone Formations and the Upper Coal Measures of the Avonmouth Basin.

Much of the Avonmouth Square and northern end of the route is underlain by the flat lying Mercia Mudstone Group sitting unconformably over a syncline of the Upper Coal Series over the Pembroke Limestone Group and finally the Portishead Formation. As the land rises in the south-east corner of the Avonmouth Square the Pembroke Limestone Group is again exposed as is the Pennant Sandstone Group, the Portishead Formation, the Shirehampton Formation and the Maesbury Mudstone Formation.

The solid geology under each tower is summarised in Table 2 below with more detailed geological descriptions included within the final Appendix.

Table 2: Summary of solid geology

Period	Published Solid Geology[2-9]	CG Tower numbers
Jurassic	Lower Lias clay	037-071
	Blue Lias limestone	018, 019, 021-036
	Penarth Group	020
Triassic	Mercia Mudstone Group	001-017, 072-143, 145, 152-156, 165-254, Avonmouth square
	Mercia Mudstone Terminal Facies (Limestone conglomerate)	157, Avonmouth square
Carboniferous	Quartzitic Sandstone Formation	Avonmouth square
	Pennant Sandstone Formation – Downend Formation consisting of sandstones with mudstones, seatearth	143, 144, 146, 160-164, Avonmouth square

[8] British Geological Survey, 2003, Sheet ST58SW (Severnside), 1:10,000, Solid and Drift edition

	and coals	
	Lower Coal Measures consisting of mudstone with sandstone and coal seams	147-150
	Pembroke Limestone Group (including Clifton Down Mudstone or Limestone Formation, Gully Oolite and Black Rock Limestone Sub-Group)	151, 158, 159, Avonmouth square
	Maesbury Mudstone Formation	Avonmouth square
	Shirehampton Formation	Avonmouth square
	Portishead Formation	Avonmouth square

3.1.3 Structural geology

At a number of locations the OHL crosses geological faulting. Towards the south of the route there is a slight syncline within the rock strata and a series of faults where the Lower and Blue Lias rocks are exposed at the surface overlying the gently dipping Mercia Mudstone. A fault lying on the interface of the Mercia Mudstone Group and the Blue Lias is noted approximately 40m south of tower CG018. West of Biddisham the OHL crosses a significant but unnamed fault, dipping to the south-west, and then passes north over the western end of the Mendips. This fault is identified running east to west crossing the OHL between towers CG071 and 072. In addition, 50m east of tower CG142 a further fault is identified.

Further to the north, from approximately tower CG146, the OHL is underlain by coal measures (Pennant Sandstone Formation and Lower Coal Measures), and as a result the faulting intensity increases. Between towers CG146 and 148 the OHL crosses 3 No. faults within the coal measures, then between towers CG158 and 160 the OHL passes approximately 100m northwest of the Tickenham Fault and east of the Naish House Fault. North of the coal measures the route passes over a syncline formed over a conjectural fault between the Portishead Formation and the Pennant Sandstone Formation. Towards the end of the OHL, in the Avonmouth region, the OHL runs across the Avonmouth Basin, cutting perpendicular to 2 No. coal seams.

With reference to the geological memoir[9] for the local area these two seams represent the Hollybush and Great Veins, and overlie the Pennant Sandstone Formation.

3.2 Unpublished geology

Generally, there has been minimal exploratory work undertaken within close proximity to the OHL route therefore borehole records have only been obtained from the British Geological Survey (BGS) to confirm the general geological setting along the OHL route.

In summary the BGS records obtained generally confirm the published geological maps although where variations are noted, these are either due to the point of exploration being distant from the towers under review or localised faulting has displaced the geological strata. A more detailed outline of the unpublished geology is included within the final Appendix.

The borehole records obtained for the OHL that relate to the Avonmouth square include ST57NW25 and ST57NW168. These confirm the published geology for the low-lying land. Two further BGS boreholes were obtained to confirm the geology of the higher ground to the south east. These are summarised in Table 3 below.

Copies of the BGS borehole records reviewed are contained within Appendix C.

Table 3. Summary of high ground BGS boreholes

Stratum	Depth to top of stratum (m bgl)	Thickness of stratum (m)
Drift deposits	0-3.05	0-3.05
Mercia Mudstone Group	0-22.26	0-22.26
Upper Coal Measures (Pennant Sandstone Formation)	3.05-22.26	Proven to 64.05

[9] Institute of Geological Sciences (now British Geological Survey), British Regional Geology, *Bristol and Gloucester District*, 2nd edition, 1980.

3.3 Economic geology

3.3.1 Coal mining

The OHL route passes over coal bearing strata near Nailsea between towers CG144-151 and CG158-164. According to the 1:10,000 scale geological map[6] of this area the strata mainly consists of mudstones or sandstones with some thin coal seams. Only towers CG144-146 are within 500m of an abandoned mineshaft and only tower CG145 is within 250m. However, the route crosses the White's Top Coal seam close to tower CG147 and the Golden Valley Under Coal seam between Towers CG147-148. At the northern end of the route the OHL crosses the Hollybush and Great Veins coal seams though these are at depth beneath the Mercia Mudstone.

3.3.2 Miscellaneous

Several small quarries and gravel pits are noted near particular towers. The closest quarry is recorded approximately 80m from Tower CG019 and is therefore not considered to be in a zone of influence that would affect the stability of tower foundations.

There are approximately 10 historical and 4 active landfill sites located on the low-lying land within the Avonmouth square. However the majority relate to industrial slag heaps, burial pits and lagoons. Some areas of landfill are located along the waterfront by Avonmouth Docks, but these are considered likely to be related to land reclamation and flood defences. Figure 4 shows the location of the recorded landfill sites within the Avonmouth area, taken from the Environment Agency (EA) website[10] and Table 4 below gives landfill site details as recorded by the EA.

Table 4. Recorded landfill sites within the Avonmouth area

Site	Landfill Site Name	Historical or Active	Dates of Operations	Waste Accepted
1	Foreshore of Avonmouth Dock	Active	n/a	Other
2	St Andrews Road	Historic	n/a	Inert

[10] www.environment-agency.gov.uk

3	Beryllium Burial Pits	Historic	31.05.72 – 31.08.72	Unknown
4	Gas Area Tip	Historic	n/a	Unknown
5/6	Rhodia Landfill Site	Active	n/a	Hazardous Industrial waste
	2 AHF Lagoon	Historic	31.12.56 – 31.12.64	Industrial
	3 AHF Lagoon	Historic	31.12.64 – unknown	Industrial
	No. 3 AHF Lagoon	Historic	18.03.80 – 19.04.94	Industrial and Inert
	No. 4 AHF Lagoon	Historic	18.01.83 – 19.04.94	Industrial
7	Kings Weston Lane	Historic	n/a	Unknown
8	Britannia Zinc Landfill	Active	n/a	Non hazardous Industrial
	Britannia Zinc Slag Tip	Historic	n/a	Industrial
	VR Tip	Historic	31.12.20 – unknown	Industrial and Inert
	Britannia Zinc Factory Tip	Historic	n/a	Industrial
	Commonwealth Smelting Ltd	Historic	n/a	Unknown
9	T Farm	Historic	31.12.59 – unknown	Inert
10	Churngold University Playing Fields Landfill	Active	n/a	Non-biodegradable
11/12	Kingsweston	Historic	n/a	Inert
	Saltmarsh Drive	Historic	31.12.50 – 31.12.74	Commercial and Household
13	Avonmouth Dock Entrance Channel	Historic	31.12.76 – 31.12.83	Inert
14	Portway	Historic	04.06.73 – 31.12.77	Commercial and Household

4. HYDROGEOLOGY AND HYDROLOGY

The hydrogeological and hydrological information was sourced from the Groundwater Vulnerability Map (GVM) (Sheets 36, 37 and 42[11,12,13]) and the Environment Agency (EA) website[11]. Tower specific information is detailed in the final Appendix.

4.1 Hydrogeology

The OHL route passes through an area with quite variable hydrogeology with parts designated as being a minor aquifer (variably permeable), a major aquifer (highly permeable) or a non aquifer (negligibly permeable). Table 5 contains a summary of vulnerability class for each tower.

Table 5. Summary of vulnerability classes

Vulnerability classes	CG Tower Number
Minor aquifer	001-014, 016-042, 069a-072, 082-087, 089, 090, 092-094, 097, 103, 104, 140-150, 152-156, 180-183, 193-198
Major aquifer	151, 157-159, 163
Non aquifer	015, 043-069, 073-081, 088, 091, 095, 096, 098-102, 105-139, 166-179, 184-192, 199-254

The majority of the Avonmouth square is a non aquifer. However, in the south-east corner of the square part of the land is designated as a major aquifer with three small isolated areas designated as a minor aquifer.

The leaching potentials of the soil classes present along the OHL route and within the Avonmouth square are shown to vary from low to high. Low permeability drift deposits are indicated in some areas and include peat, estuarine alluvium, higher estuarine alluvium, tidal flat and first terrace deposits. These are noted where they occur at the surface overlying Major and Minor aquifers and correspond to Towers CG027 to 042, 069a, 070-072, 141 and 142. Within the urban area of Avonmouth the soil class is shown to

[11] Environment Agency, 1996, Sheet 36, Groundwater Vulnerability of Gwent, South & Mid Glamorgan, 1:100,000.
[12] Environment Agency, 1994, Sheet 37, Groundwater Vulnerability of Southern Cotswolds, 1:100,000
[13] Environment Agency, 1996, Sheet 42, Groundwater Vulnerability of Somerset Coast, 1:100,000

be high, though this is based on limited data and a worst case scenario is assumed.

The major aquifer is likely to represent the Carboniferous Limestone group and the non aquifer, the Mercia Mudstone Group and the Lower Lias clays. The major aquifer description also includes where the Carboniferous Limestone is overlain by the Mercia Mudstone Marginal Facies. The Minor aquifers in this area comprise the Blue Lias, Penarth Group, and the sandstones of the Mercia Mudstone Group and Coal Measures. They also include permeable drift deposits such as head, alluvium and river terrace deposits.

4.2 Hydrology and flood risk

The majority of the towers have a 'significant' risk (>1.3% chance) of flooding each year. Towers CG058, 062, 065 to 067 and 199 are at 'low' to 'moderate' risk (0.5-1.3% chance) of flooding each year and Towers CG010, 013, 014, 018, 019-026, 064, 079 to 081, 084 to 090, 092 to 104, 146 to 149, 151 to 164, 182 and 183 are not considered to be at risk from flooding. Much of the area that the route passes over is very low lying and many towers are situated close to minor watercourses and drainage ditches. Larger watercourses contributing to the flood risk include River's Avon, Brue, Huntspill, Axe, Yeo, Kenn and Lox Yeo. A number of Rhynes, King's Sedgemoor Drain, Mark Yeo, Little River, Land Yeo, Towerhead Brook and the Old River Axe also contribute to the flood risk.

The majority of the low lying land within the Avonmouth square has a 'significant' risk (>1.3% chance) of flooding each year with isolated areas having a 'low' to 'moderate' risk (0.5-1.3% chance) of flooding. The high ground towards Shirehampton is not considered to be at risk from flooding.

5. UNEXPLODED ORDNANCE

As part of the EAW requirements for this OHL, a risk assessment of unexploded ordnance along the OHL and within the Avonmouth area was undertaken by specialist subcontractor BAE Systems. The findings of the report are summarised below. However, it should be noted that the study does not influence the risk ratings of this report; instead the full UXO risk assessment is included in Appendix D for reference.

5.1 Explosive and munitions factories

Three former explosives factories are located along the OHL; His Majesty's Explosives Factory (HMEF) Avonmouth and HMEF Henbury, dating back to WWI, and the former Royal Ordnance Factory (ROF) Bridgwater, which was operational between 1937 and 2008.

A further two WWI factories are located within 500m of the OHL; HMEF Portishead and National Filling Factory (NFF) Chittening.

HMEFs Avonmouth and Henbury are located within the Avonmouth square with the closest towers being CG218 to 239. HMEF Portishead is located closest to towers CG171 to 178 and NFF Chittening is closest to towers CG253 and 254. ROF Bridgwater is located very close to towers CG025-029b.

5.2 WWII defences

The study indicates that there are a large number of WWII defence structures in the vicinity of the site. The generally comprise pillboxes, mostly towards the south and south-west. However, towards the northern end of the OHL a number of heavy anti-aircraft (HAA) batteries are known to be located, though these have long since been demolished. Gordano Prisoner of War camp was located near these HAA batteries.

5.3 German air-dropped UXO

Much of the OHL route passes through rural areas that did not suffer heavy bombing during WWII. The rural districts of Bridgwater, Axbridge and Long

Ashton had very low bombing intensities compared to the rest of the UK. Within the County Borough of Bristol the bombing intensity was 6e HE/100 ha, a relatively high figure. The docks and industrial sites at Avonmouth were one of the most frequently targeted areas in the region.

The typical maximum depth of German air-dropped UXO within the tidal flat deposits around Avonmouth is likely to be in the order of 10m bgl.

5.4 Preliminary UXO risk assessment

The risk of encountering contamination or explosive devices from the factories or buried UXO is low as much of the surrounding areas have been extensively developed since WWII and as any residues are likely to have degraded and dispersed in the intervening years.

5.5 UXO Recommendations

It is recommended that, where exploratory work is to take place in proximity to the explosive factories, soil samples should be sent for laboratory analysis to determine if contamination is present.

Where intrusive investigation takes place close to the HAA sites, ROF Bridgwater or within Avonmouth it is recommended that, as part of the site safety briefing, personnel be informed of the defence history of the local area and the potential to encounter ordnance.

6. PRELIMINARY GEOTECHNICAL RISK RATING

Based on the information collated as part of this desk study, a Preliminary Geotechnical Risk Rating for the 257 No. towers assessed along the OHL route has been undertaken.

A summary of the perceived geotechnical hazards identified during the desk top study and walkover survey are detailed below in Section 6.1. Table E2 within Appendix E, identifies which hazards exist at each tower site, and assigns a qualitative level of risk.

Classification of risk is defined within Section 6.2 with a rationale/strategy for intrusive works detailed in Section 7.0.

6.1 Perceived geotechnical hazards

6.1.1 Ground and groundwater conditions

Areas of potentially soft ground, comprising peat and alluvial deposits (including estuarine alluvium and tidal flat deposits) have been identified as underlying certain OHL towers. Historical land uses, i.e. coal mining or land filling activities have also been recorded which may reveal excessive thicknesses of made ground upon which towers have been formed.

Poor ground (natural and man made) could result in inadequate bearing capacity of the underlying soils for any refurbished/increased OHL loads, which could result in foundation failure in both compression footings, but may also affect uplift resistance on uplift legs.

In addition, should a tower be within, say, 50m of a surface water feature, there is the possibility that it may be influenced by a high groundwater table. It may be that these towers require an assessment of the groundwater levels or that an assumption is made, for design purposes, that foundations may be buoyant.

Furthermore, where existing foundations are founded on or close to bedrock, then the assessment of uplift resistance should be checked to ascertain whether the need for ground anchorages should be installed.

Intrusive ground investigation is recommended at selected tower sites to assess the ground and groundwater conditions and soil parameters in order that design loads and tower stability checks can be undertaken. The rationale for investigation works is detailed in Section 7.0.

6.1.2 Historical activities

In general, the majority of the OHL spans open fields although where the OHL passes through Avonmouth the history is more varied. A number of towers within Avonmouth are situated on historical landfill sites and/or Made Ground.

Given the potential variability and consistency of Made Ground deposits or landfill, foundation loads may surcharge adjacent features and cause instability resulting in structural distress and possible foundation failure.

In addition, where foundation refurbishment works are envisaged, consideration should be given to chemical testing of soils to assess human health risk to site operatives accordingly. Where Made Ground is encountered then adoption of PPE and hygiene protocols should be undertaken.

Where sites of archaeological interest are located in the proximity of the towers, additional investigation by archaeologists may be required during intrusive investigations.

6.1.3 Flood risks

The majority of OHL towers are at risk from flooding due to the many rivers, streams and drainage ditches that cross the route. During times of flood, the tower positions identified within close proximity to watercourses may be at risk from 'significant' flood events. At such locations, consideration of floodwater scour protection should be catered for in design to protect foundation bases.

6.1.4 Concrete durability

Where peat or high water levels has been identified, acidic ground conditions may exist, which may react with subsurface concrete and cause degradation of steelwork and concrete.

The Mercia Mudstone and Lower Lias naturally contain sulphates and sulphide. An assessment of sulphates in the ground where such geology exists would be required to enable appropriate concrete mix design. This assessment should follow the guidelines in BRE Special Digest 1[14].

6.1.5 Shallow coal workings

The zone of influence from shallow coal workings is dictated by the seam thickness and thickness of overlying competent bedrock. Where foundations lie within bedrock of less than ten times seam(s) thickness, then this is considered to be within an influencing depth of void propagation to surface.

OHL towers situated towards the mid-section of the route, i.e. Tower CG143 to 150 are noted to lie within an area of historical mining activity and are deemed to represent 'high' risk.

Of particular note, Towers CG143 to145 overlie coal seams within the Coal Measures strata at approximately 224m bgl. The White's Top Coal seam (1.05m thick) outcrops at the surface close to tower CG147 and the OHL crosses the Golden Valley Top and Under Coal seams (0.50 and 0.83m thick) at the surface between towers CG147 to148.

6.1.6 Excavations

The ground conditions should not pose significant difficulties for conventional excavators and earthmoving equipment. Based on a likely high water table in some areas, groundwater control, such as pumping from a sump, may be required to ensure that excavations remain dry during the tower construction works. All excavations to which man access is required should be battered-back or shored in accordance with the guidelines presented in CIRIA Report 97[15].

6.1.7 Geomorphological conditions

Towers located on steep slopes are at possible risk from slope instability issues. These may result from actual tower foundations loading slope

[14] BRE Special Digest 1: 2005. Concrete in Aggressive Ground, 3rd Edition
[15] *Trenching Practice (Second Edition).* Construction Industry Research and Information Association. Report 97.

surfaces, which may result in slope and foundation failure. Soil erosion through weathering processes may also induce localised landslips, causing instability concerns.

6.2 Classification of risk

By assessing both geomorphological and desk study hazards, an evaluation of perceived geotechnical risk can be formulated, as detailed below.

Each tower site has been reviewed independently, with a classification of risk assigned to each tower. This is detailed within Table E2 in Appendix E, although a summary is provided within Table 6 overleaf.

6.2.1 High

Where towers have been classified as being of 'high' geotechnical risk, specialist geotechnical investigation and/or geotechnical analysis is recommended. This is principally focussed on towers where poor ground has been recorded and/or geomorphological conditions such as steep slopes, shallow coal workings or historical/active landfill sites have been noted.

Ground investigation techniques would be focussed on assessing other possible instability mechanisms, in addition to foundation failure and are likely to be undertaken by more robust drilling and analytical techniques.

6.2.2 Medium

Towers that are considered to be of 'medium' geotechnical risk are recommended for limited ground investigation. Investigation is required to principally confirm the tower location geology and expose existing foundations to assess type and founding depths, where high groundwater and/or poor ground conditions have been recorded. This would allow an assessment of the long-term stability of both uplift and compression foundation legs to be made. This would also appraise the local groundwater conditions for consideration in design.

In addition, where the EAW have identified towers with possible concrete degradation, limited ground investigation techniques will be required to assess concrete condition. Similarly, in areas where Made Ground, landfills

or industrial uses are recorded, sample should be taken to assess contamination risks.

6.2.3 Low

The towers classified as a 'low' geotechnical risk would not usually require any ground investigation to be undertaken, except where confirmation of published geology between isolated tower spans was required.

6.2.4 Summary

Table 6 below summarises the level of risk assigned to each tower inspected as part of this study.

Table 6 Summary of Classification of Risk from Table E2

Risk Ranking	CG Tower Numbers
High	032, 140-150, 156, 171-177, 182-185, 203-227, 236-242, 247-254
Medium	001-009, 011, 012, 015-017, 019, 027-031, 033-063, 065-078, 082, 083, 085-088, 090-092, 094, 101, 105-139, 157, 164-170, 178-181, 186-198, 199-202, 228-235, 243-246
Low	010, 013-014, 018, 020-026, 064, 079-081, 084, 089, 093, 095-100, 102-104, 151-155, 158-163

7. RECOMMENDATIONS FOR INVESTIGATION

7.1 Rationale

The rationale for intrusive works at selected tower sites is based on a qualitative risk ranking classification of known or likely geo-hazards identified during the site desk study and walk-through survey and dictated by the variation in structural loads. The type of geo-hazard identified, together with site access constraints and underlying geology will ultimately dictate which investigation techniques are deemed most suitable. A phased ground investigation approach is recommended to assist in 'streamlining' project timescales and cost schedules.

7.2 Strategy

In summary, where low and medium risk towers exist, we would recommend a limited ground investigation to assess existing ground (natural and backfill), groundwater conditions and foundation depths/sizes. This would typically be undertaking using window sampling/dynamic probing techniques and/or using a mechanical excavator to expose foundations for inspection and obtaining concrete cores as necessary.

Should poor/soft ground be encountered to excessive depth, then additional more robust drilling techniques may be required to cater for any subsequent pile design.

In some areas where long sections of towers are classified as 'medium' risk due to the soft drift deposits and high flood risk it may be possible to limit ground investigation to every 5th or 10th tower if ground conditions are found to be consistent or if nearby boreholes confirm the geology. Any discontinuities can be subject to further investigation.

Where angle or terminal towers are designated as medium risk the classification may vary depending on structural loadings as these towers are likely to have different foundations and more intrusive work may be necessary to determine the final classification.

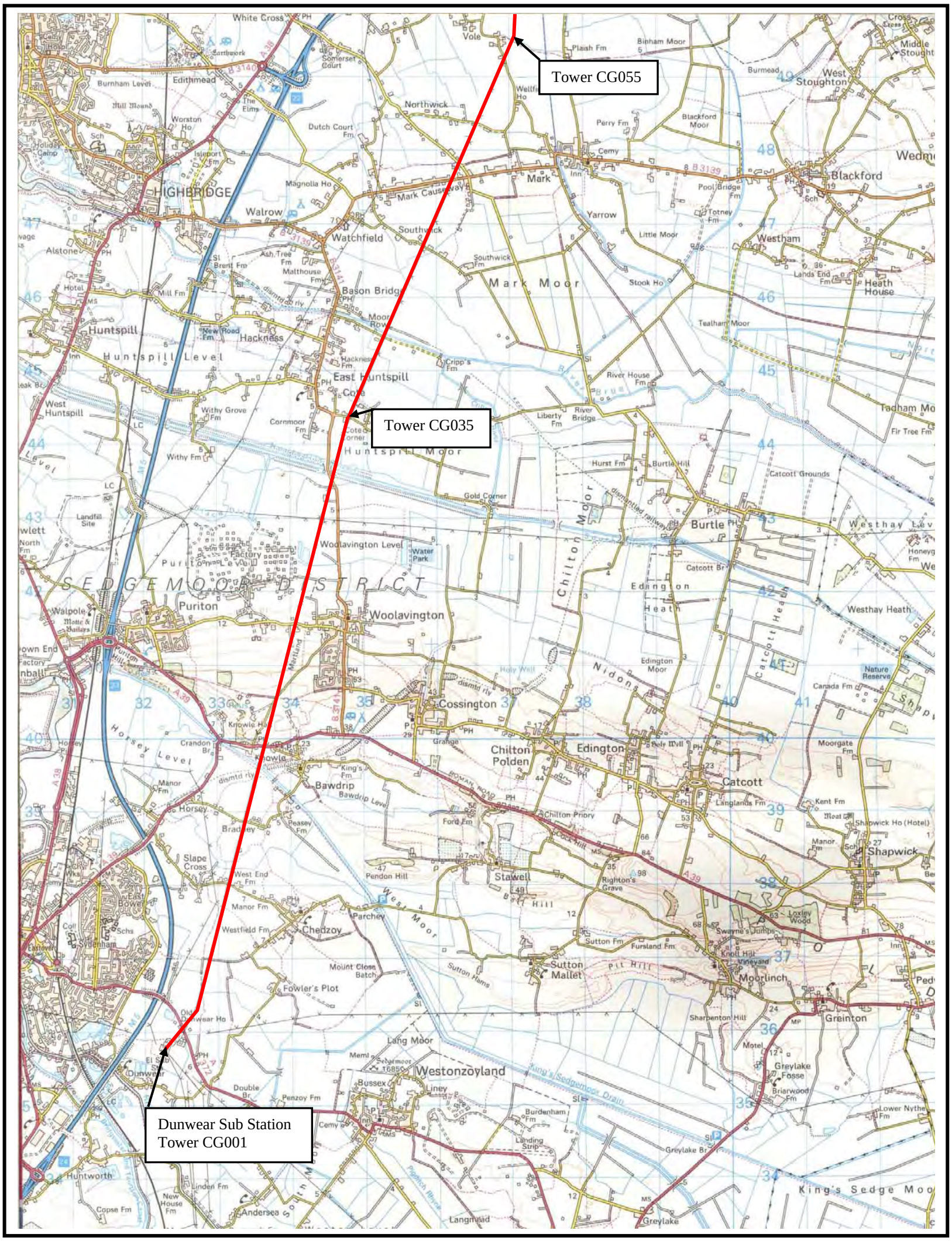
Where high risk towers exist, it is recommended that a selection of towers be investigated to assess whether ground conditions are likely to pose a risk to surface instability. This may entail the use of rotary or cable percussive drilling and/or probing techniques. This is particularly relevant at the northern end of the route from tower CG144 onwards where many towers are high risk but are located in pairs supporting adjacent OHLs. Where the towers are paired a single intrusive investigation may be sufficient at alternating towers.

Where slope stability issues may pose a threat to tower stability, then cable percussive and/or rotary boreholes may be required to obtain appropriate soil parameters for subsequent analytical modelling.

Table E2 within Appendix E details recommendations for intrusive works with a glossary of terms denoted beneath Table E1 also within Appendix E.

During any ground investigation phase of work it would be beneficial to assess access routes, scaffolding gantry and possible crane/pile working platform locations at the same time. This should look to assess the near surface ground conditions for access road / working platform design purposes.

FIGURES



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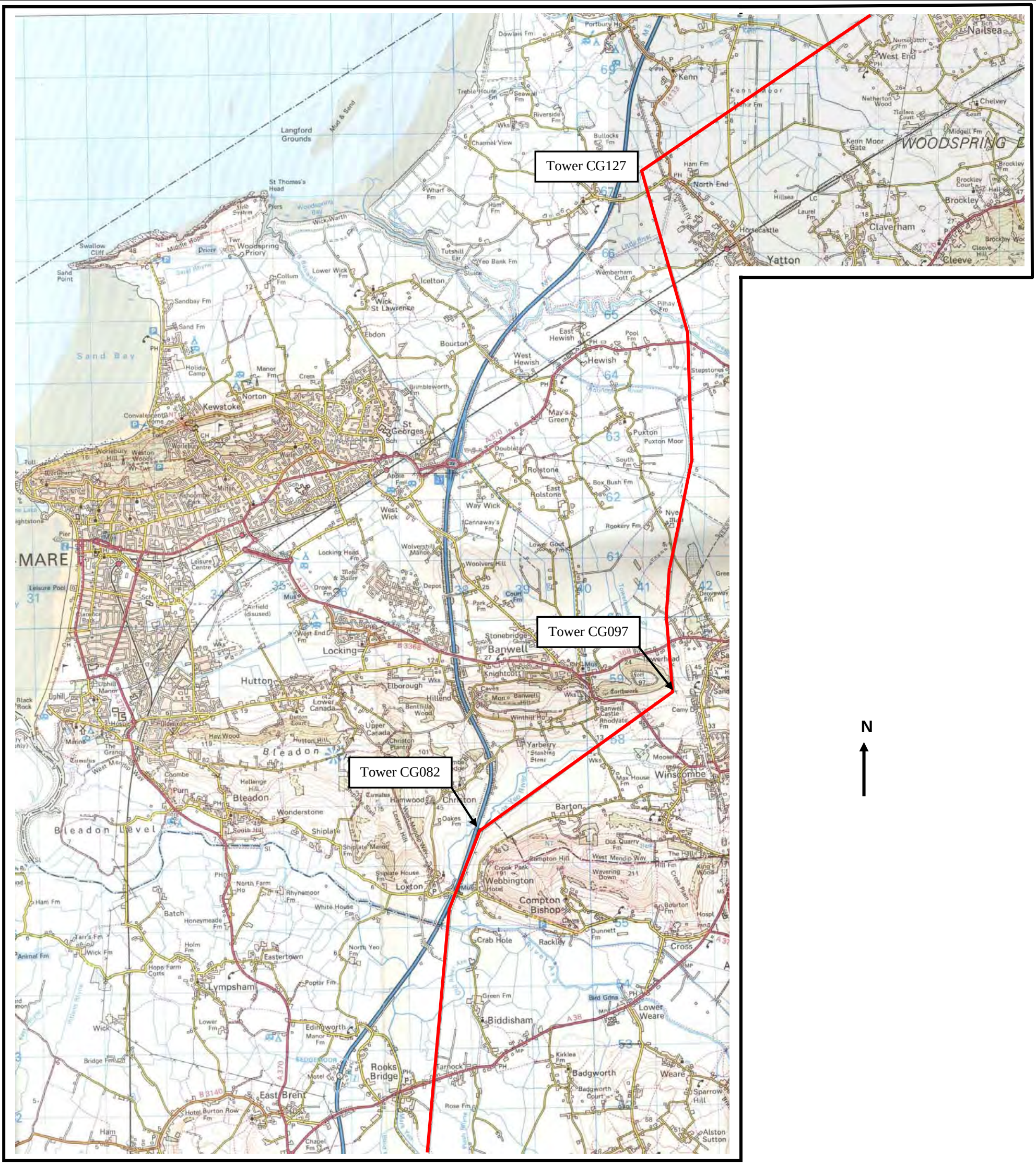
N

Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Route location map**	**Figure 1a**



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Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Route location map**	**Figure 1b**

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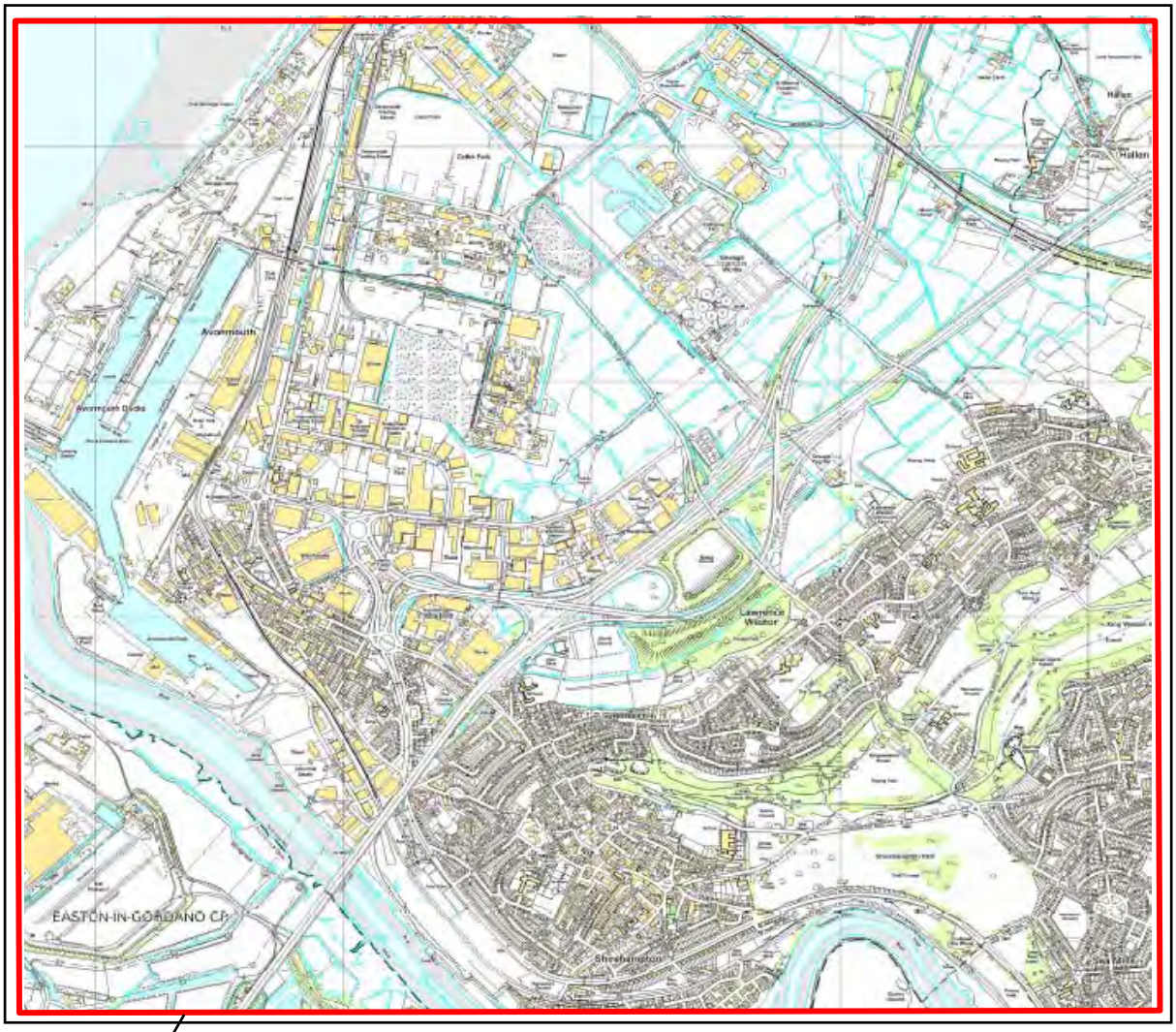
Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Route location map**	**Figure 1c**



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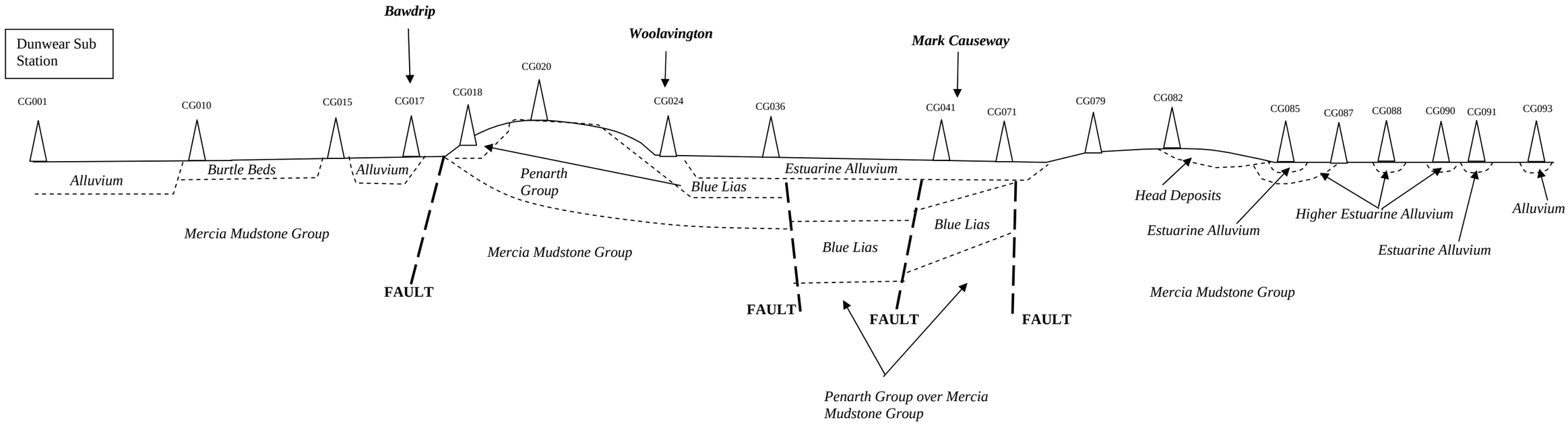
Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Route location map**	**Figure 1d**

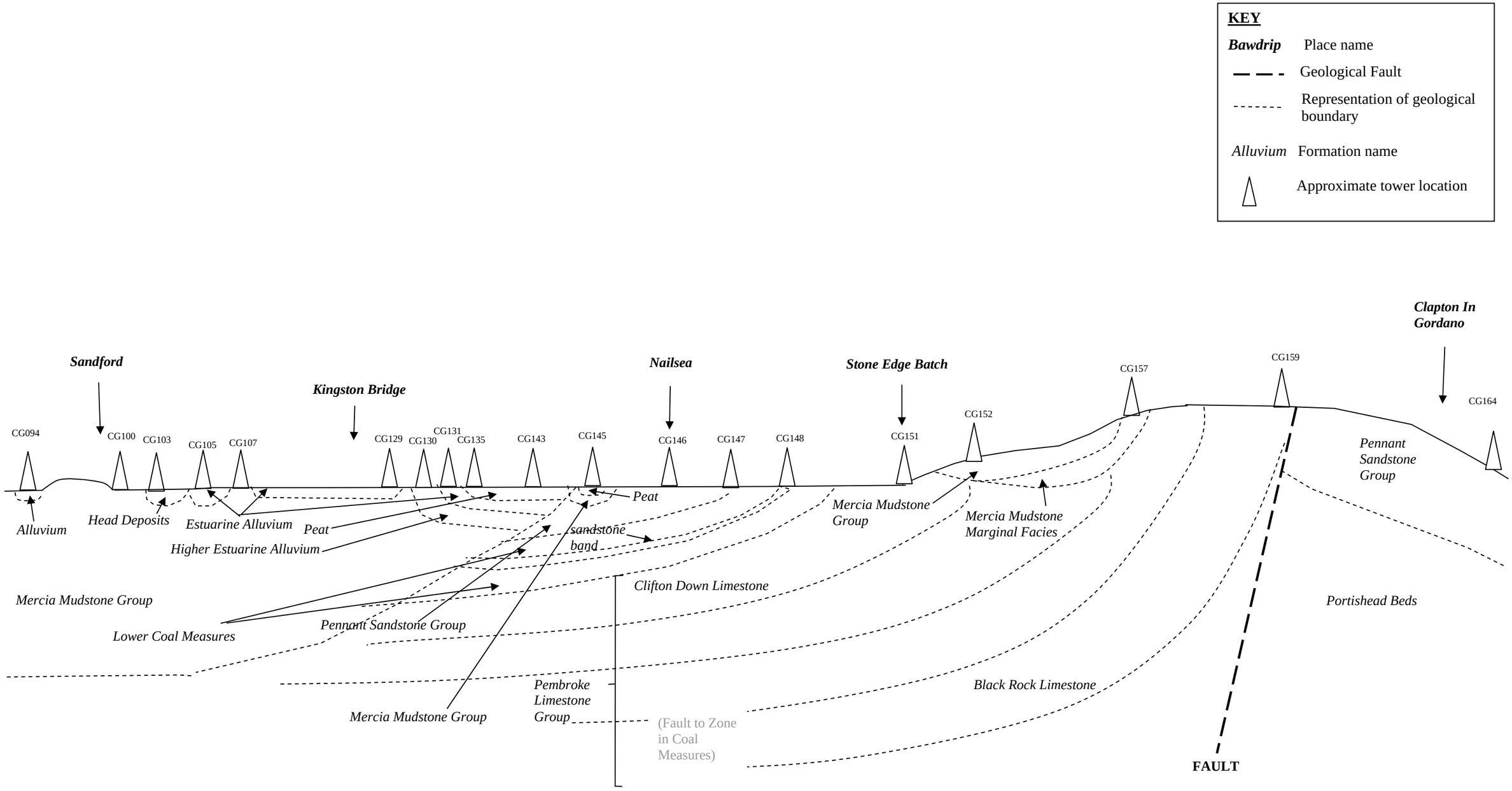
KEY

Bawdrip	Place name
— — -	Geological Fault
-------	Representation of geological boundary
Alluvium	Formation name
	Approximate tower location



NOT TO SCALE – VERTICAL SCALE EXAGGERATED

Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Conceptual geological cross section**	**Figure 2a**



Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Conceptual geological cross section**	**Figure 2b**

KEY

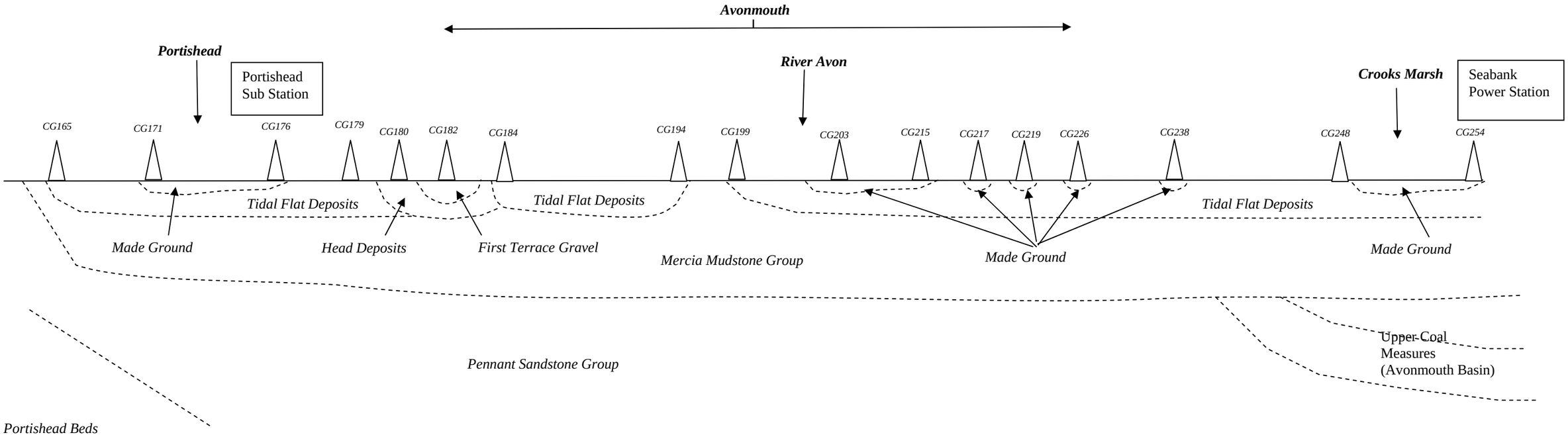
Bawdrip Place name

Geological Fault

Representation of geological boundary

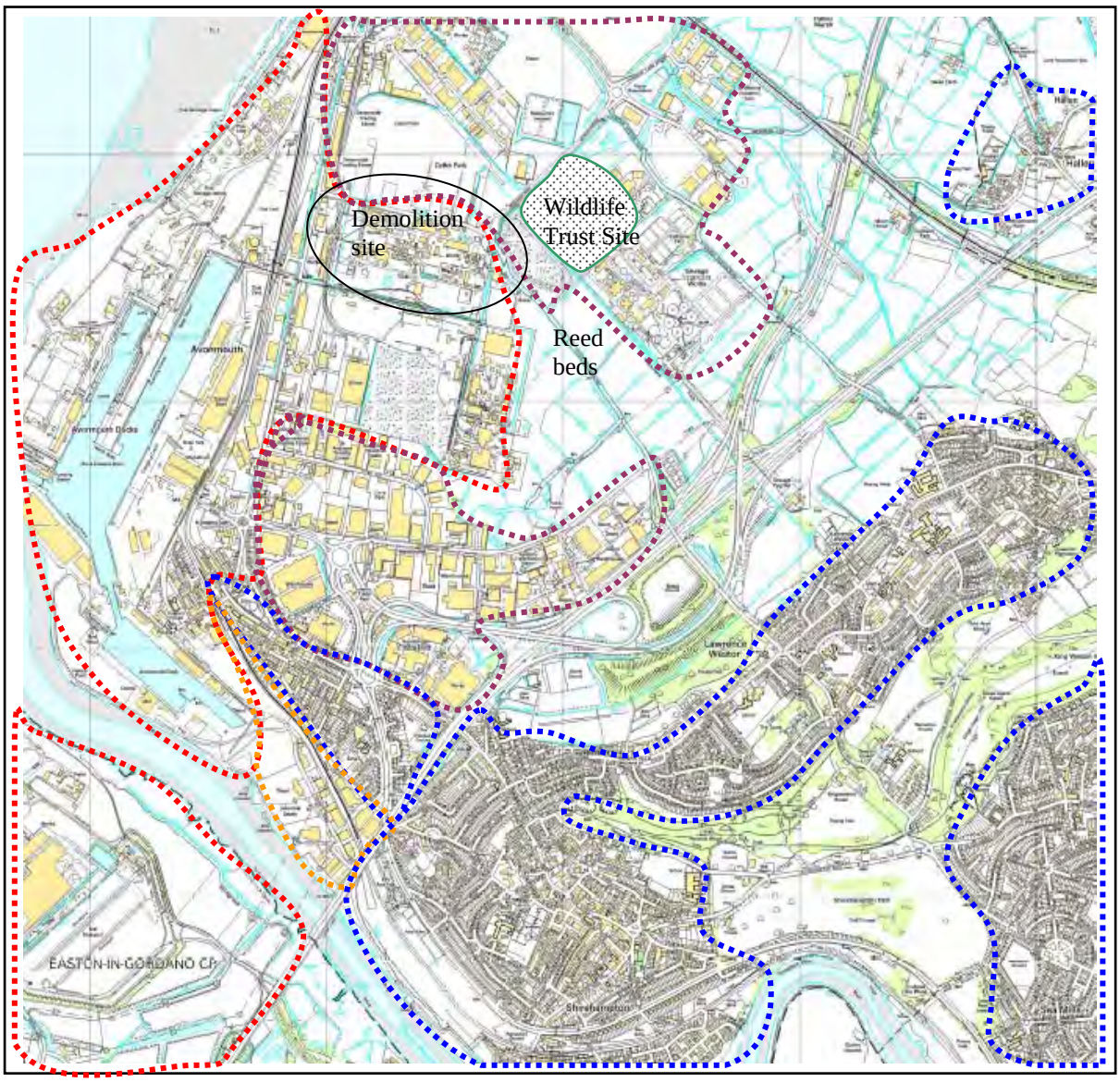
Alluvium Formation name

Approximate tower location



NOT TO SCALE – VERTICAL SCALE EXAGGERATED

Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Conceptual geological cross section**	**Figure 2c**



Residential

Heavy Industrial

Mixed Industrial

Commercial Industrial

Remaining site area is agricultural, public open space, woods, highways, river or sea and coastal area

N

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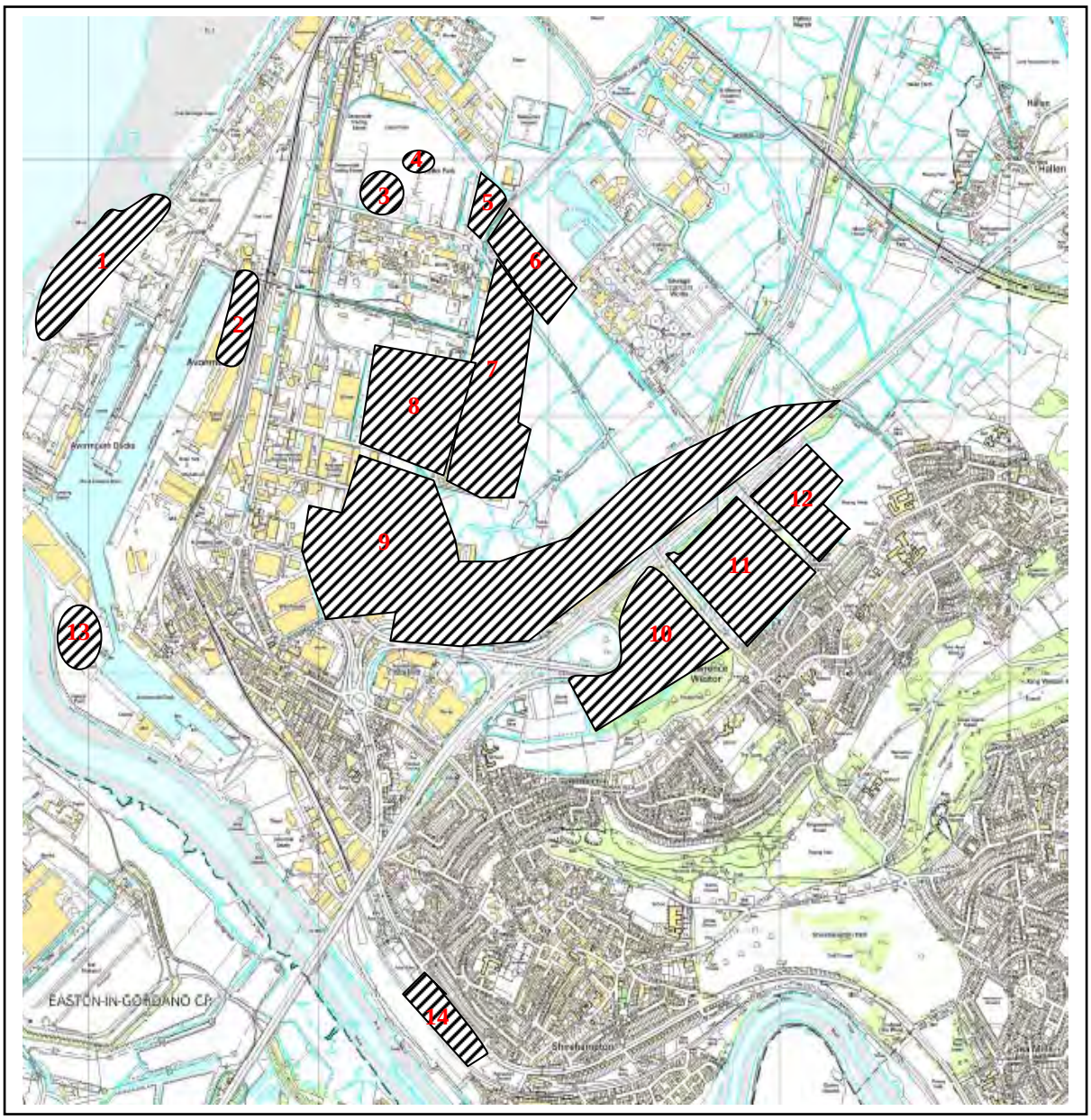
Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Avonmouth Square Land Use Summary Plan**	**Figure 3**



Approximate Landfill Boundaries according to Environment Agency website

See report text, Section 3.3.2, Table 4 for details of landfill 1-14.

N

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Client	Project	Job No
Electricity Alliance West	**Seabank to Bridgwater and Avonmouth**	**CGN/2644**
CARD GEOTECHNICS	Title: **Avonmouth Landfill Site Location Plan**	**Figure 4**

APPENDIX A

CD with satellite imagery of OHL route and historical maps

APPENDIX B

Photosheets

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	1

Notes

Top – Tower CG010 onwards (with adjacent OHL route to east)

Bottom – Towers CG020 onwards

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	2

Notes
Left – Tower CG032 adjacent to Huntspill River
Right – Towers CG098 traversing slope.

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	3

Notes

Top – Tower CG151 (left), with adjacent OHL (right)

Bottom – Tower CG153 (left) with adjacent OHL (right)

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	4

Notes

Top – Tower CG162 onwards crossing M5 towards Portishead

Bottom – Tower CG174 and entry to Portishead Substation

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	5

Notes

Top – Tower CG216 base within industrial estate

Bottom – Tower CG226 in flood plain adjacent to M49

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	6

Notes

Top – Tower CG231 adjacent to railway tracks

Bottom – Tower CG250 onwards crossing Crooks March Landfill Site

CARD GEOTECHNICS

PHOTO SHEET

Date	Job No	Made by	Checked by	Sheet No
16/11/2009	CGN/2644	AB	JS	7

Notes

Top – Avonmouth area looking towards Laurence Weston

Bottom – Demolition site near King Weston Lane

APPENDIX C

BGS borehole records

ST 33 NW | 32

LOG for BOREHOLE No. B210/22

Fig. 36

LANGPORT ROAD OVERBRIDGE

Location No. 5333

Sheet 1 *of*

Carried out by cable tool boring in Bin size to 71ft 6in and diamond drilled to 84ft 6in.

Date 11th to 18th July 1969

N.G.R. 3214, 3649

Description	Reduced Level: ft.	Depth ft.	Depth in.	Thickness ft.	Thickness in.	Standard Penetration test: Depth and Penetration ft.	Standard Penetration test: Depth and Penetration in.	Standard Penetration test: No. of Blows (N)	
Ground Level (Ft. above N.D.)	18 · 0	0	0						
Brown clayey TOPSOIL	17 · 0	1	0	1	0				
Stiff grey-brown mottled silty CLAY, becoming more grey with depth				4	9				
Estimated base of crust									
Medium dense grey with a trace of brown medium & fine SAND with a little clay.	12 · 3	5	9						
more clayey	9 · 8	8	3	2	6				
Compact black & brown PEAT				2	3				
	7 · 5	10	6						
Soft to firm mid grey silty CLAY with crumbly texture and patches of black & brown peat				11	9				
becoming soft									4" PISTON
	-4 · 3	22	3						54mm PIST
									54mm PIST
									4" PISTON
Soft mid grey silty CLAY with partings of silt. Vertical peat over most of the layer with occasional horizontal bands				13	9				54mm PIST
peaty									54mm PIST
very peaty									54mm PIST
Compact brown & black fibrous PEAT	-18 · 0	36	0	0	6				
	-18 · 5	36	6						
Loose becoming medium dense mid-grey silty fine SAND with occasional laminations of clay & patches of peat						40	6 12	6	
						45	6 12	7	
				21	0				

Scale 1 In. = 5 ft.

● Disturbed Sample ↕ Bulk Sample ▮ Tube or Core Sample (Length to scale) △ Water Sample

SOIL MECHANICS LTD., Staverton Airport, Cheltenham, Glos.

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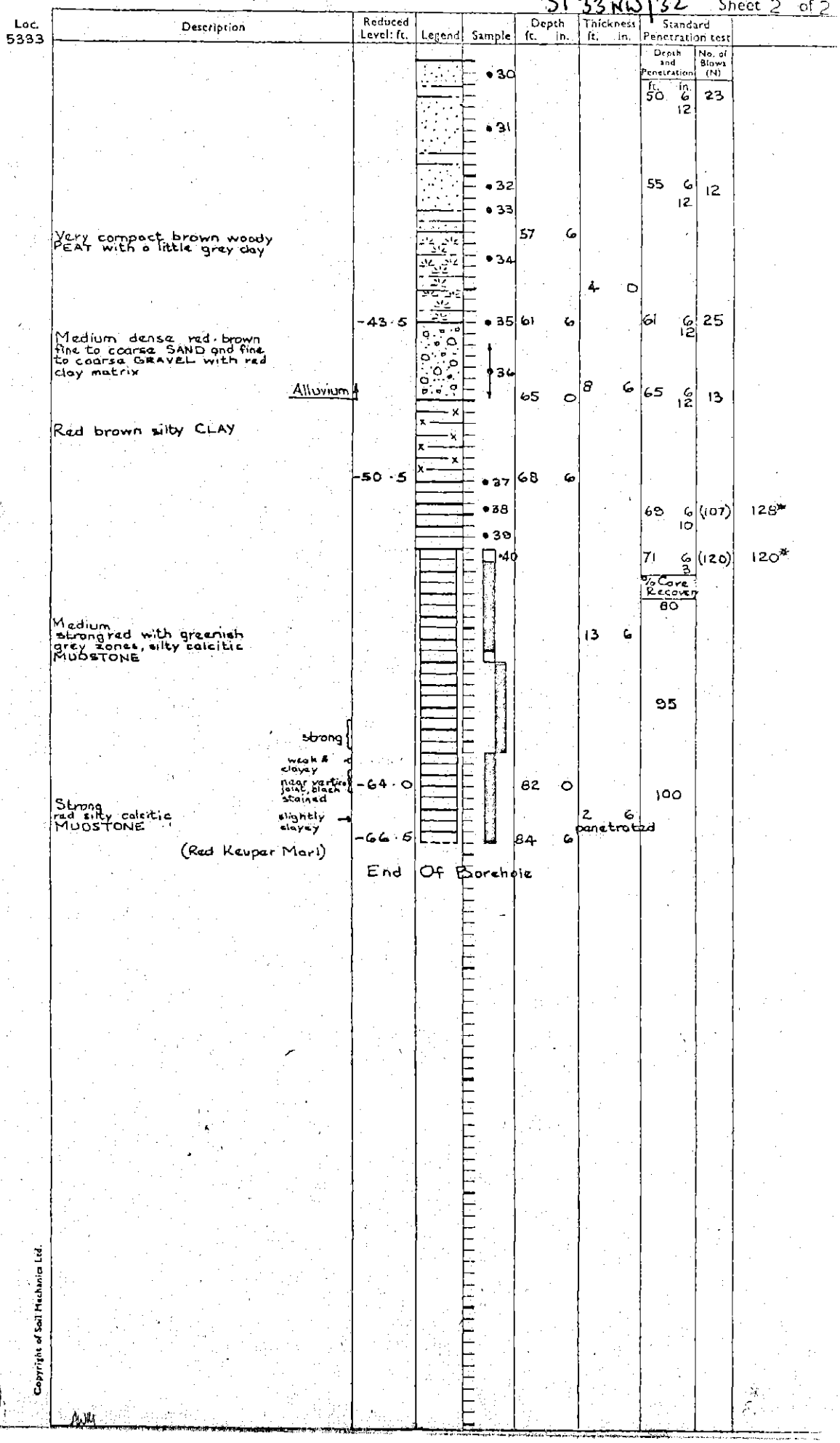
[ST33NW BJ 32 .]

CONTINUATION LOG for BOREHOLE No. B 210/22 Fig. 36

ST 33 NW/32 Sheet 2 of 2



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· 1

RECORD OF WELL

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295/130

ST33/4

At Sibleys Fm., Chedzoy

Town or Village Bridgwater

County SOMERSET.

EXACT SITE OF WELL

Six-inch sheet SOSE/E. Six-inch National Grid sheet ST 3397 3744

For ..... State whether owner, tenant, builder, contractor, consultant, etc.:— .....

Address (if different from above) .....

* DELETE WHICHEVER IS INAPPLICABLE

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

SHAFT .....ft.; diameter.....ft.; HEADINGS (please attach details—dimensions and directions)

BORE 50 ft.; diameter of bore: at top 6 in.; at bottom .....in.

Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.) 25' of 6" galvanised steel lining tube.

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

TEST CONDITIONS

Rest level of water 11 ft. ~~above~~ below well top. Suction at .....ft. Yield on ..... hours'* days' test pumping at 700 galls. per hour with depression to 18 ft. below well top.

Recovery to rest level in ..... mins.* hours Capacity of pump .....g.p.h. Date of measurements .....

NORMAL CONDITIONS

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

Make and/or type ..... Motive power .....

Capacity .....galls. per hour. Suction at 47 ft. below well top.

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

Well made by F.G. Clements Ltd. Date of sinking March 1965.

Information from F.G. Clements Ltd.

ADDITIONAL NOTES ANALYSIS (please attach copy if available)

Data Bank · Aug 1980

LOG OF STRATA OVERLEAF.

For Survey use only

Date Received 15-3-65.

Section 6 .....

Pumping test .....

Observ. well .....

Recorder .....

E.R. log .....

Site marked on

1" map O

6" map O.19.3.65.

(use symbol)

Record forwarded

to .....

date .....

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

23/11/59 (3697) Wt.54188—P.S.47 10M 1/60 M.P.Ltd. G.722

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[ST33NW BJ 44 .]

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far	THICKNESS Feet	 Inches	DEPTH Feet	 Inches
	Sandy Gravel } Bustle Beds			25	—
	Hard Sandy Marl } Bustle Beds			50	—

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[ST33NW BJ 44 .]

.295/130

ST 33/4

Bowtle Beds to 50 FT

OTE
Nov 78

Data Bank · Aug 1980

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RECORD OF WELL

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~~295~~/130

At Sibley Fm, Chedzoy

Town or Village Bridgwater

County SOMERSET

ST 33 NW/44 3397 3744

EXACT SITE OF WELL

Six-inch sheet 50 SE/E Six-inch National Grid sheet ST 3397 3744

For ..... State whether owner, tenant, builder, contractor, consultant, etc. :—

Address (if different from above).....

DELETE WHICHEVER IS INAPPLICABLE

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

SHAFT.....ft.; diameter.....ft.; HEADINGS (please attach details—dimensions and directions)

BORE 50 ft.; diameter of bore: at top 6 in.; at bottom.....in.

Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.) 25' of 6" galvanised steel lining tube.

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

TEST CONDITIONS

Rest level of water 11 ft. above / below well top. Suction at.....ft. Yield on.....hours'/days' test pumping at 700 galls. per hour with depression to 18 ft. below well top.

Recovery to rest level in.....mins./hours Capacity of pump.....g.p.h. Date of measurements.....

NORMAL CONDITIONS

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

Make and/or type..... Motive power.....

Capacity.....galls. per hour. Suction at 47 ft. below well top.

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

Well made by F.G. Clements Ltd., Date of sinking March 1965.

Information from F.G. Clements Ltd.,

ADDITIONAL NOTES ANALYSIS (please attach copy if available)

LOG OF STRATA OVERLEAF.

For Survey use only

Date Received 15-3-65.

Section 6 .....

Pumping test .....

Observ. well .....

Recorder .....

E.R. log .....

Site marked on

1" map O

6" map O 19.3.65 (tube symbol)

Record forwarded

to .....

date .....

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

23(11)/59 (3697) WL5418—9,647 10M 1/60 M.P.L.&L. G.723

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ST33NW/44

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
Burtle Beds	Sandy Gravel			25	—
	Hard Sandy Marl } Burtle Beds			50	—
EAE 11/78					
	Probably only the top 25' is Burtle Beds BJW 7/80.				

295 (2) /130

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ST 3443 4548

279/7

Huntspill

337 out of its 340 houses are supplied by the Bridgwater Rural District Council from their Willoughby Supply in the Quantock Hills (*see* Broomfield).

BASON BRIDGE BORING.

ST 3443 4547

At the Elementary Schools (600 yds. S. of Bason Bridge), East Huntspill. Made (for water) in 1896 and particulars communicated by E. W. Stevens of Taunton to H. B. Woodward.

ST34/2

W. A. E. Ussher, "Geol. Quantock Hills, etc.", *Mem. Geol. Surv.* (1908), p. 83, references on pp. 38, 76, 80, 84. J. McMurtrie, *Proc. Somerset Arch. and Nat. Hist. Soc.*, vol. lvii, pt. ii (1912), p. 32.

Well, 30 ft., rest bored :—

		Thickness. Ft.	In.	Depth. Ft.	In.
[Alluvial Deposits and Burtle Beds]	1. Fine calcareous silt	16	0	16	0
	2. Peat ... ... 3 to	4	0	19	6
	3. Fine calcareous silt	43	6	63	0
	4. Blowing sand, marine shells. *Pecten, Pholas*, etc.	10	0	73	0
	5. Sand with clay	1	0	74	0
	6. Calcareous shale	1	0	75	0
	7. Blowing sands with bits of flint, shales at 8 ft. *Hydrobia (Rissoa)*	10	0	85	0
	8. Shingle containing *Pecten, Pholas*, bits of Lias, Carboniferous limestone, quartz, etc. *Belemnites, Gryphaea*, Ammonites ...	3	0	88	0
	9. Sand with clay	1	0	89	0
	10. Stiff calcareous clay, with nodules	2	0	91	0
	11. Hard calcareous blue clay ...	11	0	102	0
	12. Dark clay, with fragments of *Rhynchonella* and *Spiriferina walcotti*	1	0	103	0
	13. Lighter-coloured calcareous clay, with *Gryphaea*	2	0	105	0
	14. Hard dark marly clay, Belemnite	4	0	109	0
Lower Lias	15. Hard dark marly clay with marlstones	6	0	115	0
	16. Lias clay	3	0	118	0
	17. Clay with earthy limestones ...	2	0	120	0
	18. Dark Lias clay	3	0	123	0
	19. Light-coloured Lias clay ...	6	0	129	0
	20. Dark clay	4	0	133	0
	21. Marly clay, with *Gryphaea* ...	2	0	135	0
	22. Blue Lias rock	1	0	136	0
	23. Marly clay	1	0	137	0
	24. Earthy limestone	1	0	138	0
	25. Dark dense Lias clay and shale; *Gryphaea*	2	0	140	0
	26. Soft Lias clay	2	0	142	0

(cont.)

Correspondence between Stevens & H.B. Woodward (1895-6) 279/7.

O.D.+16'. Sited on 6" Som. 38 NE/E. H. Pike 2.5.1969.

Huntspill

BASON BRIDGE BORING.

Water from [Lower Lias at] a depth of about 270 ft. *See* p. 59.

Made in 1896.

	In grains per gallon. (1)	(2)
Solids	476	459·2
Chlorine	240	245
Free ammonia	3	1·52
	In parts per million.	
Albuminoid ammonia	1·58	·98

Published in 'Wells & Springs of Somerset', p. 57-59

British Geological Survey

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[ST34NW BJ 23 .]

	27. Marly clay, with limestone in top 3 ft.	5	0	147	0
	28. Dense Lias clay, with a layer of marlstone at 160 ft. and limestone at 172 to 172½ ft. ...	34	0	181	0
	29. Earthy limestone	1	0	182	0
	30. Dense dark Lias clay. Marlstone with *Gryphaea* at 181-182 ft. *Rhynchonella* at the base	21	0	203	0
	31. Black marly clay	1	0	204	0
	32. Black dense clay with nodules ...	2	0	206	0
	33. Black marly clay	2	0	208	0
	34. Dark dense Lias clay with limestone nodules	5	0	213	0
	35. Dense Lias clay	20	0	233	0
	36. Dark dense Lias clay, very hard	20	0	253	0
	37. Earthy limestone	1	0	254	0
	38. Very dark dense Lias clay ...	21	0	275	0
	39. Blue Lias rock	1	0	276	0
	40. Dark marly Lias clay	1	0	277	0
	41. Hard black marly Lias clay ...	16	0	293	0
	42. Black dense Lias clay ...	20	0	313	0
	43. Very hard marly clay	8	0	321	0
	44. Earthy limestone-rock ...	2	0	323	0
	45. Hard dark dense Lias clay with earthly limestone-rock at 336-340 feet	31	0	354	0
Lower Lias	46. Earthy limestone-rock. Salt drying out at 375 ft.... ...	26	0	380	0
	47. Softer clay, marly	3	0	383	0
	48. Hard dense Lias clay. Salt dries out	6	0	389	0
	49. Softer Lias clay	1	0	390	0
	50. Hard marly clay	3	0	393	0
	51. Black marly clay	3	0	396	0
	52. Hard black clay. Salt ...	2	0	398	0
	53. Black softer marly clay ...	2	0	400	0
	54. Loose marly clay, light-coloured	1	0	401	0
	55. Dense black clay	1	0	402	0
	56. Soft black clay	1	0	403	0
	57. Black shales	0	6	403	6
	58. Hard marly clay	2	6	406	0
	59. Hard dark clay	3	0	409	0
	60. Softer clay	1	0	410	0
	61. Hard light-coloured marly clay	8	0	418	0
	62. Hard dark clay	9	0	427	0
	63. Hard light-coloured marly clay	4	0	431	0
	64. Hard dark marl	20	0	451	0
	65. Hard dark dense clay	1	3	452	3
	66. Hard marly clay	4	9	457	0
	67. Black shales	1	0	458	0
	68. Hard dark dense Lias clay ...	3	0	461	0
	69. Hard marly clay with limestones	4	0	465	0
	70. Clay and limestones	6	0	471	0
	71. Dense Lias clay	6	0	477	0
	72. Earthy limestone	4	0	481	0
	73. Dense clay, bottom foot lighter-coloured. Salt	3	0	484	0
	74. Darker marly clay	1	0	485	0
	75. Dark dense clay	2	0	487	0
	76. Hard marly clay. Lime-deposit drying out	1	0	488	0
Lower Lias	77. Black clay, with shales ...	4	0	492	0
	78. Dense black clay, softer ...	2	0	494	0
	79. Hard black clay. Salt and lime drying out from top half ...	2	0	496	0
	80. Hard light-coloured dense clay. Salt drying out	3	0	499	0
	81. Hard very hard dense clay ...	1	0	500	0
	82. Hard black dense clay ...	1	0	501	0
	83. Dark slimy clay, very soft. ...	1	0	502	0

Lined with 109 ft. of tubing, 6 in. diameter, to 109 ft. ex surface (to exclude upper water), and lined with 242 ft. of tubing, 5 in. diameter, to 242 ft.

Ussher stated (p. 38) that ". . . the Rhaetic was not penetrated at a depth of 494 ft." Also (p. 83), that bed 2 was probably correlative with the forest bed at the mouth of the Parrett; and that (p. 84) bed 8 " might correspond to the later glacial gravels."

W. H. Cousins, Engineer and Surveyor, Bridgwater Rural District Council, informs me that " This [borehole] was made originally to supply the new Elementary Schools. The water was brackish and unsuitable and when the [Bridgwater] Rural District Council's [Willoughby] supply was laid on, the borehole was abandoned."

" Eighteen months or so ago from July, 1924, a borehole [illegible] deep was made by the Wm. Hulbert Dairy Co., at Basonbridge Factory. The water is brackish and is now used only for milk cooling and engine cooling."

N.B. Analysis, p. 232.

of Somerset',

p.

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[ST34NW BJ 23 .]

Somerset.

(Lt Authority) 279 41

Jun. 3

Bason Bridge, East Huntspill. ST34/2

Artesian Well at New Board Schools. 7

ST 3443 4548

Architect, A. Basil Cottam, A.R.I.B.A. Bridgwater.

Engineer, E.W. Stevens, Taunton.

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Fine calcareous silt (Alluvium)		16	0		16	0
Peat			6		16	6
Fine calcareous silt		13	6		30	0
Fine Calcareous silt		30	0		60	0
Blowing Sand with mixed water & marine shells: Pecten, Pholas, etc.		10	0		70	0
Sand with clay		1	0		71	0
Calcareous Shale		1	0		72	0
Blowing Sand with bits of flint - Shells. (Stones & Shells at 81 ft. Hydrobia (Rissoa?) Ilex)		10	0		82	0
Shingle containing bits of Lias, Carboniferous Limestone, Quartz etc. Belemnites, Gryphaea, Pecten, Pholas, Ammonites.		3	0		85	0
Sand with Clay		1	0		86	0
Stiff calcareous clay with Nodules.		2	0		88	0
Hard calcareous blue clay		11	0		99	0
Dark coloured Clay with fragments of Rhynchonella & Spirifera Walcotti		1	0		100	0
Lighter coloured calcareous clay Gryphaea.		2	0		102	0
Hard dark marly clay. Belemnite.		4	0		106	0
Hard dark marly clay with Marlstones		6	0		112	0
Lias Clay		3	0		115	0
Clay with earthy limestones		2	0		117	0
Dark Lias Clay		3	0		120	0
Light Colour Lias Clay		6	0		126	0
Dark Clay		4	0		130	0
Marly Clay with Gryphea		2	0		132	0
Blue Lias Rock		1	0		133	0
Marly Clay		1	0		134	0
Earthy Limestone		1	0		135	0

P57

W B & L (x)—80555—1000-4-97

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[ST34NW BJ 23 .]

Somerset. ST34/2

4 Bacon Bridge, East Huntspill. 2/17

ST 3443 4548

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Dark dense Lias Clay & Shale. Gryphea & Selenite		2	0			
Soft Lias Clay		2	0			
Marly Clay with Limestones		3	0			
Marly Clay		2	0			
Dense Lias Clay		4	0			
Dense Lias Clay: at base a layer of Marlstones		12	0			
Dense Lias Clay		12	0			
Large Earthy Limestones			6			
Dense Lias Clay		5	6			
Earthy Limestone		1	0			
Dense Dark Lias Clay		2	0			
Marlstones with Gryphea.		1	0			
Dense Dark Lias Clay (pieces of Rhynchonella at base)		18	0			
Black Marly Clay		1	0			
Black dense Clay with Nodules		2	0			
Black Marly Clay		2	0			
Dark dense Lias Clays with Limestone (nodules)		5	0			
Dense Lias Clay		10	0			
Dense Lias Clay		10	0			
Dark dense Lias Clay, very hard		10	0			
ditto ditto		10	0			
Earthy Limestones		1	0			
Very dark dense Lias Clay		19	0			
? ditto		2	0			
Blue Lias Rock		1	0			
Dark Marly Lias Clay.		1	0			
Hard Black marly Lias Clay		16	0			
Black dense Lias Clay		10	0		300	0

W B & L (x)—80555—1000-4-97

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[ST34NW BJ 23 .]

Somerset.

ST34/2

Bacon Bridge, East Nimrod Hill. 2/7

ST 3443 4548

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Black dense Lias clay		10	0			
Very hard marly clay		8	0			
Earthy limestone rock		2	0			
Hard dark dense Lias clay		16	0			
Earthy limestone rock		4	0			
Hard dark dense Lias clay		11	0			
Earthy Limestone Rock (Salt drying out at 2' from bottom)		26	0			
Softer clay, marly		3	0			
Dark dense Lias clay (Salt dries out)		6	0			
Softer ditto		1	0			
Hard marly clay, dries light		3	0			
Black marly clay		3	0			
Hard Black clay. Salt.		2	0			
Black Softer marly clay		2	0			
Loose marly clay, light.		1	0			
Dense black clay		1	0			
Soft black clay		1	0			
Black Shales			6			
Hard marly clay		2	6			
Hard dark clay		3	0			
Softer clay		1	0			
Hard light marly clay		4	0			
Very hard light marly clay		4	0			
Hard dark clay		3	0			
Hard dark dense clay		6	0			
Hard light marly clay		1	0			
Hard very light marly clay		3	0			
Hard dark marl		1	0			
Hard dark dense clay		20	0		449	0

W B & L (x)—80655—1000-4-07

2

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[ST34NW BJ 23 .]

Somerset.

Bason Bridge, East Huntspill

ST 3443 4548

ST34/2

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Lighter Shaley Clay		1	3			
Hard Marly Clay		4	9			
Black Shales		1	0			
Hard dark dense Lias clay		3	0			
Hard marly clay with limestones		4	0			
Clay & Limestones		6	0			
Dense Lias Clay		2	0			
Dense Lias Clay		1	0			
Dense Lias Clay		3	0			
Earthy Limestone		4	0			
Dense Clay		2	0			
Lighter dense clay		1	0		482	0

Further Information from letter dated Nov 14 1896 regarding samples sent.

Lighter Marly Clay, Salt dries out freely -					482	0
Darker Marly Clay (salt)					483	0
Dark dense Clay (no salt)					484	0
Do do plastic (do)					485	0
Hard Marly Clay, Lime deposit drying out					486	0
Black Clay with shells at 487, 488 & 489 feet						
Very hard Black Clay (Lime deposit)					490	0
Dense Black Clay softer					491	0
Dense Black Clay (Softer). Remains plastic unless dried by heat. A brownish green Tint noticeable when first brought up					492	0
Hard very Black Clay. Salt and Lime drying out					493	0
Hard very Black Clay (Plastic)					494	0

The boring seems to have been abandoned at a depth of 500ft as in a letter dated Nov 26, 1896 announcing the abandonment of the undertaking the occurrence of a soft clay bed at 499 feet is mentioned.

WB & L (x)—80555—1000-4-97

(4)

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[ST34NW BJ 23 .]

ST34/2 279/7

279/7

ST 3443 4548

Alluvial deposits, marine sand & shingle to 89ft (27·1m)
Low Lia to 502ft (153·0m)

The marine deposits at the base probably belong to the basal Holocene sequence of the Burtle Beds as mapped in Wells & Ignis of Somerset.

J. W. Green
20. 3. 78

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ST 34 NW/23
N.G.R.
3443.4548

Huntspill

337 out of its 340 houses are supplied by the Bridgwater Rural District Council from their Willoughby Supply in the Quantock Hills (*see* Broomfield).

BASON BRIDGE BORING:

At the Elementary Schools (600 yds. S. of Bason Bridge), East Huntspill. Made (for water) in 1896 and particulars communicated by E. W. Stevens of Taunton to H. B. Woodward.

W. A. E. Ussher, "Geol. Quantock Hills, etc.", *Mem. Geol. Surv.* (1908), p. 83, references on pp. 38, 76, 80, 84. J. McMurtrie, *Proc. Somerset Arch. and Nat. Hist. Soc.*, vol. lvii, pt. ii (1912), p. 32.

Well, 30 ft., rest bored :—

		Thickness. Ft.	In.	Depth. Ft.	In.	
[Alluvial Deposits and Burtle Beds]	1. Fine calcareous silt	16	0	16	0	(4.9 m)
	2. Peat ... ... 3 to	4	0	19	6	(5.9 m)
	3. Fine calcareous silt	43	6	63	0	(19.2 m)
	4. Blowing sand, marine shells. *Pecten, Pholas*, etc.	10	0	73	0	(22.3 m)
	5. Sand with clay	1	0	74	0	(22.6 m)
	6. Calcareous shale	1	0	75	0	(22.9 m)
	7. Blowing sands with bits of flint, shales at 8 ft. *Hydrobia* (*Rissoa*)	10	0	85	0	(25.9 m)
	8. Shingle containing *Pecten, Pholas*, bits of Lias, Carboniferous limestone, quartz, etc. *Belemnites, Gryphaea*, Ammonites ...	3	0	88	0	(26.8 m)
	9. Sand with clay	1	0	89	0	(27.1 m)
	10. Stiff calcareous clay, with nodules	2	0	91	0	(27.7 m)
	11. Hard calcareous blue clay ...	11	0	102	0	(31.1 m)
	12. Dark clay, with fragments of *Rhynchonella* and *Spiriferina walcotti*	1	0	103	0	(31.4 m)
	13. Lighter-coloured calcareous clay, with *Gryphaea*	2	0	105	0	(32.0 m)
	14. Hard dark marly clay, Belemnite	4	0	109	0	(33.2 m)
Lower Lias	15. Hard dark marly clay with marlstones	6	0	115	0	(35.1 m)
	16. Lias clay	3	0	118	0	(36.0 m)
	17. Clay with earthy limestones ...	2	0	120	0	(36.6 m)
	18. Dark Lias clay	3	0	123	0	(37.5 m)
	19. Light-coloured Lias clay ...	6	0	129	0	(39.3 m)
	20. Dark clay	4	0	133	0	(40.6 m)
	21. Marly clay, with *Gryphaea* ...	2	0	135	0	(41.2 m)
	22. Blue Lias rock	1	0	136	0	(41.5 m)
	23. Marly clay	1	0	137	0	(41.8 m)
	24. Earthy limestone	1	0	138	0	(42.1 m)
	25. Dark dense Lias clay and shale; *Gryphaea*	2	0	140	0	(42.7 m)
	26. Soft Lias clay	2	0	142	0	(43.3 m)

(cont.)

Correspondence between Stevens & H.B. Woodward (1895-6) 279/7, (≈ 5.5m) O.D. +18'. Sited on 6" Som 38 NE/E. H. Pike 2.5.1969.

Huntspill

BASON BRIDGE BORING.

Water from [Lower Lias at] a depth of about 270 ft. *See* p. 59.
Made in 1896.

	In grains per gallon. (1)	(2)
Solids	476	459·2
Chlorine	240	245
Free ammonia	3	1·52
	In parts per million.	
Albuminoid ammonia	1·58	·98

Published in 'Wells & Springs of Somerset pp. 57-59

Solely Holocene Alluvial deposits & marine sd. & head deposits throughout. J.W.G. 20.3.78

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[ST34NW BJ 23 .]

	27. Marly clay, with limestone in top 3 ft.	5	0	147	0	(44.8m)
	28. Dense Lias clay, with a layer of marlstone at 160 ft. and limestone at 172 to 172½ ft. ...	34	0	181	0	(55.2m) (55.5m)
	29. Earthy limestone	1	0	182	0	
	30. Dense dark Lias clay. Marlstone with *Gryphaea* at 181-182 ft. *Rhynchonella* at the base	21	0	203	0	(61.9m)
	31. Black marly clay	1	0	204	0	(62.2m)
	32. Black dense clay with nodules ...	2	0	206	0	(62.8m)
	33. Black marly clay	2	0	208	0	(63.4m)
	34. Dark dense Lias clay with limestone nodules	5	0	213	0	(64.9m)
	35. Dense Lias clay	20	0	233	0	(71.0m)
	36. Dark dense Lias clay, very hard	20	0	253	0	(77.1m)
	37. Earthy limestone	1	0	254	0	(77.4m)
	38. Very dark dense Lias clay ...	21	0	275	0	(83.8m)
	39. Blue Lias rock	1	0	276	0	(84.1m)
	40. Dark marly Lias clay	1	0	277	0	(84.4m)
	41. Hard black marly Lias clay ...	16	0	293	0	(89.3m)
	42. Black dense Lias clay ...	20	0	313	0	(95.4m)
	43. Very hard marly clay	8	0	321	0	(97.8m)
	44. Earthy limestone-rock ...	2	0	323	0	(98.4m)
Lower Lias	45. Hard dark dense Lias clay with earthly limestone-rock at 336-340 feet	31	0	354	0	(107.9m)
	46. Earthy limestone-rock. Salt drying out at 375 ft.... ...	26	0	380	0	(116.8m)
	47. Softer clay, marly	3	0	383	0	(116.7m)
	48. Hard dense Lias clay. Salt dries out	6	0	389	0	(118.6m)
	49. Softer Lias clay	1	0	390	0	(118.9m)
	50. Hard marly clay	3	0	393	0	(119.8m)
	51. Black marly clay	3	0	396	0	(120.7m)
	52. Hard black clay. Salt ...	2	0	398	0	(121.3m)
	53. Black softer marly clay ...	2	0	400	0	(121.9m)
	54. Loose marly clay, light-coloured	1	0	401	0	(122.2m)
	55. Dense black clay	1	0	402	0	(122.5m)
	56. Soft black clay	1	0	403	0	(122.8m)
	57. Black shales	0	6	403	6	(123.0m)
	58. Hard marly clay	2	6	406	0	(123.8m)
	59. Hard dark clay	3	0	409	0	(124.7m)
	60. Softer clay	1	0	410	0	(124.9m)
	61. Hard light-coloured marly clay	8	0	418	0	(127.4m)
	62. Hard dark clay	9	0	427	0	(130.2m)
	63. Hard light-coloured marly clay	4	0	431	0	(131.4m)
	64. Hard dark marl	20	0	451	0	(137.5m)
	65. Hard dark dense clay	1	3	452	3	(137.8m)
	66. Hard marly clay	4	9	457	0	(139.3m)
	67. Black shales	1	0	458	0	(139.6m)
	68. Hard dark dense Lias clay ...	3	0	461	0	(140.5m)
	69. Hard marly clay with limestones	4	0	465	0	(141.7m)
	70. Clay and limestones	6	0	471	0	(143.6m)
	71. Dense Lias clay	6	0	477	0	(145.4m)
	72. Earthy limestone	4	0	481	0	(146.6m)
	73. Dense clay, bottom foot lighter-coloured. Salt	3	0	484	0	(147.5m)
	74. Darker marly clay	1	0	485	0	(147.8m)
	75. Dark dense clay	2	0	487	0	(148.4m)
	76. Hard marly clay. Lime-deposit drying out	1	0	488	0	(148.7m)
	77. Black clay, with shales ...	4	0	492	0	(149.9m)
Lower Lias	78. Dense black clay, softer	2	0	494	0	(150.6m)
	79. Hard black clay. Salt and lime drying out from top half ...	2	0	496	0	(151.2m)
	80. Hard light-coloured dense clay. Salt drying out	3	0	499	0	(152.1m)
	81. Hard very hard dense clay ...	1	0	500	0	(152.4m)
	82. Hard black dense clay ...	1	0	501	0	(152.7m)
	83. Dark slimy clay, very soft ...	1	0	502	0	(153.0m)

Lined with 109 ft. of tubing, 6 in. diameter, to 109 ft. ex surface (to exclude upper water), and lined with 242 ft. of tubing, 5 in. diameter, to 242 ft.

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~~"Eighteen months or so ago from July, 1924, a borehole 150 feet deep~~ was made by the Wilts.-United Dairy Co., at Basonbridge Factory. The water is brackish and is now used only for milk cooling and engine cooling."

N.B. Analysis, p. 232.

... of Springs ...

'of Somerset'.

ST 34 NW 23
N.G.R. 3443. 4648

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[ST34NW BJ 23 .]

Feb. Limestone

ST34NW 23
3443, 4548

Bason Bridge, East Huntspill.

Artesian Well at New Board Schools.

Architect, A. Basil Cottam, A.R.I.B.A. Bridgwater.

Engineer, J. W. Stevens, Taunton.

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Fine calcareous silt (Alluvium)		16	0		16	0
Peat			6		16	6
Fine calcareous silt		13	6		30	0
Fine Calcareous silt		30	0		60	0
Blowing Sand with much water & marine Shells: Pecten, Pholas, etc.		10	0		70	0
Sand with Clay		1	0		71	0
Calcareous Shale		1	0		72	0
Blowing Sand with bits of flint - Shells. (Stones & Shells at 81 ft. Hydrobia (Rissoa) Ulvae)		10	0		82	0
Shingle containing bits of Lias, Carboniferous Limestone, Quartz etc. Belemnites, Gryphaea, Pecten, Pholas, Ammonites.		3	0		85	0
Sand with Clay		1	0		86	0
Stiff calcareous clay with Nodules.		2	0		88	0
Hard calcareous blue clay		11	0		99	0
Dark Coloured Clay with fragments of Rhynchonella & Spirifera Walcotti		1	0		100	0
Lighter Coloured Calcareous clay. Gryphaea.		2	0		102	0
Hard dark marly clay. Belemnite.		4	0		106	0
Hard dark marly clay with Marlstones		6	0		112	0
Lias Clay		3	0		115	0
Clay with earthy limestones		2	0		117	0
Dark Lias Clay		3	0		120	0
Light Color Lias Clay		6	0		126	0
Dark Clay		4	0		130	0
marly Clay with Gryphea		2	0		132	0
Blue Lias Rock		1	0		133	0
Marly Clay		1	0		134	0
Earthy Limestone		1	0		135	0

P 54

W B & L (x)—80555—1000-4-97

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ST 34 NW 123
3443. 4848

Bason Bridge, East Huntspill

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Dark dense Lias Clay & Shale. Gryphea & Selenite		2	0			
Soft Lias Clay		2	0			
Marly Clay with Limestones		3	0			
Marly Clay		2	0			
Dense Lias Clay		4	0			
Dense Lias Clay: at base a layer of Marlstones		12	0			
Dense Lias Clay		12	0			
Large Earthy Limestone			6			
Dense Lias Clay		5	6			
Earthy Limestone		1	0			
Dense Dark Lias Clay		2	0			
Marlstones with Gryphea.		1	0			
Dense Dark Lias Clay (Pieces of Rhynchonella at base)		18	0			
Black Marly Clay		1	0			
Black dense Clay with Nodules		2	0			
Black Marly Clay		2	0			
Dark dense Lias Clays with Limestone (nodules)		5	0			
Dense Lias Clay		10	0			
Dense Lias Clay		10	0			
Dark dense Lias Clay, very hard		10	0			
ditto ditto		10	0			
Earthy Limestones		1	0			
Very dark dense Lias Clay		19	0			
? ditto		2	0			
Blue Lias Rock		1	0			
Dark Marly Lias Clay.		1	0			
Hard Black Marly Lias Clay		16	0			
Black dense Lias Clay		10	0		300	0

W T & L (x)—80555—1000-4-07

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ST 03 NW 10
3443.4648

-1

Bacon Bridge, East Hunterspill

	Thickness. Yards.	feet.	ins.	Depth from Surface. Yards.	feet.	ins.
Lighter Shaley Clay		1	3			
Hard Marly Clay		4	9			
Black Shales		1	0			
Hard dark dense Lias clay		3	0			
Hard marly clay with limestones		4	0			
Clay & Limestones		6	0			
Dense Lias Clay		2	0			
Dense Lias Clay		1	0			
Dense Lias Clay		3	0			
Earthy Limestone		4	0			
Dense clay		2	0			
Lighter dense clay		1	0		482	0
Further Information from letter dated Nov 14 1896 regarding samples sent.						
Lighter Marly Clay, Salt dries out freely-					482	0
Darker Marly Clay (salt)					483	0
Dark dense clay (no salt)					484	0
Do do plastic (do)					485	0
Hard Marly Clay, Lime deposit drying out					486	0
Black Clay with shells at 487, 488 & 489 feet						
Very hard Black Clay (Lime deposit)					490	0
Dense Black Clay softer					491	0
Dense Black Clay (Softer). Remains plastic unless dried by heat. A brownish green tint noticeable when first brought up					492	0
Hard very Black Clay, salt and Lime drying out					493	0
Hard very Black Clay (Plastic)					494	0

The boring seems to have been abandoned at a depth of 500 feet as in a letter dated Nov 26, 1896 announcing the abandonment of the undertaking the occurrence of a soft clay bed at 499 feet is mentioned

W B & L (x6—80555—1000-4-97)

(4)

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[ST34NW BJ 23 .]

ST 34 NW 23
3443. 4648

Bacon Bridge, East Harnhill

	Thickness.			Depth from Surface.		
	Yards.	feet.	ins.	Yards.	feet.	ins.
Black dense Lias clay		10	0			
Very hard marly clay		8	0			
Earthy limestone rock		2	0			
Hard dark dense Lias clay		16	0			
Earthy limestone rock		4	0			
Hard dark dense Lias clay		11	0			
Earthy Limestone Rock (Salt drying out at 2' from bottom)		26	0			
Softer clay, marly		3	0			
Dark dense Lias clay (Salt drips out)		6	0			
Softer ditto		1	0			
Hard marly clay, dries light.		3	0			
Black marly clay		3	0			
Hard Black clay. Salt.		2	0			
Black Softer marly clay		2	0			
Loose marly clay, light.		1	0			
Dense black clay		1	0			
Soft black clay		1	0			
Black Shales			6			
Hard marly clay		2	6			
Hard dark clay		3	0			
Softer clay		1	0			
Hard light marly clay		4	0			
Very hard light marly clay		4	0			
Hard dark clay		3	0			
Hard dark dense clay		6	0			
Hard light marly clay		1	0			
Hard very light marly clay		3	0			
Hard dark marl		1	0			
Hard dark dense clay		20	0		449	0

W B & L (x)—60555—1000-4-07

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9

ST 3479 4582

RECORD of WELL or BORING 279

Survey No.
1" N.S.
1" O.S.

at (house or farm) Mess. United Dairy Co.'s Basonbridge Factory

Town, Village, &c. Huntspill County Somerset Six-inch map

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

Popular edition or one-inch map Sheet 10 Square

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

Sunk ft., diameter ft. Bored 1345 ft.; diameter of boring: at top in., at bottom in.

Details of lining tubes (internal diameters preferred) 53' 10" x 6", from 70 2/3' below ground level. (20' x 6" perforated)

ST34/3

Water struck at depths of (feet)

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

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

Quality (attach copy of analysis if available) Brackish; used only for cooling purposes.

Made by for Messrs. United Dairies Ltd. Date of boring c. 1923

Information from W.H. Cousins, Esq., Surveyor, Bridgwater, R.D.C.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS. Feet.	THICKNESS. Inches.	DEPTH. Feet.	DEPTH. Inches.
	Deepened by Isler & Co. in 1922, from 81½'.				
	Grey sand	12		93	6
	Sandy clay	12	6	106	
	Clay and stone	4	6	110	6
	Hard blue clay	14		124	6
	Rest water level 6'. Yield unknown.				
	Information from B. Isler & Co.				

Published in 'Wells & Springs of Somerset', p. 55

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

For Survey use only.

Date received.	G.S.M.	M. of H. notified.	Site marked on 1" map.

(2473BC) Wt 26030/205 5,000 11/36 H, J, R & L, Ld Gp 616

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[ST34NW BJ 25 .]

1063 Wt. 22438/0364 10m 7/45 (51) P.&S.

RECORD OF WELL (SHAFT OR BORE)

(For Survey use only)
6-inch O.S. Registered No.
279
ST34/3 10

At United Dairies Factory

Town or Village Bason Bridge, nr Huntspill

County Somerset Six-inch quarter sheet 39 NW/W

For Mr. United Dairies Ltd.

Exact site of well ST 3478 4582

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

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

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

BORE 81½ ft.; diameter of bore: at top ..... ins.; at bottom ..... ins. Lengths, diameters, perforations, etc., of lining tubes 30' x 8" from 3' below ground level
80' x 7½" from 1' below ground level,
70' x 7½" perforated.

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

Rest-level of water 7¾ ft. above/below well-top. Suction at ..... ft. Yield on ..... hours'/days' pumping 1875 gal. per hour with depression to ..... ft. below well-top, Capacity of pump ..... g.p.h. Recovery to rest level in ..... mins./hours Date of measurements ..... Date of well 1912

Quality of water (*attach copy of analysis if available*) .....

Well made by C. Isler & Co.

Information from C. Isler & Co.

Additional notes in space overleaf.

(For Survey use only) Geological Classification	Nature of Strata	Thickness Feet	Thickness Ins.	Depth Feet	Depth Ins.
	If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far				
	Mould	1		1	
	Brown clay	5		6	
	Blue clay	9		15	
	Peat coal		6	15	6
	Blue clay	31	6	47	
	Loamy sand	16	6	63	6
	Grey sand	18		81	6
	This is second boring. First boring, made in 1912, was abandoned and filled in.				
	Water brackish. Used for milk cooling only.				
	Since disused and filled in. Factory on mains.				
	O.D. +17'. Sited on 6" Sor 39 NW/W. H. Pike 2.5.1949.				

Continued overleaf

Geological Survey and Museum, South Kensington, London, S.W.7.	Date received	Correspondence File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (use symbol) on 1" Map	Site marked (use symbol) on 6" Map
			279		O	O

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[ST34NW BJ 25 .]

(For Survey use only)
GEOLOGICAL CLASSIFICATION

NATURE OF STRATA *(Continued)*

F.

ADDITIONAL NOTES

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3

BRIDGEWATER R.D.C.

Depot BASON BRIDGE

Date	6.6.47.
Source	marine Water
Appearance	Colourless clear
Suspended Solids	0.02 p.p. 10 6
Total Solids	26.6
Free NH_3	nil
Alb. NH_3	nil
O_2 Absorbed	—
Nitrates	0.06
Nitrites	nil
Chlorides	4.44
Sulphates	4.50
Temporary Hardness	11.25
Permanent "	1.05
Total "	12.25
Hardness due to Lime	9.25
Iron	nil
pH	7.98

279/10

ST34/3

Copied V.D. Central Lab. White City 18.4.48
Hmp.

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[ST34NW BJ 25 .]

279/10

ST34/3

279/10 Holocene { Alluvial deposits to 106 ft (32.3m)
? Shingle (beach) to 110 ft (33.7m)
Lower Lias to 124 ft 6in (37.9m)

The 'clay & stone' of the drillers description is interpreted as shingle at 279/7 but it could conceivably be Lower Lias.

J. W. Cole

20.3.78

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ST34NW/25
3479. 4982

At United Dairies Factory

Town or Village Bason Bridge, nr Shepton Mallet

County Somerset Six-inch quarter sheet 39 NW/W

For ~~Mr.~~ United Dairies Ltd

Exact site of well

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

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

SHAFT ft.; diameter ft. Details of headings

BORE 81½ ft.; diameter of bore: at top ins.; at bottom ins. Lengths, diameters, perforations, etc., o lining tubes 35' x 8" from 3' below ground level
80' x 7½" from 1' below ground level,
70' x 7½" perforated.

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

Rest-level of water ¾ ft. above / below well-top. Suction at ft. Yield on hours' / days' pumping, 1876 gal. per hour with depression to ft. below well-top, Capacity of pump g.p.h. Recovery to rest level in mins. / hours Date of measurements Date of well 1912

Quality of water (*attach copy of analysis if available*)

Well made by C Isler & Co

Information from C Isler & Co

Additional notes in space overleaf.

(For Survey use only) Geological Classification	Nature of Strata	Thickness Feet	Thickness Ins.	Depth Feet	Depth Ins.	
	If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far					
	Mould	1		1		(0.3 m)
	Brown clay	5		6		(1.8 m)
Alluvial deposits	Blue clay	9		15		(4.6 m)
	Peat coal		6	15	6	(4.7 m)
	Blue clay	31	6	47		(14.3 m)
	Loamy sand	16	6	63	6	(19.4 m)
(Wat.)	Grey sand	18		81	6	(24.8 m)
	This is second boring. First boring, made in 1912, was abandoned and filled in.					
	Water brackish. Used for milk cooling only.					
	Space drained and filled in Factory on mains					
	O.D. +17' Sited on 6" Som 39NW/N H. Pike 25/9/19					

Continued over leaf

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[ST34NW BJ 25 .]

RECORD OF WELL OR BORING

United Dairy Co.'s Basonrid[illegible] Factory

1" N.S. ST34NW/26
1" O.S. 3479, 4582

Hunts[illegible] County Somerset Six-inch map

... a tracing from a map is ... nce and direction from parish ... s, or other object shown on maps). N.G.R. 3479, 4582 Popular [illegible] Sheet ... of ... one-inch map (Square ...

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

... ft., diameter ... ft. Bored 124½ ft.; diameter of boring: at top ... in., at bottom ... in.

Details of lining tubes (internal diameters preferred) 53'10" x 6", from 70⅔' below ground level. (20' x 6" perforated)

Water struck at depths of (feet) ...

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

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

Quality (attach copy of analysis if available) Brackish; used only for cooling purposes.

Made by ... for The United Dairies Ltd. Date of boring c. 1923

Information from W.H. Cousins, Esq., Surveyor, Bridgwater R.D.C.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS. Feet.	THICKNESS. Inches.	DEPTH. Feet.	DEPTH. Inches.
	Deepened by Isler & Co. in 1922, from 81½'.				
Alluvial deposits	Grey sand	12		93	6 (23.5)
	Sandy clay	12	6	106	(32.2)
? L	Clay and stone	4	6	110	6 (33.7)
Lower Lias	Hard blue clay	14		124	6 (37.8)
	Rest water level 6'. Yield unknown. Information from B. Isler & Co.				
J.W.J. 20/3/78					
	Dr. A. Whittaker believes the 'clay & stone' may be the same as the 'shingle' recorded in a nearby borehole. It could conceivably be Lower Lias, however. J.W.J.				

Published in 'Wells & Springs of Somerset p. 59

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[ST34NW BJ 25 .]

RECORD OF BOREHOLE No: 1

SOMERSET TRUNK ROADS

Location : CRIPPS RYHNE
Contract No. : F69/ 659
Type of Boring : Shell + Auger
Date (started) : 4.5.'70

Borehole Dia : 6"
Casing : 6" to 38'6
Ground Level : 18'8' OD 3428

ST34NW/40 4774

Depth of Casing	Water Level	SAMPLES Depth	Type	No.	STRATA Legend	Depth	Thickness	DESCRIPTION OF STRATA
						0'9	0'9	Stones, soil, clay
		1'6	D	1			3'3	Firm brown silty CLAY
		2'6-3'4	U	2				
		4'0	D	3		4'0		
		5'0-6'3	U	4			2'6	Soft brown silty CLAY
		6'6	D	5		6'6		
		8'0	D	6		8'0	1'6	Very soft grey-brown silty CLAY
		10'0-11'4	U	7			8'6	Very soft grey silty CLAY
		12'6	D	8				
		15'0	D	9				
		15'0-16'2	U	10				
		16'6	D	11		16'6		
		17'0 (N=3)	D	12			3'6	Very soft black PEAT
		19'0	D	13		15'0		
		20'0-21'4	U	14				
		22'6	D	15				
		25'0	D	16				
		25'0-26'3	U	17			21'4"	Very soft grey CLAY with occasional slight traces of vegetation
		27'6	D	18				
		30'0	D	19				
		20'0-21'4	U	20				
		32'6	D	21				
		35'0	D	22				
		35'0-36'3	U	23				
		37'6	D	24				
		40'0	D	25				
		40'0-41'4	U	26				

REMARKS: Water seepage at 25'0"

41'4" Borehole Complete

Ground levels are related to local site datum

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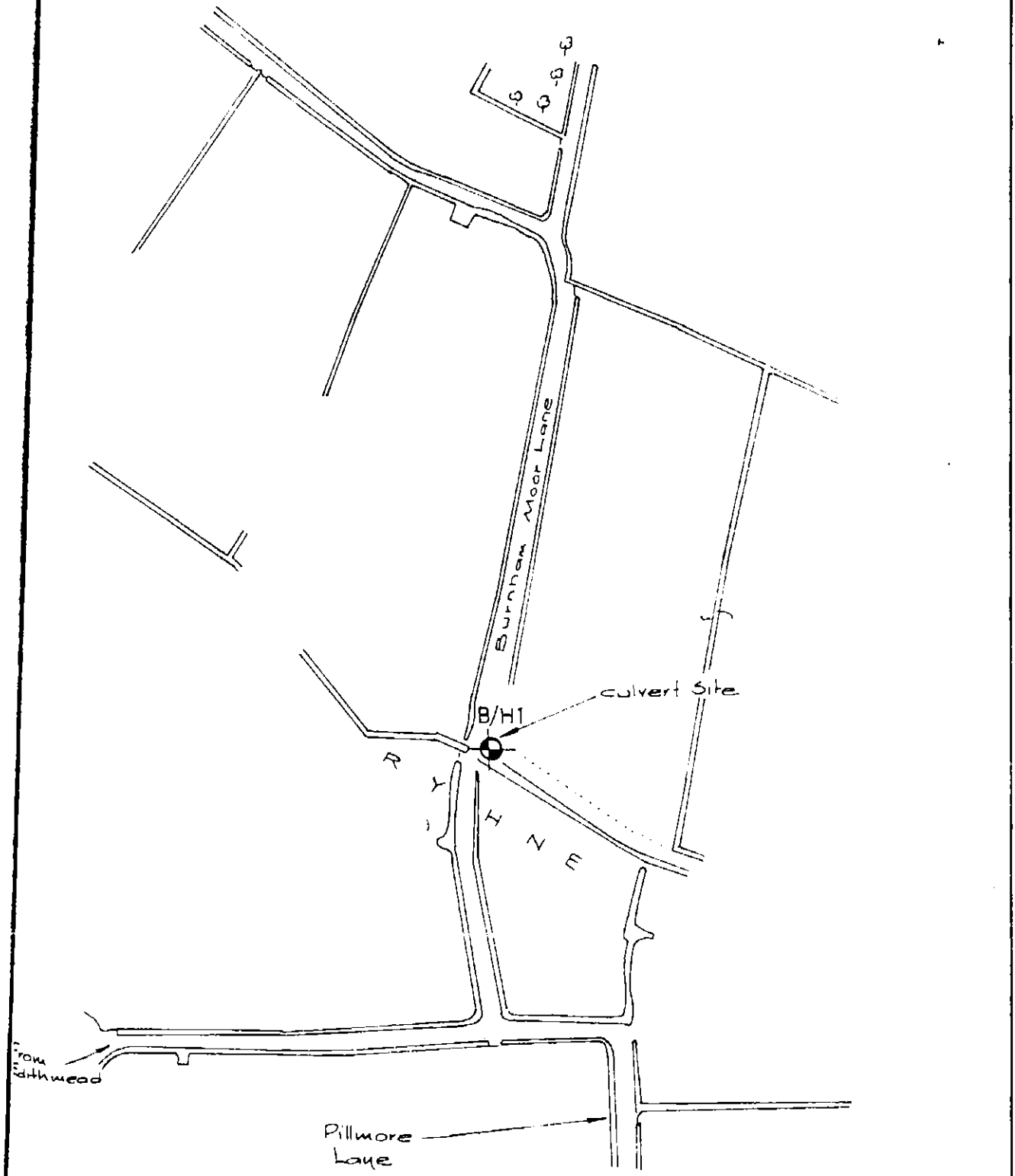
[ST34NW BJ 40 .]

ST34NW/40



SOMERSET TRUNK ROADS

CRIPPS RHYNE

Site plan showing location of boreholes

FOUNDATION ENGINEERING LTD

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[ST34NW BJ 40 .]

RECORD OF WELL (SHAFT OR BORE)

1-inch Map Registered No. ST 34 SW 45

N.G.R. 3463.4370

At Causeway Bridge

Town or Village

County Six-inch quarter sheet 39 SW

For Mr.

Exact site of well Sited on Somerset 39SW/W 7347

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

Level of ground surface above sea level (O.D.) (20.31 ~) 17.52 ft.

If well-top is not at ground level, state how far ... above; below; ft.

SHAFT ft.; diameter ft. Details of headings

BORE ft.; diameter of bore: at top ins.; at bottom ins. Lengths, diameters, perforations, etc., of lining tubes

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

Rest-level of water ft. above / below well-top. Suction at ft. Yield on hours' / days' pumping, gal. per with depression to ft. below well-top, Capacity of pump g.p.h. Recovery to rest level in mins. / hours Date of measurements Date of well 1942

Quality of water (*attach copy of analysis if available*)

Well made by

Information from County Surveyor, Taunton per R.A.K.

Additional notes in space overleaf.

(For Survey use only) Geological Classification	Nature of Strata (If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far)	Thickness Feet	Thickness Ins.	Depth Feet	Depth Ins.
Alluvial deposits.	Made ground			1	(0.3 ~)
	Soft brown clay	11		12	(3.7 ~)
	Peat	6		18	(5.5 ~)
	Soft blue clay	55		73	(22.3 ~)
	Hard stony brown clay	6		79	(24.1 ~)

Continued over leaf

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[ST34SW BJ 45 .]

DEPARTMENT OF THE ENVIRONMENT
Soils Section C.E.L. Cardington

Investigation No CEL/71/099

Appendix A
Sheet No. 4

Geotechnical Investigation for Proposed TNT Capacity

BRIDGWATER
ROYAL ORDNANCE FACTORY

ST/34 SW 51 (1:2500)

BOREHOLE LOG

CEL/Soils/695/4/71

Borehole No. 2

Ground Level

Date 13th – 15th November 1971

Note:

Description of Strata	Legend	Sample	Depth m	O.D.	Remarks
TOPSOIL; dark brown (based on drillers' description)			0		
CLAY; firm to stiff, shaly, silty, brown, grey banded, with patches of weathered silty mudstone			0·4		Vane Shear Test Attempted at 1·0m depth – Clay too stiff WEATHERED LIAS (Soil Type LW)
CLAY; stiff to very stiff, shaly, friable, silty, dark brown and grey banded with brown patches			2·7		←1st Water Entry, 3·7m
MUDSTONE; Friable, shaly, silty, grey Band of hard, argillaceous dark grey limestone 0·5m at base			3·9		LIAS (Soil Type L) ←2nd Water Entry, 4·9m
MUDSTONE; shaly, silty grey. Band of hard argillaceous dark grey limestone 0·5m at 6·8m		(>89)	5·4		SPT – Penetration 5½ inches
SHALE; very thinly laminated,		(19)	7·0		

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[ST34SW BJ 51 .]

DEPARTMENT OF THE ENVIRONMENT
Soils Section C.E.L. Cordington

Investigation No. CEL/71/099

Appendix A
Sheet No. 5

Geotechnical Investigation for Proposed TNT Capacity

BRIDGWATER
ROYAL ORDNANCE FACTORY

ST34SW/51

BOREHOLE LOG

CEL /Soils/695/5/71

Borehole No. 2 Contd.

Ground Level

Date

Note:

Description of Strata	Legend	Sample	Depth m	O.D.	Remarks
SHALE; contd. from Sheet No. 4			8·0		
SHALE; friable, silty very silty in places, grey with very thinly laminated friable partings			9·0		LIAS (Soil Type L)
		(>50)			SPT - Penetration 1 inch
			10·0		End of Borehole

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[ST34SW BJ 51 .]

ST 35 NE/22 LOG for BOREHOLE No. 226 ST/35NE/22 Fig.

Location No. 4765 Sheet 1 of

Carried out by mechanical auger **PRELIMINARY**

Date 7th May 56

3790·5590

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	
Ground Level (Ft. above N.D.)	23·6' (7.16m)			0 0				
~~Tarmacadam, Rolled Clay Gravel~~ and ~~Concrete~~. TOPSOIL,				2 0	2 0			
			•1	2 0				
			•2					
Stiff to firm grey and brown mottled silty CLAY. [Recent Alluvium]					6 6			
			•3					
				8 6 (2.59)				
Very dense red medium and coarse silty SAND and coarse GRAVEL. [Head]			•4		4 0			6H
			•5			11 6 3"	172	*
	+11ft' (+3.35m)			12. 6 (3.81)				
Weak becoming			•6			13 6 6"	86	⊛
			•7		4 9	15 6 6"	102	⊛
Medium strong grey MUDSTONE.			•8	17 3 (5.26)		17 - 0 4"	144	⊛
[Tea Green Marl-Keuper]	6·4			END OF BOREHOLE				
Water encountered at 10 ft								

Copyright of Soil Mechanics Ltd.

⊛ Initial penetration extrapolated
* Extrapolated value.

Scale 1 in.=5 ft.

● Disturbed Sample ◆ Bulk Sample ▮ Tube or Core Sample (Length to scale) △ Water Sample

SOIL MECHANICS LTD., 65 Old Church Street, London, S.W.3.

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[ST35NE BJ 22 .]

ST85NE/26

LOG for BOREHOLE No. 228A Fig.

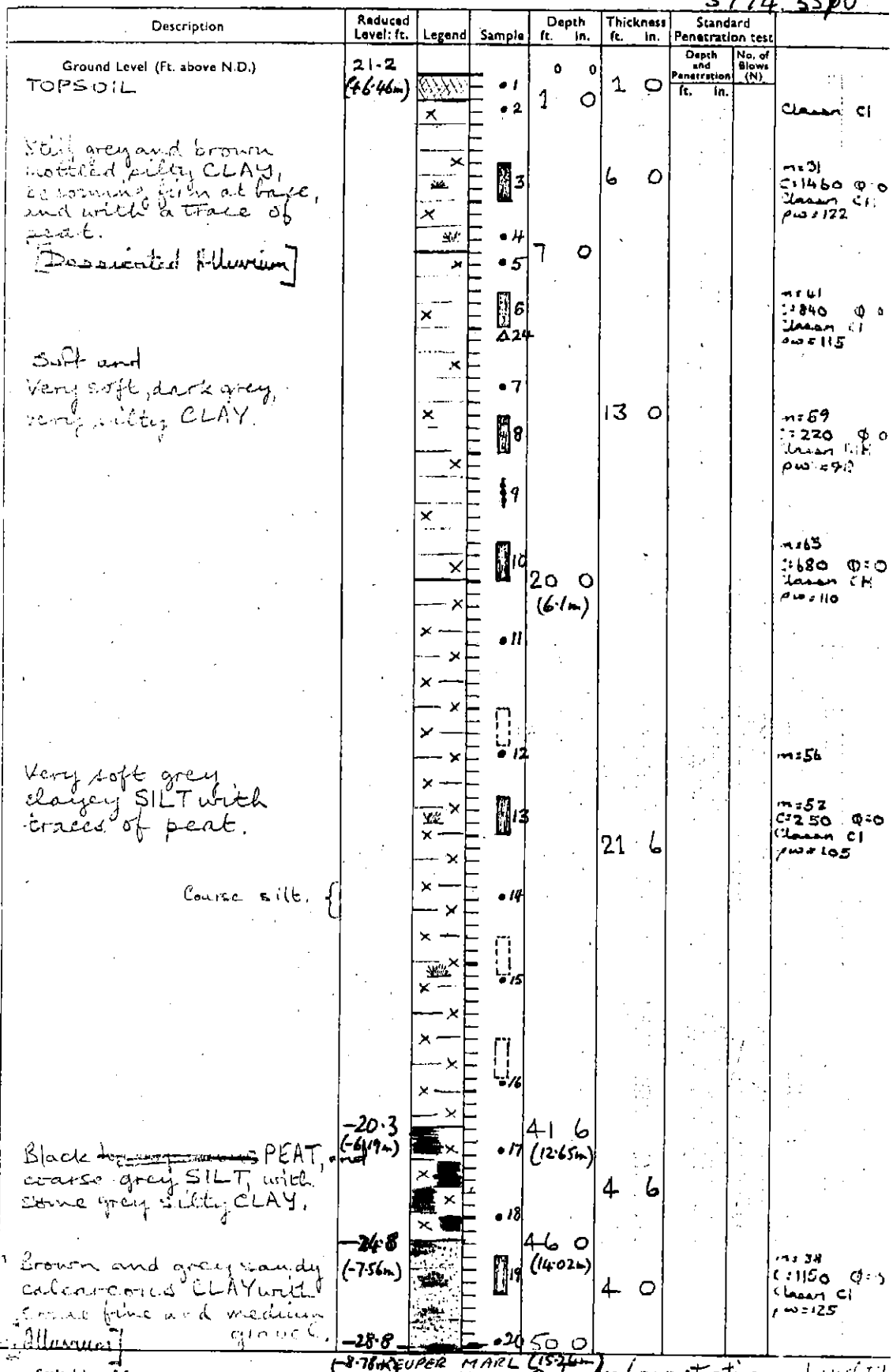
Location No. 14765 Sheet 1 of 2

Carried out for Eng. mechanical auger

Date 8TH-12TH JULY 1966

PRELIMINARY

3774.5500



⊛ Initial penetration extrapolated

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[ST35NE BJ 26 .]

ST 13 5NE/20

CONTINUATION LOG for BOREHOLE No. 228 A

Fig.
Sheet 2 of 2

Loc.	Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
[illegible]	[illegible] with [illegible] STONE, [illegible] at 6-a.s.e. [illegible] Weathered Red Marl - Keuper]	-28·8			50 0			
				• 21				
				• 22		5 4 penetrated.	52 6 / 12	54
		-34·1		• 23	55 4 (16·87)		55 0 / 4	59
					END OF BOREHOLE			

DATE	TIME	DEPTH OF B.H.	DEPTH OF Casing	DEPTH TO Water
made water at 15'-0".				
3.7.66	1830	24'	24'	DRY.
11.7.66	0745	"	"	16'
"	1830	50'	50'	20'
12.7.66	0730	"	"	?

PRELIMINARY

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GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No. ST 35 SE/1

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner:

Nat. Grid Reference 3682 . 5227

For whom made

Town or Village Rooks Bridge County Som.

Exact site

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

1"N.S. Map No.	1"O.S. Map No.	Confidential or not
280		

Purpose for which made

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking 1953

Information from Date received

Examined by

SOMERSET RIVER BOARD

Rooksbridge Sluice Boring Taken 1953

Somerset Sheet 26 N.W. 3682 5227 35 SE

17.0	to	11.0	Brown clay
11.0	to	5.0	Blue clay
5.0	to	2.0	Peat
2.0	to	-3.0	Silty clay

Limit of boring.

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LOG for BOREHOLE No. 2332

Fig.

Location No. 4847

ST | 3556 | 12

Sheet 1 of 2

Carried out for by mechanical auger

NGR.: 3705. 5427

Date 5th DECEMBER 1966 EAST BRENT

1st NS. 279

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
Ground Level (Ft. above N.D.)	22·3			0 0			
TOPSOIL	[+6·80m]		1	1 0	1 0		
				[0·3m]	[0·3m]		
Firm to stiff, becoming soft to firm with depth, brown slightly silty ~~brown~~ CLAY, occasionally weakly laminated.			2				
			3		7 3		
			4				
[Desiccated Alluvium]				8 3			
			5	[2·51m]			
Very soft grey and light brown silty CLAY.							
	mottled		6				
			7		10 9		
			8				
			9				PISTON
			10	19 0			PISTON
				[5·79m]			
Medium dense dark yellow brown and green grey clayey silty fine and medium SAND.			11		8 0		PISTON
			12				PISTON
				27 0			
			13	[8·23m]			PISTON
Soft to firm blue grey silty CLAY and medium dense blue grey fine and medium sand.					7 6		
			14				PISTON
			15	34 6			PISTON
				[10·51m]			
			16				PISTON
			17		13 6		PISTON
[All Alluvium]			Δ18			42 6	
			●19			12"	13
Medium dense and loose blue grey and light brown slightly clayey SILT							
			●20				
clayey							
Loose green brown fine sandy SILT with patches of fine and medium sand	-27·7			48 0	(3 6)		
				[14·62m]			

Scale 1 in.=5 ft.

● Disturbed Sample ♦ Bulk Sample ▮ Tube or Core Sample (Length to scale) Δ Water Sample

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[ST35SE BJ 12 .]

CONTINUATION LOG for BOREHOLE No. 233 E Fig.
ST/35SE/12 Sheet 2 of 2

Loc. 4847

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
Sandy SILT (See sheet 1)	-27·7				3 6		
			●21	51 6		51 0 12"	16
			●22	[15·70m]			
Very soft green grey very silty CLAY, becoming dark green grey clayey SILT and light brown clayey SAND and fine GRAVEL with depth.			●23			57 0 12"	15
			24		18 6		
			●25			64 0 12"	36
[Alluvium] Hard, dark blue grey and yellow green laminated silty CLAY (and frequent layers of mudstone) [Lower Lias]	-44·5		●26	70 0 [21·34m]	1 6	70 6 7½"	>200 *
	-49·2			71 6 [21·79m]			
End of borehole							

Water Level Observations during boring:-

DATE	TIME	DEPTH OF B.H.	DEPTH OF CASING	DEPTH TO WATER
29.11.66	17.30	42'0"	40'0"	22'0"
30.11.66	08.00	" "	" "	3' 6"
[illegible].12.66	17.30	65'0"	65'0"	19'0"
[illegible].12.66	08.00	" "	" "	5' 6"
5.12.66	17.30	71'6"	70'0"	38'2"
5.12.66	08.00	" "	" "	9'3"

* Extrapolated value

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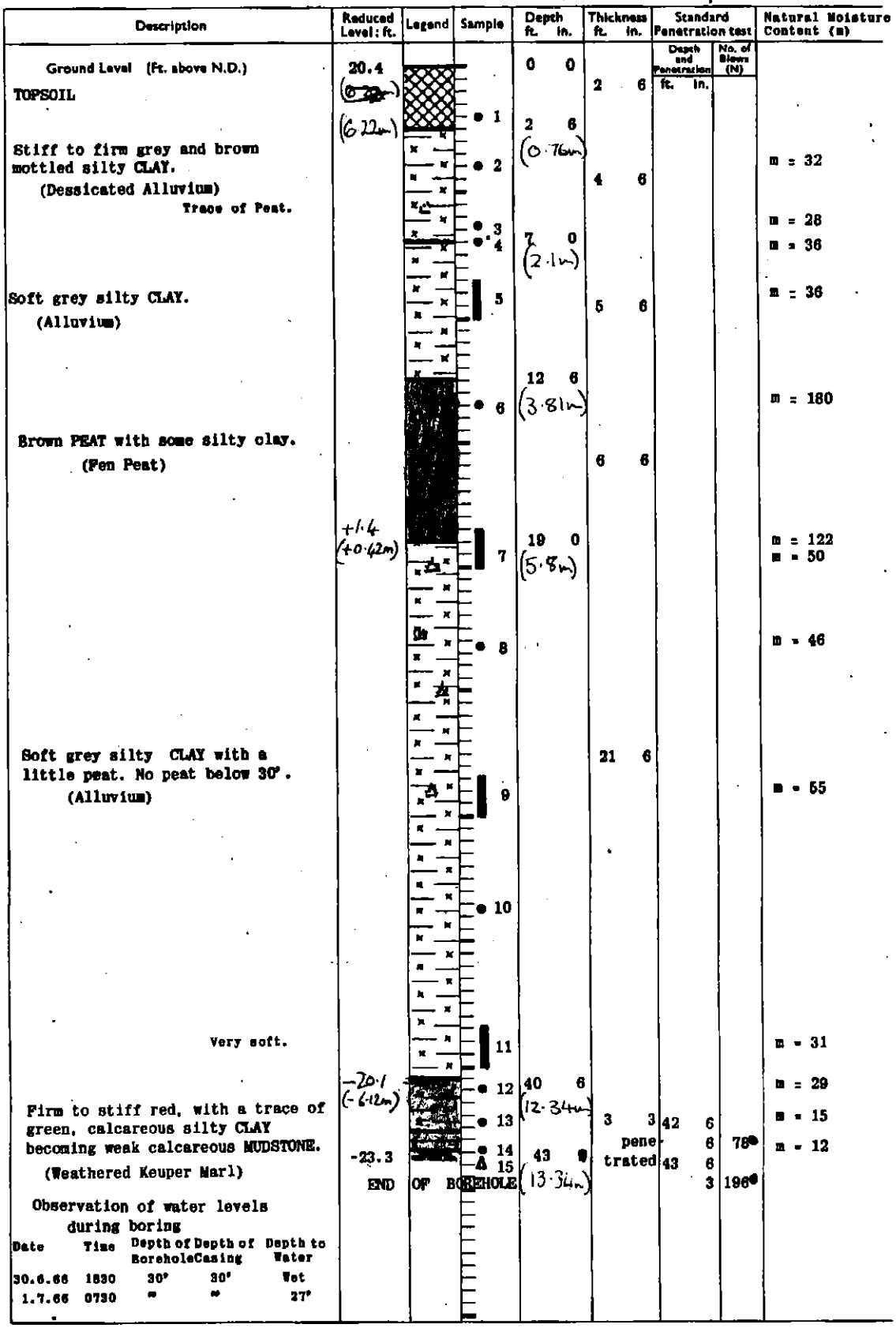
LOG for BOREHOLE No. 230B Fig. 57

Location No. 4765 ST 35SE/20 **Sheet** 1 of 1

Carried out by boring rig 3749. 5498

Date 30th June to 1st July 1966



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[ST35SE BJ 20 .]

LOG for BOREHOLE No. 232

Fig. 60

Sheet 1 of 1

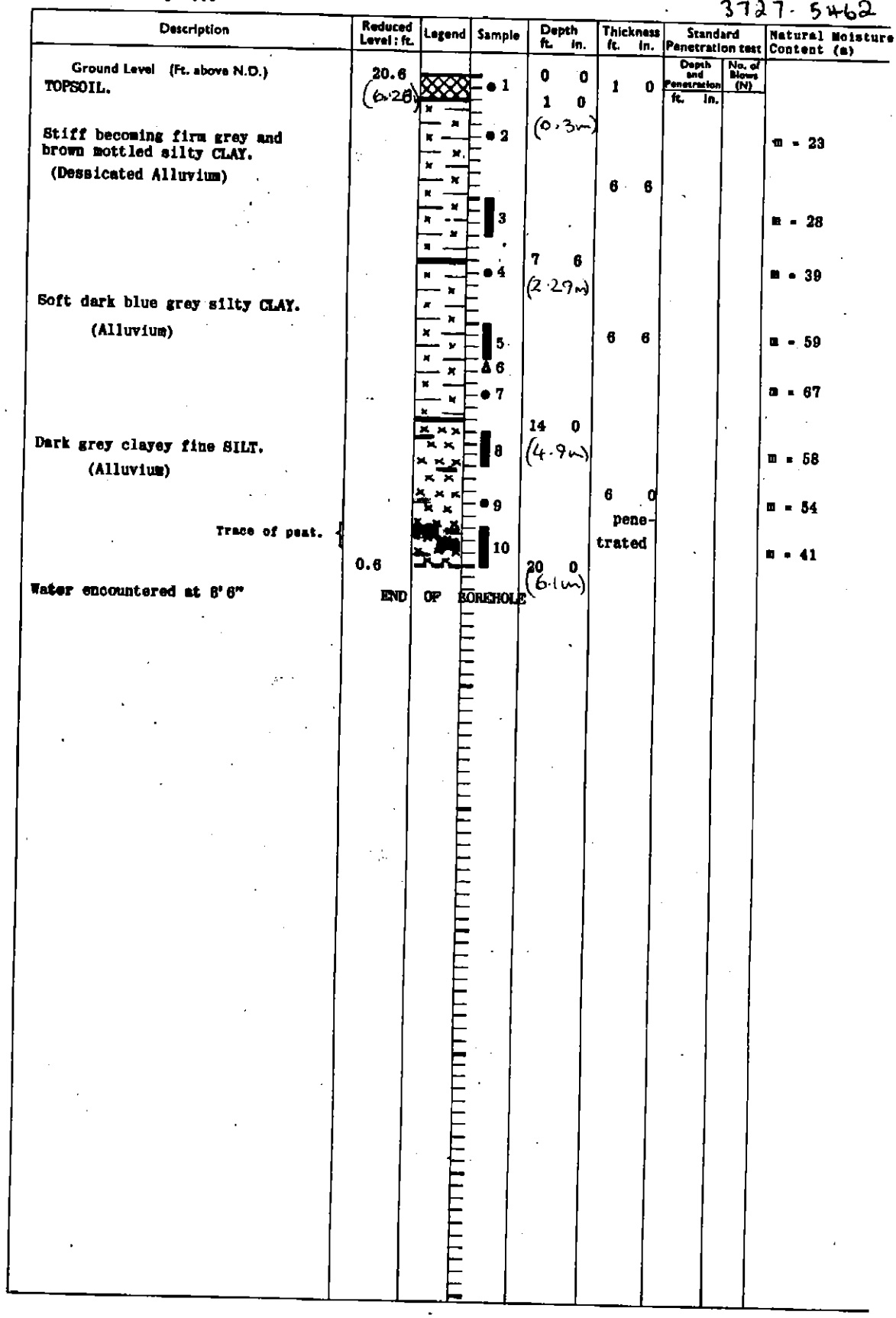
Location No. 4765

Carried out by boring rig

Date 1st July 1966

ST 35 SE | 22

3727 · 5462



Scale 1 in. — 5 ft.

● Disturbed Sample ↕ Bulk Sample ▮ Tube or Core Sample (Length to scale) Δ Water Sample

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[ST35SE BJ 22 .]

Structural Soils Limited

ST45NW 4002 5777 17

BOREHOLE LOG

CONTRACT	CLIENT	DATE	BOREHOLE No / SHEET
WINSCOMBE STW	WESSEX WATER	23.7.91	3 / 1 OF 1

GROUND LEVEL	GRID REF.	EQUIPMENT & METHOD	DIAMETER	DEPTH OF HOLE
		CABLE PERCUSSION	150mm	10.05m

Casing Depth	Samples and In-situ Tests No	Type	Depth	Blows	Water	Description of Strata	Depth M.	Legend
						Grass over TOPSOIL		
	1	D	0.5			MADE GROUND: Soft to firm becoming soft brown and grey silty clay with occasional limestone cobbles and gravel and pockets of firm red brown clay	0.1	
	2	SPT	1.05	12			1.0	
	3	CPT	2.0	5			2.0	
							2.5	
	4	CPT	2.9	15		Soft to firm very sandy grey/dark grey slightly organic silty CLAY with sandy pockets and occasional gravel (probably made ground)	3.0	
	5	U	3.35	28	3.35m			
	6	D	3.8			Stiff to very stiff red brown friable silty CLAY with occasional small mudstone lithorelicts	4.0	
	7	D	4.4					
4.8m	8	SPT	5.0	68			5.0	
	9	D	6.0					
	10	SPT	6.4	77/120mm			6.0	
							6.5	
	11	D	7.4			Red brown fine grained laminated silty MUDSTONE, very weak with a little clay in fractures (Keuper Marl zone I-II)	7.0	
	12	U	7.95	110			8.0	
	13	D	8.35					
	14	D	9.0				9.0	
	15	SPT	9.7	96/90mm			10.0	
						Borehole terminated at 10.05m depth		

REMARKS
Chiselling 6.5-10.05m depth, 0.75 hours
Water strike at 3.35m depth, standing at the same level.

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[ST45NW BJ 17 .]

WINSCOMBE SEWAGE TREATMENT WORKS
BOREHOLE LOCATION PLAN

ST45NW 15 - 22.

LEGEND

PROPOSED STRUCTURES

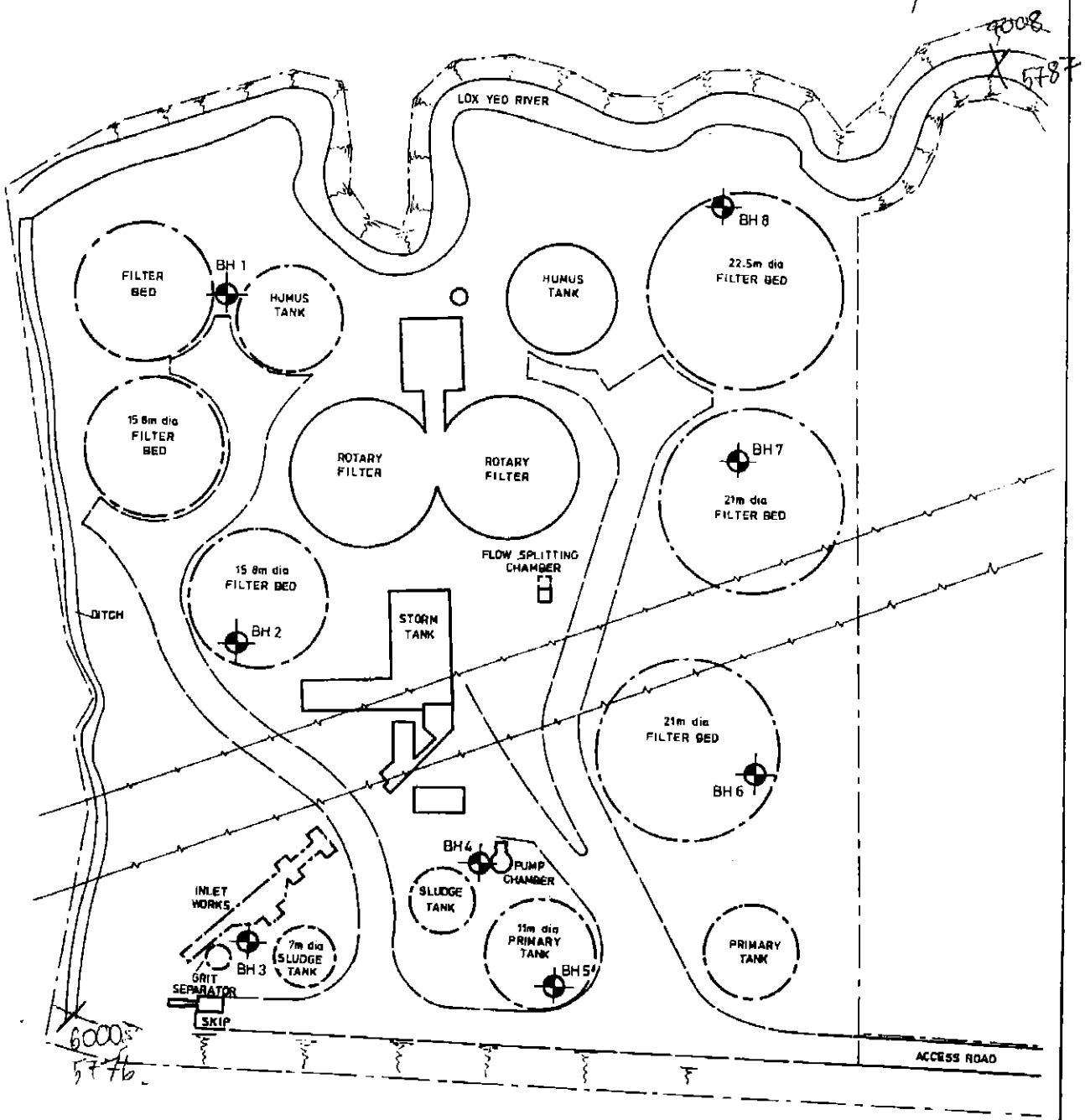
EXISTING STRUCTURES

SITE BOUNDARY

PROPOSED ACCESS ROAD

OVERHEAD CABLES

NOT TO SCALE



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NOTT. Bridge & Co., Ltd.

ST/46 NW/26

BORING RECORD.

Site: Yeo Valley, Kenn, Somerset — Hole No: 55
For: Maynard, Ford & Stevens — Sheet: 9
Boring Type: — N.B. Ref: B1/26
Rig: Sykes 1"NS. 264 — Dates - start: 26-3-63
Diameters/Depths: 6" N.G.R.: 4340. 1909 — finish: 28-3-63
Operative: A Cottrell.

Depths/RLs Strata	Depths/RLs Others	Sample Nos:	Strata:	Remarks:	Tests Etc.
GL					
	1-3	D	Peat.		WT 1-6
2-0					
5-3			Brown & grey clay		
	3-6	D	grey clay.		
			(from top)		
	8-0	U4	water stopped entering; began again 32-3.		30 flows.
15-0					
	16-0	D	Peat		
	17-8	U4			
20-0			Grey silt.		
	25-0	D			
27-6					
			Peat.		
	30-0	D			
31-0			Gravel & Peat.		
	32-3	D			
	32-6	W	water returned 1-6 probably from above.		
38-0		D	Red marl & grit.		

U4 = 4" Undisturbed Sample. SPT = Standard Penetration Test. Scale 1" = 8'
D = DISTURBED SAMPLE. WT = WATER TABLE.

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[ST46NW BJ 26 .]

BOREHOLE No. 200 Sheet 1

3606/274

BOREHOLE LOG

ST/46NW/47

LOC

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY
ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: DIAMETER: DATE:

CHAINAGE: GROUND LEVEL PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
			30' 0" (9.1m)		
		16		70	
Very soft to [illegible] silty CLAY		17 (4)		33	C 720 ø 3 pw 112
		18		44	
		(4)			
		19	39' 6" (12.04m)	52	
Black clayey PEAT		(4)			
Firm varying to [illegible] stiff [illegible] mottled brown mottled sandy gravelly CLAY		20	41' 3" (12.57m)	36	
		(4)			
		21	43' 0" (13.11m)	43	C 1750 ø 0 pw 112
END OF BOREHOLE					

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[ST46NW BJ 47 .]

BOREHOLE No. 200 Sheet 1

ST/46NW/14 T1
4127.6893

BOREHOLE LOG

Clevedon, Som.

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY M5 N.S. 264
ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: [illegible] & AUGDIAMETER: 6 INCH DATE: 8TH MAY 1961

CHAINAGE: GROUND LEVEL 28.4 ft N.D PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Water encountered at 3 ft below ground level
Ground Level		1	0ft. 0in.	81	
Soft brown silty CLAY with rootlets.		2(4)	0'6" (0.15m)	29	
		3			
		4		36	
Firm very [illegible] to soft grey slightly silty CLAY		5(4)		38	C 1150 ø 0 pw 113 Mv 4.1 x 10^{-3}
		6		50	
		7(4)		36	Mv 1.9 x 10^{-3} pw 111
		8	13'0" (3.9m)	250	
Black clayey PEAT with wood		9(4)			
		10		410	
		(4) 11	19'6" (5.9m)		
Soft grey silty CLAY		12		42	
		13(4)		52	C 860 ø 0 pw 103
		14		66	
Black PEAT Very soft grey slightly peaty silty CLAY		15(4)	(8.9m) 29'6" 30'0" (9.1m)	46	

CONTINUED ON SHEET 2

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[ST46NW BJ 47 .]

LOG for BOREHOLE No. 158B

Fig. 89

Sheet 1 of

Location No. 4765

Carried out by mechanical auger

Date 18th January, 1967

ST 46 NW/67

4061 · 6687

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	Natural Moistur Content (%)
Ground Level (Ft. above N.D.)	17.7 (5.39m)			0 0				
TOPSOIL			1		1 6			
				1 6 (0.46m)				
Firm grey and brown mottled silty CLAY (Dessicated Alluvium)			2		6 6			Piston m = 30
Blue grey			3					
			4					m = 39 Piston
Brown peat			5	8 0 (2.4m)				
Soft blue grey silty CLAY with traces of peat (Alluvium)			6		7 0			
			7					m = 53 Piston
			8					
				15 0 (4.6m)				
Dark brown PEAT (Fen Peat)					3 6			
			9	18 6 (5.64m)				
Firm and soft to firm blue grey silty CLAY and traces of peat (Alluvium)			10		3 6			
			11	22 0 (6.7m)				Piston
Firm red brown silty sandy CLAY with traces of fine and medium mudstone gravel			12		3 6			
			13					
			● 14	25 6 (7.77m)		25 6 12	19	
Firm blue grey silty sandy CLAY, becoming dense pale grey slightly clayey SILT with traces of fine gravel (Alluvium)			● 15		3 0	27 0 12	46	
				28 6 (8.69m)				
			● 16			30 6 12	26	
			● 17			32 0 12	83	
Weak red MUDSTONE								
			● 18			35 6 12	22	
(Weathered Keuper Marl)			● 19			37 0 12	50	
					24 6 penetrated			
			● 20			40 6 12	21	
			● 21			42 0 12	48	
			●22			45 6 12	15	
Weak green siltstone			●23			47 0 12	24	
	-32.3							

Scale 1 in. = 5 ft.

● Disturbed Sample Bulk Sample Tube or Core Sample (Length to scale) △ Water Sample

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[ST46NW BJ 67 .]

ST 46 NW / 67

CONTINUATION LOG for BOREHOLE No. 158B

Fig. 89
Sheet 2 of 2

Loc. 4765	Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
		-32.3						
	(Weathered Keuper Marl)			● 24		(24 6)	50 6	
	Medium strong			● 25		pene-	12	67
		-35.3		Δ 26	53 0	trated	52 0	
					(16.2m)		Nil	>200 ●
	END OF BOREHOLE							

Depth to water at completion was 7' 4"

● Initial penetration extrapolation

ST 46 NW / 67

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[ST46NW BJ 67 .]

267
3606

BOREHOLE No. 494

BOREHOLE LOG

NGR. 4086.6326 1"NS. 264

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY
ROSS SPUR JUNCTION TO EAST BRENT PUXTON. ST/46SW/4

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: H. AUG. DIAMETER: 6 INCH DATE: 27TH APRIL 1961

CHAINAGE: GROUND LEVEL 14.8ft N.D. PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Water encountered at 8'5" below ground level. Rose 6" below ground level.
TOPSOIL	Ground Level		0ft. 0in.		
		1	(0.3m)	32	
Firm grey slightly silty CLAY		2(1½)		49	C = 540 pw = 110
		3	5'6" (1.68m)	48	Classn CH
Firm varying to soft grey slightly silty CLAY		4(1½)		34	C = 1400 pw = 120
peaty		5		55	
		6(1½)		43	C = 990 pw = 112
		7	14'6" (4.42m)	120	
Black clayey PEAT		8(1½)	15'9" (4.80m)	36	C = 600 pw 115
		9		39	
Soft to firm varying to soft slightly silty CLAY		10(1½)		49	C = 440 pw 104
		11		61	
		12(1½)	25'9" (7.85m)	49	C = 690 pw = 110
END OF BOREHOLE					

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[ST46SW BJ 4 .]

THE CEMENTATION CO., LTD.

SOIL MECHANICS SECTION

BORING RECORD

CONTRACT PORTBURY — BOREHOLE No. 26.

Report No. 4322/KWV — Order No.

Bored for The Port of Bristol Authority.

Site Address Sheepway, Portbury, Nr. Bristol, Somerset.

Boring Commenced 16. 2. 65. — Boring Completed 6. 3. 65.

Type of Boring Shell & Auger 0'0"-40'0" Rotary 40'0"-82'0" — Diameter of Borehole 8 and 4½ ins.

Ground Level 42 O.D. approx.

Water Struck (1) 21'0" (2) (3) ST47NE/48

Standing Water Level 17'9"

Remarks GR 4920 7675

Description of Strata	Depth From	Depth To	Thickness	Samples Ref. No.	Type	Depth
Topsoil.	0'0"	1'0"	1'0"	2098	J	0'6"
Firm light brown fissured silty clay.	1'0"	4'0"	3'0"	2099 2100	U J	1'6"-3'0" 3'6"
Stiff red marl with pockets of grey marl and occasional veins of calcite.	4'0"			2201 2202 2203	U J U	4'6"-6'0" 8'0" 9'6"-11'0"
				2204 2205 2206	J U J	13'0" 14'6"-16'0" 18'0"
				2207 2209 2210	U J U	19'6"-21'0" 23'0" 24'6"-26'0"
		33'6"	29'6"	2211 2212 2213	J U J	28'0" 29'6"-31'0" 33'0"
Hard red very friable marl with pockets of grey marl.	33'6"	42'0"	8'6"	2214 2215 2216	J D J	34'0" 36'0" 40'0"
				2208	W	(21'0")
Hard red marl with pockets of grey marl and bands of rock marl.	42'0"			Core Recovery		
				40'0" to 46'0" - 67%		
				46'0" to 51'0" - 90%		
				51'0" to 56'0" - 60%		
				56'0" to 58'0" - 50%		
				58'0" to 61'0" - 67%		
				61'0" to 67'6" - 46%		
				67'6" to 74'0" - 62%		
		82'0"	40'0"	74'0" to 79'0" - 60%		
		25m.		79'0" to 82'0" - 83%		

Code: U — Undisturbed Sample D — Large Disturbed Sample J — Jar Sample W — Water Sample

Note.—Unless classification tests have been made and the results are included in this Report, the descriptions of strata given above have been obtained by inspection in accordance with British Standard Code of Practice CP 2001 (1957) Site Investigations. To ensure agreement as to interpretation, clients are requested to check the descriptions against the samples submitted.

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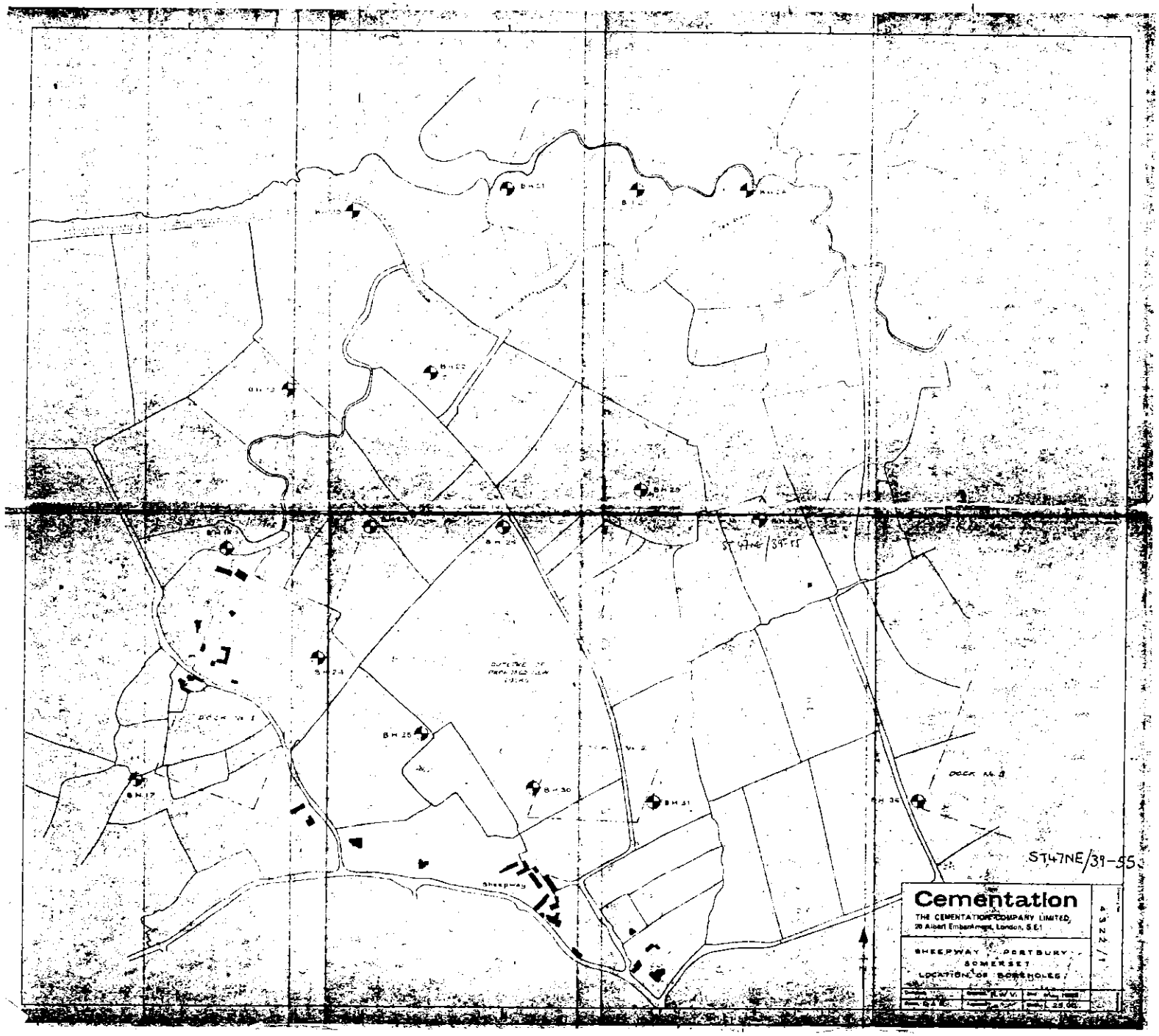
[ST47NE BJ 48 .]



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RECORD OF BOREHOLE 11 ST47NE 4826 7657 68

Ground level: 6.90m above O.D. Dia. of boring: 0.20m to 22.05m

Method of boring: Shell and Auger Lining tubes: 0.20m to 21.90m

Daily Progress	Samples Depth	Samples Type	Change of Strata Legend	Change of Strata Depth	Change of Strata O.D. Level	Description of Strata
				0.40	6.50	TOPSOIL
	0.45 - 0.90	U(4)				
	0.90	D				
	1.50	D				Very stiff becoming firm mottled brown-grey silty CLAY with granular particles and with plant debris
	2.00 - 2.45	U(4)				
	2.45	D		2.45	4.45	
	3.50 - 3.95	U(4)				
	4.00	D				
						Very soft grey silty CLAY
	5.15 - 5.45	U(4)				
	5.15	D				
	6.50 - 6.95	U(4)				
	6.95	D		7.00	-0.10	
	7.65 - 7.95	U(7)				
	7.65	D				
						Very loose grey clayey SILT
	9.50 - 9.95	U(4)				
	9.95	D		10.30	-4.00	
	11.15 - 11.45	U(7)				
	11.15	D				
	12.50 - 12.95	U(4)				
	12.95	D				Loose grey silty fine SAND with soft grey silty clay, and with compact PEAT at 15.95m
	14.15 - 14.45	U(6)				
	14.15	D				
	15.50 - 15.95	U(4)				
	15.95	D		16.40	-9.50	
	16.55 - 16.85	C(14)				Brown sandy fine to medium GRAVEL
	16.55	BD		17.10	-10.20	
	17.50 - 17.95	U(4)				
	17.95	D				
9.6.73	18.50	D				

Key to type of sample:
- U(4) — 102mm (4in.) dia. undisturbed sample
- D — disturbed sample
- BD — bulk disturbed sample
- V — vane test
- S ( ) — standard penetration test
- C ( ) — dynamic cone penetration test

Figure in brackets is No. of blows for penetration given in depth column (see Notes, page 1).

Remarks: (Observations on ground-water, etc.)

Lab. Ref. No. S/ 7843

PORTISHEAD POWER STATION

FIG. 11

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[ST47NE BJ 68 .]

RECORD OF BOREHOLE 11 (Sheet 2)

Ground level:..... Dia. of boring: ST47NE 68

Method of boring:..... Lining tubes:.....

Daily Progress	Samples: Depth	Samples: Type	Change of Strata: Legend	Change of Strata: Depth	Change of Strata: O.D. Level	Description of Strata
	19.50 - 19.95	U(4)				Moderately to highly weathered (Grade III to IV) red-brown friable SILTSTONE
	19.95	D				
	20.50	D				
	21.50 - 21.90	U(4) *				
	21.90	D				
12.6.73	22.05 - 22.12	C(18)		22.15	-15.25	

Key to type of sample:
- U(4) — 102mm (4in.) dia. undisturbed sample
- D — disturbed sample
- BD — bulk disturbed sample
- V — vane test
- S ( ) — standard penetration test
- C ( ) — dynamic cone penetration test

Figure in brackets is No. of blows for penetration given in depth column (see Notes, page 1).

Remarks: (Observations on ground-water, etc.)

Ground-water was encountered during boring at 1.00m.

* Seating blows only.

* Full penetration of sampler not attained.

Lab. Ref. No. S/ 9843

PORTISHEAD POWER STATION

FIG. 11 (Cont'd)

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[ST47NE BJ 68 .]

RECORD OF BOREHOLE 11A

ST47NE 68

Ground level: 6.90m above O.D. Dia. of boring: 0.075m

Method of boring: Open Hole to 18.00m Rotary Air Flush Core Drilling from 18m Lining tubes:

Daily Progress	Core Recovery		Change of Strata			Description of Strata
	Depth	%	Legend	Depth	O.D. Level	
		0%				Open Hole Drilling
	18.20			18.20	-11.30	

Key to type of sample:
U(4) — 102mm (4in.) dia. undisturbed sample
D — disturbed sample
BD — bulk disturbed sample
V — vane test
S ( ) — standard penetration test
C ( ) — dynamic cone penetration test
Figure in brackets is No. of blows for penetration given in depth column (see Notes, page 1).

Remarks: (Observations on ground-water, etc.)

Lab. Ref. No. S/ 9843

PORTISHEAD POWER STATION

FIG. 12

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[ST47NE BJ 68 .]

RECORD OF BOREHOLE 11A (Sheet 2)

Ground level:..... Dia. of boring: ST47NE 68

Method of boring:..... Lining tubes:.....

Daily Progress	Core Recovery Depth	Core Recovery %	Change of Strata Legend	Change of Strata Depth	Change of Strata O.D. Level	Description of Strata
	20.70	30% (0%)		21.20	-14.30	Highly to completely weathered (Grade IV to V) silty MUDSTONE. Slightly calcareous, with occasional green reduced pockets
	23.70	96% (0%)		22.20	-15.30	Moderately to highly weathered (Grade III to IV) broken thinly bedded brown very weak friable fissile calcareous MUDSTONE with calcite lined joints. Occasional green reduced pockets
	26.50	44% (0%)		27.50	-20.60	Highly weathered (Grade IV) broken thinly bedded brown moderately weak slightly fissile friable MUDSTONE. Jointed at 60° and vertically
	29.50	81% (0%)		31.80	-24.90	Moderately weathered (Grade III) broken red-brown weak slightly friable MUDSTONE with occasional green reduction spots
	32.50	79% (0%)				
6.6.73	35.50	75% (0%)		35.50	-28.60	Moderately to highly weathered (Grade III to IV) thinly bedded red-brown moderately weak, sometimes soft, slightly calcareous silty MUDSTONE, fissile on the top 0.80m; occasional Grade V bands and jointed from 32.90mto 33.05m at 30° and 60°. Occasional green reduction spots

Key to type of sample:
- U(4) — 102mm (4in.) dia. undisturbed sample
- D — disturbed sample
- BD — bulk disturbed sample
- V — vane test
- S ( ) — standard penetration test
- C ( ) — dynamic cone penetration test

Figure in brackets is No. of blows for penetration given in depth column (see Notes, page 1).

Remarks: (Observations on ground-water, etc.)

First 18m Open Hole drilled. No samples obtained, for lithologies encountered see Borehole 11.
Air used as circulatory fluid.

Lab. Ref. No. S/ 9843

PORTISHEAD POWER STATION

FIG. 12

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[ST47NE BJ 68 .]

BOREHOLE RECORDS

ST47SE/114.

Name of Site NAILSEA

Week Ending 28th December 1949

Contractors Mr Grantham

No. of Rigs 719

Site Ref.No. 819

Location Number	Ground Level	Depth to Coal	Thickness of Coal	Total Depth	REMARKS
209		98' 6"	2' 3"		0' - 1' Top Soil 1' - 37' Broken Sandstone & Clay Partings 37' - 41' Grey Clay (Thin Sandstone Bands) 41' - 59' Grey Clay (S) 59' - 80' Grey Clay (Thin Shale Bands) 80' - 87' Grey Shale (S) 87' - 90' Grey Clay (S) 90' - 92'6" Dark Clay (S) 92'6" - 98'6" Dark Clay (hard bands) 98'6" - 99'9" Coal (S) 99'9" - 100'9" Coal (S) 100'9" - 110' Grey Clay (S)
Hole Completed		- 23rd December 1949			
Moving Time		- 2 hours			
Drilling Time		- 20 hours			
Drilling Speed		- 5.5 ft. per hour.			
Casing		- Nil			
Standing Time		- Nil.			Rig Move, not in excess of ½ mile.
Core Recovery		- 60%			
Open	-	0' - 1'			
Cored	-	1' - 37'			
Open	-	37' - 80'			
Cored	-	80' - 87'			
Open	-	87' - 100'			
				110'	

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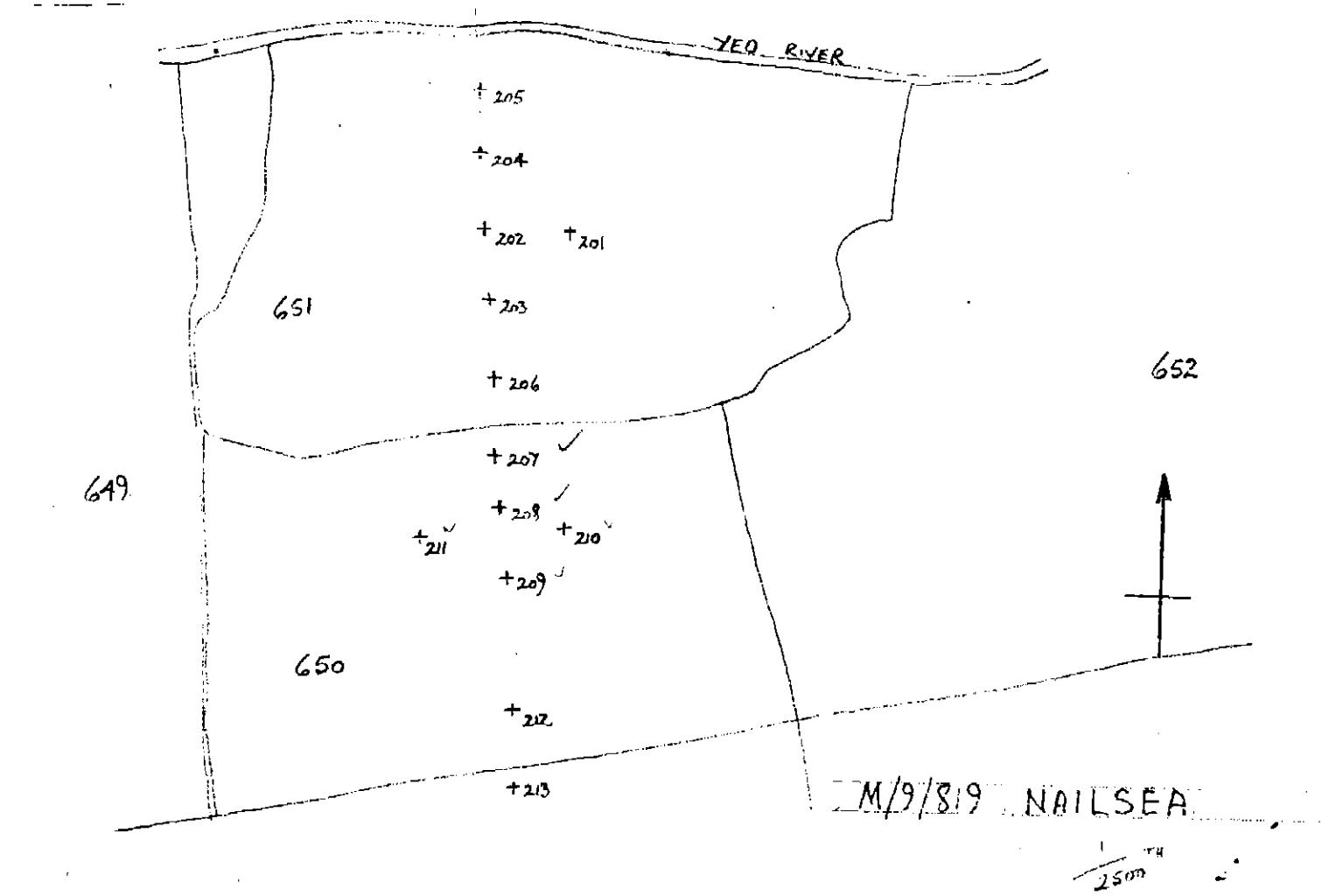
[ST47SE BJ 114 .]



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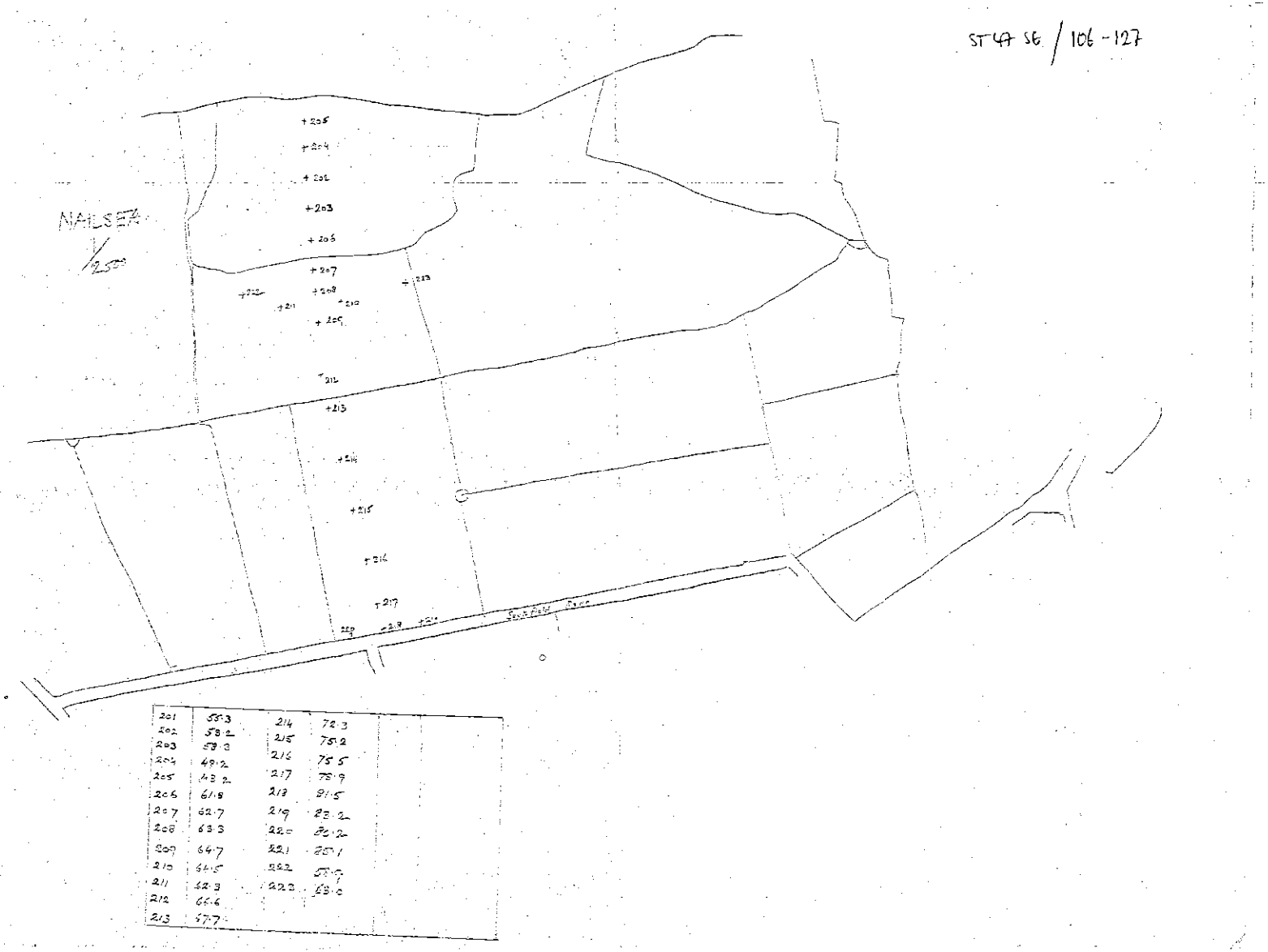
[ST47SE BJ 114 .]



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RECORD OF WELL (SHAFT OR BORE)

(attach copy of analysis if available)

For Survey use only

ST 43/20 N.

264/106

EXACT SITE OF WELL

At "DUNSHILL WOOD"

ST 4720 7295

Town or Village CLAPTON-IN-GORDANO

County SOMERSET. Six-inch quarter sheet 6 NW/a

For Mr. TRUEBODY State whether owner, tenant, builder, contractor, consultant, etc. :—

Address (if different from above)

Level of ground surface above sea-level (O.D.) approx 420 ft. If well-top is not at ground level, state how far ... {above; below; ft.

SHAFT ft. ; diameter ft. ; Details of headings

BORE 364 ft. ; diameter of bore : at top 8 ins. ; at bottom ins.

Details of permanent lining tubes

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

TEST CONDITIONS

Rest-level of water ft. above / below well-top. Suction at ft. Yield on hours' / days' test pumping at galls. per with depression to ft. below well-top.

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

NORMAL CONDITIONS

Description of permanent pumping equipment :

Make and/or type Motive power

Capacity 100 gallons per hour. Suction at ft.

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

Well made by GREEN & CLEMENTS. Date of well 1932

Information from gardener at "Dunshill Wood"

ADDITIONAL NOTES

Supplies "Dunshill Wood" and one other house.

New pump fitted May 1951.

East Park Lt at site

LOG OF STRATA OVERLEAF.

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.		Date Received 13-5-1949	1" O.S. Map No.	Site marked (use symbol) on 1" Map O	on 6" Map O

(23243) W1.44781/0424 12,000 3/48 A.& E.W.Ltd. Gp.685

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[ST47SE BJ 140 .]

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

NGRC

BOREHOLE RECORDS

ADJUSTMENT FORM

QUARTER SHEET ST 47 SE .

BH REGISTRATION NUMBER 133 - 140 .

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

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9096

207

BOREHOLE LOG

1"NS. 264 NGR: 4648. 7453

ST 14 7 SE 17

ST/47SE 117

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY
Clapton-in-Gordano Som. ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: Diamond Drill DIAMETER: NX 3 IN NOMINAL DATE: 23 March 1961

CHAINAGE: 1226 +00 GROUND LEVEL 165.7 Ft. N.D. PAVEMENT LEVEL 145.7 Ft. N.D.

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Core Recovery
Ground Level			0ft. 0in.		
TOPSOIL - Red calcareous SAND with particles of calcareous CONGLOMERATE as below.			1' 0" (0.3m)		40%
Hard					100%
CONGLOMERATE - Fine and medium sized angular and rounded fragments of limestone and sandstone (?) in a fine grained red varying to light brown calcareous sand matrix. Small vughs present, massive. (Dolomitic Conglomerate - Trias)					90%
					100%
					100%
					10%
					95%
			30' 0" (9.1m)		
CONTINUED ON SHEET 2					

BRIDGE SITE - CUTTING

Piezometer installed at 40' 0"
No water encountered

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[ST47SE BJ 17 .]

612
3606
007

BOREHOLE LOG

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY ST/47SE/17
ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: DIAMETER: DATE:

CHAINAGE: GROUND LEVEL PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Core Recovery
			30' 0" (9.1m)		95%
					100%
			(2") 40' 0" (12.2m)		17%
END OF BOREHOLE					

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[ST47SE BJ 17 .]

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No. ST/47SE/25

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: MS Motorway (R. Avon - E. Brent) 117 B

For whom made Freeman, Fox & Partners

Town or Village Clapton in Gordano County Somerset

Exact site ... (Attach a tracing from a map, or a sketch-map, if possible.)

Purpose for which made trial

Nat. Grid Reference 4791.7400

1"N.S. Map No.	1"O.S. Map No.	Confidential or not
264		

Ground Level at shaft bore relative to O.D. ... If not ground level give O.D. of beginning of shaft bore ...

Made by Soil Mechanics Ltd for Freeman, Fox & Partners Date of sinking 1966

Information from Examination of core Date received ...

Examined by J. McA. HART. 26/8/66.

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	Description of Strata	Thickness Ft	Thickness In.	Depth Ft	Depth In.
	No Core.	8	0	8	0
Coal Measures (Permian)	Medium-grained, well-compacted, well-bedded sandstone with some pale pinkish and medium grey bands. Abundant finely-divided carbonaceous matter segregated along bedding planes. Much hematite staining in places. Many joints parallel to bedding and high angled joints from 9/8 to 12/5. Dip 28° at 9/6, 28° at 9/4, 26° at 11/1, 22° at 12/6, 15° at 13/11.			2.44m	
	Well-rotted, highly ferruginous sandstone, very jointed and with much red clay.	7	2	15	2
	Medium-grained, well-compacted, well-bedded sandstone. Medium grey and with abundant finely-divided carbonaceous matter on most bedding planes. Slightly cavernous weathering in places. Abundant joints parallel to bedding and high-angled undulating joint from 19/5 to 20/4. Dip 30° at 19/1, 25° at 17/5, 25° at 19/2, 20° at 22/1.			4.63m	
	Rotten band with much carbonaceous matter at 19/4-5. Dip. 30° at 17/1,	1	4	16	6
				5.03m	

C.B.H. 34134 W.L. 58370 - Dd. P.S.4 - 2000 - 2/60

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[ST47SE BJ 25 .]

Name of Shaft or Bore given by Geological Survey:

6-inch Map Registered No. ST 47 SE 25 2

Geological Classification	Description of Strata	Thickness Ft	Thickness In.	Depth Ft	Depth In.
	36° at 26/11, 34° at 29/11, 39° at 33/3, 28° at 36/0, 30° at 37/11, 36° at 40/3, 35° at 42/1, 31° at 43/6, 28° at 44/9. Sandstone rather rotted from 27/11 62 9/2, Dip. 20° at 45/9, 30° at 46/8, 20° at 47/1, 32° at 48/8, 25° at 50/6, 30° at 51/4.	35	2	51 15.70m	8
	Severely rotted sandstone with much limonite and clayey material. Core reduced to a soggy mass with much hematite and carbonaceous. A few slightly more solid lumps, highly micaceous in places.	1	10	53 16.32m	6
	Medium-grained medium grey, highly micaceous sandstone with few joints in upper 7", more beneath, well-bedded. Dip throughout 22° ± 5°.	4	0	57	6
	Bottom of hole.			57 17.54m	6

(5412) WL32837/PS.154 6m 10/64 G.W.B.Ltd. Gp.863

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[ST47SE BJ 25 .]

RECORD OF WELL (SHAFT OR BORE)

W15 ST 47/18
264
103

At Moorlands.
Town or Village Nailsea
County Somerset · Six-inch quarter sheet ST 47 NW/W
For Mr. Parker
Exact site of well ST 4655 7089 { Attach a tracing from a map, or a sketch-map, if possible.

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

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

Shaft_____ft., diameter_____ft. Details of headings_____

Bore 38 ft. ; diameter of bore : at top 4 ins. ; at bottom_____ins.

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

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

TEST DETAILS — Month _____ Year _____

Rest-level of water_____ft. above / below well-top. Suction at_____ft. Yield on_____hours' / days' pumping 180 gallons per hour (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 F. G. CLEMENTS LTD. Date of well 1934

Information from_____

ADDITIONAL NOTES.

(12) Well at Nailsea for Mr Parker. 1934
at the Clevedon end of the village
In Coal measures. Depth 38ft. 4" well. yield
180 Gals per hour. A very good house supply

House called "Moorlands". Very good supply. Needs
tank. O.D. 57'. Sited on 6" Sheet 5. NW/W.
H. Pike. 13.5.1949

LOG OF STRATA OVERLEAF.

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.	Date received. Sept 1941	G.S.M. Office File No.	1" N.S. Map No. 264	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

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(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far... ...	THICKNESS Feet ...	 Inches ...	DEPTH Feet	 Inches
	Coal Measures	38	-	38	-

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[ST47SE BJ 63 .]

RECORD OF WELL (SHAFT OR BORE)

W/S ST 47 SE/63

264

4660. 7189 103

At MOORLANDS.

Town or Village Nailsea

County Somerset. Six-inch quarter sheet S NW/W

For Mr. Parker

Exact site of well

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

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

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

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

Bore 38 ft.; diameter of bore: at top 4 ins.; at bottom _____ ins.

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

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

TEST DETAILS
Month _____
Year _____

Rest-level of water _____ ft. above / below well-top. Suction at _____ ft. Yield on _____ hours' / days' pumping 180 gallons per hour (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 F. G. CLEMENTS LTD. Date of well 1934

Information from

ADDITIONAL NOTES.

(12) well at Nailsea for Mr Parker. 1934
at the Clevedon end of the village
In Coal measures. Depth 38ft. 4" well. yield
180 Gals per hour. a very good house supply
House called "Moorlands". Very good supply. New
York. O.D. 57'. Sited on 6" Sor 5. NW/W.
H. Pike. 13.5.1949 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.
Sept 1941		264		⊙	⊙

(17208) WL42901/0377 10,000 2/41 A.& E.W.Ltd. Gp.686

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[ST47SE BJ 63 .]

ST 47 SE /63

(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
	Coal Measures	38	.	38	.

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[ST47SE BJ 63 .]

ST57NW/168

		Borehole No. 4130	
Methods: Cable tool boring 150mm dia. G.L to 14.00m. Rotary coring 92mm dia. from 14.00 to 33.00m using air/mist flush and mylar.	Dates: 29/03/90 - 03/04/90	Job No. 7625	Sheet 1 of 4
	Coordinates: 354187 E 179875 N	Site: SECOND SEVERN CROSSING Main Onshore Ground Investigation	
	Ground Level: 6.37 mOD	Client: Department of Transport	

Depth m	Sample/Test	Field Records	Level mOD	Depth m (Thick)	Description	Legend
				(0.40)	TOPSOIL	
0.60 - 1.05	U 1 (23 BLOWS)		5.97	0.40	Firm locally soft grey and brown mottled extremely closely fissured CLAY with occasional rootlets. (ESTUARINE ALLUVIUM)	
1.10 - 1.55	SPT N(4)	1,1/1,1,1,1				
1.10 - 1.55	D 2					
1.60 - 2.05	U 3 (21 BLOWS)			(1.90)		
2.10 - 2.55	SPT N(4)	1,1/1,1,1,1			black organic parting 2mm thick	
2.10	D 4					
2.10 - 2.55	D 5		4.07	2.30		
2.60 - 3.60	P 6				Soft locally firm grey thinly laminated very silty CLAY with occasional black and brown organic matter. (ESTUARINE ALLUVIUM)	
3.10	D 7					
				(3.00)		
4.10	D 8					
4.10	V (N<50 R36.0)					
4.30 - 5.30	P 9					
4.85	D 10				probably thin bed of spongy brown and black amorphous peat with some plant remains.	
			1.07	5.30		
				(0.70)	Firm grey thinly laminated fine sandy SILT with a little black organic matter. Strong odour. (ESTUARINE ALLUVIUM)	
6.00	D 11		0.37	6.00		
6.00	V (N>50 R=37.5)					
6.00 - 7.00	P 12				Loose grey and brownish grey silty fine SAND. Slight organic odour. (ESTUARINE ALLUVIUM)	
7.00 - 8.00	P 13					
8.00 - 9.00	P (NR)					
8.45	D 14					
				(5.70)		
9.00 - 9.45	SPT N(4)	1,1/1,1,1,1				
9.00 - 9.75	D 15					
9.45 - 9.75	SPT N(7)	,/2,1,2,2				

Remarks: 1. Water added from 1.50 to 14.00m.

Scale 1:50

Logged by GW/PA

See key sheet for symbols and abbreviations

160491/1137

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ST57NW/168

		Borehole No. 4130	
Methods: Cable tool boring 150mm dia. G.L to 14.00m. Rotary coring 92mm dia. from 14.00 to 33.00m using air/mist flush and mylar.	Dates: 29/03/90 - 03/04/90	Job No. 7625	Sheet 2 of 4
	Coordinates: 354187 E 179875 N	Site: SECOND SEVERN CROSSING Main Onshore Ground Investigation	
	Ground Level: 6.37 mOD	Client: Department of Transport	

Depth m	Sample/Test	Field Records	Level mOD	Depth m (Thick)	Description	Legend
10.50 - 10.95	SPT N(5)	1,1/1,2,1,1			silty fine SAND (As sheet 1)	
10.50 - 11.25	D 16					
10.95 - 11.25	SPT N(10)	,/2,2,3,3				
11.75	D 17		-5.33	11.70		
11.95	D 18			(0.40)	Firm dark brown organic SILT with occasional plant remains, frequent white shells and with very closely spaced partings of grey sand. (ESTUARINE ALLUVIUM) From 11.90 to 12.10m, peat.	
12.15	D 19		-5.73	12.10		
12.20 - 12.65	U 20 (69 BLOWS)			(0.30)		
12.70 - 13.15	SPT N(63)	4,7/ 10,10,19,24	-6.03	12.40	Firm greenish grey and grey mottled CLAY with frequent rootlets. (ESTUARINE ALLUVIUM)	
12.70 - 13.15	D 21			(1.10)	Very stiff red brown calcareous very silty CLAY with occasional becoming many sand sized lithorelicts. Locally with coarse gravel sized lithorelicts. (KEUPER MARL GRADE III/IVa)	
13.50 - 13.80	SPT N(70*)	11,13/20,50,,	-7.13	13.50		
13.50 - 13.80	D 22				Very stiff red brown very silty CLAY with many gravel sized lithorelicts and occasional green alteration spots. (KEUPER MARL GRADE III)	

Depth m	TCR	SCR	RQD	If	Field Records	Level mOD	Depth m (Thick)	Description	Legend
14.30	100	0	0		Coring started at 14.00m W23			fine gravel sized gypsum inclusions	
	100	0	0						
14.90							(3.80)		
	100	0	0	NI					
16.90					SPT: 8,13/25, 31, 50 for 20mm D24				
17.30						-10.93	17.30	Red brown friable slightly to moderately weathered very silty MUDSTONE very weak with closely spaced clay smeared subh J. (KEUPER MARL GRADE II) Below 19.10m, with occasional coarse gravel sized green alteration spots.	
	93	41	22	160					
19.60									
19.90				20	SPT: 4,9/17, 50 for 45mm D25		(5.20)		

Remarks: 2. Chiselling, 13.20 to 14.00m, 1.75 hrs.

Scale 1:50

Logged by GW/PA

See key sheet for symbols and abbreviations

160491/1138

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ST57NW/168

Methods	Dates	Job No.	Borehole No.
Cable tool boring 150mm dia. G.L to 14.00m. Rotary coring 92mm dia. from 14.00 to 33.00m using air/mist flush and mylar.	29/03/90 - 03/04/90	7625	4130
	Coordinates 354187 E 179875 N	Site	Sheet 3 of 4
	Ground Level 6.37 mOD	Client	SECOND SEVERN CROSSING Main Onshore Ground Investigation
			Department of Transport

Depth m	TCR	SCR	RQD	If	Field Records	Level mOD	Depth m (Thick)	Description	Legend
20.10				NI				45 deg PL J MUDSTONE (As sheet 2)	
	100	55	18	60					
22.50					SPT: 50 for 30mm D26	-16.13	22.50		
22.70				NI		-16.33	(0.20) 22.70	Red brown slightly weathered SILTSTONE strong with occasional fine gravel sized cavities and medium gravel sized alteration spots. (KEUPER MARL GRADE II/I)	
	100	33	22	80			(2.10)	Red brown friable slightly weathered very silty MUDSTONE very weak with occasional green alteration spots and very closely to closely spaced subh black stained J. (KEUPER MARL GRADE II)	
24.80						-18.43	24.80		
25.40				60	SPT: 30,50 for 10mm D27		(2.00)	Red brown friable slightly weathered locally slightly sandy very silty MUDSTONE very weak with closely spaced subh J. (KEUPER MARL GRADE II) below 26.50 closely spaced subv clay smeared J	
26.80						-20.43	26.80		
	100	12	7	NI			(1.60)	Red brown slightly weathered sandy SILTSTONE weak with closely spaced subv RO J with sand infill and occasional coarse gravel sized alteration spots. (KEUPER MARL GRADE II)	
28.40					SPT: 17,44/ 35, 50 for 10mm D28	-22.03	28.40		
	100	45	41	140			(1.00)	Red brown fine grained moderately weathered silty SANDSTONE weak locally very weak. (KEUPER SANDSTONE)	
29.40						-23.03	29.40		
29.90				120	SPT: 18,45/ 35, 50 for 35mm	-23.53	(0.50) 29.90	Red brown moderately weathered MUDSTONE very weak with a little clay matrix. (KEUPER MARL GRADE II/III)	

Remarks

Scale 1:50

Logged by GW/PA

See key sheet for symbols and abbreviations

160491/1138

GDS 1990-3

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ST57NW/165 ST57N/168

		Borehole No. 4130	
Methods: Cable tool boring 150mm dia. G.L to 14.00m. Rotary coring 92mm dia. from 14.00 to 33.00m using air/mist flush and mylar.	Dates: 29/03/90 - 03/04/90	Job No. 7625	Sheet 4 of 4
	Coordinates: 354187 E 179875 N	Site: SECOND SEVERN CROSSING Main Onshore Ground Investigation	
	Ground Level: 6.37 mOD	Client: Department of Transport	

Depth m	TCR	SCR	RQD	If	Field Records	Level mOD	Depth m (Thick)	Description	Legend
				NI			(1.10)	Red brown fine grained slightly weathered silty SANDSTONE weak with a little clay matrix. (KEUPER SANDSTONE)	
31.00						-24.63	31.00		
				80				Red brown mottled green slightly to moderately weathered very silty MUDSTONE very weak. (KEUPER MARL GRADE II)	
31.50	100	43	24				(1.40)		
				NI					
32.40						-26.03	32.40		
				80			(0.60)	Light green slightly weathered fine sandy SILTSTONE strong. (KEUPER SANDSTONE)	
33.00					W29:	-26.63	33.00		

Remarks

Scale 1:50

Logged by GM/PA

See key sheet for symbols and abbreviations

160491/1139

GDS 1990-2

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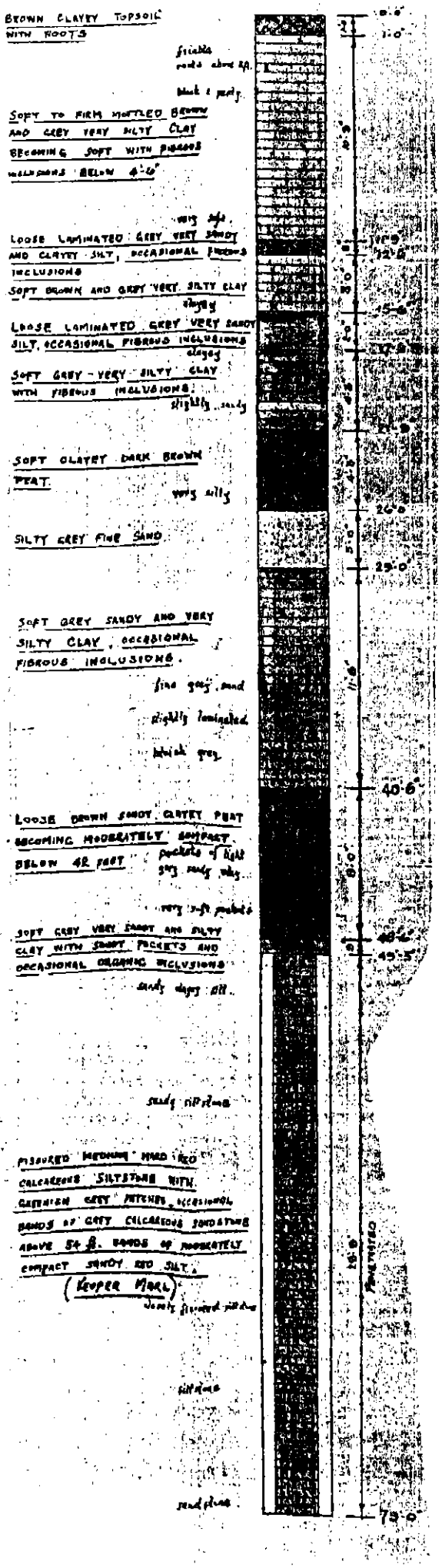
[ST57NW BJ 168 .]

ST 58 SW 25



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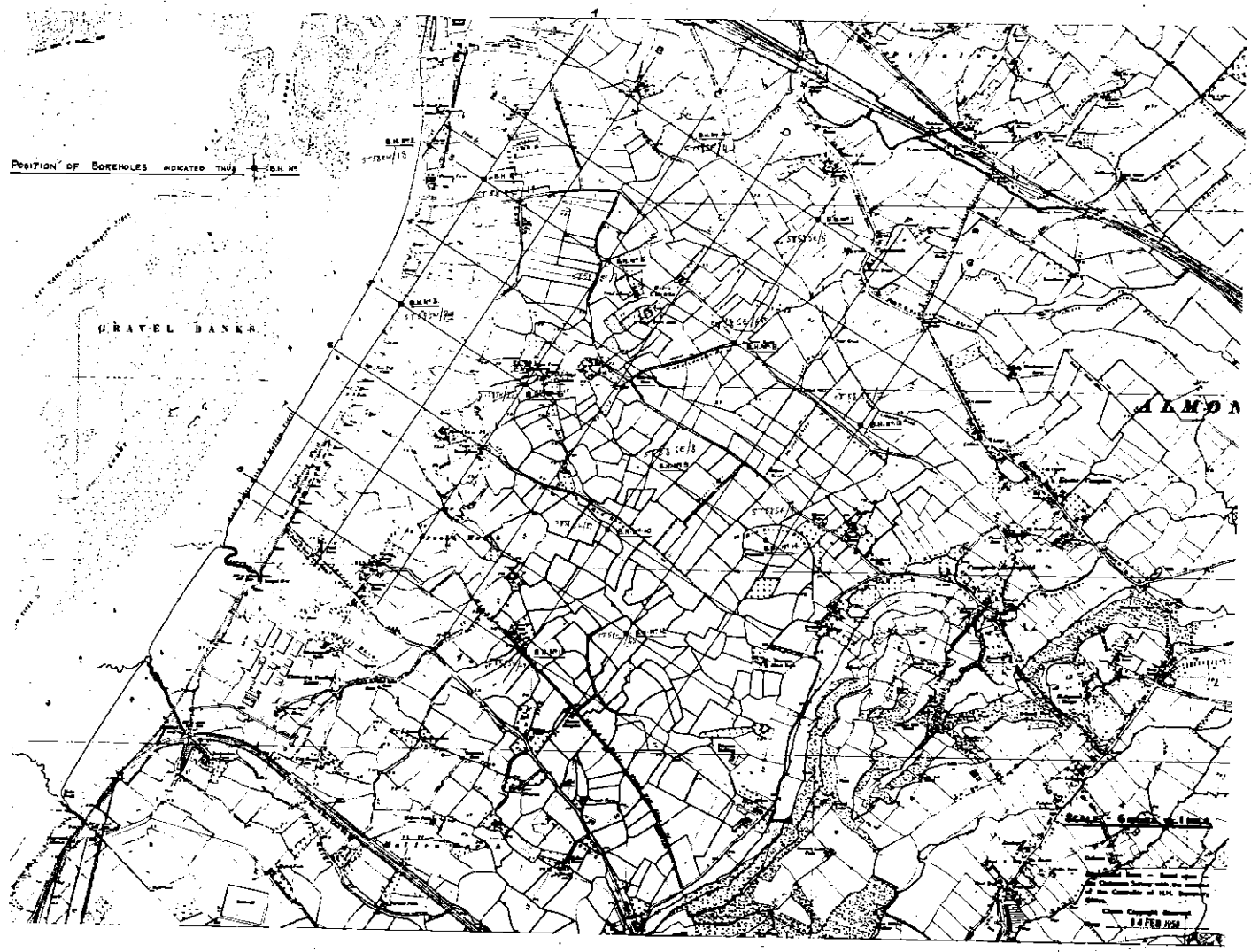
[ST57NW BJ 25 .]



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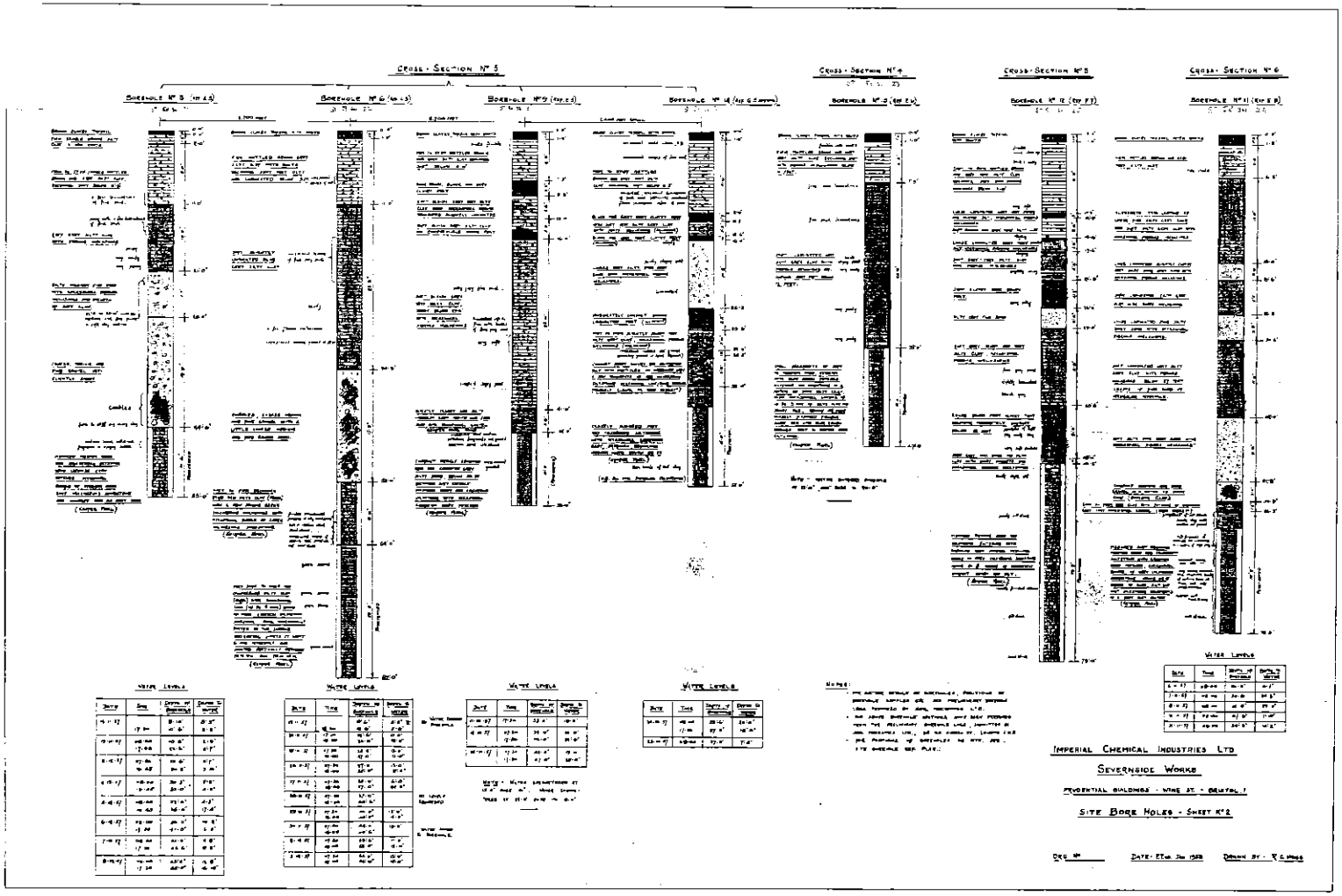

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ST 57 NW / 25

5231 6800

Kirkland + Lapper.

See note appended to ST 57 NW/1.

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[ST57NW BJ 25]

ST 57 NW / G.L.M. ref.

BOREHOLE SECTION SHEET. 264

LE GRAND, SUTCLIFF & GELL, LTD. Date July-Oct 1902.

CONTRACT NAME Avonmouth. ORDER NO. 2163. 75

Bored for Messrs. Kirkland & Capper. (Coop. Soc)

Address 17, Victoria Street. S.W.

Address of Site

District or Town Avonmouth. County 6" Gloucestershire. 71.

Standing Water Level 18 Feet Below Surface Pumping W.L. Feet Below Surface

Dia. of Borehole 4 Inches Yield of Water 720 G.P.H.

O.D. of Site + 25 Water Struck (1) Ft. B.S. (2) Ft. B.S. (3) Ft. B.S.

Depth from surface to bottom of Dug Well

Special Remarks Bad water.

Grid Ref. 5231 7800

FULL DETAILED DESCRIPTION OF STRATA	THICKNESS FEET	THICKNESS INCHES	DEPTH BELOW SURFACE FEET	DEPTH BELOW SURFACE INCHES
No. 1 Boring				
Clayey Soil	1	0	1	0
Greenish Clay	6	6	7	6
Alluvial Deposits. Mottled Clay	5	6	13	0
Mottled Sandy Clay	3	0	16	0
Red Marl	30	0	46	0
Red Rock (Hard)	2	0	48	0
Red Marl	12	0	60	0
Red Rock	1	9	61	9
Marl	0	4	62	1
Rock	4	4	66	5
Thick Layer of Rock and thin Marl	7	1	73	6
Trias. Keuper marls & stots. Hard Red Rock	5	6	79	0
with wedges & base Layers of Red Rock and Marl	7	0	86	0
of Dol. Conglom Green Sandy Marl	1	0	87	0
Layers of Red Rock and Marl	2	0	89	0
Red Rock	3	6	92	6
Red Rock and Marl	10	0	102	6
Red Rock and Marl and Little Grey Sand	6	6	109	0
Layers of Red Rock and Marl	7	6	116	6
Hard Red Rock	2	0	118	6
Red Marl and Rock	3	0	121	6
Hard Red Rock	3	6	125	0
Very Hard Grey and Red Rock		9	125	9
? Pennant Series Hard Grey Rock	2	6	128	3
TOTAL	128	3	128	3

AR/S.

For LeGrand, Sutcliff & Gell, Ltd..

A Rade

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[ST57NW BJ 25 .]

2

BOREHOLE SECTION SHEET.

ST 57 NW/~~46~~ 25 FORM No. 1.

264/75

LE GRAND, SUTCLIFF & GELL, LTD. Date JULY 1902

CONTRACT NAME Avonmouth. ORDER NO. 2163

Bored for Messrs. Kirkland & Capper.

Address 17, Victoria Street, London. S.W.

Address of Site

District or Town Avonmouth *County* Gloucestershire.

Standing Water Level 8'3" *Feet Below Surface* *Pumping W.L.* 24'3" *Feet Below Surface*

Dia. of Borehole 4 *Inches Yield of Water* 960 G.P.H.

O.D. of Site *Water Struck (1)* *Ft. B.S.* (2) *Ft. B.S.* (3) *Ft. B.S.*

Depth from surface to bottom of Dug Well

Special Remarks. Water is fresh. 3" Column Pump & 30ft. of 2" Suction fixed.

FULL DETAILED DESCRIPTION OF STRATA	THICKNESS FEET	THICKNESS INCHES	DEPTH BELOW SURFACE FEET	DEPTH BELOW SURFACE INCHES
No. 2 Boring				
Top Soil.....	1	0	1	0
Greenish Clay,.....	8	0	9	0
Soft Muddy Clay.....	36	0	45	0
Grey Blowing Sand and Pebbles.....	13	6	58	6
Red Marl.....	10	6	69	0
Red Rock and Marl.....	16	0	85	0
65' of 4" tubes, top 6" above surface.				
AR/S.				
For LeGrand, Sutcliff & Gell, Ltd..				
[redacted]				
TOTAL	85	0	85	0

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[ST57NW BJ 25 .]

3

ST 57 NW/~~46~~ 25

Form No. 1.

BOREHOLE SECTION SHEET.

LE GRAND, SUTCLIFF & GELL, LTD.

Date July 19 02

264/75

CONTRACT NAME Avonmouth ORDER NO.

Bored for Messrs. Kirkland & Capper.

Address 17, Victoria Street, London. S.W.

Address of Site

District or Town Avonmouth. *County* Gloucestershire.

Standing Water Level 16'4" *Feet Below Surface* *Pumping W.L.* 29 *Feet Below Surface*

Dia. of Borehole 4 *Inches Yield of Water* 1200 G.P.H.

O.D. of Site *Water Struck (1)* *Ft. B.S. (2)* *Ft. B.S. (3)* *Ft. B.S.*

Depth from surface to bottom of Dug Well

Special Remarks Water brackish. Gas at this site.

FULL DETAILED DESCRIPTION OF STRATA	THICKNESS FEET	THICKNESS INCHES	DEPTH BELOW SURFACE FEET	DEPTH BELOW SURFACE INCHES
No. 3 Boring				
Top Soil.....	1	0	1	0
Mottled Clay,.....	6	6	7	6
Blue Muddy Clay.....	36	0	43	6
Mottled Loam and Stones.....	4	6	48	0
Marley Clay and Stones.....	2	0	50	0
Red Marl.....	11	4	61	4
Red Rock and Marl.....	5	8	67	0
TOTAL	67	0	67	0

Borehole temporarily lined with 4" pipes to 54ft., but later pipes were pulled back to 39'0".

AR/S.

For LeGrand, Sutcliff & Gell, Ltd.,

[redacted]

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4

ST 57 NW/25 Form No. 1.

BOREHOLE SECTION SHEET.

264/75

LE GRAND, SUTCLIFF & GELL, LTD. Date 4 Oct. 1902

CONTRACT NAME Avonmouth. ORDER NO.

Bored for Messrs. Kirkland & Capper.

Address 17, Victoria Street, LONDON. S.W.

Address of Site

District or Town Avonmouth. *County* Gloucestershire.

Standing Water Level 14 *Feet Below Surface* *Pumping W.L.* - *Feet Below Surface*

Dia. of Borehole ? *Inches Yield of Water* 8'9" 1200 *G.P.H. without enhancement of p.*

O.D. of Site *Water Struck* (1) 29'0" Ft. B.S. (2) 59½ 67' Ft. B.S. (3) *Ft. B.S.*

Depth from surface to bottom of Dug Well

Special Remarks Water rather brackish and smelling bad.

FULL DETAILED DESCRIPTION OF STRATA	THICKNESS FEET	THICKNESS INCHES	DEPTH BELOW SURFACE FEET	DEPTH BELOW SURFACE INCHES
No. 4 Boring				
Top Soil	1	6	1	6
Greenish Clay	7	3	8	9
Blue Muddy Clay	20	3	29	0
Grey Sand	3	3	32	3
Blue Muddy Clay	7	5	39	8
Peat		4	40	0
Muddy Clay	3	0	43	0
Muddy & Sandy Clay	5	2	48	2
Mottled Sandy Loam	2	8	50	10
Red Marl	9	2	60	0
Layers of Marl & Rock	7	0	67	0
TOTAL	67	0	67	0

AR/S.

For LeGrand, Sutcliff & Gell, Ltd.,

[redacted]

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[ST57NW BJ 25 .]

5

BOREHOLE SECTION SHEET. ST 57 NW/~~SE~~ 25 FORM No. 1.

LE GRAND, SUTCLIFF & GELL, LTD. Dec. 1903.

264/75

CONTRACT NAME Avonmouth. ORDER NO.

Bored for Messrs. Kirkland & Capper.
Address 17, Victoria Street, London.S.W.
Address of Site
District or Town Avonmouth. *County* Gloucestershire.
Standing Water Level 18' 3" *Feet Below Surface* *Pumping W.L.* ? *Feet Below Surface*
Dia. of Borehole ? *Inches Yield of Water* See remarks. G.P.H.
O.D. of Site *Water Struck (1)* Ft. B.S. (2) Ft. B.S. (3) Ft. B.S.
Depth from surface to bottom of Dug Well
Special Remarks Gas found at 38ft. (see also notes below).

FULL DETAILED DESCRIPTION OF STRATA	THICKNESS Feet	Inches	DEPTH BELOW SURFACE Feet	Inches
No. 5 Boring				
Top Soil.....	1	0	1	0
Mottled Clay.....	4	6	5	6
Blue Muddy Clay.....	33	6	39	0
Gravel.....	2	6	41	6
Marley Clay and Stones.....		6	42	0
Red Marl.....		6	42	6

Remarks contd.

Small supply of 2 G.P.M. found in Gravel 39' to 41'6". Water salt and smells bad.

Tubes withdrawn.

AR/S.

For LeGrand, Sutcliff & Gell, Ltd..

[redacted]

TOTAL 42 6 42 6

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[ST57NW BJ 25 .]

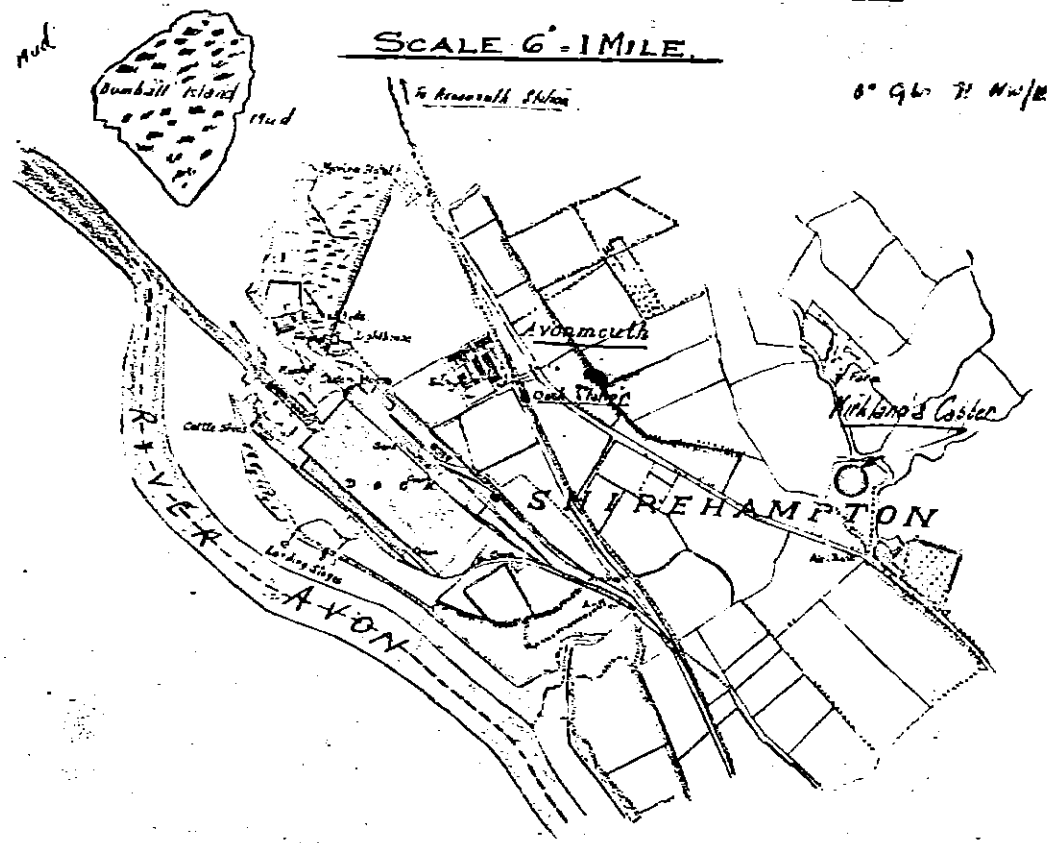
6" Geo.

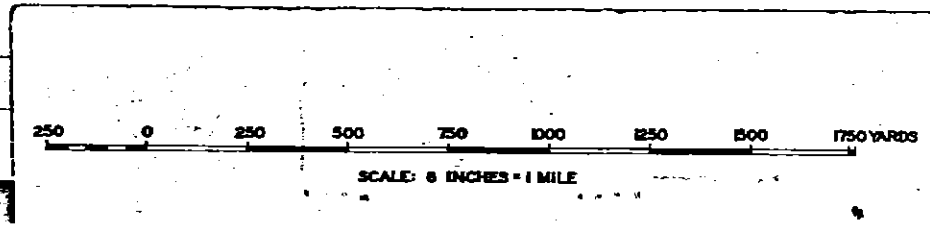
264/75

— KIRKLAND & CAPPER —

SITE OF AVONMOUTH TRIAL BORINGS

SCALE 6" = 1 MILE.





ST 57 NW/BJ 25.

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GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)
6-inch Map Registered No.
ST/57NW/62

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: MS Motorway (R. Avon - E. Brue) 101 A

Nat. Grid Reference: 5119.7591

For whom made: Freeman, Fox & Partners

Town or Village: Easton in Gordano County: Somerset

Exact site: (Attach a tracing from a map, or a sketch-map, if possible.)

1"N.S. Map No.	1"O.S. Map No.	Confidential or not
264		

Purpose for which made: trial

Ground Level at shaft / bore relative to O.D. ____ If not ground level give O.D. of beginning of shaft / bore ____

Made by: Soil Mechanics Ltd Date of sinking: 1966

Information from: Examination of cores Date received: 26/8/166

Examined by: D.S. Moores

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	No core	19	—	19 (5.79m)	—
	Conglomerate – hard, pale green, matrix with scattered small pebbles		9	19 (6.02m)	9
	Conglomerate – red, marly matrix, with scattered small pebbles (some sub-angular) & rarely boulders; with some limonite and calcite in small cavities	1	9	21 (6.55m)	6
Dolomitic Conglomerate (Keuper) (to 32/6)	Conglomerate – pale grey-green sandstone matrix with large, rounded and sub-angular pebbles, mainly grey limestone; cavities with calcite	4	3	25 (7.85m)	9
	Limestone, dolomitized, massive, very fine-grained		9	26 (8.08m)	6
	Limestone, light grey and red with sandy marl in irregular beds and pebbles (? section through a very large conglomerate structure)	1	6	28 (8.54m)	—
	Conglomerate, very well cemented, – hard light grey matrix with mainly limestone pebbles	1	10	29 (9.05m)	10
	Sandstone soft, red marly, with a few small pale green pebbles and scattered quartz pebbles		7	29 30	5
	Limestone, pale green, dolomitized		7	31 (9.45m)	—

C.B.H. 3434 - W.L. 38370 - Dd. P.S.9-2000-2/60

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[ST57NW BJ 62 .]

Name of Shaft or Bore given by Geological Survey: 101A

6-inch Map Registered No. ST 57 NW 162

Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	Sandstone, soft, red, marly with small green pebbles		4	31 (9.55m)	4
Dolomitic Conglomerate	Conglomerate – soft red marly matrix and small sandstone pebbles		5	31 (9.68m)	9
	Sandstone, grey-green, fine-grained, dolomitized, with scattered quartz pebbles		5	32 (9.82m)	2
	Sandstone, pale grey-green, calciferous		3	32 (9.89m)	5
Coal Measures (Permian)	Sandstone, purple, coarse, micaceous, with a vertical joint and a few carbonaceous partings and with a thick joint at 35ft 0–6 in. lined with calcite and hematite; dip 35° at base	4	7	37 (11.28m)	—

C.B.H. 27185 - WL 53825 - Dd. 0469-2000-2/56

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GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No.

ST 1 - ?/SW/26

Name of Shaft or Bore given by Geological Survey: ACROW BORE G.5

Name and Number given by owner: G.5

Nat. Grid Reference: 53363 82230

For whom made

Town or Village ..... County .....

Exact site ..... (Attach a tracing from a map, or a sketch-map, if possible.)

1"N.S. Map No.	1"O.S. Map No.	Confidential or not
264		Declassified 15.2.71

Purpose for which made ..... (6.71M)

Ground Level at ~~shaft~~ bore relative to O.D. + 22 ft. If not ground level give O.D. of beginning of ~~shaft~~ bore .....

Made by Towaby Ltd. Date of sinking 1960

Information from Examination of cores Date received Jan 1961

Examined by L.S.O'Connis, D.B.Paterson and J. McA. Hart

SPECIMEN NUMBERS AND ADDITIONAL NOTES

Specimens:— Br 8018 – 8228

(For Survey use only) GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS Ft	THICKNESS in.	DEPTH Ft	DEPTH in.
	Open hole			(M)	
	Clay	46	–	(14.02) 46	–
	Marl and sandstone	114	6	(48.92) 160	6
	Cored below 160 ft. 6 in. (48.92m.)				
	Chocolate brown – red, sandy, micaceous marl with a few pale green patches and streaks; breccia in lower 3 in.	3	–	(49.83) 163	6
Trias C.M.	Red, grey and green, soft, shaky mudstone, faintly micaceous, with a few Lingula near top	5	4	(51.46) 168	10
	Greenish-grey, silty mudstone	2	2	(52.12) 171	–
	Grey, shaky siltstone with dark mudstone wisps	3	6	(52.88) 173	6
	Grey, smooth, faintly micaceous mudstone	1	3	(53.28) 174	9
	Grey, shaky mudstone		1	(53.31) 174	10
	Grey siltstone, abundantly striped with dark calcareous and finely micaceous partings above 179 ft.; less striped below	4	8	(54.61) 179	6
	Grey, silty mudstone, becoming less silty downwards; very smooth, faintly micaceous and slightly shaky below 182 ft.	7	6	(57.00) 187	–

C.B.H. 27185 - Wt. 53825 - Od. 0609-2000- 2/54
27865- 43095- 0624-2000-6/54

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[ST58SW BJ 26 .]

Name of Shaft or Bore given by Geological Survey: Avon Bore G.S

6-inch Map Registered No. ST 58 SW/26

53363 82230

Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	Grey siltstone abundantly striped with dark carbonaceous and coarsely micaceous partings	1	6	(M) (57.45) 188	6
	Grey, fine-grained sandstone		10	(57.71) 189	4
	Light grey striped silt. & mudstone with numerous carbonaceous partings with plant detritus	1	2	(58.06) 190	6
	Dark grey silty shaly mudstone becoming fissile in lowest 6"	1		(58.37) 191	6
	Black closely fissile shale		9	(58.60) 192	5
	Dark grey silty mudstone becoming coarser downwards to striped silt & mudstone — slightly micaceous with poor plant fragments	5	7	(60.30) 197	10
	Black shaly mudstone with abundant plant fragments & small nodules				
	Fossils at 198/0 & 198/7				
	Leaves at 198/8	1	2	(60.66) 199	—
	Poor shaly coal		8	(60.86) 199	8
	Pyritous coal, sulphurous in lower 1/2ft	3	4	(61.27) 203	
	Soft fissile clay with abundant rootlets and some nodules	2	7	(62.08) 205	
	Silty mudstone with abundant rootlets	3	1	(63.12) 205	1
	Grey slightly micaceous shale		3	(63.50) 208	4
	Light grey siltstone with subordinate silty mudstone. Finely micaceous. Frequent carbonaceous partings. Small scale cross-bedding & slump structures. Silty mudstone carries poor plant fragments	2	7	(64.11) 210	4
	Slightly micaceous grey silty mudstone with a few poor plants		10	(64.36) 211	2
	Striped light grey silt. & dark silty mudstone. Slump structures. Coaly partings	[redacted]	14	(64.47) 211	6
	Dark grey shale (1ft 8in Loss)	1	11	(65.05) 213	5
	Striped silt. & silty mudstone with plant fragments. Frequent carbonaceous partings	1	3	(65.48) 214	8
	Grey silty mudstone, slightly micaceous with poor plants		4	(65.53) 215	—
	Black shale with plants		2	(65.55) 215	2
	Black shales with fossils				
	Leaves at 215/5, 215/7 and 215/8				
	Slumps at 215/10 & 216/-		11	(65.80) 216	1
	Coal		4	(65.89) 216	6
	Dark grey fissile clay with abundant rootlets	3	4	(66.66) 218	9
	Grey silty mudstone with abundant rootlets	1	4	(67.06) 220	1
	Grey silty mudstone with fewer rootlets		10	(67.34) 220	11
	Grey silty mudstone, slightly micaceous with a few rootlets	1	5	(67.79) 222	4
	Coarse mudstone with silty wisps & poor plants — slightly micaceous	2	10	(68.63) 225	2
	Grey mudstone with silty wisps		4	(68.73) 225	6
	Dark grey mudstone		3	(68.81) 225	9
	Striped silt. and coarse mudstone with carbonaceous partings		7	(68.99) 226	4

C.B.H. 27185 - Wt. 53825 - Dd. 0609 2000 - 2/56

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[ST58SW BJ 26 .]

Name of Shaft or Bore given by Geological Survey:

Acraw Bore GS

6-inch Map Registered No. ST 58 SW/26 1

53363 82230

Geological Classification	Description of Strata	Thickness Ft	Thickness In.	Depth Ft	Depth In.
	Dark grey coarse mudstone with occasional plants and pieces of light grey silty	8	6	(62.14) 226	10
	Grey fairly micaceous mudstone with numerous bedding planes with traces, [redacted] + Anthracomya + other mussels				
	Occasional carbonaceous partings	12		(72.80) 238	10
	Dark grey dense black mudstone with conchoidal fracture traces + mussels	1	2	(73.15) 240	
	light grey silty mudstone with traces + mussels (Anthracomya?)		10	(73.41) 240	10
	light grey silty mudstone with occasional fossils traces + mussels	2	3	(74.09) 243	1
	light grey shaly mudstone with rare fossils. Siderite band at 244/10	3	9	(75.23) 246	10
	Light grey shaly mudstone with abundant coal fossils. Traces throughout - mussels common in lower part	3	2	(76.20) 250	
	Grey mudstone with occasional traces and mussels		6	(76.35) 250	6
	Dark grey shale with abundant traces		9	(76.58) 251	3
	Dark grey shale with traces + mussels	1	7	(77.04) 252	10
	Black shale with siderite nodules		1	(77.09) 252	11
	Black shale with mussels		6	(77.27) 253	6
	Unfossiliferous black shale		4	(77.32) 253	9
	Black shale with siderite nodules		4	(77.46) 254	1
	Black shale with mussels	1		(77.75) 255	1
	Unfossiliferous black shaly mudstone	1	6	(78.21) 256	7
	Black shale with mussels	1	6	(78.66) 258	1
	Barren grey shaly mudstone		8	(78.87) 258	9
	Very fossiliferous black shales		4	(78.92) 259	1
	Barren dark grey shales with banding planes pebbled + slickensided (dip 5°)		6	(79.12) 259	7
	Buff coloured siderite layer		1	(79.15) 259	8
	Dk grey shaly fossil shale	1	8	(79.65) 261	4
	Compact buff coloured siderite mudstone		5	(79.78) 261	9
	Black unfossiliferous shale	1	2	(80.14) 262	11
	Siderite mudstone		4	(80.24) 263	3
	Dk grey shale, unfossiliferous with pebbled bedding planes. Becomes fine and more carbonaceous downwards			(80.87) 265	4
	Dk grey shaly mudstone with abundant mussels and small siderite nodules		9	(81.18) 266	1
	Dk grey carbonaceous mudstone with mussels frequents		1	(81.23) 266	2
	Dk grey mudstone with abundant mussels	1	10	(81.69) 268	
	Mixed broken grey fissiley		3	(81.76) 268	3
	Grey fissiley with abundant rootlets with siderite nodules in layers 9°	2	9	(82.60) 271	
	Coal		10	(82.65) 271	10
	Fissiley - dense grey silty clay with abundant rootlets	1	3	(83.24) 273	1

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[ST58SW BJ 26 .]

Name of Shaft or Bore given by Geological Survey:

Arrow Bore 95

6-inch Map Registered No. ST 58 SW/26 E

53363 82230

Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	Grey silty mudstone with few nodules		5	(83.36)m 273	4
	Silty mudstone with few nodules		8	(83.54) 274	2
	Fine grained grey faintly micaceous sandstone grading down into grey silt, cross bedded with small plant fragments	2	6	(84.33) 276	8
	Fine silty mudstone, slightly micaceous with few small plant fragments	7	6	(86.61) 284	2
	Striped light grey micaceous silt and dark grey silty mudstone	1	1	(86.94) 285	3
	Fine dark grey silty mudstone with few plant fragments	5	11	(88.75) 291	2
	Striped light grey silt and dark grey mudstone - both faintly micaceous	2	10	(89.61) 294	
	Dk grey silty mudstone with few plant fragments	1	3	(89.99) 295	3
	Striped light grey faintly micaceous silt & dark grey silty mudstone - frequent carbonaceous partings. Cross bedded	13		(93.95) 308	3
	Fine grained light grey sandstone with frequent carbonaceous partings. Cross bedded & sparsely micaceous	6	11	(95.76) 314	2
	Medium to coarse grained grey slightly micaceous sandstone. Occasional carbonaceous partings & coal fragments	14	8	(100.20) 328	10
	Light grey coarse silt with common carbonaceous partings	1	1	(100.56) 329	11
	Medium grained light grey slightly micaceous sandstone with few coal fragments	3	8	(101.68) 333	7
	Dark grey faintly micaceous mudstone	1	6	(102.13) 335	1
	Coarse grained light grey faintly micaceous sandstone with pellets of dark grey mudstone found	5	6	(102.139) 335	7
	Medium grained micaceous sandstone lightly micaceous with a few plant fragments Occasional remains mudstone mud pellets from 236/- downwards	8	8	(104.93) 344	3
	Medium - coarse grained light grey lightly micaceous sandstone with large angular fragments of striped dark grey mudstone & light grey silt - up to 10" in diameter. Inclusions show concentric of buff coloured limonitic mud at core. Sign of washout in light grey medium grained sandstone assem 347/10-348/1	3	10	(106.16) 348	1
	Medium grained light grey slightly micaceous sandstone with numerous carbonaceous partings. Cross bedded. Vertical jointing with pyrite shales - pyritic calcite 351/6 - 353/4	6	1	(107.95) 354	2
	Coarse micaceous sandstone slightly micaceous. Vertical jointing.	6	8	(109.98) 360	10

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[ST58SW BJ 26 .]

Name of Shaft or Bore given by Geological Survey:

Avon Bore 95

6-inch Map Registered No. ST 58 SW/26 F

53363 82230

Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	Coaly sandstone		2	(110·03) 361	
	Coarse grained light grey micaceous sandstone lightly micaceous. Veined at right angles by calcite joints	1	6	(110·46) 362	6
	Coarse grained sandstone with abundant plant remains Calamites	1	4	(110·90) 363	10
	Coarse light grey micaceous sandstone with abundant coaly fragments & buff coloured oval shale mud pellets	3	8	(112·81) 367	6
	Broken sandstone with abundant coal fragments		4	(112·12) 367	10
	Medium grained sandstone with coal fragments		9	(112·84) 368	7
	Coal parting		1	(112·89) 368	8
	Medium grained light grey micaceous sandstone with abundant coal fragments & light buff coloured shale mud pellets	1	4	(112·38) 370	
	Medium grained light grey micaceous sandstone with some carbonaceous partings	1	6	(118·23) 371	6
	Broken siltstone with coaly partings		6	(113·39) 372	
	Medium grained sandstone, slightly micaceous with abundant coal fragments & small angular shale mud pellets	1	11	(113·97) 373	11
	Medium grained light grey micaceous sandstone with some carbonaceous partings	2	4	(114·68) 376	3
	Coarse light grey micaceous sandstone with coaly fragments and buff coloured mud pellets		9	(114·91) 377	-
	Medium grained light grey sandstone with abundant coal fragments. Concentration of mud pellets at 379/-	2	7	(115·70) 379	7
	Carbonaceous shale parting		1	(115·72) 379	8
	Coarse grained light grey slightly micaceous sandstone with large coal fragments and a few mud pellets		11	(116·30) 380	7
	Coarse grey sandstone with large coal fragments & buff coloured mud pellets	1	3	(116·88) 381	10
	Coarse grained micaceous sandstone with coal fragments. Concentration of mud pellets 383/8 - 384/- & 385/8 - 385/11	4	6	(117·39) 386	4
	Coarse light grey micaceous sandstone with coaly partings		3	(117·83) 386	7
	Coal parting		1	(117·90) 386	8
	Coarse grey micaceous sandstone with coal fragments		3	(117·93) 386	11
	Dk grey fissile clay with abundant nuts with pockets of pale grey sandstone		11	(118·27) 387	10
	Medium grained light grey micaceous sandstone with coal fragments & light buff coloured mud pellets	4		(119·43) 391	10
	Medium grained sandstone with few small plant fragments		7	(119·61) 391	5
	Dk grey micaceous silty mudstone with nodules with, at the base, nodular nodules	1	7	(120·04) 393	10

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[ST58SW BJ 26 .]

Name of Shaft or Bore given by Geological Survey: Arena Bore 95

6-inch Map Registered No. ST 58 SW/26

53363 82230

GEOLOGICAL CLASSIFICATION	DESCRIPTION OF STRATA	THICKNESS Ft	THICKNESS in.	DEPTH Ft	DEPTH in.
	Medium grained light grey sandstone with occasional round pellets. Carbonaceous partings 394/2-6 and 395/6 lower 8"				
	Coaly & shaley partings in passage 394-397/6	6	2	(121.09) 400	6
	Medium grained light grey sandstone with large coal fragments and large well rounded buff coloured mud pellets	1		(122.38) 401	6
	Light grey medium grained slightly micaceous sandstone with carbonaceous partings	1	9	(123.52) 402	3
	Coarse grained light grey sandstone with few carbonaceous partings - becoming finer downwards	2	7	(124.31) 403	10
	Fine sandstone with mud pellets, coal partings	5	6	(124.46) 404	4
	Medium grained light grey sandstone with abundant coal fragments increasing in frequency downwards	1	1	(124.78) 404	5
	Brown coal		2	(124.84) 404	7
	Medium grained hard, finely micaceous light grey sandstone with occasional carbonaceous partings	10	11	(128.17) 420	6
	Medium grained grey sandstone with coal fragments & mud pellets - increasing in frequency to the base	1		(128.47) 421	6
	Medium grained grey slightly micaceous very hard sandstone with scattered mud pellets throughout.				
	Concentration of mud pellets 422/3-6 & in basal 6"	7	2	(130.66) 428	8
	Poor quality shaley coal		8	(130.80) 428	4
	Coal, hard, sulphurous pyritic		8	(131.04) 430	
	Dark grey muddy fine clay with abundant rootlets with occasional septarian nodules	5	6	(130.32) 435	5
	Silty fine clay with abundant rootlets	1	3	(135.10) 436	8
	Dark grey silty micaceous with rootlets	1	10	(133.65) 438	6
	Grey silty micaceous with rough fracture occasional septarian nodules	1	6	(134.11) 440	
	Dark grey poorly fissile shaly micaceous with lenses of septarian nodules	5	10	(135.89) 441 5	10
	Silty micaceous with plant fragments		4	(135.99) 441 6	2
	Coal		1	(136.02) 441 6	2
	Soft grey fine clay	1	9	(136.55) 442 8	
	Grey silty micaceous with abundant rootlets	1	4	(136.96) 442 9	6
	Grey silty micaceous with few rootlets	1	11	(137.54) 451	3
	Pale grey micaceous with rough fracture and small range septarian nodules				
	Septarian nodules 442/9 - 443/10	14	3	(141.88) 446	6
	Dark grey peat earth with abundant rootlets		4	(141.99) 446	10
	Pale grey silty shaly micaceous	1	10	(142.54) 447	8
	Pale green micaceous with frequent rootlets ("weathered" - near fireclay)	4	1	(143.79) 471	9

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[ST58SW BJ 26 .]

ST58SW/26
ST3363,82230

Borehole G.5. (6.71 M)

Elevation 22 ft. OD (Assumed)

Cored below 160 ft. (48.77m)

	0	ALLUVIUM
(M)		Clay
(14.62)	46	
		KEUPER
		Marl and Sandstone
(51.21)	168	
		COAL MEASURES
		Alternating shale and sandstone
(60.66)	199	
		Coal 5 ft. (Avonmouth No. 2)
(62.18)	204	
		Shale and sandstone
(65.84)	216	
		Coal 4-in.
(66.14)	217	
		Sandstone, subordinate shale
(82.60)	271	
		Coal 10-in.
(82.91)	272	
		Shale and sandstone
(86.26)	283	
		Sandstone, subordinate shale
(111.80)	367	
		Coal 4-in.
(112.19)	368	
		Grey pennant-type sandstone
(130.76)	429	
		Coal, 8-in.
(131.06)	430	
		Grey seatearth, shale and siltstone. Dip 14°
(142.04)	466	
		Red and grey shale
(143.26)	470	T.D.

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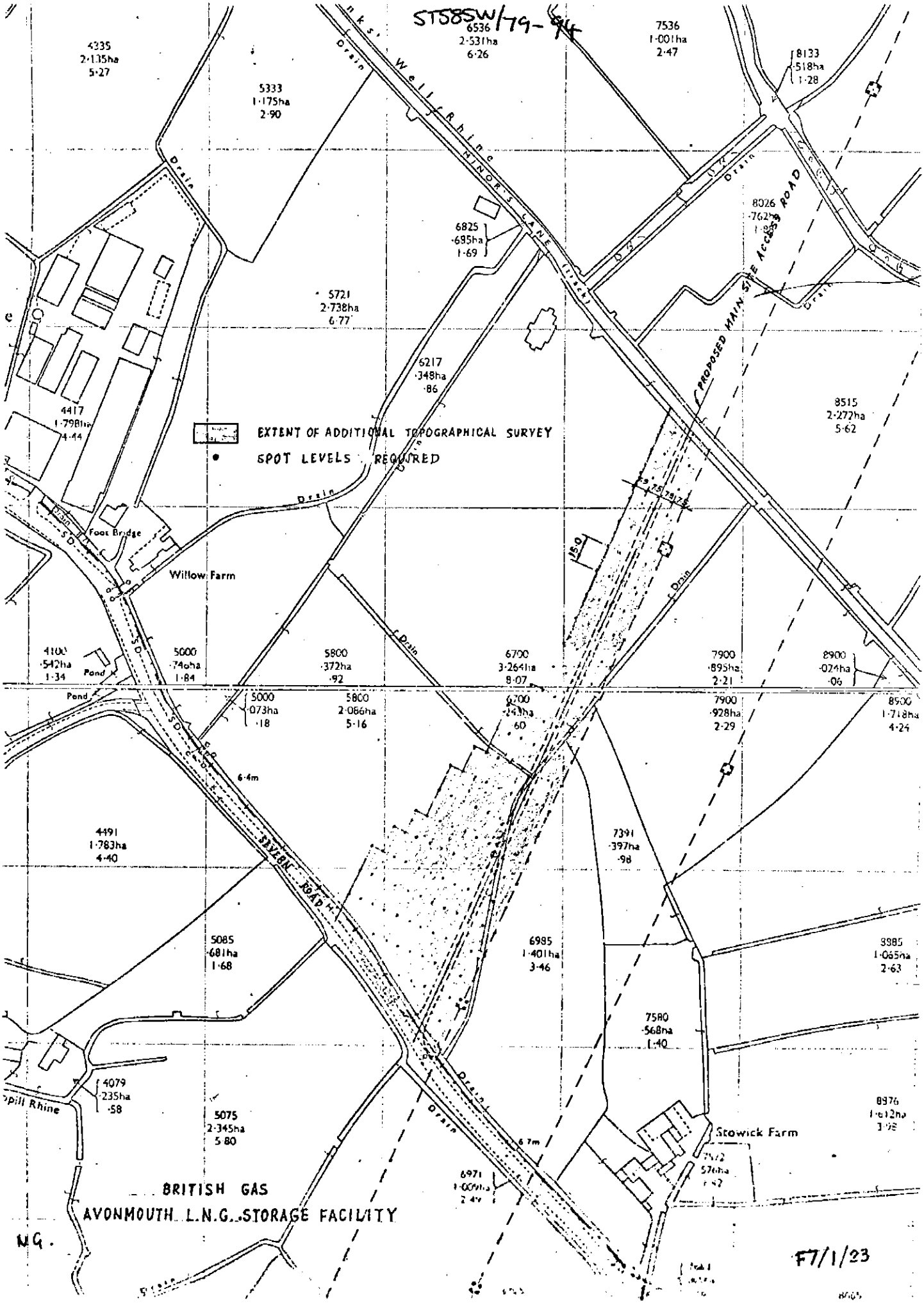

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[ST58SW BJ 79 .]

ST58SW/79

Holst Soil Engineering Limited

BOREHOLE LOG

Borehole No. A

Contract No. S10858/F2489
Location Avonmouth
Client The British Gas Corporation
Method of Boring Percussion & Rotary Core Drilling
Diameter of Borehole

Sheet 1 of 2
Chainage
Ground Level
Date

GR 5464 . 8156

Description of Strata	Legend	Depth below G.L.m	Thick-ness of Strata m	Type of Sample	c KN/sq.m	ø deg	m.c. %	y Kg/cum	N
Topsoil		0.20	0.20	0.50 □	49	0	23.4	1915	
Firm brown mottled silty CLAY		1.80	1.60	2.00 □	7	0	38.2	1775	
Very soft brown and grey mottled silty CLAY		2.50	0.70	3.00 □	6	0	46.8	1740	
Very soft grey silty organic CLAY with occasional peat traces		5.40	2.90	4.50 □	8	0	61.4	1605	
Loose grey brown silty fine SAND		6.90	1.50	5.50 I 7.00					4
Grey and black clayey PEAT		7.50	0.60	□	9	0	51.9	1460	
Medium dense grey silty fine SAND		8.70	1.20	8.00 I 8.80					11
Grey and black clayey PEAT		9.30	0.60	□	9	0	36.0	1710	
Medium dense grey silty fine SAND with occasional bands of silt		13.00	3.70	9.50 I 11.00 I 12.50 I					10 13 21
Grey clayey SILT with peat traces		13.80	0.80	13.30 I					23
Loose grey silty fine SAND		15.40	1.60	14.00 I 15.00					10
Soft grey very silty organic CLAY		16.00	0.60	□	20	0	58.3	1675	
Stiff to very stiff red brown calcareous sandy CLAY with soft bands (weathered marl)		21.00	5.00	16.50 □ 17.90 □ 19.50 □	21 86 140	0 5 13	29.7 19.2 17.5	1940 2160 2255	
Highly weathered red/grey calcareous fine grained SANDSTONE with occasional thin clayey bands and solution voids (keuper marl) log continued									

Type of Sample
□ Undisturbed Sample
○ Disturbed Sample
△ Water Sample
I Penetration Test
c Apparent Cohesion
ø Angle of Friction
m.c. Moisture Content
y Bulk Density
N S.P.T. Value

Remarks (Observations of Ground Water etc)
Water struck at 2.00m and 7.50m and 16.00m
Final standing level 6.00m

Water levels are subject to seasonal or tidal variations and should not be taken as constant

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[ST58SW BJ 79 .]

ST58SW/79

Holst Soil Engineering Limited

BOREHOLE LOG

Borehole No. A

Contract No. S10858/F2489
Location Avonmouth
Client The British Gas Corporation
Method of Boring Percussion & Rotary Core Drilling
Diameter of Borehole

Sheet 2 of 2
Chainage
Ground Level
Date

Description of Strata	Legend	Depth below G.L.m	Thick-ness of Strata m	Type of Sample	c KN/sq.m	ø deg	m.c. %	y Kg/cum	N
Highly weathered red/grey calcareous fine grained SANDSTONE with occasional thin clayey bands and solution voids (keuper marl)		23.70	2.70						
Moderately to highly weathered fragmented red/grey mottled calcareous SILTSTONE with clayey bands (keuper marl)		30.00	6.30						
Slightly weathered fairly massive red/grey mottled calcareous SILTSTONE with occasional clayey bands (keuper marl)		33.00	3.00						

Type of Sample
□ Undisturbed Sample
○ Disturbed Sample
△ Water Sample
I Penetration Test
c Apparent Cohesion
ø Angle of Friction
m.c. Moisture Content
y Bulk Density
N S.P.T. Value

Remarks (Observations of Ground Water etc)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

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[ST58SW BJ 79 .]

ST/57 NW/27
5451 7809

264

Boring at Aust Farm, Lawrence Weston, Glos.
(The Farm is on the Kings Weston Estate)
Situd on 6" Glos 71 N.E.W. by G.A.K.

		Thickness	Depth.	Metres.
Kemper ? partly disintegrated Coal Measures G.A.K. 1935	5. Conglomerate.	25'. 0"	25'. 0"	7.62m
	4. Sandstone and Sand. Red.	30'. 0"	55'. 0"	16.77m
Coal Meas.	3. Sandstone & Pennant. Grey..	18'. 0"	73'. 0"	22.26m
	2. Blue clay and Shales.	12'. 0"	85'. 0"	25.92m
	1. Pennant	106'. 0"	191'. 0"	58.25m

G.A.K. 13.3.37.

48 hours pumping test gave a yield of 1,500 gallons per hour on 4" pumps.
Water level on completion of bore 25 feet from top.
Water level on test reduced from 40 feet from top to 60 feet in four hours.

These particulars were given to me by Major Gonne the Estate Agent, on August 18th. 1936.
Kingsweston Estate Office, Shirehampton Bristol

Approx. ht. of site above O.D = 55 feet.
Beds 1–3 are probably Coal measures
Beds 4 & 5 " " " Trias.
It is not unusual to have red sands at the base of the Trias where it rests upon Pennant. Similar sands have been seen at Brislington on the E. side of Bristol where the Trias rests directly on Pennant. I have not seen the cores, however, and therefore cannot be absolutely certain.

Position:– O.S. one inch N.S. map Sheet 264 III. 1.8 miles N.W. of Westbury-on-Trym Church and 1.7 miles N.E. of Shirehampton Railway Station. It lies practically on the 50 foot contour which passes through the village, on the W. side of the lane leading to Kingsweston Hill.

G. A. Kellaway. 1937.

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[ST57NW BJ 27 .]

ST 57 NW/27.

Bristol, Aust Farm, Lawrence Weston : Borehole

Nat. Grid Ref. ST/5451 7809

1 in 264 Height above O.D. c. 50 ft (15·24 m)

Drilled c. 1934

Information from Kingsweston Estate Office, Shirehampton

	Thickness M.	Depth M	Thickness ft	in	Depth ft	in
Keuper						
Conglomerate	(7·62)	(7·62)	25	0	25	0
Coal Measures						
Red sandstone and sand	(9·14)	(16·76)	30	0	55	0
Grey pennant sandstone	(5·49)	(22·25)	18	0	73	0
Blue clay and shale	(3·66)	(25·91)	12	0	85	0
Pennant sandstone	(32·31)	(58·22)	106	0	191	0

Information prepared for publication in Bristol and Somerset Coalfield memoir (G. A. Kellaway) by E. M. Pyatt 1972.

C-6

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[ST57NW BJ 27 .]

ST 57 NW/34

Kingsweston B Borehole Nat. Grid Ref. ST/54427762

1 in 264 Height above O.D. c. 64.00 m

Drilled by Bristol City Engineer's Department

Cores examined by G A Kellaway, 1959

	Thickness m	Depth m
?Drift on weathered Trias		
Soil and red clay	1.52	1.52
Stony sand or loam with fragments of breccia	1.52	3.04
Upper Coal Measures		
Red-stained Pennant sandstone. Dips steep to vertical/	21.34	24.38
Massive grey Pennant sandstone with coaly bands. Dip almost vertical.	7.62	32.00
Pinkish grey incoherent sand. ?Fault	.31	32.31
Massive grey Pennant sandstone with very low dip, increasing to steep at base	13.41	45.72
Conglomerate and pebbly sandstone with coal and shale wisps and inclusions	4.57	50.29
Mudstone and sandstone. Steeply dipping in lower part. Poorly preserved plants.	10.06	60.35
Grey Pennant sandstone	3.66	64.01

Information prepared for publication in Bristol and Somerset Coalfield memoir (G. A. Kellaway) by E. M. Pyatt, 1972.

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Name of Shaft or Bore given by Geological Survey:

Trial bore for Kingsweston Tunnel (contd)

6-inch Map Registered No. ST 57 NW/34

5442. 7762

Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	BOREHOLE B				Metres
	? Drift or weathered Trias:-				
	Soil and red clay	5		5	1.52
	Stony sand or loam with fragments of breccia	5		10	3.05
	Reddish Pennant Sandstone with very steep dips - nearly vertical	45		55	16.77
	Ochreous and reddish brown ground-up shale.	8		63	19.21
	Pennant Sandstone with some quartz pebbles, clay galls, altered ironstone. Rock somewhat cavernous. Dips steep to vertical.	2½		65½	19.97
	Red-stained Pennant-type sandstone	7½		73	22.26
	Red-stained grey sandy mudstone	2		75	22.87
	Pennant sandstone becoming grey but with some red patches.	5		80	24.40
	Fairly massive grey Pennant-type sandstone; presence of some coaly bands shews dip is almost vertical.	25		105	32.02
	Pinkish-grey incoherent sand. ? Fault.	1		106	32.33
	Fairly massive grey Pennant Sandstone, very low dip, perhaps horizontal in middle with dips increasing again towards base.	39		145	44.22
	Steeply dipping carbonaceous Pennant-type Sandstone.	5		150	45.75
	Conglomerate and pebbly sandstone with coaly and shaly wisps and inclusions. Pebble content is very varied and includes abundant fragments of pink and green sandstone and of buff or grey limestone.	15		165	50.32
	Striped mudstone and sandstone with some limestone.	15		180	54.90
	Contorted sandy mudstone and sandstone passing down into steeply dipping (nearly vertical) grey mudstone and sandy mudstone with poorly preserved plants.	18		198	60.39
	Grey 'Pennant' Sandstone, dip appears to be steep.	12		210	64.05

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[ST57NW BJ 34 .]

APPENDIX D

BAE Systems UXO desk study

BAE Systems Environmental

Risk Assessment for German Air-dropped UXO

Seabank to Bridgwater, and Avonmouth

Card Geotechnics

BAE SYSTEMS

Risk Assessment for German Air-dropped UXO

Seabank to Bridgwater, and Avonmouth

Card Geotechnics

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Project No: A0958-00	Report Ref: A0958-00-R1-1	Issue Date: November 2009

UKAS TESTING No. 1764

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CONTENTS

1. INTRODUCTION 1

2. DEFENCE HISTORY 3

3. POTENTIAL DEFENCE RELATED CONTAMINATION 6

4. CONCLUSIONS 8

FIGURES

Figure 1 Site plan

Figure 2 Former defence sites

Figure 3 Bombing intensity

Figure 4 Hazard areas

APPENDICES

Appendix 1 Aerial photographs

Appendix 2 Selected defence sites

Appendix 3 Geological maps

1. INTRODUCTION

1.1. Background and Objectives

BAE Systems Environmental was commissioned by Card Geotechnics Limited to carry out a desk study for defence-related contamination and German air-dropped UXO along a 58 km electricity overhead line (OHL) from Bridgwater (Somerset) to Seabank (Avon).

It is understood that this assessment was commissioned because National Grid plan to construct new electricity pylons as part of a replacement project. The replacement pylons are likely to be constructed within 200 m of existing pylons.

The route lies in close proximity to a number of former defence sites, and certain areas along the route are known to have been bombed during the Second World War (WWII).

BAE Systems Environmental was commissioned to assess the potential for defence-related contamination and UXO to exist at the Site and to assess the risk that this may pose to construction workers.

This report presents the findings of this assessment.

1.2. 'The Site'

The term 'Site' refers to the following areas:

- a 200 m corridor either side of the existing electricity OHL between Bridgwater (ST537820) and Seabank (ST324359); and,
- a 4.5 x 4.2 km rectangle at the northern end of the route encompassing the Avonmouth area, centred on ST529783.

The Site area is approximately 40 km^2.

A Site Plan is given as Figure 1.

1.3. Scope of Work

The desk study comprised the following:

- Review of documents pertaining to the defence history of the area.
- Review of information relating to German air-dropped ordnance including bomb impact data, records of Explosive Ordnance Clearance (EOC) tasks, and records relating to the intensity of bombing in the vicinity of the Site.
- Evaluation of the military related activities carried out in the vicinity of the Site with respect to their potential to cause defence-related contamination.
- Assessment of the potential for German air-dropped UXO to remain on the Site, and its likely penetration depth.
- Assessment of implications of any potential military contamination and UXO for construction work.

This report presents the findings of the desk study.

1.4. Sources of Information

The following sources of information were consulted:

- in-house records, particularly relating to ROF Bridgwater and other explosives/munitions factories;
- The National Archive (Kew)
- National Monuments Record (including aerial photographs and the River Severn 'Rapid Coastal Zone Assessment Survey')
- the Defence of Britain Database
- historical maps provided by the Client

In addition, numerous in-house lists of defence sites were consulted to establish the locations of anti-aircraft gun sites, prisoner of war sites, ranges, RAF stations, decoy sites and other features.

Due to the size of the Site it was considered impractical to enquire to the 33 Regiment archive for records of historical explosive ordnance disposal (EOD) tasks.

1.5. Reporting Conditions

This report has been specifically prepared without the benefit of knowing the exact intentions of third parties and should therefore not be used by such organisations without prior consultation with BAE Systems Environmental.

It must be emphasised that the desk study is of a preliminary nature and can only indicate the potential for military related contamination and UXO.

Our appraisal relies on the accuracy of the documents consulted and that BAE Systems Environmental will in no circumstances be held responsible for the accuracy of such information or data supplied.

This report contains summaries of information relevant to the risk assessment and does not comprise a comprehensive record of the substantial volume of reference material consulted.

2. DEFENCE HISTORY

2.1. Introduction

Using the sources of information listed in Section 1.4, we have identified a number of sites with a former defence-related use, ranging from explosives factories to individual structures such as pillboxes. The majority of these features are located outside the Site boundary.

The following section provides details of the defence sites, both inside and within close proximity to the Site, as well as the relative scale of German bombing across the Site.

2.2. Explosives and munitions factories

Generally, the manufacture of munitions is organised into 3 No. types of factories: explosive factories, where explosives and propellant are made; engineering factories, where metal components and casings are manufactured; and, 'filling factories', where the explosives and components are brought together to form the finished item.

Three former explosives factories are within the Site boundary. His Majesty's Explosives Factory (HMEF) Avonmouth and HMEF Henbury are in the northern part of the Site and date back to WWI. In the south, part of the Site is within former Royal Ordnance Factory (ROF) Bridgwater which was operational between WWII and 2008.

A further 2 No. WWI factories are within 500 m of the northern part of the Site – HMEF Portishead and National Filling Factory (NFF) Chittening.

The locations of the factories are shown on Figure 2 and Appendix 2.

HMEF Avonmouth (within the Site)

In August 1916, a 100 ha site at Avonmouth was selected for the erection of a plant to produce picric acid to meet the large demand required for the war effort. Picric acid is a high explosive that was used in the early years of WWI, replacing gunpowder as a shell filling.

Construction began in November 1916 but by the end of 1917, with most of the plant erected, its use was altered to the manufacture of mustard gas which commenced in June 1918. The factory was laid out for the production of 500 tonnes per week with the manufactured gas being transported to the nearby filling factory at Chittening (see below).

The factory experienced numerous difficulties in production and closed at Armistice.

The factory is located in the northern area of the Site. Historical maps from the 1930s depict this sits as 'Avonmouth Works' with little indication of a military use. The 1946 aerial photographs show the factory to comprise industrial properties, similar to its current use.

HMEF Henbury (within the Site)

Documentary evidence indicates that in 1916 a site was chosen for the manufacture of nitrocellulose (used as a gun propellant), to be designated HMEF Henbury. Work commenced in December 1916 but it was abandoned in May 1917 and never completed.

It was not possible to ascertain the exact location of the Site, but a report by English Heritage suggests that it was to the immediate north of HMEF Avonmouth in the northern area of the Site (see Appendix 2).

A 1946 aerial photograph shows a small number of isolated buildings to the north of the site of the former HMEF Avonmouth, which could be the former location of HMEF Henbury.

ROF Bridgwater (within the Site)

The boundary of the Site in the south encroaches on former Royal Ordnance Factory Bridgwater, an explosive factory operational from 1937 until 2008.

The facility was constructed for the manufacture of the explosives RDX and tetryl but diversified after the war to manufacture a wide range of other compositions, and also ammunition breakdown activities. The Site, currently owned by BAE Systems, still remains intact although manufacturing ceased in 2008.

The part of the factory that coincides with the Site was primarily engaged in the manufacture of TNT and HMX.

NFF Chittening (400 m from Site)

Located 2 km to the north of HMEF Avonmouth, and in close proximity to the northern boundary of the Site, a 80 ha site was chosen for the filling of mustard gas shells was selected in November 1917 and construction began in January 1918.

The factory became NFF No. 23 and was laid out for the charging and filling of 6", 4.5" and 18 pounder (pdr.) shells. Filling commenced during June 1918 on the 6" shells and over 150,000 shells were filled up to Armistice.

Documentary evidence suggests that the factory was being built-up to accommodate the filling a wide variety of fuzes and shells including 4.7" shrapnel, 3" anti-aircraft shells, 9.2" high explosive shells and 18 pdr. However, Armistice was signed before this work could be undertaken and the factory was shut down.

There is evidence that the factory was re-used for aircraft breaking after WWII.

The site is now used as an industrial park with no trace remaining of the original buildings.

TNT Factory, Portishead (550 m from Site)

During WWI, the use of TNT as an alternative shell filling to picric acid increased. In order to match this greater demand a number of factories were converted to its manufacture.

The initial phase of TNT manufacture involves the distillation of benzene to produce toluol, TNT's basic ingredient. A distillation plant belonging to Shell was dismantled, transported to and erected at a site in Portishead in order to produce toluol.

This plant, along with a similar Shell plant at Barrow-in-Furness, contributed half of the UK's toluol needs during WWI, an output of 1,100 tonnes per month.

It is not known whether toluol was subsequently converted to TNT at the facility, or whether it was transported to another factory for further processing.

The most likely location of this factory is shown on Figure 2.

2.3. WWII defences

Records show that there were a large number of WWII defence structures in the vicinity of the Site (see Figure 2).

The vast majority were pillboxes, the largest concentrations of which were located around the southern area of the Site and to the west of the central area of the Site. It is not known how may of these pillboxes still remain.

In and around the northern area of the Site, a number of heavy anti-aircraft (HAA) batteries are known to have been located. Aerial photographs have identified 2 No., one of which (Portbury) was partially within the northern Site boundary (see Appendix 2) and the second is in close proximity to the northern boundary, to the south of the River Avon.

A series of structures, most likely to have formed Gordano Prisoner of War (PoW) Camp is evident to the east of the second HAA battery.

The HAA battery and associated PoW camp have long been demolished with an industrial estate now present. The concrete bases of the 5 No. AA gun emplacements are still present at Portbury.

2.4. German air-dropped UXO

Figure 3 shows the bombing intensity (measured in high explosive devices per 100 ha) in the former boroughs through which the Site passes. This is taken from the Bomb Census in the National Archive.

Much of the Site passes through rural areas of Somerset and Avon which did not suffer heavy bombing during WWII. The Rural Districts of Bridgwater, Axbridge and Long Ashton had bombing intensities of 0.7, 2.1 and 5.4 HE/100 ha. This is a very low intensity compared to other parts of the UK.

The northern part of the Site is largely within the County Borough of Bristol where the bombing intensity was 63 HE/100 ha, a relatively high figure. The docks and industrial sites at Avonmouth were one of the most frequently targeted areas in the region.

No individual bomb impact maps were available for the purposes of this assessment.

The geology in the Avonmouth area is largely reclaimed land and tidal flat deposits (see Appendix 3). In these conditions, the typical maximum penetration depth of German air-dropped UXO is likely to be in the order of 10 m.

3. POTENTIAL DEFENCE RELATED CONTAMINATION

3.1. Introduction

The following section details the potential contamination associated with the identified defence-related activities within the Site boundary, i.e. the explosives factories at Avonmouth/Henbury and Bridgwater, and the anti-aircraft gun position at Portbury near Portishead.

There are a number of pillboxes within and close to the Site boundary. The small arms ammunition used by personnel in these structures is not considered to offer a significant source of defence-related contamination, and are not discussed in the following section.

Similarly, the unrecorded activities of the Home Guard in WWII has led to the potential to uncover unexploded ordnance in many parts of the UK, particularly in rural areas. The potential to encounter UXO from this origin is not specifically considered in this section.

3.2. Potential Contamination Sources

HMEF Avonmouth and Henbury

The activities at HMEF Avonmouth would have involved the storage of large quantities of picric acid (a high explosive) and mustard agent (a chemical weapons agent).

Picric acid (trinitrophenol) is a yellow crystalline solid. It degrades to more sensitive explosive forms (picrate salts) and is also toxic at low concentrations. Mustard gas is a liquid blistering agent (vesicant) that was used extensively in WWI munitions.

Soil contaminated may exist as a result of spillage and leakage of these substances. However, in this scenario it is likely that contamination would have degraded/dispersed over the intervening 90+ years. The greatest potential for a hazard to exist is where the substances have been contained (e.g. in tanks or drums) and/or disposed of in large quantities.

It was not possible to obtain a historical plan of HMEF Avonmouth that could have indicated areas of higher and lower risk.

The northern part of HMEF Avonmouth shown in Appendix 2 is likely to be HMEF Henbury. Evidence suggests that this factory was not fully commissioned. However, the boundary between the two factories can not be ascertained.

ROF Bridgwater

The Site boundary passes through an area of Bridgwater that formerly manufactured the explosives TNT and HMX. There may have also been ammunition breakdown activities in this area.

There are no known areas of waste disposal in this part of the factory, but soil contamination may exist as a result of spillage and leakage or, in particular, associated with the drainage network.

Anti-aircraft gun site

Anti-aircraft gun positions of this type typically utilised 3.7" and/or 4.5" high explosive ammunition.

These could be present shallowly buried in close proximity to the gun positions as a result of misfires, or accidental or deliberate discarding of surplus/defective rounds.

German air-dropped UXO

Broadly speaking the weapons deployed over the UK landmass can be divided into four groups:

- **Large high explosive (HE) bombs.** These account for the majority of weapons deployed over the UK, typically of weights 50, 250, 500 and 1,000 kg. They are the most common type of German UXO found today because of the shear numbers dropped and their ability to penetrate into the ground. They also present the greatest hazard as UXO.

- **Large incendiary bombs (IBs).** These were usually similar in appearance to HE bombs, typically 250 kg, but with a filling of hydrocarbon (petrol, oil) often ignited by phosphorus. Their thin-walled construction gave them little penetration potential and they often broke up on hitting the ground.

- **Cluster munitions, or 'bomblets'.** These were dropped in large containers that burst open at a predetermined height releasing bomblets over a wide area. The bomblets were either incendiary (often containing magnesium or thermite) or HE fragmentation devices weighing around 1 to 10 kg.

- **Ballistic missiles.** V1s, or 'doodlebugs', were 8 m long winged aircraft either launched from the continent or released from aircraft over the Channel. The less common V2 was a 14 m long ballistic missile launched from land. Neither had the potential to penetrate significantly into the ground.

4. CONCLUSIONS

4.1. Context of risk assessment

The purpose of this study was to assess the potential for defence-related contamination and German air-dropped munitions to exist at the Site and to evaluate the implications of these factors on construction personnel and future uses.

It is understood there are plans to replace electricity pylons along the route of the existing OHL. These are likely to be constructed within 200 m of existing pylons and involve piled and excavated foundations.

The criteria for deciding if there are potentially unacceptable risks depends on the context of the risk assessment.

The regulatory framework for personnel involved in site investigation and construction work is the Health and Safety at Work Act 1974 (and associated legislation), which requires employers and other duty holders to reduce risks to a level that is 'as low as reasonably practicable' (ALARP).

The ALARP approach is a fundamental principle of the UK health and safety legislative framework. It aims to protect those at risk but ensures that there is proportionality between the costs and benefits of risk reduction measures.

The principles of ALARP underpin the duties of clients, designers and contractors set out in the Construction (Design & Management) Regulations 2007. For example, designers are required so far as is reasonably practicable to avoid foreseeable risks to persons carrying out construction work (s11(2)&(3)), and contractors must plan and manage construction work in a way which ensures that, so far as is reasonably practicable, it is carried out without risks to safety (s13(2)).

Our risk assessment and recommendations are made on the basis of whether there are reasonably practicable measures that can be taken to reduce the risk.

4.2. Preliminary risk assessment and recommendations

Historical records indicate that there are number of significant defence site in the vicinity of the Site. However, only a small number are within the Site boundary, namely: the explosives factories at Avonmouth, Henbury and Bridgwater; and, an anti-aircraft gun site located near Portishead.

These features are indicated as 'hazard areas' on Figure 4.

HMEF Avonmouth

The activities at HMEF Avonmouth involved the manufacture and storage of large quantities of picric acid (a high explosive) and mustard agent.

Exposing or encountering these substances would present a significant risk to personnel undertaking intrusive work. However, the risk of uncovering hazardous accumulations of these substances is considered to be low, because a) there has been extensive development in this area since WWI; and b) residues may have degraded and dispersed in the 90+ years that have elapsed since the factory was in operation.

Notwithstanding, prior to construction work in this area it would be prudent to commission an exploratory (trial pit) investigation utilising both air monitoring and soil laboratory analysis for chemical weapons agent, carried out by competent personnel. If residues are not detected then construction work could proceed with minimal risk to personnel.

ROF Bridgwater

The Site encroaches on a part of Bridgwater that was engaged in the manufacture of explosives. The likelihood of encountering devices or explosives in a hazardous quantity/state is low. However, in order to minimise the risk posed to personnel, it is recommended that any excavations in this area are supervised by a competent explosives specialist.

AA gun position

Large calibre anti-aircraft shells contain a high explosive, and would pose a hazard if found during intrusive works. The likelihood of munitions being accidentally or deliberately discarded is low.

It is recommended that, as part of a standard site safety briefing, personnel conducting intrusive works in this area are informed of the defence history of the local area and the potential to encounter ordnance. This will reduce the possibility of inappropriate handling of suspicious objects, and the removal of devices from the Site.

German air-dropped UXO

The risk of German air-dropped UXO being present in the rural areas within which the majority of the Site is located is negligible.

The Avonmouth area was relatively heavily bombed. However, the fact that the area has been extensively developed since WWII reduces the risk of UXO being present today.

The intrusive works associated with the construction of pylons are relatively minor in scale. The likelihood of encountering German air-dropped UXO is very low.

It is considered that risk mitigation measures such as down-hole geophysics and explosives safety supervision are not justified for addressing German UXO, because their costs are likely to be grossly disproportionate.

However, it is recommended that personnel involved in excavation work in the Avonmouth area are informed of the potential to encounter UXO, as part of a standard site safety briefing.

Figures

Figure Title

Figure 1 - Site Plan

Project

Seabank to Bridgwater

Project No	Report No	Scale
A0958-00	A0958-00-R1-1	NTS

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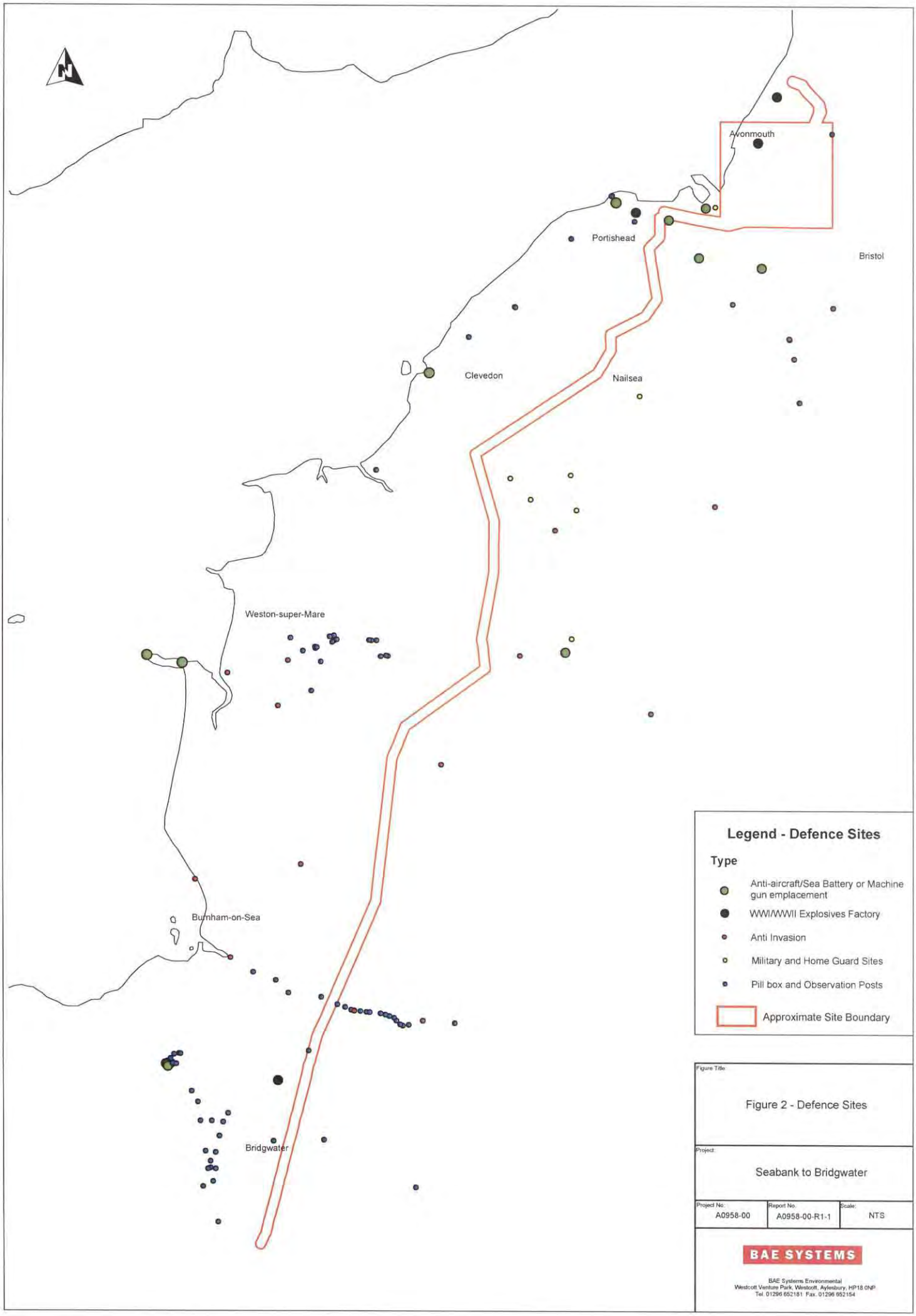

Figure Title:

Figure 2 - Defence Sites

Project:

Seabank to Bridgwater

Project No.:	Report No.:	Scale:
A0958-00	A0958-00-R1-1	NTS

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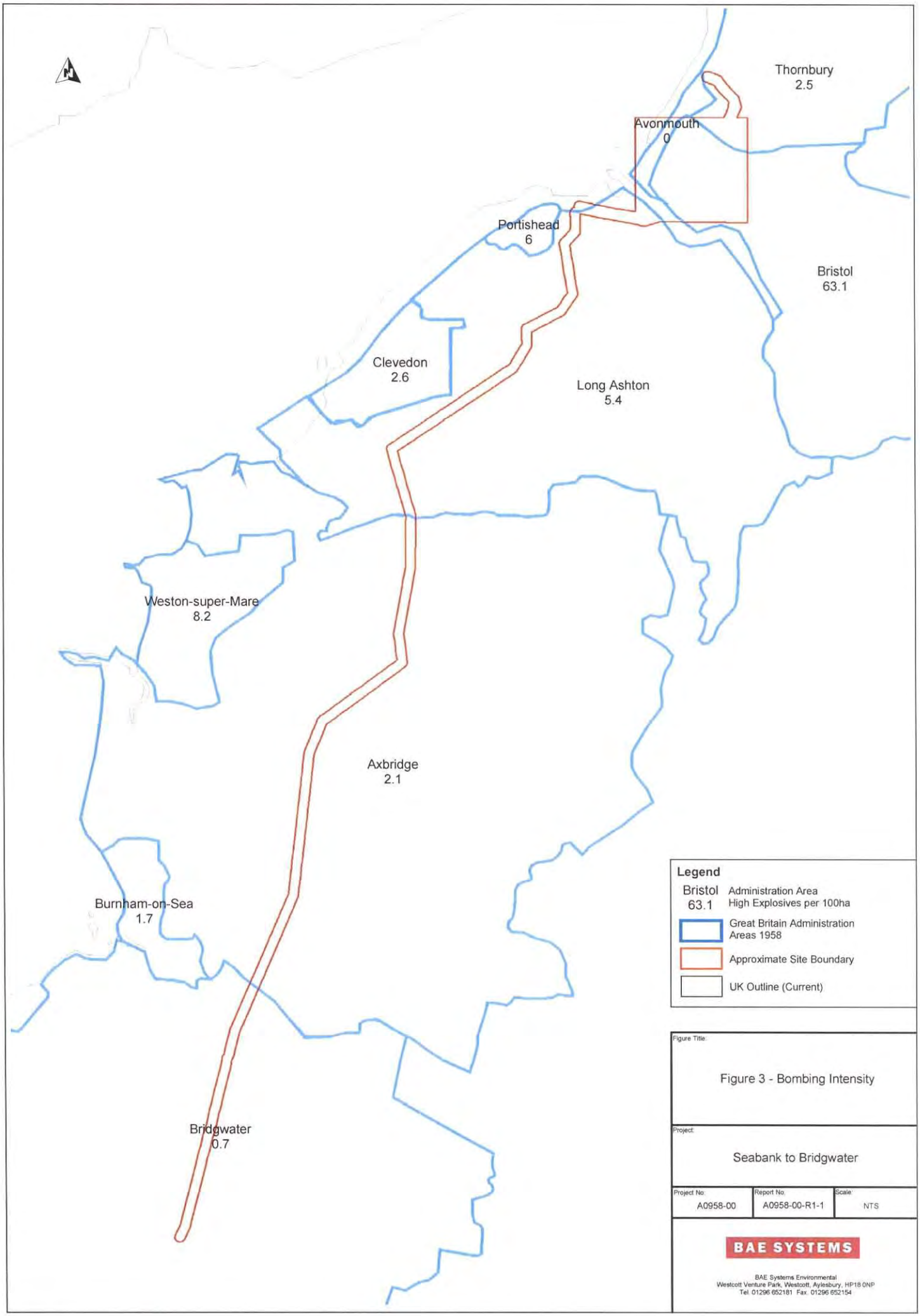

Figure Title:

Figure 3 - Bombing Intensity

Project:

Seabank to Bridgwater

Project No.	Report No.	Scale:
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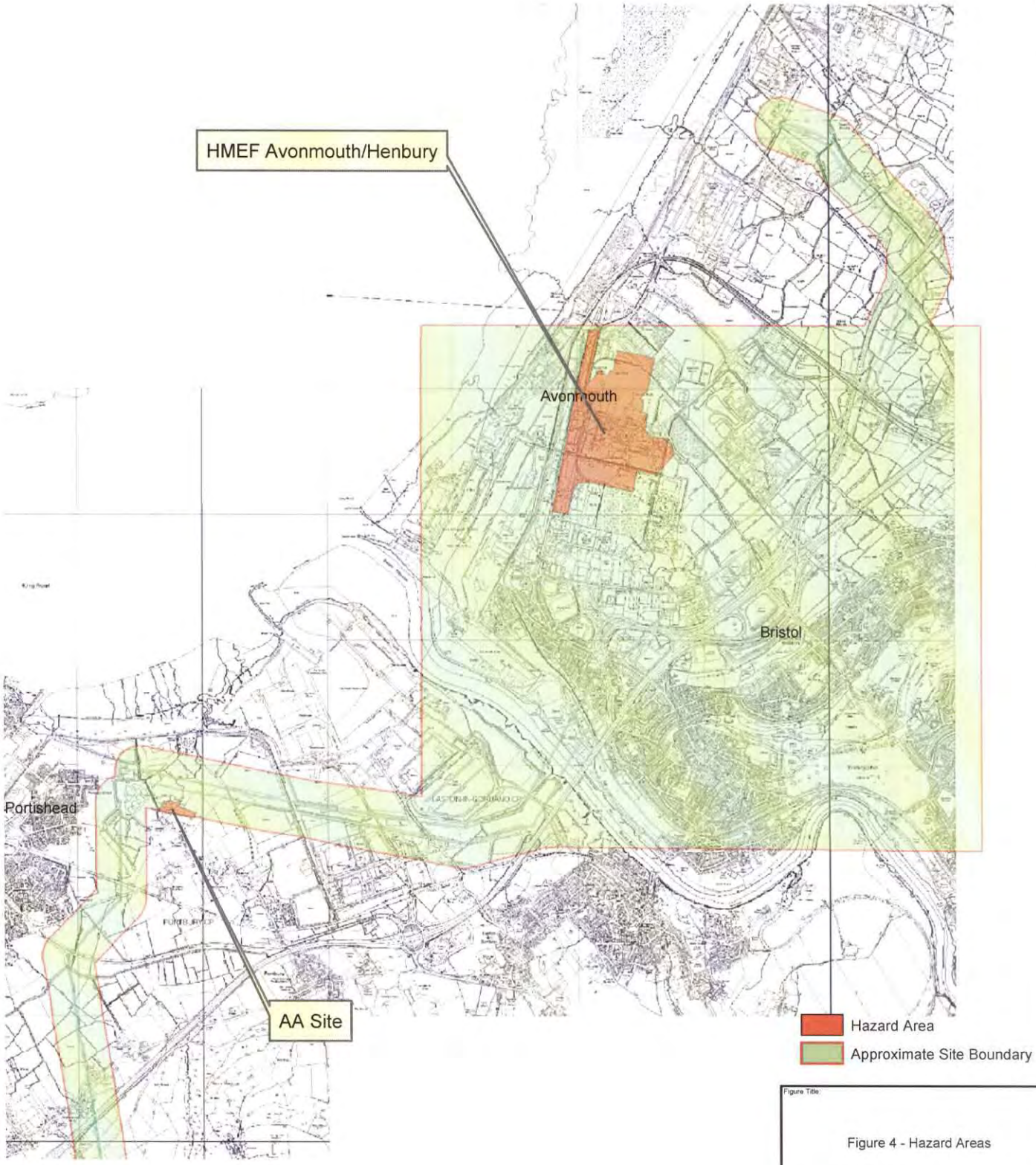

Figure Title:

Figure 4 - Hazard Areas

Project:

Seabank to Bridgwater

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Figure Title:

Figure 4 - Hazard Areas

Project:

Seabank to Bridgwater

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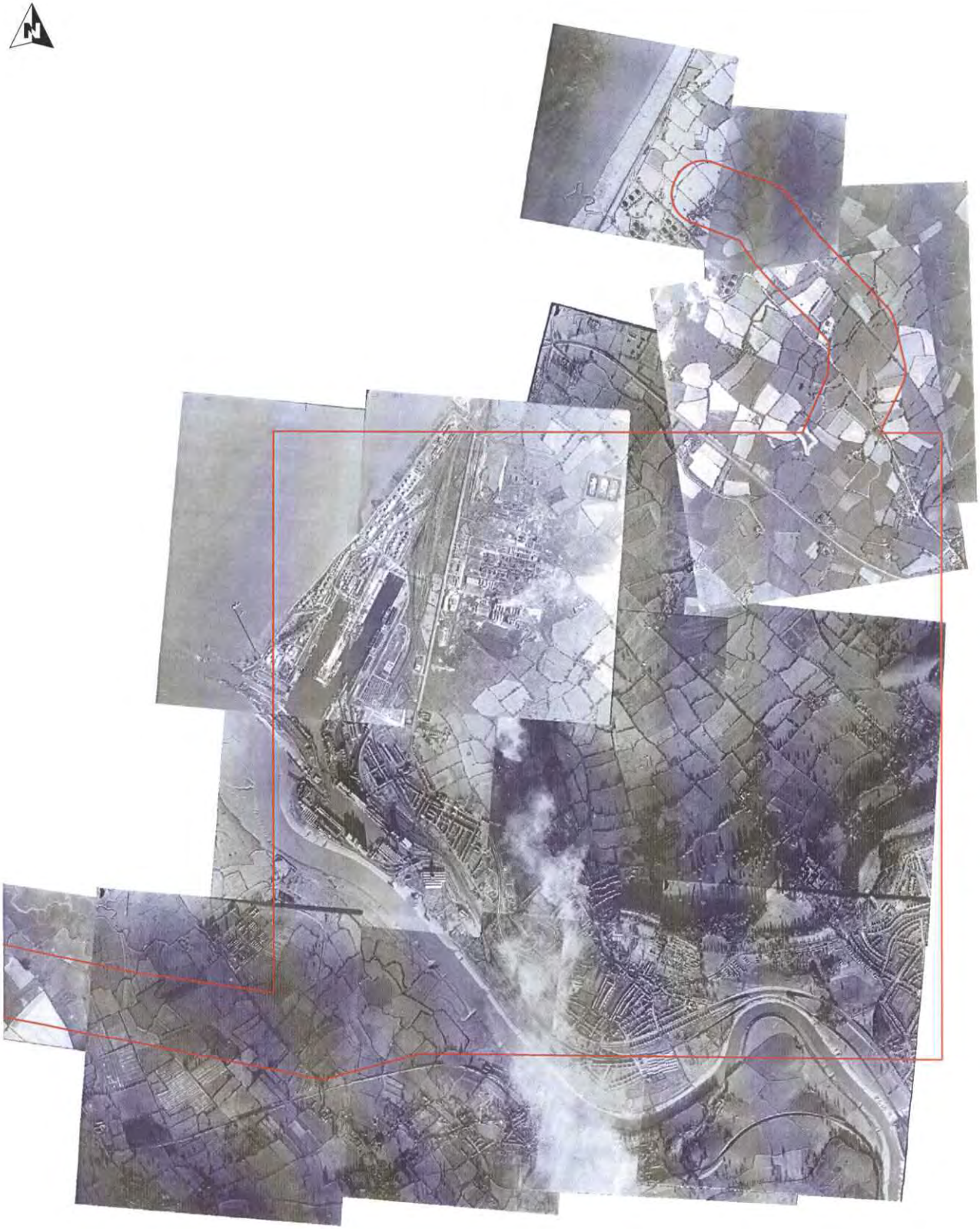
Appendix 1

Aerial Photographs



Approximate Site Boundary

Figure Title:

Figure 4 - Aerial Photgraph Composite 1940's 50's and 60's

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
A0958-00	A0958-00-R1-1	NTS

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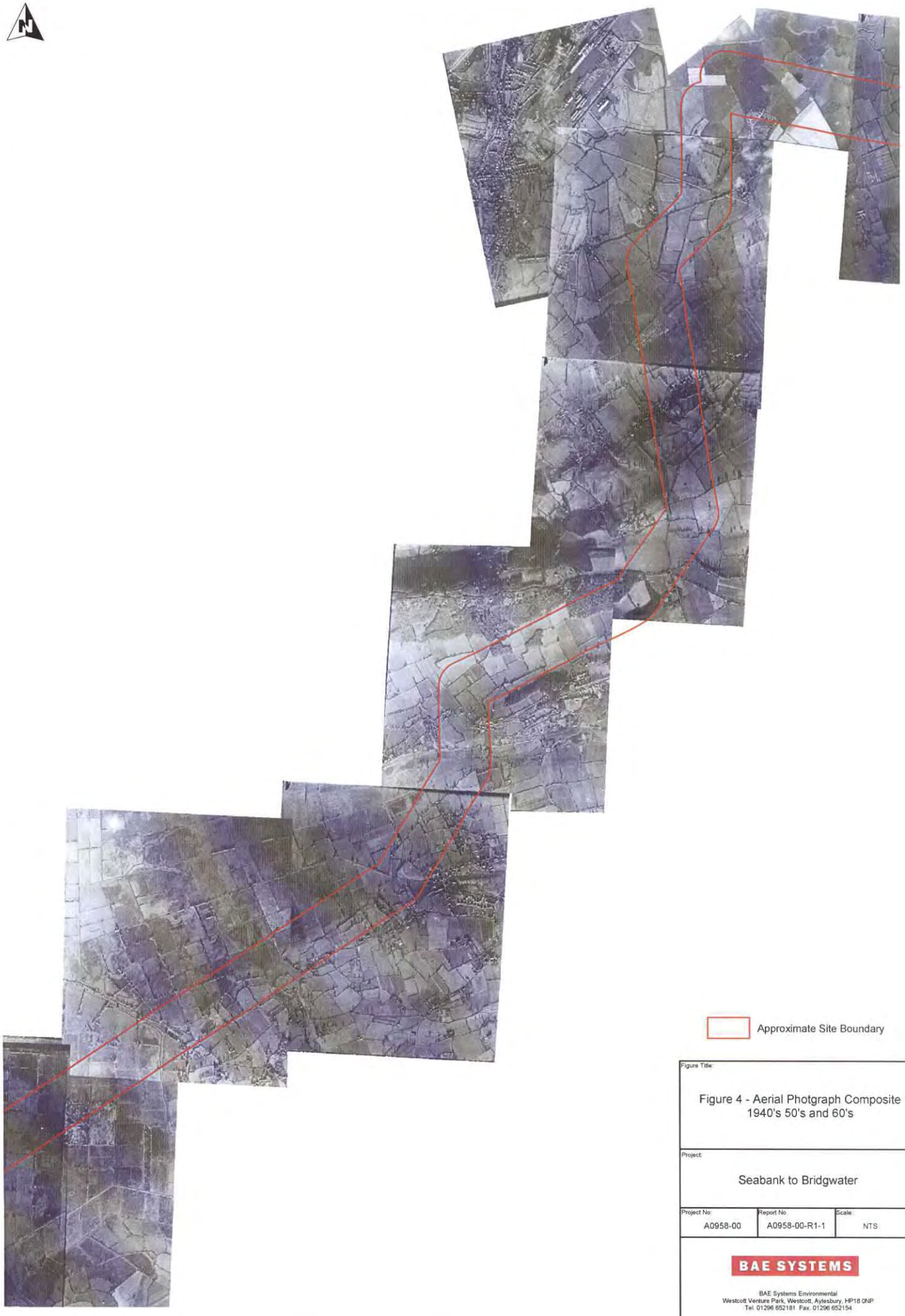

Approximate Site Boundary

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Figure 4 - Aerial Photgraph Composite 1940's 50's and 60's

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
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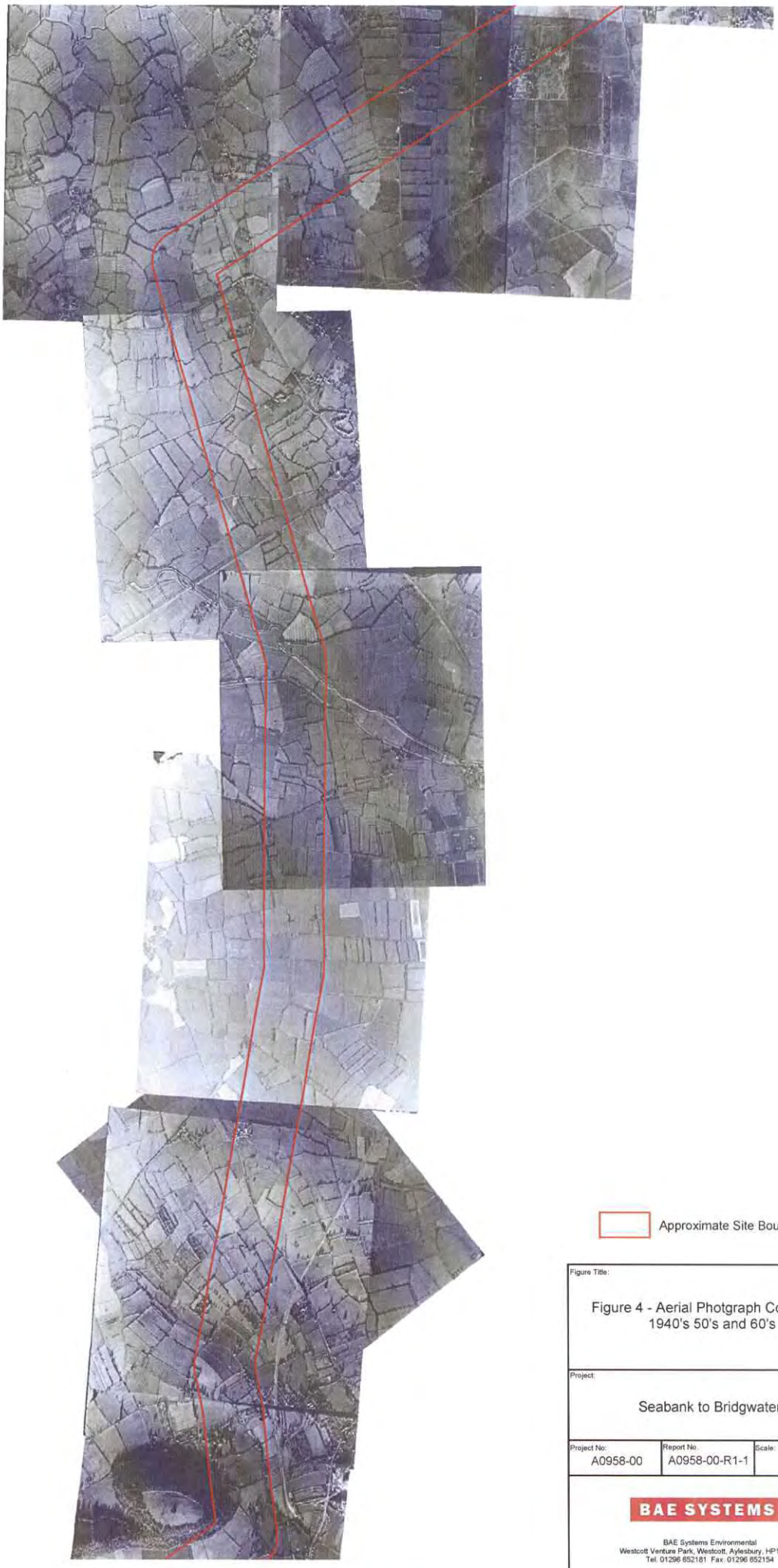

Approximate Site Boundary

Figure Title:

Figure 4 - Aerial Photgraph Composite 1940's 50's and 60's

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
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Approximate Site Boundary

Figure Title:

Figure 4 - Aerial Photgraph Composite 1940's 50's and 60's

Project:

Seabank to Bridgwater

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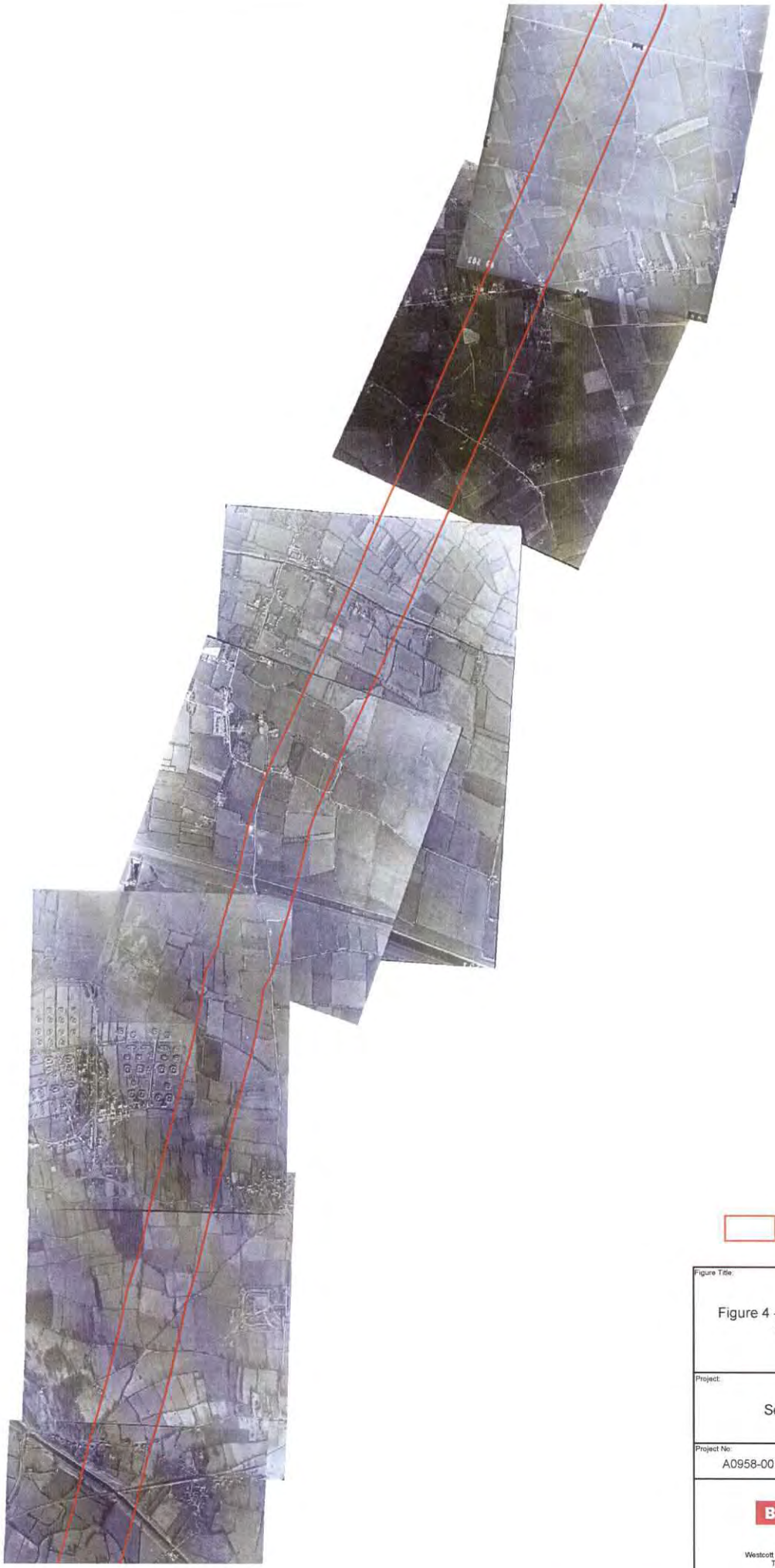

Approximate Site Boundary

Figure Title:

Figure 4 - Aerial Photgraph Composite 1940's 50's and 60's

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
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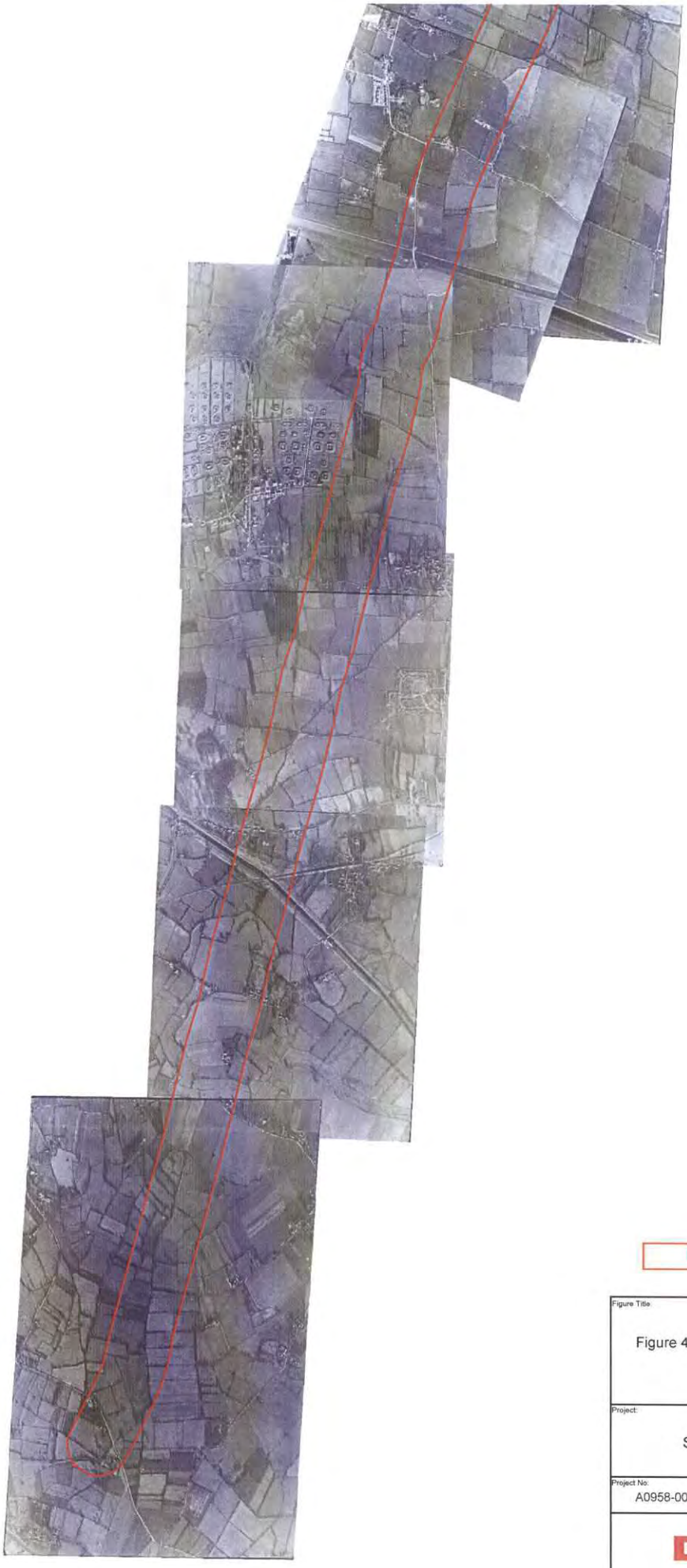

Approximate Site Boundary

Figure Title:

Figure 4 - Aerial Photgraph Composite 1940's 50's and 60's

Project:

Seabank to Bridgwater

Project No:	Report No.	Scale:
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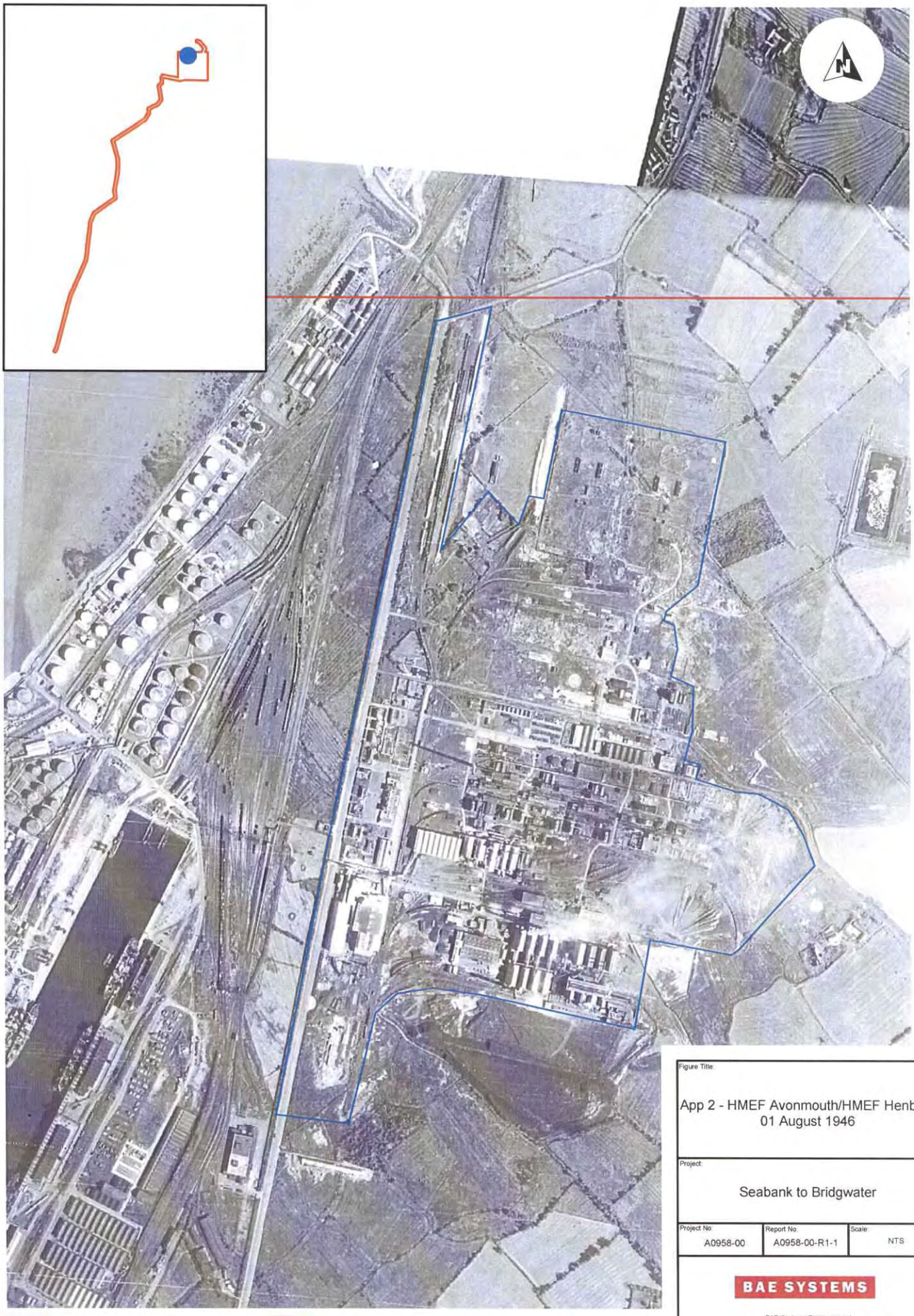
Appendix 2

Selected Defence/Military Sites



Approximate Site Boundary

Approximate Factory Boundary

Figure Title:

App 2 - HMEF Avonmouth/HMEF Henbury
01 August 1946

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
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Figure Title:

App 2 - NFF Chittening
Ref: MUN5/154 (Date Unknown)

Project:

Seabank to Bridgwater

Project No:	Report No.	Scale:
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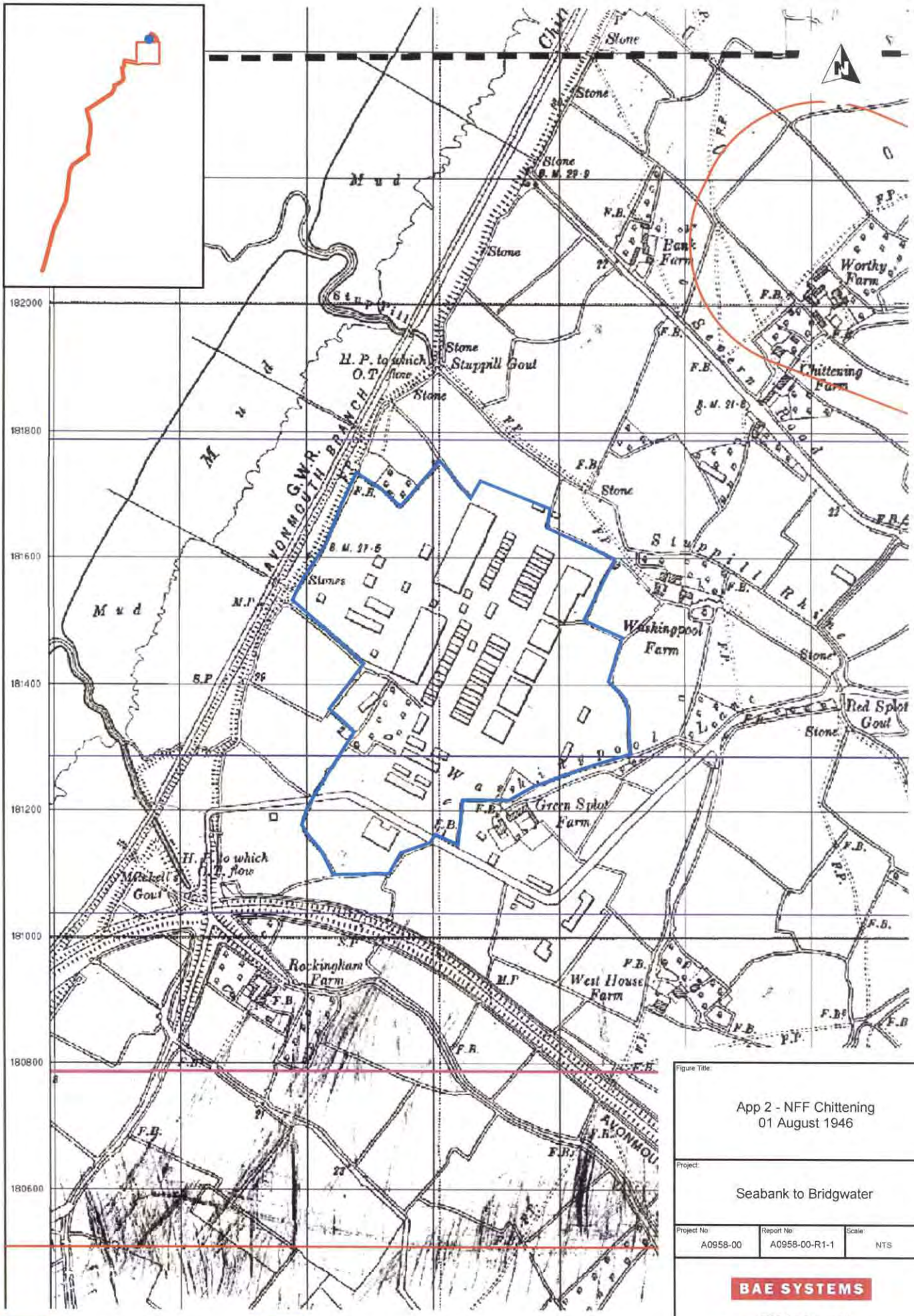

Figure Title:

App 2 - NFF Chittening
01 August 1946

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
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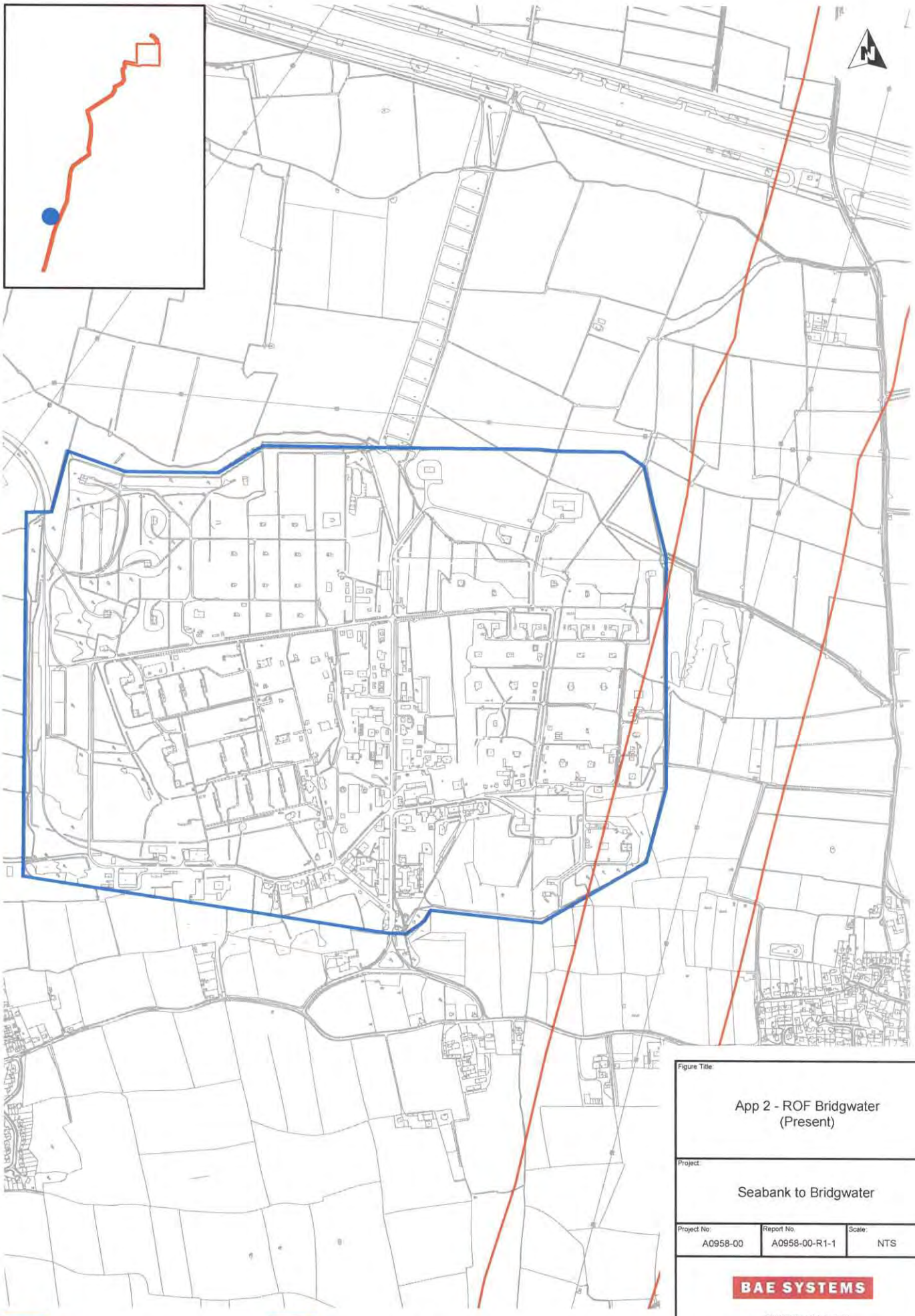

Approximate Site Boundary

Approximate Factory Boundary

Figure Title:

App 2 - ROF Bridgwater (Present)

Project:

Seabank to Bridgwater

Project No:	Report No.	Scale:
A0958-00	A0958-00-R1-1	NTS

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Approximate Site Boundary

Approximate Factory Boundary

Figure Title:

App 2 - ROF Bridgwater
23 Jan 1947

Project:

Seabank to Bridgwater

Project No:	Report No.	Scale:
A0958-00	A0958-00-R1-1	NTS

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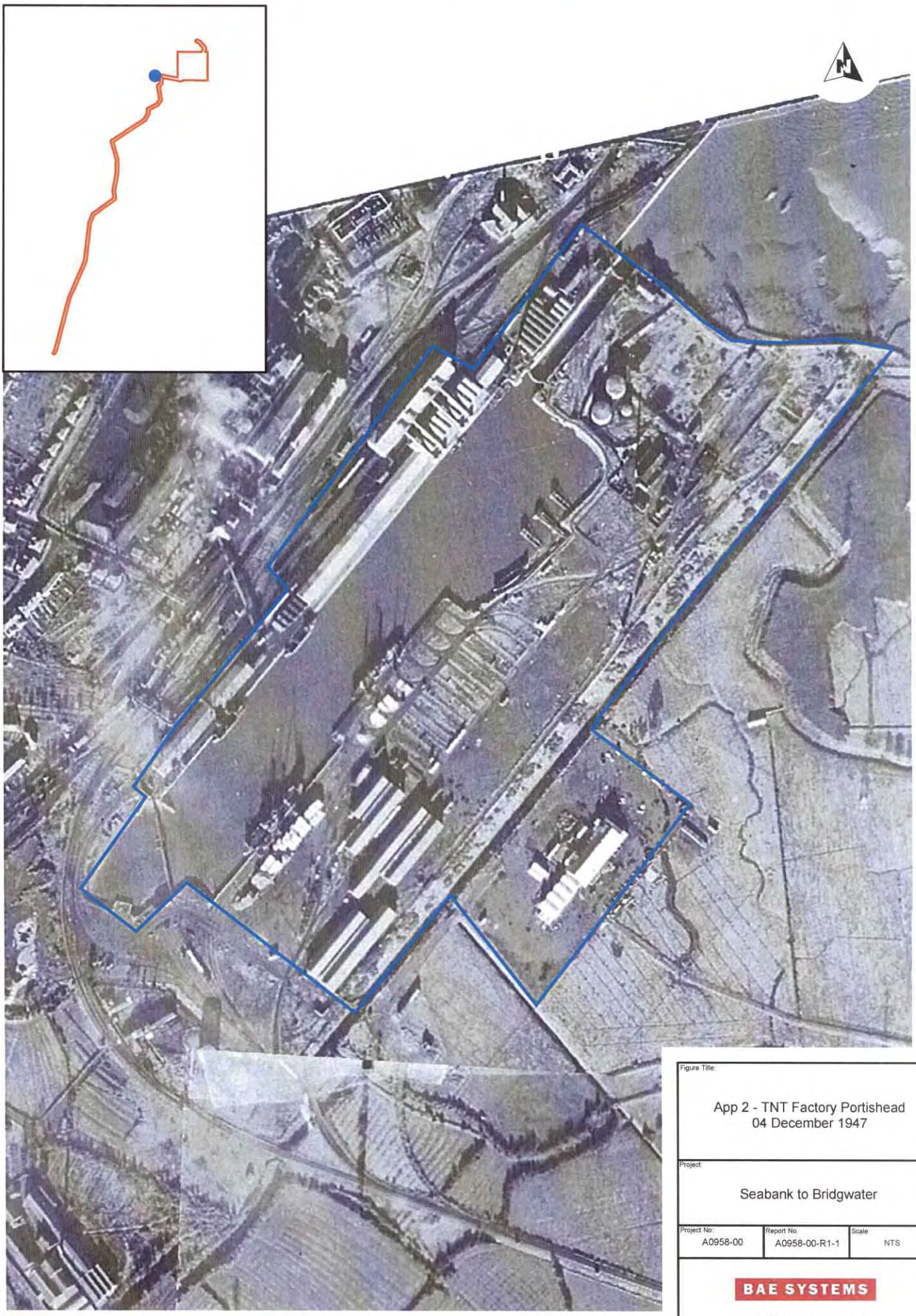


Approximate Site Boundary

Approximate Factory Boundary

Figure Title:

App 2 - TNT Factory Portishead
04 December 1947

Project:

Seabank to Bridgwater

Project No:	Report No.	Scale:
A0958-00	A0958-00-R1-1	NTS

BAE SYSTEMS

BAE Systems Environmental
Westcott Venture Park, Westcott, Aylesbury, HP18 0NP
Tel. 01296 652181 Fax. 01296 652154

Figure Title:

App 2 - Anti-Aircraft and Baloon Barage Sites
26 April 1947

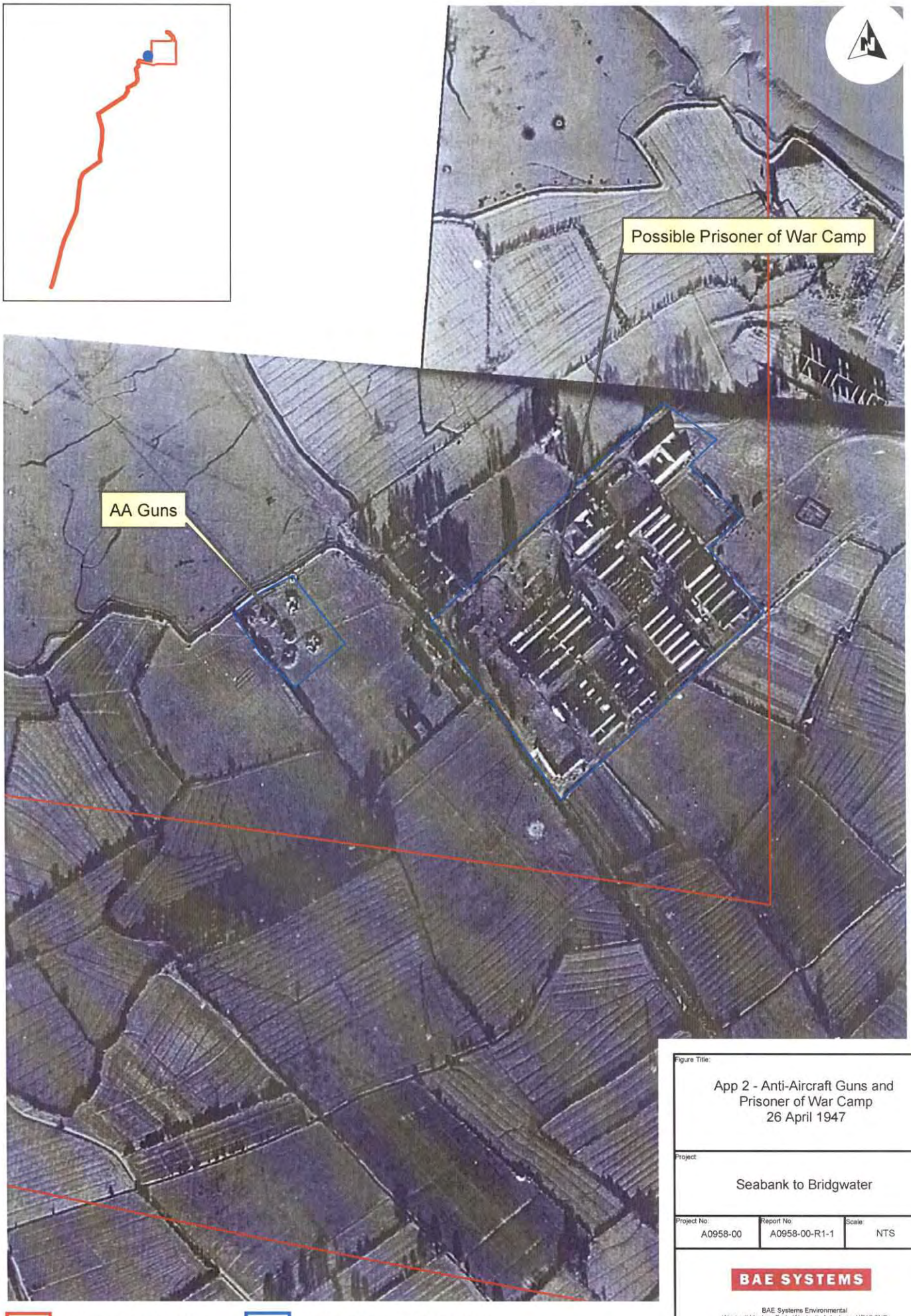
Project:

Seabank to Bridgwater

Project No:	Report No.	Scale:
A0958-00	A0958-00-R1-1	NTS

BAE SYSTEMS

BAE Systems Environmental
Westcott Venture Park, Westcott, Aylesbury, HP18 0NP
Tel. 01296 652181 Fax. 01296 652154



Approximate Site Boundary

Approximate Defence Site Boundary

Figure Title:

App 2 - Anti-Aircraft Guns and Prisoner of War Camp
26 April 1947

Project:

Seabank to Bridgwater

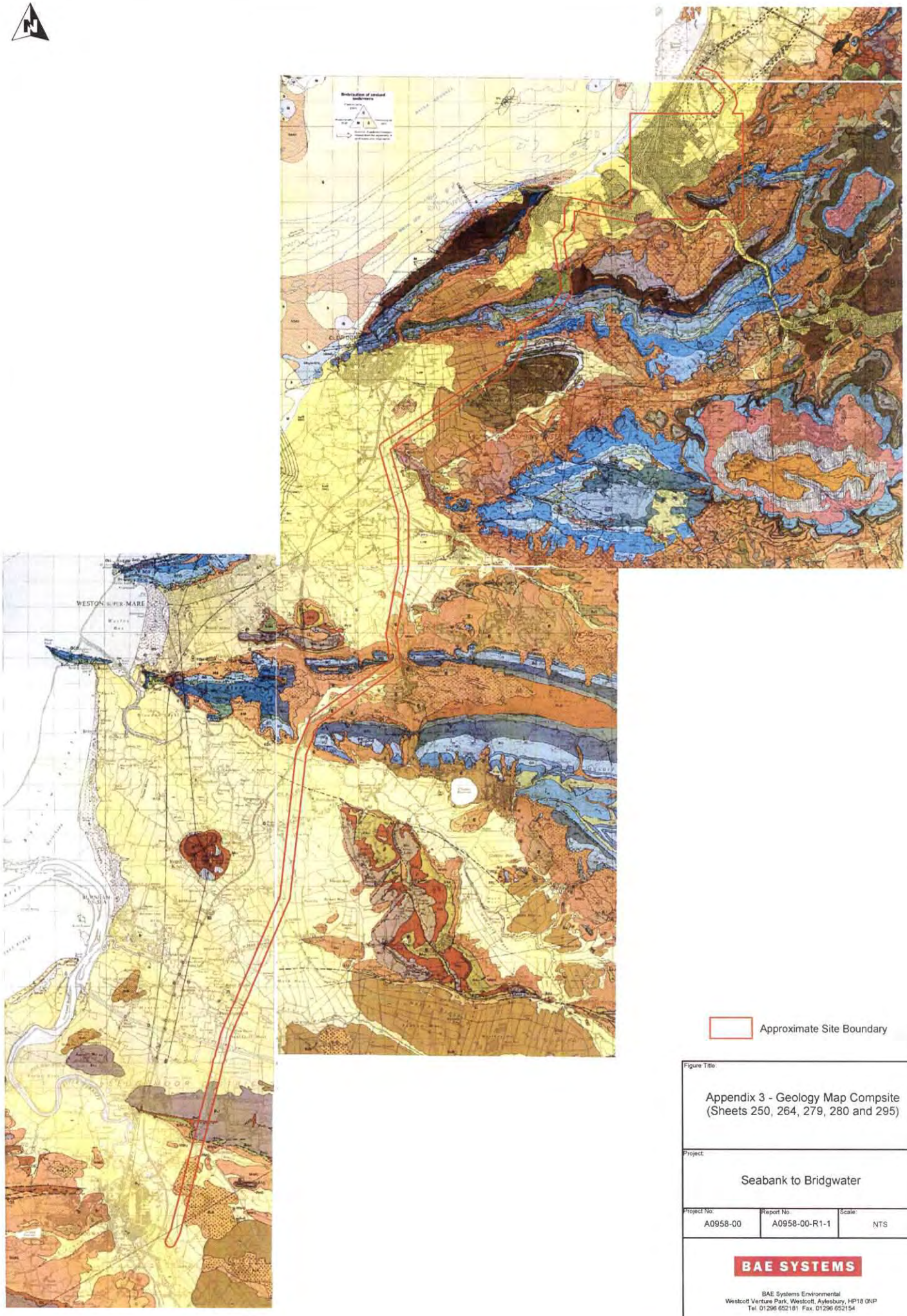
Project No:	Report No:	Scale:
A0958-00	A0958-00-R1-1	NTS

BAE SYSTEMS

BAE Systems Environmental
Westcott Venture Park, Westcott, Aylesbury, HP18 0NP
Tel. 01296 652181 Fax. 01296 652154

Appendix 3

Geology



Approximate Site Boundary

Figure Title:

Appendix 3 - Geology Map Compsite (Sheets 250, 264, 279, 280 and 295)

Project:

Seabank to Bridgwater

Project No:	Report No:	Scale:
A0958-00	A0958-00-R1-1	NTS

BAE SYSTEMS

BAE Systems Environmental
Westcott Venture Park, Westcott, Aylesbury, HP18 0NP
Tel. 01296 652181 Fax. 01296 652154

Map Sheet 250 - Chepstow

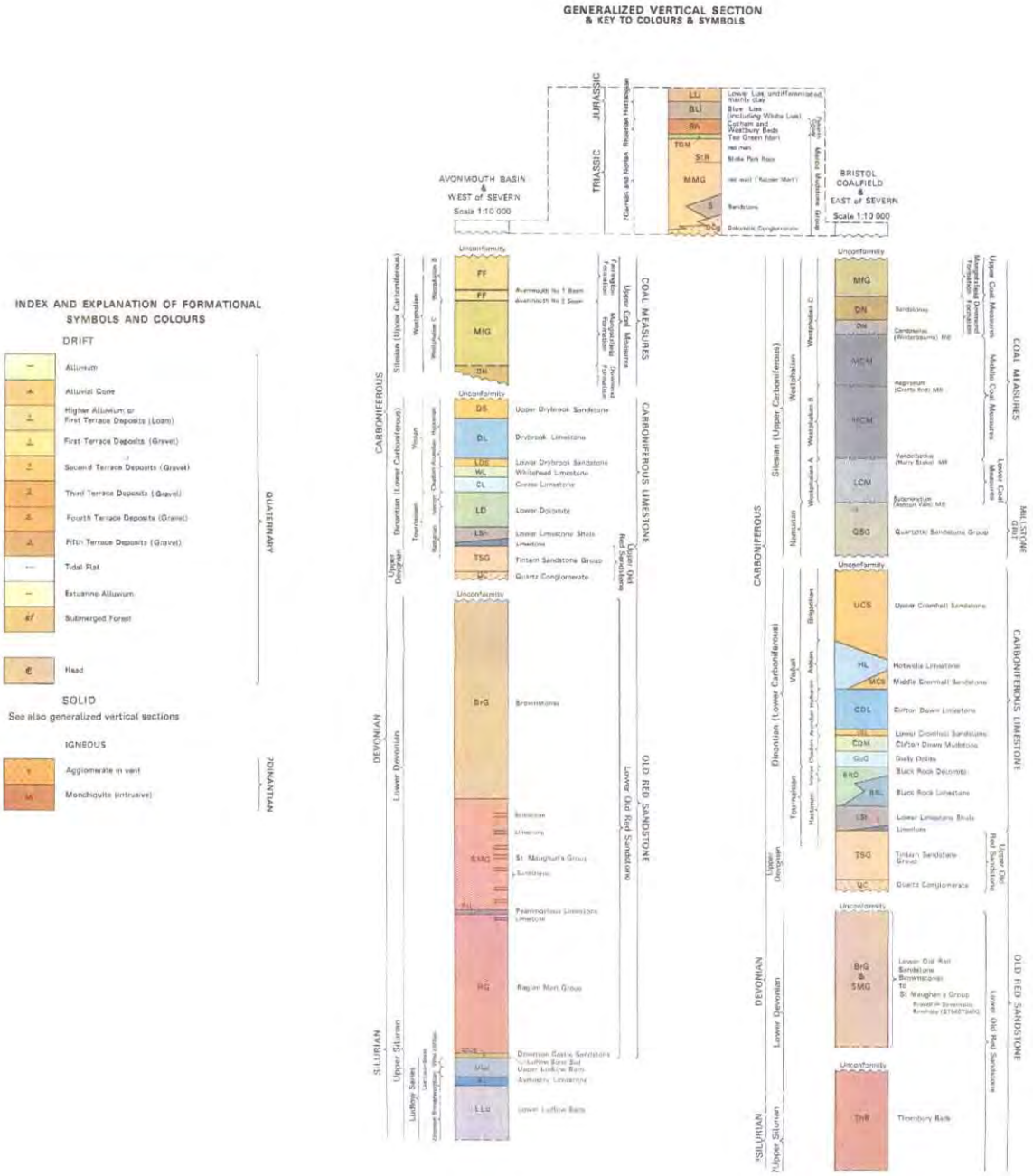


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FIGURE TITLE :

Appendix 3 - Extract Of Geological Key

PROJECT :

Seabank to Bridgwater

REPORT NUMBER :

A0958-00-R1-1

BAE SYSTEMS

Map Sheet 279 – Weston-super-Mare

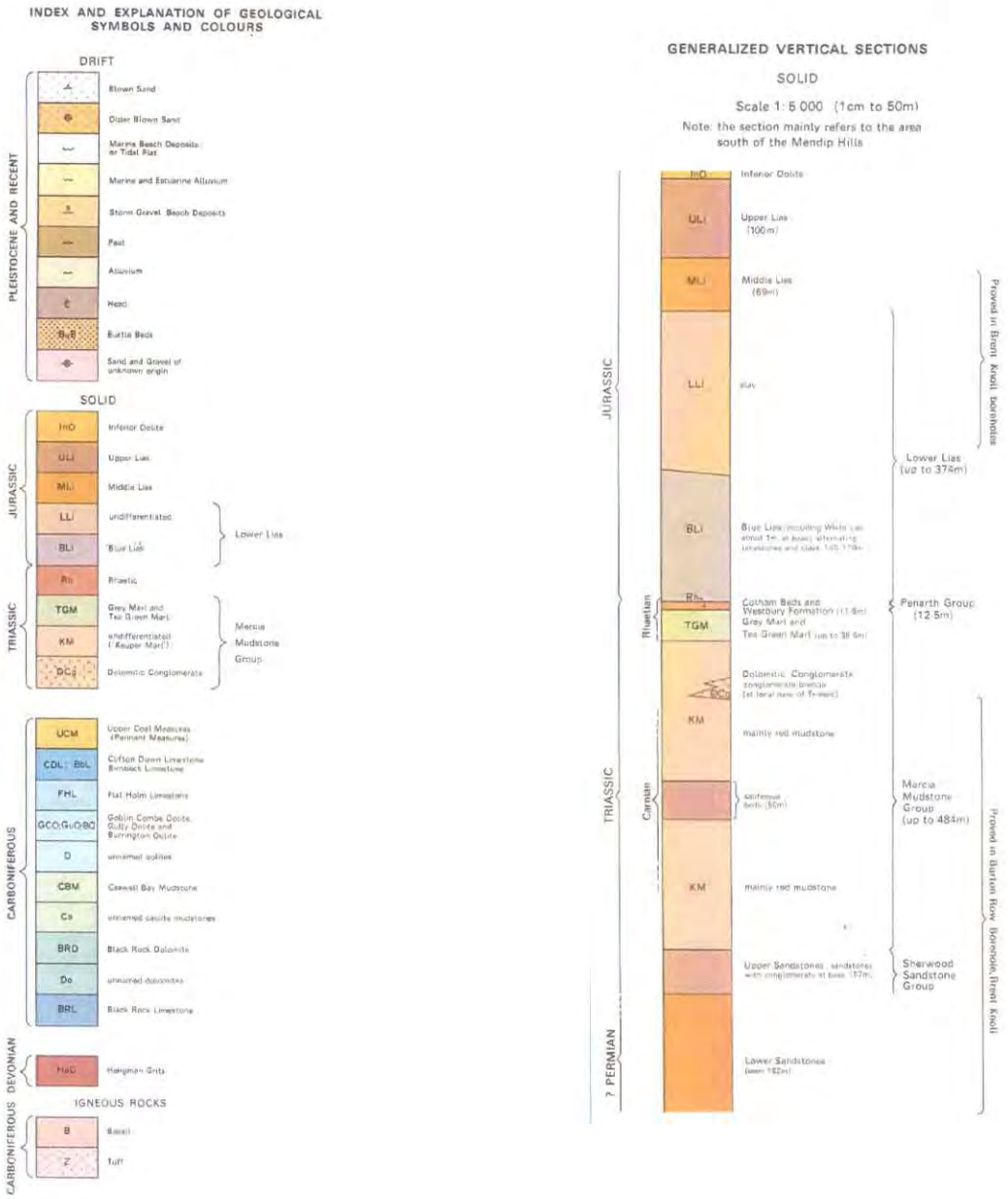

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FIGURE TITLE :

Appendix 3 - Extract Of Geological Key

PROJECT :

Seabank to Bridgwater

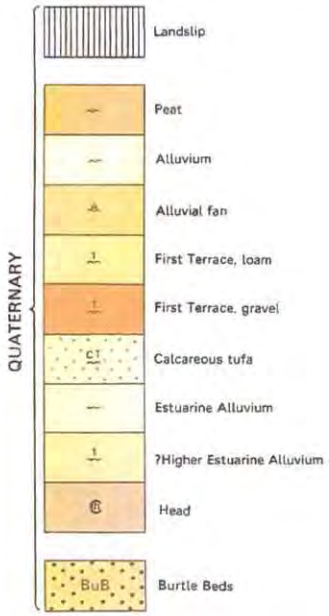
REPORT NUMBER :

A0958-00-R1-1

BAE SYSTEMS

Map Sheet 280 - Wells

INDEX AND EXPLANATION OF DRIFT SYMBOLS AND COLOURS



GENERALIZED VERTICAL SECTION & KEY TO COLOURS & SYMBOLS

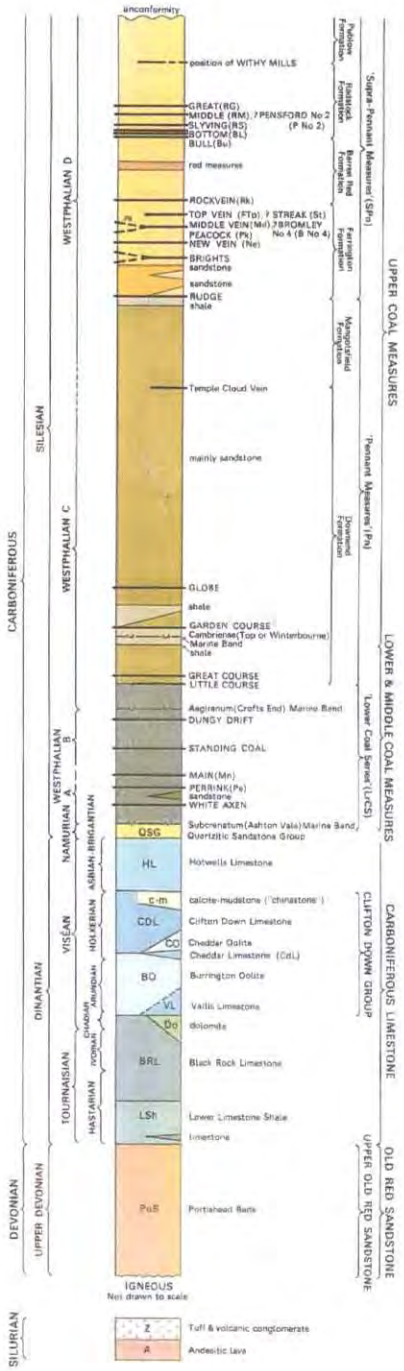


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FIGURE TITLE :

Appendix 3 - Extract Of Geological Key

PROJECT :

Seabank to Bridgwater

REPORT NUMBER :

A0958-00-R1-1

BAE SYSTEMS

Map Sheet 264 - Bristol

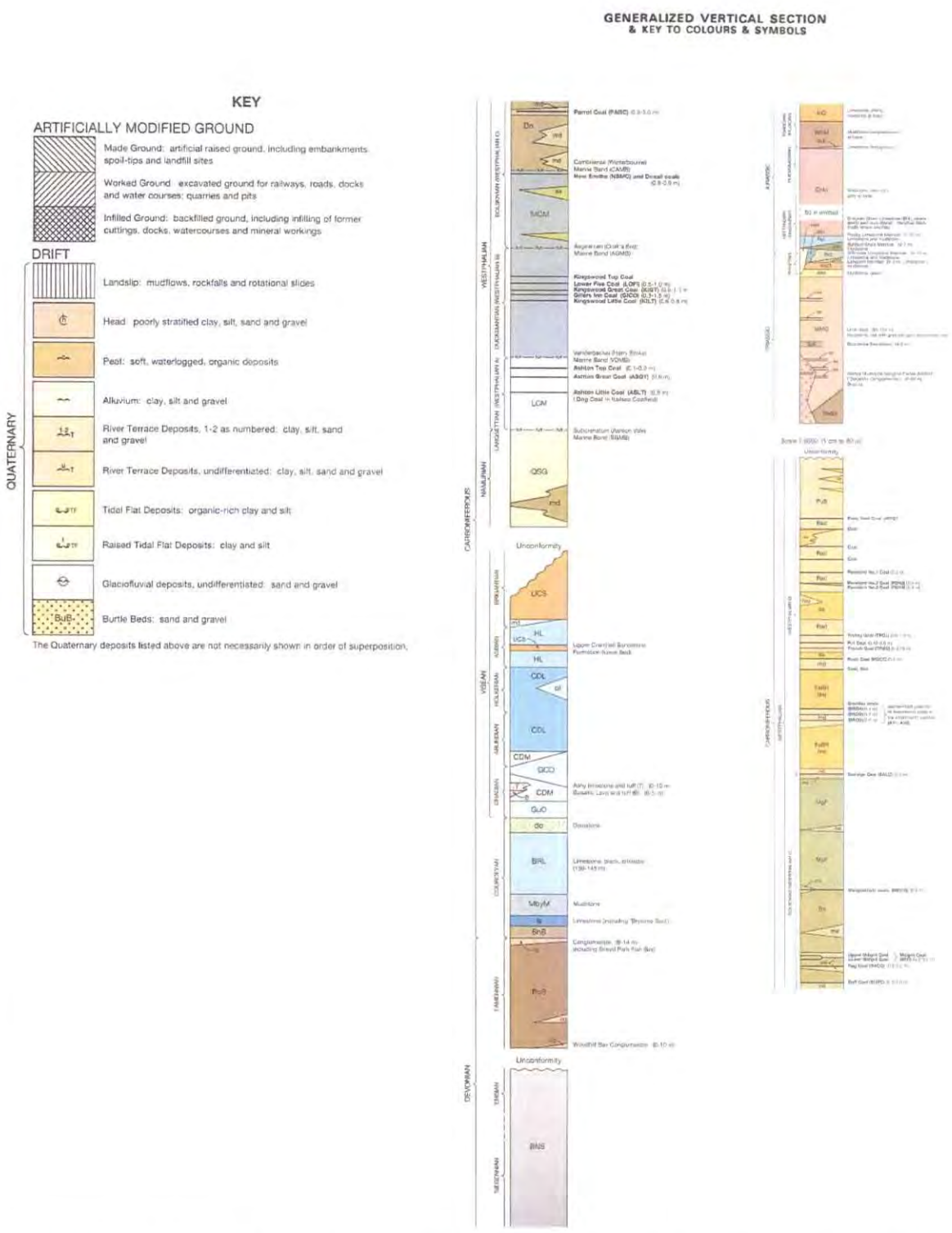

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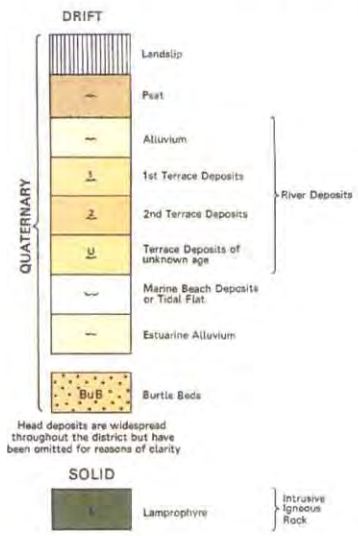
FIGURE TITLE : Appendix 3 - Extract Of Geological Key	BAE SYSTEMS
PROJECT : Seabank to Bridgwater	REPORT NUMBER : A0958-00-R1-1

Map Sheet 295 - Taunton



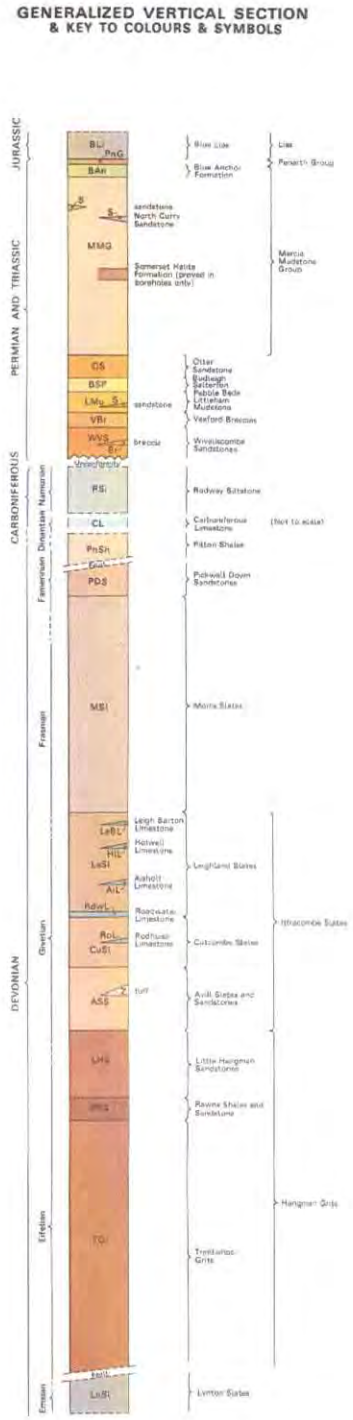


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FIGURE TITLE :

Appendix 3 - Extract Of Geological Key

PROJECT :

Seabank to Bridgwater

REPORT NUMBER :

A0958-00-R1-1

BAE SYSTEMS

APPENDIX E

Preliminary geotechnical risk ranking table

Appendix E

Table E1 Qualitative Classification of Geotechnical Risk

Risk Rating	Description
HIGH	Ground investigation required to assess Tower specific geotechnical hazards/risks
MEDIUM	Ground investigation required to confirm published geology, foundation depths and types
LOW	Ground investigation not normally required other than to confirm published geology between isolated tower spans

List of abbreviations used within Table E2

U	Uplift foundation risk
C	Compression foundation risk
GW	Groundwater risk/buoyancy risk
CM	Coal mining risk
CD	Concrete durability risk
SG	Soft ground risk
SS	Slope stability risk
MG	Made Ground risk
LS	Landslip risk
TP	Trial Pit
WS	Window Sample borehole
DPT	Dynamic Probe Tests
CP	Cable Percussion borehole
RO	Rotary Openhole borehole

Notes to Table E2:-

1. This information is based on the assumption that the foundations have been designed and built in accordance with the National Grid Transco Technical Specification NGT Tech Spec TS 3.4.15 and the foundations are perceived to be of 'standard pyramid' type.
2. Walkover survey limited to points of public access only. Detailed appraisal of tower settings could not be undertaken.
3. Where appropriate, historical borehole and older geological map descriptions have been updated to current nomenculture

References used:-

1. British Geological Survey, 1984, Sheet 295, Taunton , 1:50,000, Solid and Drift Edition.
2. British Geological Survey, 1980, Sheet 279, Western-Super-Mare, 1:50,000, Solid and Drift Edition
3. British Geological Survey, 1984, Sheet 280, Wells, 1:50,000, Solid and Drift edition.
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5. British Geological Survey, 2003, Sheet ST47SE (Clapton-in-Gordano), 1:10,000, Solid and Drift edition
6. Environment Agency, 1996, Sheet 36, Groundwater Vulnerability of Gwent, South & Mid Glamorgan, 1:100,000.
7. Environment Agency, 1994, Sheet 37, Groundwater Vulnerability of Southern Cotswolds, 1:100,000
8. Environment Angency, 1996, Sheet 42, Groundwater Vulnerability of Somerset Coast, 1:100,000
9. www.environment-agency.gov.uk
10. BGS Record number ST33NW32
11. BGS Record number ST33NW44
12. BGS Record number ST34SW51
13. BGS Record number ST34SW45
14. BGS Record number ST34NW23
15. BGS Record number ST34NW25
16. BGS Record number ST34NW40
17. BGS Record number ST35SE1
18. BGS Record Number ST35SE12
19. BGS Record Number ST35SE22
20. BGS Record Number ST35SE20

21. BGS Record Number ST35NE26
22. BGS Record Number ST35NE22
23. BGS Record Number ST45NW17
24. BGS Record Number ST46SW4
25. BGS Record Number ST46NW47
26. BGS Record Number ST46NW67
27. BGS Record Number ST46NW26
28. BGS Record Number ST47SE114
29. BGS Record Number ST47SE63
30. BGS Record Number ST47SE25
31. BGS Record Number ST47SE17
32. BGS Record Number ST47NE68
33. BGS Record Number ST47NE48
34. BGS Record Number ST57NW25
35. BGS Record Number ST57NW168
36. BGS Record Number ST58SW79
37. BGS Record Number ST58SW26
38. British Geological Survey, 2003, Sheet ST47NE (Portishead), 1:10,000, Solid and Drift edition
39. British Geological Survey, 2003, Sheet ST57NW (Avonmouth), 1:10,000, Solid and Drift edition
40. British Geological Survey, 2003, Sheet ST58SW (Severnside), 1:10,000, Solid and Drift edition

Soil Classifications:-

High U	Soil classification for urban areas which is based on fewer observations therefore the worst case is assumed and classified as high leaching potential
High 1	Soils which readily transmit liquid discharge because they are either shallow, or susceptible to rapid by-pass flow directly to rock, gravel or groundwater
High 2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential
High 3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants but have some ability to attenuate due to clay or organic content
Intermediate 1	Soils which can possibly transmit a wide range of pollutants
Intermediate 2	Soils which can possibly transmit non- or weakly adsorbed pollutants but are unlikely to transmit adsorbed pollutants
Low	Pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal or they have the ability to attenuate diffuse pollutants.

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
	Lat	Lon																										
CG001	332273.87	135924.02	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1979 the Grid Transformer Station is located on the site.	Minor	High 1	Y	River Parrett 200m NE, stream 300m W		N	unknown	-	-	-	-	-	-	-	-	Y	Not accessed	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG002	332369.25	136044.99	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1938 the site is marked within an industrial estate and by 1962 a tower is marked on the site.	Minor	High 1	Y	River Parrett 1km NE, stream 100m W		N	Grass, brambles	0	N	N	N	N	N	N	N	Y	Very overgrown around tower	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG003	332369.25	136044.99	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower is marked on the site.	Minor	High 1	Y	Stream 100m W		N	Crops	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG004	332596.95	136361.41	N	Alluvium	Mercia Mudstone Group[1]	Alluvium to 19.8m, Mercia Mudstone Group to 25.8m[10]	From 1887 the site is located in open fields. By 1962 a tower is marked on the site.	Minor	High 1	Y	Stream 250m S		N	Crops	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG005	332734.63	136737.84	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower is marked on the site.	Minor	High 1	Y	Stream adjacent		N	Crops	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG006	332743.34	136997.30	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower is marked on the site. By 1979 a parallel overhead line is marked adjacent to the tower.	Minor	High 1	Y	Stream 100m N		N	Crops, close to ditch	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG007	332782.67	137227.66	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower is marked on the site. By 1979 a parallel overhead line is marked adjacent to the tower.	Minor	High 1	Y			N	Crops	0	N	N	N	Y	N	N	N	N	Dip in centre	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG008	332885.57	137488.00	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower is marked on the site. By 1979 a parallel overhead line is marked adjacent to the tower.	Minor	High 1	Y			N	Crops	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG009	332971.83	137745.00	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site.	Minor	High 1	Y			N	Crops	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG010	333046.12	138018.06	N	Burtle Beds	Mercia Mudstone Group[1]	Burtle Beds to 7.6m, Mercia Mudstone Group to 15.7m[11]	From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	N	Stream 300m S		N	Crops, weeds round bottom	0	N	N	N	N	N	N	N	N		LOW			
CG011	333083.62	138179.05	N	Burtle Beds	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	Y	Stream adjacent		N	Sheep grazing	0	N	N	N	Y	N	N	N	N	Dip in centre	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG012	333165.16	138477.82	N	Burtle Beds	Mercia Mudstone Group[1]		From 1887 the site is located in open fields next to a possible farm. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	Y	Stream 250m N		N	Crops	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG013	333284.62	138804.79	N	Burtle Beds	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	N			N	Crops	0	N	N	N	N	N	N	N	N		LOW			
CG014	333317.81	139006.66	N	Burtle Beds	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	N			N	Ploughed field	0	N	N	N	N	N	N	N	N		LOW			
CG015	333387.10	139323.16	N	None recorded	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	King's Sedgemoor Drain 400m S		N	Ploughed field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG016	333506.97	139570.39	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1904 a dismantled railway is marked 100m N. By 1962 a tower has been constructed on the site and King's Sedgemoor Drain has been widened. By 1979 there has been local excavation around King's Sedgemoor Drain and a sewage works is marked 400m E.	Minor	Intermediate 2	Y	King's Sedgemoor Drain 100m S		N	Crops	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG017	333514.52	139737.89	N	Alluvium	Mercia Mudstone Group[1]		From 1887 the site is located in open fields. By 1962 a tower has been constructed on the site and King's Sedgemoor Drain has been widened. By 1979 there has been local excavation around King's Sedgemoor Drain.	Minor	Intermediate 2	Y	King's Sedgemoor Drain adjacent		N	Grass field adj to canal	0	N	N	N	N	N	N	Y	N	10-15m from canal edge. Generally sloping to canal. Cut out level where tower is	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by King's Sedgemoor Drain
CG018	333599.84	140105.35	N	None recorded	Blue Lias[1]		From 1887 the site is located in open fields. By 1904 an Old Quarry is marked 300m W. By 1931 the quarry is no longer marked. By 1961 a tower has been constructed on the site.	Minor	Intermediate 1	N		Disused quarry 300m W	N	Crops	5	N	N	N	N	N	N	N	N	slight slope to S	LOW			
CG019	333703.29	140442.76	N	None recorded	Blue Lias[1]		From 1887 the site is located in open fields. By 1904 the site is adjacent to an Old Quarry. By 1931 the quarry is no longer marked. By 1961 a tower has been constructed on the site. On the 1979 map a local excavation is marked adjacent to the tower.	Minor	Intermediate 1	N		Adjacent to old quarry	N	Crops	5	N	N	N	N	N	N	N	N	slight slope to S	MEDIUM	WS, DPT, TP	C, MG	
CG020	333731.61	140703.19	N	None recorded	Penarth Group[1]		From 1887 the site is located in open fields. By 1961 a tower has been constructed on the site. By 1999 a mast is located 20m SE.	Minor	Low	N			N	Grass field	0	N	N	N	N	N	N	N	N	Top of hill	LOW			
CG021	333804.76	140856.06	N	None recorded	Blue Lias[1]		From 1887 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	Low	N			N	Crops	5	N	N	N	N	N	N	N	N	slight slope to N	LOW			

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG022	333855.54	141166.80	N	None recorded	Blue Lias[1]		From 1887 the site is located in open fields with 'Cats Quarry' 200m W. By 1961 a tower has been constructed on the site.	Minor	High 1	N		Cats quarry 200m W	N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	LOW			
CG023	333895.80	141323.42	N	None recorded	Blue Lias[1]		From 1887 the site is located in open fields with 'Cats Quarry' 200m W. By 1961 a tower has been constructed on the site.	Minor	High 1	N		Cats quarry 200m W	N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	LOW			
CG024	333950.25	141571.73	N	None recorded	Blue Lias[1]		From 1887 the site is located in open fields. By 1904 an old Quarry is marked 100m NE. By 1931 the quarry is no longer marked. By 1961 a tower has been constructed on the site and 'Mortlands Farm' is marked adjacent to the tower.	Minor	High 1	N		Old quarry 100m NE	N	Pony grazing field	5	N	N	N	N	N	N	N	N	Bottom of hill	LOW			
CG025	334047.39	141879.54	N	None recorded	Blue Lias[1]	Clay to 3.9m, Blue Lias to 10m[12]	From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1	N			N	Grass field	0	N	N	N	N	N	N	N	N	Behind hedge no direct visual access	LOW			
CG026	334127.52	142114.40	N	None recorded	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1	N	Lake 300m N		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	LOW			
CG027	334173.57	142413.52	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site. By 1979 a possible lake or reservoir, listed as 'previous sand quarry', is marked adjacent to the NW.	Minor	High 1 (low permeability drift)	Y	Adjacent to a lake and stream	Adjacent to 'previous sand quarry'	N	Grass cattle grazing, close to stream	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by surface water features
CG028	334224.63	142655.98	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site. By 1979 a possible reservoir or lake is adjacent and W of the site.	Minor	High 1 (low permeability drift)	Y	Adjacent to a lake		N	Unknown	-	-	-	-	-	-	-	-	N	No access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by lake
CG029	334305.35	142895.06	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Lake 200m S		N	Grass cattle grazing	0	N	N	N	N	N	N	N	Y	Line spilts to CG029a and b to pass around E-W powerline	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG029A	334372.82	143011.64	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1974 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y			N	Grass cattle grazing	0	N	N	N	N	Y	N	N	Y	Line spilts between CG029a and b to pass around E-W powerline	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG029B	360632.01	134254.76	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1974 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y			N	Grass cattle grazing	0	N	N	N	N	Y	N	N	Y	Line spilts between CG029a and b to pass around E-W powerline	MEDIUM	WS, DPT, TP	C, GW, CD, SG	

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CG030	334383.67	143193.33	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site. By 1979 2 new towers and a powerline, running E-W, are located near the tower.	Minor	High 1 (low permeability drift)	Y	Huntspill River 500m S		N	Grass cattle grazing	0	N	N	N	N	Y	N	N	Y	Line merges back to one	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG031	334444.36	143403.30	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields, close to a Rhyne. By 1904 the Quaking Bridge is located 40m NE. By 1961 a tower has been constructed on the site. By 1999 Homestead Farm has been built ~40m S.	Minor	High 1 (low permeability drift)	Y	Huntspill River 300m S		N	Grass cattle grazing	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG032	334508.05	143662.28	N	Estuarine Alluvium	Blue Lias[2]	Estuarine Alluvium to 24.07m[13]	From 1886 the site is located in open fields, close to a Rhyne. By 1904 the Quaking Bridge is located 50m SE. By 1961 a tower has been constructed on the site. By 1962 Huntspill River is marked adjacent to the tower to the N. The tower is now located on an embankment.	Minor	High 1 (low permeability drift)	Y	Adjacent to Huntspill River		N	Bank of river, grass	30-40	N	on opposite bank	N	N	Y	N	Y	N	on bank of river. Possibly built on man-made bank	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, SS, LS, MG	Restricted by Huntspill River
CG033	334595.28	143904.62	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site. By 1962 the Huntspill River is located ~150m S.	Minor	High 1 (low permeability drift)	Y	Huntspill River 150m N		N	Grass cattle grazing	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG034	334639.29	144172.19	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Adjacent to a stream. Huntspill River 400m N.		N	Grass cattle grazing	0	N	N	N	N	Y	N	N	Y	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG035	334754.21	144439.20	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Adjacent to a stream. Huntspill River 600m N.		N	Grass sheep grazing	0	N	N	N	N	Y	N	N	N	Adjacent to stream and ditch	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream and ditch
CG036	334864.61	144708.26	N	Estuarine Alluvium	Blue Lias[2]		From 1886 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Adjacent to a stream and a drain.		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream and drain
CG037	334996.92	145043.01	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Stream 300m E.		N	Grass cattle grazing	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG038	335120.41	145293.90	N	Estuarine Alluvium	Lower Lias[2]	Estuarine Alluvium to 27m. Lower Lias to 153m[14]	From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	River Brue 200m N		N	Grass cattle grazing	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG039	335228.09	145505.96	N	Estuarine Alluvium	Lower Lias[2]	Estuarine deposits to 32.3m. Beach deposits to 33.7m. Lower Lias to 37.9m[15]	From 1885 the site is located within a woodland adjacent to the River Brue (~20m N) and the Somerset & Dorset Joint Railway (~100m N). By 1961 a tower has been constructed on the site. By 1974 the railway has been dismantled.	Minor	High 1 (low permeability drift)	Y	Adjacent to River Brue		N	Grass cattle grazing	0	N	N	N	N	Y	N	N	N	Next to a ditch	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by River and ditch

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CG040	335290.53	145726.04	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located within a woodland. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	River Brue 200m S		N	Grass cattle grazing	5	-	-	-	-	-	-	-	N	Behind hedge no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG041	335424.90	146017.72	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	River Brue 500m S, tributary 250m N		N	Grass field??	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG042	335532.81	146204.87	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields adjacent to a Rhyne. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Adjacent to tributary of River Brue		N	Grass field??	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG043	335595.14	146457.21	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Tributary of River Brue 250m S		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG044	335738.25	146701.98	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a stream		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG045	335800.87	146911.05	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Stream 300m E		N	Pony grazing field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG046	335943.50	147175.18	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields possible close to a pond. By 1961 a tower has been constructed on the site.	Non aquifer		Y			N	Grass field??	0	N	N	N	N	N	N	N	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG047	336043.05	147440.40	N	Estuarine Alluvium	Lower Lias[2]	Estuarine Alluvium to 12.49m[16]	From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y			N	Grass field??	0	N	N	N	N	N	N	N	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG048	336139.81	147713.00	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in a wood adjacent to buildings with a foundry 300m W. By 1904 the site is located in open fields. By 1961 a tower has been constructed on the site	Non aquifer		Y	Stream 200m N		N	Grass field adjacent to caravan park	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG049	336248.28	147950.31	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a stream		N	Grass cattle grazing field	5	N	N	N	N	Y	N	N	N	Adjacent to ditch, slopes towards ditch	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by ditch
CG050	336333.69	148171.01	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Stream 250m N		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	

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CG051	336425.65	148373.17	N	Estuarine Alluvium	Lower Lias[2]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a stream		N	Horse grazing field, brambles round legs	0	N	N	N	N	Y	N	N	N	Adjacent to a ditch	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream and ditch
CG052	336590.51	148639.82	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Stream 250m S		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG053	336689.20	148874.26	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Stream 200m W		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG054	336831.92	149107.82	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y			N	Grass field	0	N	N	N	N	Y	N	N	Y		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG055	336883.95	149330.94	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Stream 250m N		N	Grass field, undulating	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG056	337015.41	149587.23	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a stream		N	Grass field??	0	-	-	-	-	-	-	-	Y	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG057	337036.70	149865.22	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Stream 300m S and Mark Yeo river 400m E		N	Grass field??	0	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG058	337069.87	150162.20	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in woodland. By 1962 a tower has been constructed on the site. By 1974 the tower is located within a field/pasture part of Pilrow Farm.	Non aquifer		Y	Mark Yeo river 300m E		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG059	337089.23	150403.40	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Mark Yeo river 250m E		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG060	337112.85	150678.59	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Mark Yeo river 250m E and Blind Pill Rhyne 100m N		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG061	337132.65	151007.20	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Mark Yeo river 100m E and adjacent to Blind Pill Rhyne		N	Edge of crop field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG062	337197.44	151197.02	N	Estuarine Alluvium	Lower Lias[3]		From 1885 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Mark Yeo river		N	Edge of crop field, next to muck heap	0	N	N	N	N	Y	N	N	N	10-15m from Mark Yeo (river)	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by river

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CG063	337210.86	151478.56	N	Estuarine Alluvium	Lower Lias[3]		From 1884 the site is located in open fields close to to field Drain. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Mark Yeo river 200m SE		N	Grass field	0	N	N	N	N	N	N	N	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG064	337241.82	151715.62	N	Estuarine Alluvium	Lower Lias[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		N	Plash Rhyne 300m E		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	LOW			
CG065	337296.17	151982.87	N	Estuarine Alluvium	Lower Lias[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Plash Rhyne		N	Grass cattle grazing, long grass	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by rhyne
CG066	337322.70	152258.35	N	Estuarine Alluvium	Lower Lias[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Plash Rhyne		N	Grass sheep grazing	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by rhyne
CG067	337333.70	152507.67	N	Estuarine Alluvium	Lower Lias[3]	Estuarine Alluvium to 6m[17]	From 1884 the site is located in open fields adjacent to Willow Farm. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Plash Rhyne		N	Grass sheep grazing	0	N	N	N	N	N	N	N	N	Close to ditch to N	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by rhyne
CG068	337359.06	152755.36	N	Estuarine Alluvium	Lower Lias[3]		From 1884 the site is located in woodland. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Plash Rhyne		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by rhyne
CG069	337418.43	153046.90	N	Estuarine Alluvium	Lower Lias[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site possible close to a stream/river.	Non aquifer		Y	Adjacent to Plash Rhyne		N	Grass field	-	-	-	-	-	Y	-	-	N	No direct visual access. Next to river	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by rhyne
CG069A	337405.62	153248.47	N	Estuarine Alluvium	Lower Lias[4]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Plash Rhyne 200m W		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG070	337459.15	153502.60	N	Estuarine Alluvium	Lower Lias[5]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1 (low permeability drift)	Y	Old River Axe 200m N		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG071	337448.91	153794.66	N	Estuarine Alluvium	Lower Lias[6]		From 1884 the site is located in open fields adjacent to a tribute to the River Axe. By 1961 a tower has been constructed on the site.	Minor	Intermediate 2 (low permeability drift)	Y	Adjacent to Old River Axe		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by river
CG072	337493.26	154022.11	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	Intermediate 2 (low permeability drift)	Y	Old River Axe 300m E		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG073	337541.58	154261.18	N	Estuarine Alluvium	Mercia Mudstone Group[3]	Estuarine Alluvium to 21.34m. Blue Lias to 21.79m[18]	From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to tributary, Old River Axe 150m E		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by river
CG074	337575.02	154527.46	N	Estuarine Alluvium	Mercia Mudstone Group[3]	Estuarine Alluvium to 6.1m[19]	From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	Old River Axe 250m SE		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG075	337606.35	154768.75	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		Y	River Axe 200m N		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG076	337617.16	155049.32	N	Estuarine Alluvium	Mercia Mudstone Group[3]	Estuarine Alluvium to 12.34m. Mercia Mudstone Group to 13.34m[20]	From 1884 the site is located in open fields directly adjacent to the River Axe. By 1962 a tower has been constructed on the site. By 1979 pipelines are marked 300m W.	Non aquifer		Y	Adjacent to River Axe		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by river
CG077	337672.09	155300.10	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1962 a tower has been constructed on the site. By 1978 the M5 has been constructed 20m W. (Note: the construction of the M5 has rerouted the powerline)	Non aquifer		Y	Forks of Lox Yeo River 100m W and 200m E, River Axe 250m S		N	Grass field	-	-	-	-	-	-	-	-	Y	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG078	337754.51	155540.54	N	Estuarine Alluvium	Mercia Mudstone Group[3]	Estuarine Alluvium to 15.2m. Mercia Mudstone Group to 16.8m[21]	From 1884 the site is located in open fields. By 1978 a tower has been constructed on the site and the M5 is located 20m W.	Non aquifer		Y	Adjacent to forks of Lox Yeo River		N	Grass field	0	-	-	-	-	Y	-	-	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Resticted by river
CG079	337868.48	155825.42	N	None recorded	Mercia Mudstone Group[3]	Alluvium to 3.8m. Mercia Mudstone Group to 5.2m[22]	From 1884 the site is located in open fields. By 1979 a tower has been constructed on the site and the M5 is located 20m W.	Non aquifer		N	Lox Yeo River 150m W		N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5	LOW			
CG080	337989.17	156141.47	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1904 a gravel pit is marked 350m E and old sand quarries are marked 600m W. By 1979 a tower has been constructed on the site and the M5 is located 20m W.	Non aquifer		N	Lox Yeo River 300m W	Old sand quarries 600m W	N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5	LOW			
CG081	338087.59	156330.12	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1904 a gravel pit is marked 350m E and old sand quarries are marked 600m W. By 1979 a tower has been constructed on the site and the M5 is located 20m W.	Non aquifer		N	Lox Yeo River 400m W	Old sand quarries 600m W	N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5. Box in middle of tower legs	LOW			
CG082	338180.83	156569.88	N	Head Deposits	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 100m and a quarry marked 400m E. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	Y	Adjacent to Lox Yeo River	Disused quarry 400m E	N	Grass field	5	N	N	N	N	N	N	N	Y	sloping gently towards M5	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG083	338371.37	156704.49	N	Head Deposits	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 200m. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	Y	Lox Yeo River 180m NW		N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG084	338589.73	156857.56	N	Head Deposits	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 200m. By 1962 a tower has been constructed on the site.	Minor	Intermediate 1	N	Lox Yeo River 180m NW		N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5	LOW			
CG085	338799.17	157036.22	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 200m. By 1962 a tower has been constructed on the site.	Minor	High 1	N	Lox Yeo River 300m NW		N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG086	339033.49	157203.46	N	Higher Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 200m. By 1962 a tower has been constructed on the site.	Minor	High 1	N	Lox Yeo River 400m NW		N	Grass field	5	N	N	N	N	N	N	N	N	sloping gently towards M5	MEDIUM	WS, DPT, TP	C, GW, CD, SG	

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CG087	339218.08	157310.92	N	Boundary between higher estuarine alluvium and none recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 200m. By 1962 a tower has been constructed on the site.	Minor	High 1	N	Lox Yeo River 400m NW		N	Crop field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG088	339402.81	157430.40	N	Higher Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Lox Yeo River within 200m. By 1962 a tower has been constructed on the site.	Non aquifer		N	Lox Yeo River 200m NW		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG089	339622.82	157604.63	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Minor	High 1	N	Lox Yeo River 200m NW		N	Grass field	-	-	-	-	-	-	-	-	N	No direct visual access	LOW			
CG090	339835.28	157802.86	N	Higher Estuarine Alluvium	Mercia Mudstone Group[3]	Made Ground to 2.5m. Higher Estuarine Alluvium to 6.5m. Mercia Mudstone Group to 10m[23]	From 1884 the site is located in open fields with the Lox Yeo River 40m NW and Max Farm 250m SE. By 1961 a tower has been constructed on the site and a sewage plant is located on the River.	Minor	High 1	N	Lox Yeo River 150m N		N	Field behind water works	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG091	340053.01	157928.09	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields adjacent to the Lox Yeo River. By 1962 a tower has been constructed on the site.	Non aquifer		Y	Lox Yeo River 100m SW		N	Cattle grazing field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG092	340260.78	158132.18	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields 10m from a stream/drain. By 1961 a tower has been constructed on the site.	Minor	High 1	N	Tributary of Lox Yeo River 450m S		N	Cattle grazing field	0	N	N	N	N	N	N	N	N	Leg C in a drain/ditch, chimney exposed	MEDIUM	WS, DPT, TP	GW, SG, CD	
CG093	340538.73	158266.84	N	Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields 10m from a stream/drain. By 1961 a tower has been constructed on the site.	Minor	High 1	N			N	Cattle grazing field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG094	340741.40	158418.85	N	Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields 10m from a stream. By 1961 a tower has been constructed on the site.	Minor	High 1	N	Tributary of Lox Yeo River 450m SE		N	Grass field	5	N	N	N	N	N	N	N	N	Slopes slightly to the S	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG095	340891.40	158566.59	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with the site of a Roman road ~40m NE.. By 1961 a tower has been constructed on the site.	Non aquifer		N			N	Cattle grazing field	0	N	N	N	N	N	N	N	N		LOW			
CG096	341105.83	158737.94	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site.	Non aquifer		N			N	Crop field	5	N	N	N	N	N	N	N	N		LOW			
CG097	341314.30	158900.47	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with the Great Western Railway Cheddar Valley Branch ~250m E and Towerhead Brook ~150m E. By 1961 a tower has been constructed on the site. By 1966 the railway is labelled as dismantled.	Minor	High 3	N	Towerhead Brook 250m NE		N	Crop field	5	N	N	N	N	N	N	N	Y		LOW			
CG098	341347.36	158939.90	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with a quarry 150m N and the Great Western Railway Cheddar Valley Branch and Towerhead Brook ~150m E. By 1961 a tower has been constructed on the site. By 1966 the railway is labelled as dismantled.	Non aquifer		N	Towerhead Brook 200m E	Disused quarry 150m N	N	Crop field	10	N	N	N	N	N	N	N	N		LOW			

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CG099	341352.62	159179.84	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with general quarrying ~100m S and the Great Western Railway Cheddar Valley Branch and Towerhead Brook ~150m E. By 1961 a tower has been constructed on the site. By 1966 the railway is labelled as dismantled.	Non aquifer		N	Towerhead Brook 150m E	General historic quarry ~100m S	N	Grass field	10	N	N	N	N	N	N	N	N	No direct visual access	LOW			
CG100	341312.54	159396.72	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with the Great Western Railway Cheddar Valley Branch ~250m E and Towerhead Brook ~100m E. By 1961 a tower has been constructed on the site. By 1966 the railway is labelled as dismantled.	Non aquifer		N	Towerhead Brook 150m E		N	Grass field	10	N	N	N	N	N	N	N	N	No direct visual access	LOW			
CG101	341270.69	159671.34	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields adjacent to Towerhead Brook. By 1961 a tower has been constructed on the site. By 1981 a haulage depot is labelled ~75m S.	Non aquifer		N	Adjacent to Towerhead Brook		N	Grass field	0	N	N	N	N	Y	N	N	N	Next to stream, legs B and C possibly in stream	MEDIUM	WS, DPT, TP	C, GW	Restricted by Brook
CG102	341208.53	160003.35	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1961 a tower has been constructed on the site. (Note: different route after this tower).	Non aquifer		N	Towerhead Brook 550m S		N	Grass field	0	N	N	N	N	N	N	N	Y	joins another line	LOW			
CG103	341284.35	160302.65	N	Head Deposits	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Minor	Low	N			N	Grass field	0	N	N	N	N	N	N	N	N		LOW			
CG104	341299.70	160583.95	N	Head Deposits	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Minor	Low	N			N	Grass field	0	N	N	N	N	N	N	N	N		LOW			
CG105	341346.36	160874.01	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Towerhead Brook 200m W		N	Grass field	0	N	N	N	N	Y	N	N	N	bushes in the centre of tower	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG106	341420.27	161221.37	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Towerhead Brook 300m SW		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG107	341491.57	161559.75	N	None recorded	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Sandmead Rhyne ~250m E. By 1981 a tower has been constructed on the site.	Non aquifer		Y	One tributary to Oldbridge River 200m W and one 200m E		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG108	341572.45	161896.91	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields with Sandmead Rhyne ~100m E. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Tributary to Oldbridge River 100m N		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG109	341578.56	162108.71	N	Estuarine Alluvium	Mercia Mudstone Group[3]	Estuarine Alluvium to 7.85m[24]	From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Oldbridge River		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG110	341633.58	162346.74	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site with 1 overhead line running N to tower CG111 and one line running off to the W.	Non aquifer		Y	Adjacent to Oldbridge River		N	Grass field	0	N	N	N	N	Y	N	N	Y	joins another line	MEDIUM	WS, DPT, TP	C, GW, CD, SG	

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CG111	341670.44	162666.72	N	Estuarine Alluvium	Mercia Mudstone Group[3]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Oldbridge River		N	Grass field	0	N	N	N	N	N	N	N	N	Close to drains and river	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG112	341688.10	162951.00	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Oldbridge River		N	Grass field	0	N	N	N	N	Y	N	N	N	Close to drains and river	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG113	341676.43	163282.22	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Oldbridge River 100m W		N	Grass field	0	N	N	N	N	Y	N	N	N	Close to drains. Bushes and trees	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG114	341690.47	163609.02	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Oldbridge River 200m W		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG115	341706.52	163875.08	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Tributary to Oldbridge River 200m W		N	Cattle grazing field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG116	341675.96	164130.33	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Congresbury Yeo 300m NW		N	Cattle grazing field?	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG117	341698.55	164432.80	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Congresbury Yeo 100m NW		N	Grass field	-	-	-	-	-	-	-	-	N	Close to farm. No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG118	341710.62	164697.13	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields directly adjacent to the River Yeo. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to Congresbury Yeo		N	Cattle grazing field	0	N	N	N	N	Y	N	N	Y	Adjacent to bottom of embankment (river)	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by river
CG119	341638.48	164992.33	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields with the River Yeo ~75m SW and Binhay Rhyne ~100m SE. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Congresbury Yeo 150m S		N	Cattle grazing field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG120	341570.46	165245.01	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Congresbury Yeo 450m SW		N	Cattle grazing field??	-	-	-	-	-	-	-	-	N	Unable to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG121	341468.63	165559.02	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]	Estuarine Alluvium to 13.1m[25]	From 1884 the site is located in open fields adjacent to the Great Western Railway Bristol to Exeter line. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a tributary to Congresbury Yeo		N	Sheep grazing field	0	N	N	N	N	Y	N	N	N	Lots of drains and ditches. 10-20m from railway embankment	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG122	341394.57	165896.62	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields with a Gas works 450m E and Wemberham Lane Rhyne 50m S. By 1981 a tower has been constructed on the site.	Non aquifer		Y	Tributary to Little River 100m E, tributary to Congresbury Yeo 100m SE		N	Sheep grazing field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG123	341315.76	166207.26	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields, 200m S of Little River. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a tributary to Little River with Little River 100m N		N	Cattle grazing field	-	-	-	-	-	-	-	-	N	Lots of drains and ditches. No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG124	341192.76	166479.93	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields, 300m N of Little River. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Little River 150m S and E		N	Cattle grazing field	5	N	N	N	N	Y	N	N	N	Lots of drains and ditches	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG125	341130.71	166746.44	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site. By 2006 a new lake/reservoir is labelled 400m W.	Non aquifer		Y	Little River 300m E		N	Cattle grazing field	0	N	N	N	N	Y	N	N	N	Lots of drains and ditches	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG126	341079.09	167023.41	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]	Estuarine Alluvium to 6.89m. Mercia Mudstone Group to 16.2m26	From 1884 the site is located in open fields adjacent to Lampley Road. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Tributary to River Kenn 100m NW, Little River 400m E		N	Cattle grazing field	0	N	N	N	N	Y	N	N	N	Behind hedges	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG127	340951.21	167364.20	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to Rust Rhyne. By 1975 the M5 has been constructed 300m W. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to a tributary to River Kenn		N	Grass field	0	N	N	N	N	Y	N	N	Y	Close to stream	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG128	341177.06	167562.00	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1938 the site is directly adjacent to a railway line. By 1975 the railway line is derelict. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Tributary to River Kenn 300m W		N	Grass field	0	N	N	N	N	Y	N	N	N	Behind a hedge, difficult to see	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG129	341412.26	167726.89	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to tributary to River Kenn		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG130	341665.51	167878.02	N	Higher Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to tributary to River Kenn		N	Cut maize	0	N	N	N	N	Y	N	N	N	close to stream	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG131	341944.20	168046.88	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Tributary to River Kenn 200m NW		N	Crops/grazing	-	-	-	-	-	-	-	-	N	no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG132	342194.75	168202.07	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to Mankins Rhyne. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to tributary to River Kenn		N	Crops/grazing	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG133	342418.50	168381.04	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to Meadmoor Rhyne. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to tributary to River Kenn		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by stream
CG134	342657.34	168524.70	N	Estuarine Alluvium	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to a Rhyne. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to land drains		N	Grass field	-	-	-	-	-	-	-	-	N	no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG135	342952.50	168717.35	N	Peat	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to a Rhyne. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to land drains		N	Grass field	-	-	-	-	-	Y	-	-	N	no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG136	343183.67	168880.47	N	Peat	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to a Rhyne. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to land drains		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches

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CG137	343390.58	169013.74	N	Peat	Mercia Mudstone Group (Keuper Marl)[4]	Peat, clays and gravels to 9.44m. Mercia Mudstone Group to 11.58m[27]	From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to land drains		N	Grass field	0	N	N	N	N	Y	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG138	343638.60	169174.92	N	Peat	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site.	Non aquifer		Y	River Kenn 200m W		N	Grass field	-	-	-	-	-	-	-	-	N	no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG139	343923.16	169346.61	N	Peat	Mercia Mudstone Group (Keuper Marl)[4]		From 1884 the site is located in open fields adjacent to the River Kenn. By 1982 a tower has been constructed on the site.	Non aquifer		Y	Adjacent to River Kenn		N	Grass field	0	N	N	N	N	Y	N	N	N	adjacent to river	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by river
CG140	344218.36	169527.20	N	Peat	Mercia Mudstone Group[4]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site. By 1992 an abattoir is labelled 200m SE.	Minor	Intermediate 2 (low permeability drift)	Y	Adjacent to a tributary to River Kenn		N	Sheep grazing field	0	N	N	N	N	Y	N	N	N	Adjacent to stream. Banks generally stable, eroded in parts	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by stream
CG141	344499.69	169680.50	N	Peat	Mercia Mudstone Group[4]		From 1884 the site is located in open fields adjacent to a Rhyne. By 1982 a tower has been constructed on the site.	Minor	Intermediate 2 (low permeability drift)	Y	Adjacent to a tributary to River Kenn		N	Sheep grazing field	0	N	N	N	N	Y	N	N	N	Adjacent to stream. Banks generally stable, eroded in parts	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by stream
CG142	344707.80	169860.62	N	Peat	Mercia Mudstone Group[4]		From 1884 the site is located in open fields adjacent to a Rhyne. By 1982 a tower has been constructed on the site.	Minor	High 3	Y	Adjacent to a tributary to River Kenn		N	Sheep grazing field	0	N	N	N	N	Y	N	N	N	Adjacent to stream. Banks generally stable, eroded in parts	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by stream
CG143	344982.73	170023.02	N	Boundary between Peat and None recorded	Boundary between Mercia Mudstone Group and Pennant Sandstone Group (Downend Formation)[5]		From 1884 the site is located in open fields adjacent to Boundary Rhyne. By 1981 a tower has been constructed on the site.	Minor	Intermediate 2	Y	Adjacent to a tributary to River Kenn		Y	Sheep grazing field	0	N	N	N	N	Y	N	N	N	Adjacent to stream. Banks generally stable, eroded in parts	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by stream
CG144	345262.20	170215.52	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]		From 1884 the site is located in open fields adjacent to Boundary Rhyne. By 1981 a tower has been constructed on the site.	Minor	High 3	Y	Adjacent to a tributary to River Kenn	Abandoned mine shaft 470m east. Coal seam approximately 224m bgl.	Y	Sheep grazing field	0	N	N	N	N	Y	N	N	N	10-15m to stream. Banks generally stable, eroded in parts	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG, CM	Restricted by stream
CG145	345553.74	170427.04	N	Peat	Mercia Mudstone Group[5]		From 1884 the site is located in open fields adjacent to Boundary Rhyne. On the 1904 map West End Colliery (disused) is labelled 300m SE. By 1981 a tower has been constructed on the site.	Minor	High 3	Y	Adjacent to a tributary to River Kenn	Abandoned mine shaft 210m south-east. Coal seam approximately 224m bgl.	N	Sheep grazing field	0	N	N	N	N	Y	N	N	N	5m to stream. Banks generally stable, eroded in parts	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, CM	Restricted by stream
CG146	345783.01	170577.06	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]		From 1884 the site is located in open fields. By 1982 a tower has been constructed on the site. By 1999 the Rhyne View housing development has been constructed around the tower.	Minor	High 3	N	Adjacent to a tributary to River Kenn	Abandoned mine shaft 400m east. Coal seam approximately 224m bgl.	N	Short grass in housing estate	0	N	N	N	N	N	N	N	Y	dip in middle. Tributary culverted??	HIGH	WS, DPT, TP, CP, RO	CM	Restricted by housing
CG0147	345922.19	170813.47	N	None recorded	Lower Coal Measures[5]		From 1884 the site is located in open fields adjacent to Patch Brook. By 1961 an overhead line has been constructed 20m SE of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	High 3	N	Tributary to River Kenn 150m NW	OHL crosses White's Top Coal seam at surface south west of the tower.	N	Long grass field	0	N	N	N	N	N	N	N	N		HIGH	WS, DPT, TP, CP, RO	CM	
CG148	346059.97	171029.65	N	None recorded	Lower Coal Measures (on boundary with a sandstone band)[5]		From 1884 the site is located in open fields adjacent to Patch Brook. By 1961 an overhead line has been constructed 20m SE of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line. By 1999 a cricket pavilion is labelled adjacent to the tower.	Minor	High 3	N	Tributary to River Kenn 150m NW	OHL crosses Golden Valley Top and Under Coal seams at surface between towers 147 and 148.	N	Playing field	0	-	-	-	-	-	-	-	N		HIGH	WS, DPT, TP, CP, RO	CM	

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CG149	346182.93	171213.52	N	None recorded	Lower Coal Measures[5]	Clay with sandstone and shale bands to 30m. Coal to 30.75m. Clay to 33.5m[28]	From 1884 the site is located in open fields adjacent to Patch Brook. By 1961 an overhead line has been constructed 20m SE of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	High 3	N	Adjacent to a tributary to River Kenn		N	Cattle grazing field	0	N	N	N	N	N	N	N	N	No direct visual access	HIGH	WS, DPT, TP, CP, RO	CM	Restricted by stream
CG150	346305.65	171481.14	N	None recorded	Lower Coal Measures[5]		From 1884 the site is located in open fields. By 1961 an overhead line has been constructed 20m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	High 3	Y	Tributary to River Kenn 100m S		N	Cattle grazing field	0	N	N	N	N	N	N	N	Y	No direct visual access. Behind a hedge	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, CM	
CG151	346339.15	171784.06	N	None recorded	Pembroke Limestone Group (Clifton Down Mudstone Formation)[5]	Coal Measures to 11.58m[29]	From 1884 the site is located in open fields with an old quarry 300m SE. By 1961 an overhead line has been constructed 50m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Major	Intermediate 1	N	Land Yeo 200m S	Old quarry 300m SE	N	Cattle grazing field	5	N	N	N	N	N	N	N	N	top of slight crest, sloping down towards CG150	LOW			
CG152	346328.70	172157.51	N	None recorded	Mercia Mudstone Group[5]		From 1884 the site is located in open fields with an old quarry 300m SE. By 1961 an overhead line has been constructed 50m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	Intermediate 1	N		Old quarry 300m SE	N	Cut maize	5	N	N	N	N	N	N	N	Y	sloping slightly up towards CG153	LOW			
CG153	346563.81	172237.89	N	None recorded	Mercia Mudstone Group[5]		From 1884 the site is located in open fields with a lime kiln adjacent. By 1961 an overhead line has been constructed 50m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line and a sewage works is labelled 300m SE.	Minor	Intermediate 1	N			N	Cattle grazing field	0	N	N	N	N	N	N	N	N		LOW			
CG154	346795.81	172373.48	N	None recorded	Mercia Mudstone Group[5]		From 1884 the site is located in open fields. By 1961 an overhead line has been constructed 20m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	Intermediate 1	N			N	Cattle grazing field	0	-	-	-	-	-	-	-	N		LOW			
CG155	347078.40	172537.24	N	None recorded	Mercia Mudstone Group[5]		From 1884 the site is located in open fields. By 1961 an overhead line has been constructed 20m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	Intermediate 1	N			N	Cattle grazing field	5	N	N	N	N	N	N	N	N	sloping up towards CG156	LOW			
CG156	347309.69	172653.61	N	None recorded	Mercia Mudstone Group[5]		From 1884 the site is located in open fields with an old limekiln labelled 100m SE. By 1961 an overhead line has been constructed 20m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	Intermediate 1	N			Y	Cut maize	5	N	N	N	N	N	N	N	N	sloping up towards CG157	HIGH	WS, DPT, TP, CP, RO	C, MG	
CG157	347647.63	172804.38	N	None recorded	Mercia Mudstone Marginal Facies[5]		From 1884 the site is located in open fields. By 1961 an overhead line has been constructed 20m E of the site. By 1981 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Major	High 1	N		Old quarry 200m E	N	Grass field	10	N	N	N	N	N	N	N	Y	sloping up towards CG158. Next to small copse of trees	MEDIUM	WS, DPT, TP	C, SS	
CG158	347816.70	173043.19	N	None recorded	Pembroke Limestone Group (Black Rock Limestone Sub-group)[5]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Major	High 1	N		Old quarry 200m E	N	Grass field	5	-	-	-	-	-	-	-	N	No direct visual access. Top of hill	LOW			
CG159	347984.59	173234.98	N	None recorded	Pembroke Limestone Group (Black Rock Limestone Sub-group)[5]		From 1884 the site is located in open fields. Old Celtic foundations are marked beneath the site in 1932. By 1981 a tower has been constructed on the site.	Major	High 1	N		Old quarry 200m E	N	Grazing land	5	N	N	N	N	N	N	N	N	Sloping slightly down to NW	LOW			

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CG160	348167.99	173546.51	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Minor	High 3	N			N	Crop field	5	N	N	N	N	N	N	N	Y	Sloping up hill to M5	LOW			
CG161	348140.41	173682.91	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]		From 1884 the site is located in open fields. By 1981 a tower has been constructed on the site.	Minor	High 3	N			N	Crop field	5	N	N	N	N	N	N	N	N	Sloping down hill to M5	LOW			
CG162	348080.96	173895.83	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]		From 1884 the site is located in open fields. By 1961 an overhead line has been constructed adjacent to the site. By 2006 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	High 3	N			N	Crop field	10	N	N	N	N	N	N	N	N	Sloping down hill to M5	LOW			
CG163	348036.99	174161.52	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]	Pennant Sandstone to 17.54m[30]	From 1884 the site is located in open fields. By 1961 an overhead line has been constructed adjacent to the site. The M5 motorway is present adjacent to the site in mapping from 1981. By 2006 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Major	Intermediate 1	N	Land drain 300m NW		N	Grass field	0	N	N	N	N	N	N	N	N	No direct visual access. Adjacent to M5	LOW			
CG164	348027.83	174305.41	N	None recorded	Pennant Sandstone Group (Downend Formation)[5]	Dolomitic Conglomerate to 12.2m[31]	From 1884 the site is located in open fields, with a spring located 100m north. In 1904 a quarry is noted adjacent to the site. By 1961 an overhead line has been constructed adjacent to the site. The M5 motorway is present adjacent to the site in mapping from 1981. By 2006 a tower has been constructed on the site with the overhead line runs parallel to the 1961 line.	Minor	Intermediate 1	N	Land drain 200m NW	Old quarry adjacent	N	Grass field	5	-	-	-	-	-	-	-	N	No direct visual access. Adjacent to M5. Sloping away from M5	MEDIUM	WS, DPT, TP	C, MG	
CG165	347950.32	174747.82	N	Tidal Flat Deposits	Mercia Mudstone Group[5]		From 1884 the site is located in open fields. By 1961 a tower has been constructed adjacent to the site, and by 2006 the existing tower is constructed.	Minor	Intermediate 1	Y	Land drain 350m W		N	Cattle grazing field	0	-	-	-	-	-	-	-	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG166	347915.43	174990.40	N	Tidal Flat Deposits	Mercia Mudstone Group[5]		From 1884 the site is located in open fields. By 1961 a tower has been constructed adjacent to the site, and by 2006 the existing tower is constructed.	Non aquifer		Y	Adjacent to land drains		N	Grass field	0	-	-	-	-	-	-	-	N	possibly crops	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG167	347870.02	175241.99	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. By 1961 a tower has been constructed adjacent to the site, and by 2006 the existing tower is constructed.	Non aquifer		Y	Adjacent to land drains		N	Crop field	0	-	-	-	-	-	-	-	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG168	347840.66	175527.88	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields, with a rhine apparent adjacent to the site from 1904. By 1961 a tower has been constructed adjacent to the site. Mapping from 1981 shows the Portway Hundred (Road) to have been constructed adjacent to the site and by 2006 the existing tower is constructed.	Non aquifer		Y	Adjacent to land drains		N	Short grass field	0	-	-	-	-	-	-	-	Y		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches
CG169	348033.50	175757.90	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields, with a rhine 10m northeast of the site. Mapping from 2006 shows the existing tower.	Non aquifer		Y	Land drains 300m W and E		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG170	348244.75	176009.98	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields, with a railway line 100m north of the site. Mapping from 1970 shows another OHL tower adjacent to the site, and mapping from 2006 shows the existing tower.	Non aquifer		Y	Adjacent to a land drain		N	Grass field	0	N	N	N	N	N	N	N	Y		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains and ditches

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG171	348254.08	176169.25	Y	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows another OHL tower adjacent to the site, and mapping from 2006 shows the existing tower.	Non aquifer		Y	Adjacent to a land drain		N	Landscaped park	0	N	N	N	N	N	N	Y	N	Close to railway cutting and drain	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains and ditches
CG172	348248.16	176446.78	Y	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows another OHL tower adjacent to the site, with a power station 1km west and a transformer station 500m northwest. By 2006 the existing tower is identified feeding to a substation.	Non aquifer		Y	Land drain 300m N		N	Landscaped park	0	N	N	N	N	N	Y	N	N	Adjacent to ponds with swans	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains and ditches
CG173	348245.91	176750.64	Y	Tidal Flat Deposits	Mercia Mudstone Group[38]	Estuarine Alluvium to 17m. Mercia Mudstone Group to 35.5m[32]	From 1884 the site is located in open fields. Mapping from 1970 shows another OHL tower adjacent to the site, with a power station 1km west and a transformer station 500m northwest. By 2006 the existing tower is identified feeding to a substation.	Non aquifer		Y	Adjacent to land drains and lakes or reservoirs		N	Grass field	0	N	N	N	N	N	Y	N	N	Adjacent to ponds with swans. No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG174	348233.16	177073.51	Y	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1961 shows another OHL tower adjacent to the site, and mapping from 2006 shows the existing tower and substation.	Non aquifer		Y	Severn Estuary 200m N, adjacent to lakes or reservoirs		Y	Substation?	0	-	-	-	-	-	-	-	Y	No access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG175	348334.09	177010.54	Y	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1961 shows another OHL tower adjacent to the site, and mapping from 2006 shows the existing tower and substation.	Non aquifer		Y	Severn Estuary 200m N, adjacent to lakes or reservoirs		Y	Substation?	-	-	-	-	-	-	-	-	N	No access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG176	348414.64	177011.94	Y	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1961 shows the OHL tower at the site.	Non aquifer		Y	Severn Estuary 300m N, adjacent to lakes or reservoirs		Y	Substation?	-	-	-	-	-	-	-	-	N	No access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG177	348414.64	177011.94	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site.	Non aquifer		Y	Severn Estuary 350m N, adjacent to lakes or reservoirs and land drains		Y	Substation?	-	-	-	-	-	-	-	-	N	No access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG178	348595.40	176940.49	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1961 shows the OHL tower at the site.	Non aquifer		Y	Severn Estuary 450m N, adjacent to lakes or reservoirs and land drains		N	Substation?	-	-	-	-	-	-	-	-	N	No access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG179	348595.40	176940.49	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site.	Non aquifer		Y	Severn Estuary 500m N, adjacent to lakes or reservoirs and land drains		N	Grass field??	-	-	-	-	-	-	-	-	N	No access, too remote	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG180	348915.63	176887.33	N	Head Deposits	Mercia Mudstone Group[38]	Head Deposits to 0.9m. Mercia Mudstone Group to 25m[33]	From 1884 the site is located in open fields. Mapping from 1961 shows the OHL tower at the site. A sewage works is located 200m north in mapping from 1999 onwards.	Minor	Intermediate 1	Y	Land drains 300m NW		N	Grass field??	-	-	-	-	-	-	-	-	N	No access, too remote	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG181	348915.63	176887.33	N	Head Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site.	Minor	Intermediate 1	Y	Land drains 300m NW		N	Grass field??	-	-	-	-	-	-	-	-	N	No access, too remote	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG182	349136.51	176806.15	N	First River Terrace Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1961 shows the OHL tower at the site. A depot is built adjacent to the north in mapping from 1999 onwards.	Minor	Intermediate 1	N	Lake or reservoir 350m N		Y	Grass field??	-	-	-	-	-	-	-	-	N	No access, too remote	HIGH	WS, DPT, TP, CP, RO	C, MG, CD	Restricted by land drains

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CG183	349136.51	176806.15	N	First River Terrace Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site. A depot is built adjacent to the south in mapping from 1999 onwards.	Minor	Intermediate 1	N	Lake or reservoir 400m N		Y	Grass field??	-	-	-	-	-	-	-	-	N	No access, too remote	HIGH	WS, DPT, TP, CP, RO	C, MG, CD	Restricted by land drains
CG184	349434.88	176766.70	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1920 shows a drove stream adjacent to the site. From 1970 the OHL tower is shown at the site.	Non aquifer		Y	Adjacent to land drain		Y	Industrial estate	-	-	-	-	-	-	-	-	N	Private, difficult to access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG185	349434.88	176766.70	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1920 shows a drove stream adjacent to the site. From 1982 the OHL tower is shown at the site, whilst mapping from 1992 indicates a warehouse adjacent to the south.	Non aquifer		Y	Adjacent to land drain		Y	Industrial estate	-	-	-	-	-	-	-	-	N	Private, difficult to access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG186	349739.03	176708.52	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site, whilst mapping from 1982 indicates the Royal Portbury Dock has been built 700m north.	Non aquifer		Y	Adjacent to land drain		N	Industrial estate	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG187	349739.03	176708.52	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1982 shows the OHL tower at the site, whilst mapping from 1992 shows a warehouse adjacent to the south.	Non aquifer		Y	Adjacent to land drain		N	Industrial estate/docks	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG188	349975.27	176689.73	N	Tidal Flat Deposits	Mercia Mudstone Group[38]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site, whilst mapping from 1982 indicates the Royal Portbury Dock has been built 750m north.	Non aquifer		Y			N	Industrial estate/docks	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG189	349975.27	176689.73	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1982 shows the OHL tower at the site, whilst mapping from 1992 shows a warehouse adjacent to the south.	Non aquifer		Y	Adjacent to land drain		N	Industrial estate/docks	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG190	350266.19	176633.05	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site.	Non aquifer		Y			N	Industrial estate/docks	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG191	350336.89	176599.89	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1982 shows the OHL tower at the site.	Non aquifer		Y			N	Industrial estate/docks	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG192	350497.78	176629.46	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site. A coal stockyard is shown adjacent to the north of the site from 1999.	Non aquifer		Y			N	Industrial estate/docks	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG193	350627.23	176532.56	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1982 shows the OHL tower at the site.	Minor	Intermediate 1	Y	Land drains 400m E		N	Industrial estate/docks. Edge of car park, possibly hardstanding	-	-	-	-	-	-	-	-	N	Private, difficult to access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG194	350736.35	176608.23	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site. A coal stockyard is shown adjacent to the north of the site from 1999.	Minor	Intermediate 1	Y	Land drains 450m E		N	Rough grass next to industrial units	-	-	-	-	-	-	-	-	N	Private, difficult to access. Adjacent to earth bund	MEDIUM	WS, DPT, TP	C, GW, CD, SG	

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG195	350930.42	176471.35	N	None recorded	Mercia Mudstone Group[39]		From 1884 the site is located in open fields, with the Bristol and Portishead Railway located 150m south. Mapping from 1982 shows the OHL tower at the site.	Minor	Intermediate 1	Y	Adjacent to land drains		N	Unknown, adjacent to M5/docks	-	-	-	-	-	-	-	-	Y	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG196	350964.25	176581.67	N	None recorded	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1955 shows an OHL tower adjacent to the site and from 1970 shows the existing OHL tower at the site. A coal stockyard is shown adjacent to the north of the site from 1999.	Minor	Intermediate 1	Y	Adjacent to land drains		N	Unknown, adjacent to M5/docks	-	-	-	-	-	-	-	-	Y	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG197	351258.68	176497.99	N	None recorded	Mercia Mudstone Group[39]		From 1884 the site is located in open fields, with the Bristol and Portishead Railway located 150m south. Mapping from 1982 shows the OHL tower at the site.	Minor	Intermediate 1	Y	Adjacent to land drains		N	Unknown, adjacent to M5/docks	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG198	351250.98	176600.05	N	None recorded	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1970 shows the OHL tower at the site. A coal stockyard is shown adjacent to the north of the site from 1999.	Minor	Intermediate 1	Y	Adjacent to land drains		N	Unknown, adjacent to M5/docks	-	-	-	-	-	-	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG199	351475.24	176599.01	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1982 shows the OHL tower at the site with the M5 motorway present 40m southeast.	Non aquifer		Y	River Avon 400 NE		N	Unknown, adjacent to M5/docks	-	-	-	-	-	-	-	-	Y	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD	
CG200	351471.23	176658.77	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields. Mapping from 1955 shows an OHL adjacent to the site, whilst mapping from 1970 shows the existing OHL tower at the site. Mapping from 1982 shows the M5 motorway present 80m southeast, and from 1999 the coal stockyard is present adjacent to the north.	Non aquifer		Y	River Avon 400 NE		N	Unknown, adjacent to M5/docks	0	N	N	N	N	N	N	N	Y		MEDIUM	WS, DPT, TP	C, GW, CD	
CG201	351632.94	176944.38	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields close to the Old Sea Bank. Mapping from 1982 shows the OHL tower at the site with the M5 motorway present 40m southeast.	Non aquifer		Y	Adjacent to River Avon		N	Bank of River	-	-	-	-	-	Y	-	-	N	No direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD	Resticted by river
CG202	351632.94	176944.38	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1884 the site is located in open fields close to the Old Sea Bank. Mapping from 1955 shows an adjacent OHL tower, whilst mapping from 1970 shows the OHL tower at the site. The M5 motorway is present 80m southeast from 1982.	Non aquifer		Y	Adjacent to River Avon		N	Bank of River	-	-	-	-	-	Y	-	-	N	No direct visual access. Really tall tower	MEDIUM	WS, DPT, TP	C, GW, CD	Resticted by river
CG203	351776.77	177233.83	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the Crown Brick Works and Clay Pit to be extant on site. From 1982 the existing OHL tower is present with the M5 motorway present 40m southeast.	Non aquifer		Y	Adjacent to River Avon		N	Bank of River	0	N	N	N	N	Y	N	N	N	Really tall tower	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Resticted by river
CG204	351776.77	177233.83	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		From 1887 a Clay Pit and Bottle Works are evident at the site. Mapping from 1904 shows the Bottle Works to have become an Ironworks. From 1920 residential properties comprising Avonmouth Terrace is evident on site, whilst a Petroleum Storage Works is adjacent. The Petroleum Works is removed by 1938, with Avonmouth Terrace removed by 1955. Mapping from 1970 shows the current OHL tower on site, and by 1982 the tower is adjacent to a warehouse, with the M5 motorway 80m southeast.	Non aquifer		Y	Adjacent to River Avon		N	Bank of River	-	-	-	-	-	Y	-	-	N	No direct visual access. Really tall tower	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Resticted by river

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG205	351937.15	177448.51	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields adjacent to a railway line. From 1904 until 1938 a Petroleum Storage Works is present 250m north. Housing is shown adjacent to the site in mapping from 1955, with a warehouse and the M5 motorway is present from 1982 onwards. The existing OHL tower is present from 1970.	Non aquifer		Y	River Avon 300m SE		N	Tarmac car park of Gilcrest Group	-	-	-	-	-	-	-	-	Y	Limited access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG206	351936.77	177561.61	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields adjacent to a railway line. From 1904 until 1938 a Petroleum Storage Works is present 250m north. Housing is shown adjacent to the site in mapping from 1955, with a warehouse and the M5 motorway is present from 1982 onwards. The existing OHL tower is present from 1970.	Non aquifer		Y	River Avon 300m SE		N	Builders supplies yard possibly hard standing	-	-	-	-	-	-	-	-	Y	Limited access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG207	352275.95	177576.32	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. Housing is shown adjacent to the site in mapping from 1955, and the M5 motorway is present from 1982 onwards.	Non aquifer		Y			N	Back garden	-	-	-	-	-	-	-	-	Y	No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG208	352106.98	177737.61	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1804 shows the site to comprise open fields. Housing is shown adjacent to the site in mapping from 1920. The current OHL is present in mapping from 1970, and more housing and a roundabout are present from 1982 onwards.	Non aquifer		Y			N	Overgrown grass, brambles in housing estate	0	N	N	N	N	N	N	N	Y	Limited access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG209	352269.68	177943.49	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]	Tidal Flat Deposits from 0.0 to between 4.9-15.9m. Mercia Mudstone to between 14.3-39m[34]	Mapping from 1887 shows the site to comprise open fields. The Shirehampton Farm is present in mapping from 1904. The OHL is present from 1955, and a slip road for the M5 motorway is present in mapping from 1970. From 1982 a warehouse is present adjacent to the site on Atlantic Road.	Non aquifer		Y			N	Grass area within trading estate	0	N	N	N	N	N	N	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG209A	352447.97	177754.09	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1886 shows the site to be situated between an orchard and a road. By 1982 the tower is shown and is situated between Avonmouth Road and a works with the M5 motorway present from 1982 onwards.	Non aquifer		Y			N	Rough grass next to duel carriageway with M5 to the side (above)	0	N	N	N	N	N	N	N	N	Limited access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG210	352599.45	178031.15	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. Allotments are present from 1955, with the M5 motorway is present in mapping from 1970 onwards.	Non aquifer		Y			N	Grass embankment of site of slip road	5-10	N	N	N	N	N	Y	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG211 (CG212 missed out during numbering)	352441.05	178142.29	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. A slip road for the M5 motorway is present adjacent to the site in mapping from 1982 onwards.	Non aquifer		Y			Y	Rear yard of Hovis (grass)	0	N	N	N	N	N	N	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG213	352762.68	178191.89	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. A new road layout is present adjacent to the site from 1970, with a slip road for the M5 motorway is present from 1982 onwards.	Non aquifer		Y			Y		-	-	-	-	-	-	-	-	N	No visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access
CG214	352738.09	178347.15	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The OHL tower is apparent in mapping from 1955. Mapping from 1982 shows an electricity transmission station to be built and connected to the OHL. A warehouse development is present 50m west.	Non aquifer		Y			Y	Front yard of cake factory (grass)	0	N	N	N	N	N	N	N	Y	Feeding down into transmission station	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Limited access

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG215	352829.60	178410.02	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields with Shirehampton Rhine 50m east. The OHL tower is apparent in mapping from 1955. Mapping from 1982 shows an electricity transmission station to be built and connected to the OHL. A warehouse development is present 100m west.	Non aquifer		Y			Y	Yard next to Transmission station	-	-	-	-	-	-	-	-	Y	Feeding down into transmission station. No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG216	352837.99	178513.59	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields with Shirehampton Rhine adjacent to the east. The OHL tower is apparent in mapping from 1955.	Non aquifer		Y	Adjacent to land drain		Y	Grass field, bushes in the middle	0	N	N	N	N	N	N	N	Y	Adjacent to a stream/drain	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG217	353031.97	178430.17	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The M5 motorway is shown in mapping from 1970 to be 50m southeast, with the OHL tower apparent in mapping from 1982 onwards. Mapping from 1992 shows a warehouse development to have been built around the tower.	Non aquifer		Y	Land drain 300m N		Y	Transport depot (granite chippings)	0	N	N	N	N	N	N	N	N	Concrete service covers in the centre of the tower	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by services
CG218	352951.61	178716.17	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The OHL tower is apparent in mapping from 1955. Mapping from 1982 shows a smelting works 300m northwest of the site.	Non aquifer		Y	Adjacent to land drain		Y	Grass field	0	N	N	N	N	N	N	N	Y		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG219	353234.19	178622.70	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The M5 motorway is shown in mapping from 1970 to be 50m southeast, with a significant road cutting adjacent to the tower location. The OHL tower is apparent in mapping from 1982 onwards. Mapping from 1992 onwards shows a warehouse development to have been built around the tower.	Non aquifer		Y	Land drain 250m N		Y	Grass area in Davies Turner yard	0	N	N	N	N	N	N	N	N	fencing around tower	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by fencing
CG220	353140.46	178942.52	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The OHL tower is apparent in mapping from 1955 together with a chemical and smelting works 750m northwest. The smelting works are seen to expand significantly around 1982..	Non aquifer		Y	Land drain 250m E		Y	Grass field, brambles round legs	0	N	N	N	N	Y	N	N	N	Ditches next to roads	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG221	353407.98	178849.53	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The M5 motorway is shown in mapping from 1970 to be 50m southeast. The OHL tower is apparent in mapping from 1982 onwards. Mapping from 2006 onwards shows a pumping station adjacent to the southwest.	Non aquifer		Y	Land drain 180m NE		Y	Long grass field	-	-	-	-	-	-	-	-	N	No direct visual access. Gypsy encampment	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG222	353333.68	179094.21	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The OHL tower is apparent in mapping from 1955 onwards.	Non aquifer		Y	Adjacent to land drain		Y	Long grass field	0	-	-	-	-	-	-	-	N	No direct access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG223	353434.69	179166.57	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The OHL tower is apparent in mapping from 1955 onwards. From 1982 a sewage works is placed adjacent to the northwest of the site.	Non aquifer		Y	Adjacent to land drain		Y	Long grass field	0	-	-	-	-	-	-	-	N	No direct access. Next to sewage works	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains

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CG224	353614.17	179062.17	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields with Mere Bank Rhyne and a Roman Road adjacent. The M5 motorway is shown in mapping from 1970 to be 100m southeast. The OHL tower is apparent in mapping from 1982 onwards. Mapping from 1999 onwards shows the M49 motorway adjacent to the site.	Non aquifer		Y	Adjacent to land drain		Y	Grass field next to embankment	0	-	-	-	-	-	-	-	N	No direct visual access.	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	Restricted by land drains
CG225	353478.61	179249.02	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The OHL tower is apparent in mapping from 1955 onwards. From 1982 a sewage works is placed adjacent to the northwest of the site.	Non aquifer		Y	Land drain 150m SW		Y	Long grass field	0	-	-	-	-	-	-	-	N	No direct access. Next to sewage works	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG226	353778.58	179237.94	Y	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The M5 motorway is shown in mapping from 1970 to be 200m southeast. The OHL tower is apparent in mapping from 1982 onwards. Mapping from 1999 onwards shows the M49 motorway adjacent to the site.	Non aquifer		Y			Y	Grass field next to embankment	0	N	N	N	N	N	Y	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG227	353693.65	179475.71	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields with Poplar Farm and Katherine Farm both within 200m. The OHL tower is apparent in mapping from 1955 onwards. From 1982 a sewage works is placed adjacent to the west of the site.	Non aquifer		Y	Lake or reservoir 300m NW		Y	Grass field	0	-	-	-	-	-	-	-	Y	No direct visual access.	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG228	353887.79	179419.56	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields. The M5 motorway is shown in mapping from 1970 to be 200m southeast. The OHL tower is apparent in mapping from 1982 onwards. Mapping from 1999 onwards shows the M49 motorway adjacent to the site.	Non aquifer		Y			N	Grass field	0	-	-	-	-	-	-	-	Y	No direct visual access.	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG229	353918.05	179710.77	N	Tidal Flat Deposits	Mercia Mudstone Group[39]	Tidal Flat Deposits to 12.4m. Mercia Mudstone Group to 33m[35]	Mapping from 1887 shows the site to comprise open fields with Salt Rhyne approximately 50m northwest. The OHL tower is apparent in mapping from 1955 onwards. From 1999 a bridge over the M49 is located adjacent to the northeast of the tower.	Non aquifer		Y	Lake or reservoir 300m W		N	Rear of industrial units, adjacent to railway embankment	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG230	354092.62	179701.40	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		Mapping from 1887 shows the site to comprise open fields adjacent to a rhyne. The M5 motorway is shown in mapping from 1970 to be 400m southeast. The OHL tower is apparent in mapping from 1982 onwards. Mapping from 1999 onwards shows a bridge over the M49 motorway adjacent to the southwest of the site.	Non aquifer		Y			N	Grass field	0	-	-	-	-	-	-	-	N	No direct visual access.	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG231	354079.00	179921.39	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1920 shows the Avonmouth and Filton railway adjacent to the northeast. The OHL tower is present in mapping from 1955. Mapping from 1999 shows the M49 motorway adjacent to the west.	Non aquifer		Y	Lake or reservoir 300m NE		N	Close to railway embankment	0	N	N	N	N	N	Y	N	Y		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG232	354095.49	179965.06	N	Tidal Flat Deposits	Mercia Mudstone Group[39]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1920 shows the Avonmouth and Filton railway adjacent to the northeast. The OHL tower is present in mapping from 1982.	Non aquifer		Y	Lake or reservoir 300m NE		N	Grass Field, Close to railway embankment	0	N	N	N	N	N	Y	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	

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CG233	354216.95	180076.40	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1920 shows the Avonmouth and Filton railway 40m southwest. The OHL tower is present in mapping from 1955. Mapping from 1999 shows the M49 motorway adjacent to the west.	Non aquifer		Y	Adjacent to land drain		N	Grass field, bushes in the middle	0	N	N	N	N	Y	N	N	N	Stream 5-10m	MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG234	354290.22	180161.93	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1982.	Non aquifer		Y	Adjacent to land drain		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	Restricted by land drains
CG235	354351.35	180408.71	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1938 shows an adjacent OHL running northeast. The OHL tower is present in mapping from 1955. Mapping from 1999 shows the M49 motorway 70m west.	Non aquifer		Y	Land drain 100m W		N	Grass field	0	N	N	N	N	N	N	N	N		MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG236	354425.15	180445.08	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1982.	Non aquifer		Y	Land drain 100m W		Y	Grass field	0	N	N	N	N	N	N	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG237	354465.41	180655.69	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields adjacent to Hallen Rhyne in the earliest mapping from 1887. Mapping from 1938 shows an adjacent OHL running northeast. The OHL tower is present in mapping from 1955. Mapping from 1999 shows the M49 motorway 70m west.	Non aquifer		Y	Land drain 100m W		Y	Grass field	0	N	N	N	N	N	N	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG238	354465.41	180655.69	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1982.	Non aquifer		Y	Land drain 100m W		Y	Horse grazing field	0	N	N	N	N	N	N	N	N		HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG239	354625.75	180975.77	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1975. The M49 motorway is adjacent in mapping from 1999.	Non aquifer		Y	Land drain 100m NW		Y	Grass field adjacent to motorway	-	-	-	-	-	-	-	-	Y	No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG240	354625.75	180975.77	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1975. The M49 motorway is adjacent in mapping from 1999.	Non aquifer		Y	Land drain 200m NW		Y	Horse grazing field	0	-	-	-	-	-	-	-	Y	No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG241	354579.53	181236.86	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1999 shows a gas works 50m northeast and the M49 motorway 75m southeast.	Non aquifer		Y	Lake or reservoir 150m N		Y	Grass field	0	-	-	-	-	-	-	-	Y	No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG242	354579.53	181236.86	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields with Monks Well Rhyne 30m northeast in the earliest mapping from 1887. Mapping from 1938 shows Stowick Bungalow adjacent to the site. Mapping from 1999 shows the OHL together with a gas works adjacent to the northeast and the M49 motorway 75m southeast.	Non aquifer		Y	Lake or reservoir 150m N		Y	Grass field	0	-	-	-	-	-	-	-	Y	No direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG243	354400.64	181492.80	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields 30m northeast in the earliest mapping from 1887. Mapping from 1975 shows an industrial estate 150m south. Mapping from 1999 shows the OHL tower.	Non aquifer		Y	Lake or reservoir 200m NE		N	Horse grazing field	0	N	N	N	N	N	N	N	Y	Adjacent to gas works	MEDIUM	WS, DPT, TP	C, GW, CD, SG	

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CG244	354400.64	181492.80	N	Tidal Flat Deposits	Mercia Mudstone Group[40]	Tidal Flat Deposits to 16m. Mercia Mudstone Group to 33m[36]	The site comprises open fields in the earliest mapping from 1887. Mapping from 1999 shows a gas works adjacent to the northeast and OHL tower on site.	Non aquifer		Y	Lake or reservoir 200m NE		N	Horse grazing field	0	-	-	-	-	-	-	-	N	Adjacent to gas works, no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG245	354260.01	181606.06	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1999.	Non aquifer		Y			N	Grass field	0	-	-	-	-	-	-	-	N	Adjacent to gas works, no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG246	354260.01	181606.06	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower and an adjacent gas works are present in mapping from 1999.	Non aquifer		Y			N	Grass field	0	-	-	-	-	-	-	-	N	Adjacent to gas works, no direct visual access	MEDIUM	WS, DPT, TP	C, GW, CD, SG	
CG247	354080.29	181774.17	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1999, together with a landfill site adjacent to the northwest.	Non aquifer		Y	Lake or reservoir 300m N		Y	Grass field	0	-	-	-	-	-	-	-	Y	Adjacent to gas works, no direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG248	354069.07	181753.03	N	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. The OHL tower is present in mapping from 1999, together with a landfill site adjacent to the northwest.	Non aquifer		Y	Lake or reservoir 300m N		Y	Grass field	0	-	-	-	-	-	-	-	Y	Adjacent to gas works, no direct visual access	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG249	353891.22	182005.09	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1975 shows the Philblack Works 70m west. Two landfill sites, one operating (southeast) and one disused (northwest are adjacent to the site, and the OHL tower is present in mapping from 1999.	Non aquifer		Y	Lake or reservoir 250m E		Y	Grass field (landfill site)	0	N	N	N	N	N	Y	Y	Y	Crooks Marsh landfill Site. Next to ditch. Construction waste beneath towers	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG250	353891.22	182005.09	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Two landfill sites, one operating (southeast) and one disused (northwest are adjacent to the site, and the OHL tower is present in mapping from 1999.	Non aquifer		Y	Lake or reservoir 250m E		Y	Grass field (landfill site)	0	N	N	N	N	N	Y	Y	Y	Crooks Marsh landfill Site. Next to ditch. Construction waste beneath towers	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG251	353710.17	182131.07	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1965 shows a Works being constructed surrounding the site approximately 500m away. Mapping from 1975 shows a brickworks 100m west. Mapping from 1999 shows the site to comprise a disused landfill, with the OHL tower displayed from 2006 onwards.	Non aquifer		Y			Y	Grass field (landfill site)	-	-	-	-	-	-	-	-	N	No direct visual access. Behind works/power station	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG252	353710.17	182131.07	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1965 shows a Works being constructed surrounding the site approximately 500m away. Mapping from 1975 shows a brickworks 100m west. Mapping from 1999 shows the site to comprise a disused landfill, with the OHL tower displayed from 2006 onwards.	Non aquifer		Y			Y	Grass field (landfill site)	-	-	-	-	-	-	-	-	N	No direct visual access. Behind works/power station	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	
CG253	353555.18	182179.31	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]		The site comprises open fields in the earliest mapping from 1887. Mapping from 1965 shows a Works adjacent to the site. Mapping from 1975 the Seabank Gas Works adjacent to the site and a Fuel Storage Depot 200m west. Mapping from 1999 shows the Gas Works removed, with Seabank Power Station and the OHL tower replacing it from 2006 onwards.	Non aquifer		Y			Y	Behind power station and scrap yard	-	-	-	-	-	-	-	-	Y	No direct visual access.	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	

TOWER No.	ESTIMATED GRID REFERENCE		MADE GROUND (Y/N)	PUBLISHED DRIFT GEOLOGY	PUBLISHED SOLID GEOLOGY	BRITISH GEOLOGICAL SURVEY RECORD SUMMARY	PERTINENT HISTORY	AQUIFER CLASSIFICATION	SOIL CLASSIFICATION	FLOOD RISK (Y/N)	DISTANCE FROM SURFACE WATER FEATURE/TYPE	NATURAL CAVITIES/ MINING/QUARRYING	RISK FROM LANDFILL (Y/N)	GROUND COVER/ VEGETATION	SLOPE ANGLE (DEGREES)	CAVITIES OBSERVED (Y/N)	MAJOR EROSION OBSERVED (Y/N)	LANDSLIPS OBSERVED (Y/N)	GROUND SETTLEMENT/HEAVE OBSERVED (Y/N)	POSSIBLY HIGH GWATER/ FLOODING (Y/N)	INFILLING AROUND TOWER (Y/N)	EXCAVATION ADJACENT TO TOWER (Y/N)	TERMINAL/ANGLE TOWER (Y/N)	ADDITIONAL COMMENTS	TOTAL RISK RATING	RECOMMENDED SCOPE OF INTRUSIVE WORKS	RATIONALE FOR INTRUSIVE WORKS	ACCESS RESTRICTIONS
CG254	353555.18	182179.31	Y	Tidal Flat Deposits	Mercia Mudstone Group[40]	Tidal Flat Deposits to 14m. Mercia Mudstone Group to 51.21m. Coal Measures with coal bands to 140.46m[37]	The site comprises open fields in the earliest mapping from 1887. Mapping from 1965 shows a Works adjacent to the site. Mapping from 1975 the Seabank Gas Works adjacent to the site and a Fuel Storage Depot 200m west. Mapping from 1999 shows the Gas Works removed, with Seabank Power Station and the OHL tower replacing it from 2006 onwards.	Non aquifer		Y			Y	Behind power station and scrap yard	-	-	-	-	-	-	-	-	Y	No direct visual access.	HIGH	WS, DPT, TP, CP, RO	C, GW, CD, SG, MG	

Electricity Alliance West

Hinkley Point - Seabank

400kV Overhead Line

Geotechnical Desk Top Study

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Reference: LSTC/12/249/05	Issue:	Issue Date:	Description
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	A	12/11/12	Historical map review included.

Table of Contents

1.0 EXECUTIVE SUMMARY 4
2.0 INTRODUCTION. 5
3.0 DOCUMENT REVIEW. 6
4.0 INFORMATION EXTRACTED 7
5.0 RECOMMENDATIONS. 11
FIGURES
Figure 1: Route Plans
Figure 2: Historical Borehole Log Plot
APPENDICIES
Appendix A:-Historical Borehole Logs
Appendix B:-Ground Investigation Requirements
Appendix C:-Desk Study Data Sheets
Appendix D:-Historical Maps

1.0 EXECUTIVE SUMMARY

1.1 National Grid Electricity Transmission are proposing to construct a 400kV connection between the proposed Hinkley Point C Nuclear Power Station in Somerset and Seabank Substation near Bristol. The existing ZG route will be utilised from Hinkley Point to tower ZG42 at Huntspill where the line will be split. Two new sections of overhead line will be constructed from ZG42 north to Seabank comprising 128 towers of L12/1 construction and a short section from ZG43 south to connect with the VQ route comprising 14 towers of L8/6 construction. One section of the route to Seabank (CLD38-39) will be cabled over the Mendip Hills.

1.2 LS Transmission Consultancy Ltd has, at the request of the Electricity Alliance West (EAW), undertaken a geotechnical desk study of the anticipated ground conditions along the route, reviewing geological maps, historical borehole logs and historical maps to make recommendations for preliminary ground investigation from which preliminary tower foundation designs can be prepared.

1.3 The southern sections of the route from proposed towers VQ043R to CZG13 and CLD1 to CLD96 predominantly traverse farmland. Proposed towers CLD97 to CLD128 are to be located on land with residential, commercial or industrial use/heritage with the associated higher risk of encountering made ground and contaminated land.

1.4 The BGS geological maps for the area indicate the presence of peat, alluvium, head deposits and tidal flat deposits, strata with potentially weak ground bearing properties overlying the Mercia mudstone or Lias Groups for the majority of the route, and the use of piled foundations would be anticipated in these areas. Where no drift deposits have been identified, (proposed tower positions CZG4 - CZG10 and CLD79 – CLD91) or the overburden is proven to have sufficient strength, concrete ground bearing type foundations may be more appropriate. BGS historical borehole logs support the findings from the geological maps.

1.5 Cone penetration testing (CPT's) are a method of determining the overburden depth in a quick and efficient manner where, as here, potentially weak soils overly rock. These could supplement the information obtained in the desk study. An electronic probe containing calibrated load cells which records end resistance and side wall friction is

hydraulically pushed into the ground from a 6 wheeled truck or tracked unit. The results are analysed by an on board computer and presented as a log of estimated soil type. The probe cannot penetrate hard materials, boulders or rock. However some penetration can be made into weak and weathered materials such as Mercia mudstone and Lias. Samples are not generally retrieved, and determination of groundwater levels is limited. However inspection/starter pits, hand excavated to 1.2m depth, are recommended to check for buried services, and samples can be taken from theses pits for contamination testing. Any very shallow groundwater would be encountered in the pits.

1.6 Tests at selected and approximately equally spaced tension tower positions would provide a more detailed profile of the overburden. Rotary boreholes should be used to cross calibrate the CPT's, obtain samples for testing, install standpipes for water monitoring and penetrate the underlying rock to obtain preliminary parameters for pile design. The position of terminal and angle towers have been highlighted in the summary presented in Appendix C, from which a selection (say 20 CPTs and 5 boreholes, three into the Mercia Mudstone, and two into the Lias at the same position as 5 of the CPT's) could be tested.

1.7 Buried service details should be obtained and checked against proposed tower positions as soon as is practically possible to plan for CPT/borehole positioning and to identify any necessary diversions, with sufficient time to consult with the relevant service provider, or reposition the towers.

2.0 INTRODUCTION.

2.1 National Grid Electricity Transmission are proposing to construct a 400kV connection between the proposed Hinkley Point C Nuclear Power Station in Somerset and Seabank Substation in Bristol. The existing ZG route will be utilised from Hinkley Point to tower ZG42 at Huntspill where the line will be split. Two new sections of overhead line will be constructed from ZG42 north to Seabank comprising 128 towers (CLD1-128) of L12/1 construction and a short section from ZG43 south to connect with the VQ route comprising 13 towers (VQ043R and CZG1-13) of L8/6 construction. One section of the route to Seabank (CLD38-39) will be cabled over the Mendip Hills. The new sections of OHL will generally follow an existing 132kV OHL ("F" route) which is to be dismantled,

although sections of the line will deviate away from the original route to avoid buildings and other obstacles that have been installed since the original route was constructed. Several variations of the proposed 400kV route within an agreed corridor have been considered and a "preferred" route developed.

2.2 LS Transmission Consultancy Ltd has, at the request of the Electricity Alliance West (EAW) undertaken a geotechnical desk study of the anticipated ground conditions along the route, reviewing geological maps, historical borehole logs and historical maps to make recommendations for preliminary ground investigation for tower foundation design.

2.3 Card Geotechnics were commissioned by EAW to undertake a desk study of the existing "F" route. The historical maps and unexploded ordnance data included in their report (reference CGN/2644) are reviewed and utilized in the LSTC desk study.

2.4 The recommendations made and opinions expressed in this report are based upon the ground conditions revealed by the desk study. No responsibility can be accepted for conditions that fall beyond the scope of reference.

2.5 It should be noted that where information has been provided by the Client or third party sources, it has been supplied in good faith, but no guarantee can be provided as to its accuracy. The information is not exhaustive, and further information relative to the scheme may be available from other sources.

3.0 DOCUMENT REVIEW.

The desk study was based upon the following plans and records:-

- EAW Preferred Route drawing number 24/EAW/0050 Issue 3.
- British Geological Society (BGS) geological maps of the area; 1:50,000 scale solid and drift editions; sheet 264 - Bristol, sheet 279 - Weston Super Mare, sheet 280 - Wells, and sheet 295 – Taunton.
- BGS historic borehole logs available along the route, presented in Appendix B.
- BGS 1:625,000 Groundwater Vulnerability map of England and Wales.
- Card Geotechnics Report ref CGN2644 dated January 2010.

No buried service details were available. A site walkover was not included in the scope of work.

4.0 INFORMATION EXTRACTED

From the documents reviewed the following data for each tower location has been compiled as a table, see Appendix C.

- Tower number
- Tower type
- Geology – Solid and drift
- Features from Ordnance Survey Map (1:50,000) and Route Plan
- Features from historical maps

4.1 Site Description.

4.1.1 Although no specific site walkover was undertaken as part of this desk study, Google Earth images have been reviewed to provide a general overview. From proposed tower VQ043R to CZG13 and CLD1 to CLD96 the route generally traverses farm land, crossing a series of roads and water courses. Proposed towers CLD97 to CLD128 are to be located on land with residential, commercial or industrial use/heritage. The route crosses the River Avon between towers CLD103 & 104.

4.1.2 The proposed route plan is shown in Figure 1.

4.2 Geology

4.2.1 The 1:50,000 scale geological maps show the overlying drift geology to comprise:-

- Estuarine alluvium; proposed tower positions VQ043R, CZG1-3, CZG11-13, CLD1, CLD14-38, CLD40-46.
- Marine and estuarine alluvium; CLD2-13.
- Head deposits; CLD39, CLD92-93 (possibly tidal deposits) CLD95-96.
- Head deposits/made ground; CLD100-102 (possibly tidal flat deposits).
- Tidal flat deposits; CLD47-66, CLD78 (possibly peat), CLD93 (possibly head) CLD97-99, CLD121-125
- Tidal flat deposits/made ground; CLD103-120, CLD126-128.

- Peat; CLD67-77, CLD78 (possibly tidal flat deposits), CLD94.

Where no drift deposits are shown (proposed tower positions CZG4-10 and CLD79 to 91) some weathering of the underlying substrata is likely to have resulted in a stony, cohesive subsoil.

A summary of the overlying drift geology is included in Appendix C

4.2.2 The 1:50,000 scale geological maps show the overlying solid geology to comprise:-

- Mercia mudstone group; proposed tower positions VQ043R, CZG1-3, CZG11-13, CLD36 (possibly lower Lias), CLD37-78, CLD80-84, CLD91-128.
- Clifton Down Limestone; CLD79
- Blue anchor formation; CZG4
- Blue Lias; CZG5-10
- Lower Lias; CLD1-35, CLD36?
- Dolostone/Black rock limestone; CLD85-86.
- Pennant sandstone group; CLD87 (possibly Portishead Formation).
- Portishead Formation; CLD87 (possibly Pennant sandstone) CLD88-90.

A summary of the underlying solid geology is included in Appendix C

4.2.3 The BGS have a number of boreholes in the vicinity of the proposed route. The borehole logs are presented in Appendix A, and have been marked up on the route plan, Figure 1, and pictorially in Figure 2.

4.3 Quarrying

4.3.1 Former/disused quarries have been identified from historic maps between proposed towers CZ6 and CZ7 and in the vicinity of proposed towers CLD80 - 86 where the geological maps identify no drift deposits. Whilst there are no quarries identified at the proposed tower positions, localised unrecorded quarrying of sand, gravels, limestone or clay may have taken place.

4.4 Mining

4.4.1 The majority of the route is underlain by Blue Lias, Lower Lias and Mercia Mudstone, strata not associated with mine working. Shallow strata potentially including coal or

mineral deposits have been identified at towers CLD78, and 85 – 87. The only evidence of mining from the historic maps in this area is a disused coal shaft some 1km to the south east of tower CLD78, and the geological maps indicate that any mining would generally have taken place to the east of the proposed route.

4.4.2 The geological maps show the Avonmouth Coalfield and the Nailsea Coalfield underlying the Mercia Mudstone below northern sections of the route. The depth of any historic workings in this strata would be such that subsidence from former mining activities would be very low. However a series of former air shafts have been identified in the vicinity of tower CLD105, and further investigation will be required to establish their potential affect on the foundation design for this tower.

4.5 Hydrogeology

4.5.1 The 1:625,000 scale Groundwater Vulnerability Map of England and Wales indicates that the general strata beneath the route are classified as concealed aquifers, aquifers of limited potential, and regions without significant groundwater (The Mercia Mudstone and quaternary; costal and fluvial alluvium). The Lias and Old Red Sandstone are classified as impermeable.

4.5.2 The coastal and fluvial alluvium comprise mainly silty clays with subordinate sand, gravel and peat in valleys, estuaries and sheltered coastal environments. Sands and gravels in these deposits may provide limited supplies of uncertain quality, with the risk of saline contamination in coastal areas.

4.5.3 The carboniferous limestone is classed as a locally important aquifer.

4.6 Hydrology

4.6.1 There are numerous small water courses and drains shown along the route. The Huntspill River passes between proposed towers CLD3 and 4 and the River Avon between proposed towers CLD103 and 104.

4.6.2 The majority of towers are to be positioned in areas which are classified as being at a high risk of flooding (>1.3% chance) by the Environment Agency.

4.7 Unexploded Ordnance (UXO)

4.7.1 As part of the EAW requirements, CARD Geotechnical obtained a risk assessment of unexploded ordnance along the proposed OHL and within the Avonmouth area, undertaken by specialist subcontractor BAE Systems. The findings of the report are summarised below.

4.7.2 Three former explosives factories are located along the proposed route, HMEF Avonmouth and HMEF Henbury dating back to World War One (WWI), and the former Royal Ordnance Factory (ROF) Bridgewater which was operational between 1937 and 2008. HMEF Avonmouth and Henbury are located towards the northern area of the route in the area north of the River Avon. Proposed towers CLD111 to CLD113 are shown to be located to west of the site, and proposed towers CLD118 to 120 just to the north west. Proposed towers CLD114-117 are shown to be within the former boundary of the site. ROF Bridgewater is shown just to the west and in close proximity to proposed towers CZG9 to CZG13, and just to the south of proposed tower CLD1.

4.7.3 The report also states that there are a large number of World War Two (WWII) defence structures in the vicinity of the route. These are generally pillboxes and a number of heavy anti-aircraft (HAA) batteries which are indicated as having long since been demolished.

4.7.4 Much of the route passes through rural areas that did not suffer heavy bombing during WWII. The rural districts of Bridgewater, Axbridge and Long Ashton had very low bombing intensities compared with the rest of the UK. Within the County Borough of Bristol the bombing intensity was 6e HE/100 ha, a relatively high figure. The docks and industrial sites at Avonmouth were one of the most frequently targeted areas in the region. The report states that the typical maximum depth of German air-dropped UXO within the tidal flat deposits around Avonmouth is likely to be in the order of 10m bgl.

4.7.5 The risk of encountering contamination or explosive devices from the factories or buried UXO is low as much of the surrounding areas are rural or have been extensively developed since WW2 and as any residues are likely to have degraded and dispersed in the intervening years.

4.7.6 It has been recommended that, where exploratory work is to take place in proximity to the explosive factories, (CZG9-13 and CLD1, ROF Bridgewater) and (CLD111-CLD120 HMEF Avonmouth and Henbury) that soil samples should be sent for laboratory analysis to determine if contamination is present. Where intrusive investigation takes place close to any HHA sites, ROF Bridgewater or within Avonmouth it is recommended that, as part of the site safety briefing that personnel be informed of the potential to encounter Ordnance.

4.8 Historical Maps

4.8.1 Towers VQ043R to CZG13, and CLD1 – 96 are positioned on predominantly agricultural and farm land. Tower CLD 86 is to be positioned on the site of a deserted medieval village, and isolated features at or close to individual tower positions have been recorded on the desk summary sheets presented in Appendix C.

4.8.2 Towers CLD96 -128 are to be located on land with residential, commercial or industrial use/heritage. A summary of the main historical features including former slag heaps, railway sidings, historic buildings, oil tanks etc have recorded on the desk study summary sheets.

4.8.3 The historical maps with the marked up tower positions are presented in Appendix D.

5.0 RECOMMENDATIONS.

5.1 INVESTIGATIONS FOR PROPOSED TOWER LOCATIONS

5.1.1 The information provided in the desk study is only sufficient to give an indication of the ground profile that can be anticipated at the proposed tower positions. This will be insufficient for foundation design for which the following is required at each tower location:-

- The depth and nature of the soil overlying the rock.
- Groundwater levels, which effect design and the method of installation.
- Confirmation of the underlying rock classification and strength (dependent upon the depth and strength of the drift deposits).

5.1.2 Potential foundation types will include:-

- Concrete pads and columns (or pyramids) where suitable bearing strata can be proven at depths practical and economic to excavate.
- Piling when suitable bearing strata cannot be economically reached at depths practical to excavate, or if piling is the contractors preferred method.

5.1.3 The BGS geological maps indicate the presence of peat, alluvium, head deposits and tidal flat deposits, strata with potentially weak ground bearing properties overlying the Mercia mudstone or Lias Groups for the majority of the route, and the use of piled foundations would be anticipated in these areas. Where no drift deposits have been identified, (proposed tower positions CZG4 – CZG10 and CLD79 – CLD91) or the overburden is proven to have sufficient strength, concrete ground bearing type foundations may be more appropriate. BGS historical borehole logs support the findings from the geological maps.

5.1.4 If potential shallow mine workings are identified then they will require further investigation and if shown to affect foundations will require backfilling, probably with grout.

5.1.5 Cone penetration testing (CPT's) are a method of determining the overburden depth in a quick and efficient manner where, as here, potentially weak soils overly rock. These could supplement the information obtained in the desk study.An electronic probe containing calibrated load cells which records end resistance and side wall friction is pushed into the ground from a 6 wheeled truck or tracked unit. The results are analysed by an on board computer and presented as a log of estimated soil type. The probe cannot penetrate hard materials, boulders or rock. However some penetration can be made into weak and weathered materials such as Mercia mudstone and Lias. Samples are not generally retrieved, and determination of groundwater levels is limited. However inspection/starter pits hand excavated to 1.2m depth are recommended to check for buried services, and samples can be taken from these pits for contamination testing. Any very shallow groundwater would be encountered in the pits. The probe can be fitted with a "magcone" which is used for UXO clearance where a risk of encountering unexploded ordnance has been identified. Four to six CPT's would normally be anticipated per day, depending on available access and the distance between tests/towers. Tests at selected tension tower positions would provide a more detailed

profile of the overburden. Rotary boreholes should be drilled to cross calibrate the CPT's, obtain samples for testing, install standpipes for water monitoring and penetrate the underlying rock to obtain parameters for pile design.

5.1.6 A schedule of ground investigation requirements is presented in Appendix B. The positions of terminal towers and angle towers have been highlighted in the summary from which a selection (say 20 CPT's and 5 boreholes, three into the Mercia mudstone and two into the Lias at the same location as 5 of the CPT's) could be tested.

5.2 Buried Concrete

5.2.1 Sampling and testing of soil and groundwater for sulphates and pH is recommended for buried concrete design to BRE Special Digest 1:2005 "Concrete in aggressive ground".

5.3 Geoenvironmental assessment

5.3.1 The desk study has identified areas of potential contamination, in particular in areas with an industrial heritage. A preliminary assessment to the health and safety of ground workers and the public would be recommended in conjunction with the exploratory hole programme. Where made ground is encountered or natural ground appears contaminated, samples should be taken and analysed by a UKAS accredited laboratory.

5.3.2 Waste acceptance criteria (WAC) testing for landfill classification should also be considered.

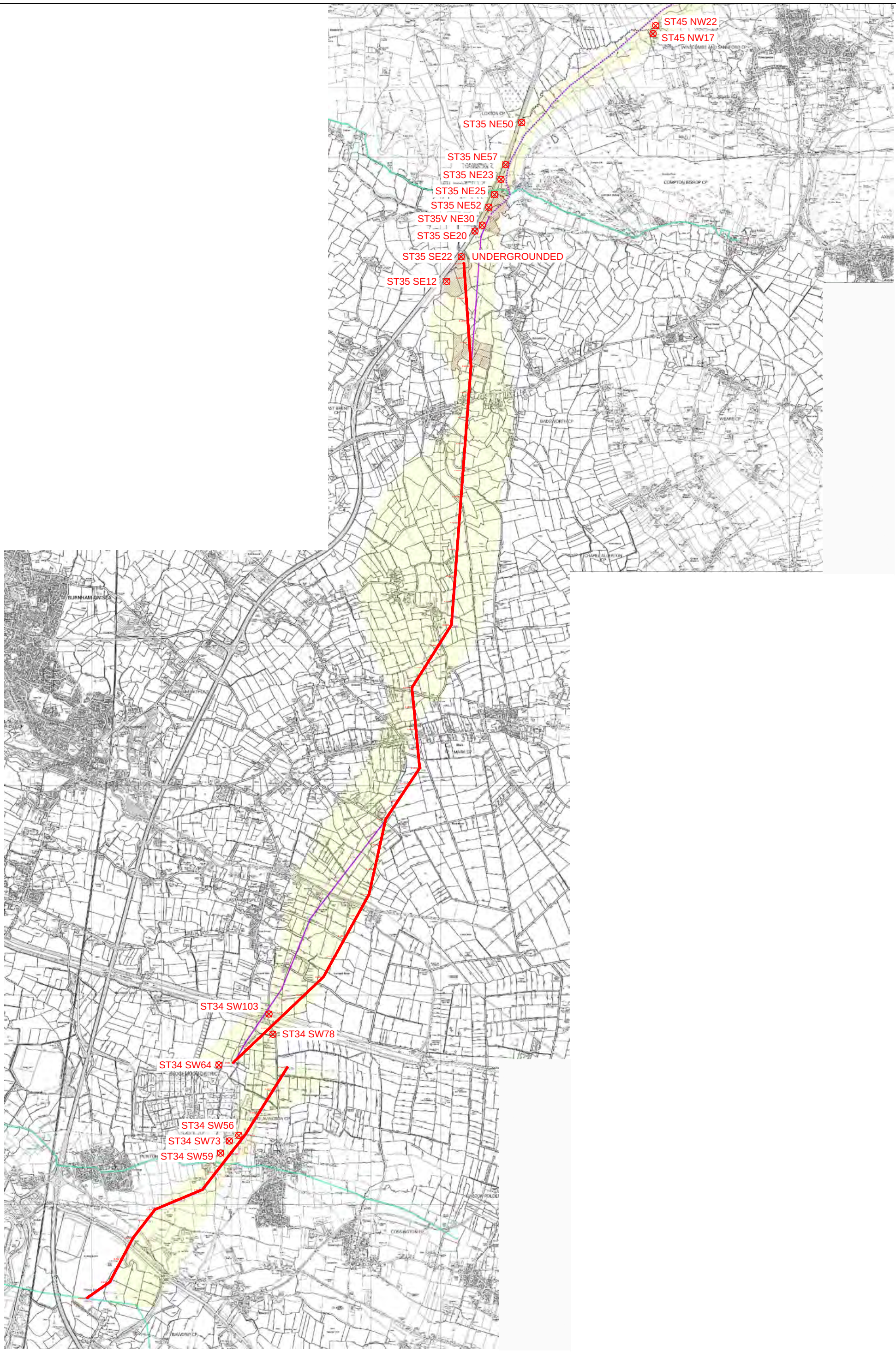
5.4 Buried Services

5.4.1 Buried service details should be obtained and checked against proposed tower positions as soon as is practically possible to identify any necessary diversions, with sufficient time to consult with the relevant service provider, or reposition the towers.

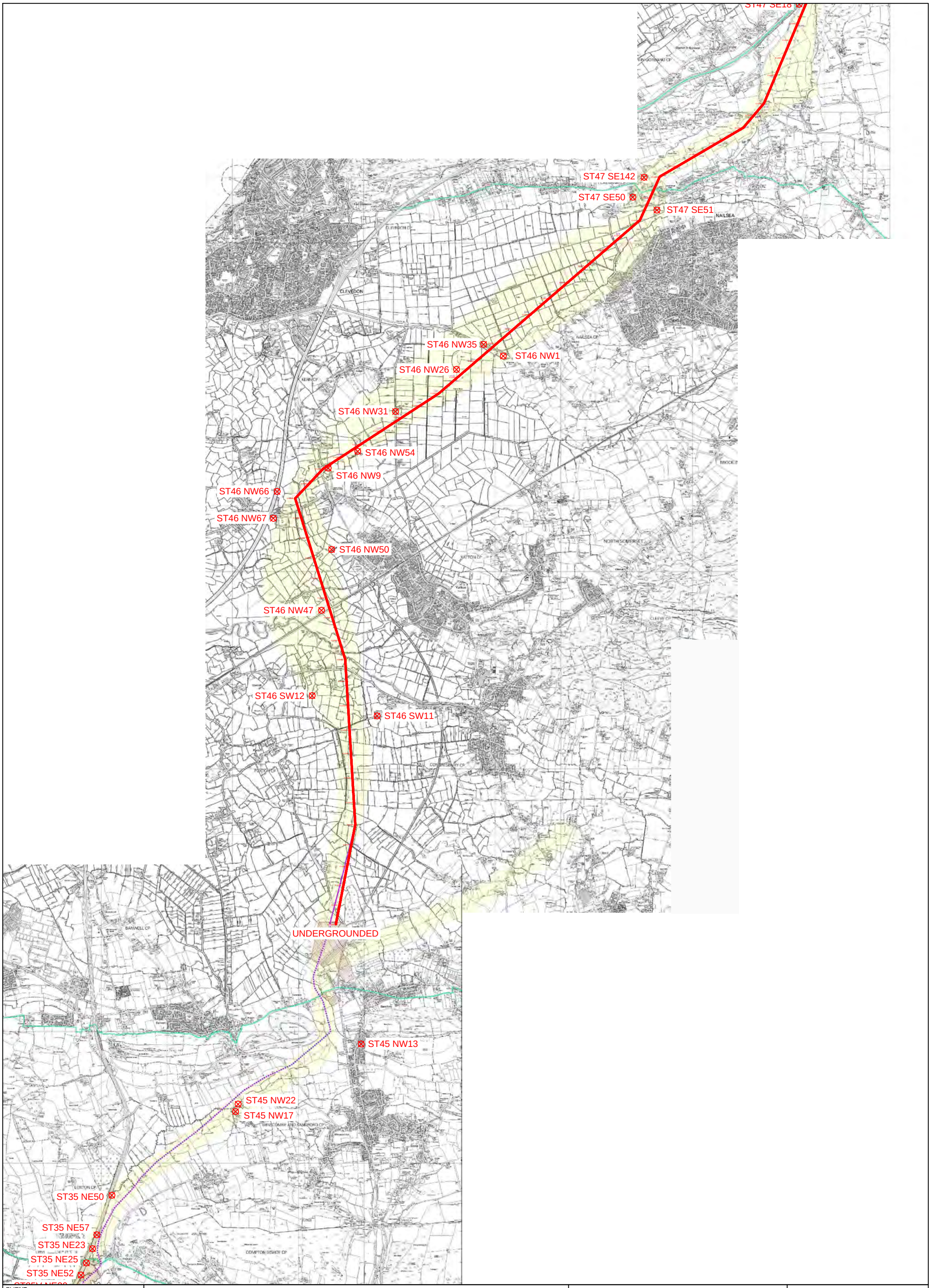
5.4.2 Buried service details should be checked and confirmed by the contractor undertaking the intrusive ground investigation, and when the tower positions have been finalised and the contract awarded.

FIGURES

Figure 1: Route Plans



CLIENT: Electricity Alliance	PROJECT / TITLE: HINKLEY POINT - SEABANK PREFERED NEW BUILD ROUTE Figure 1 - Route Location Map - Historical Borehole Locations 1 of 3	SCALE: 0 0.5 1.0 1.5 2.0 2.5 KILOMETRES 1:50,000	



CLIENT:

Electricity Alliance

PROJECT / TITLE:

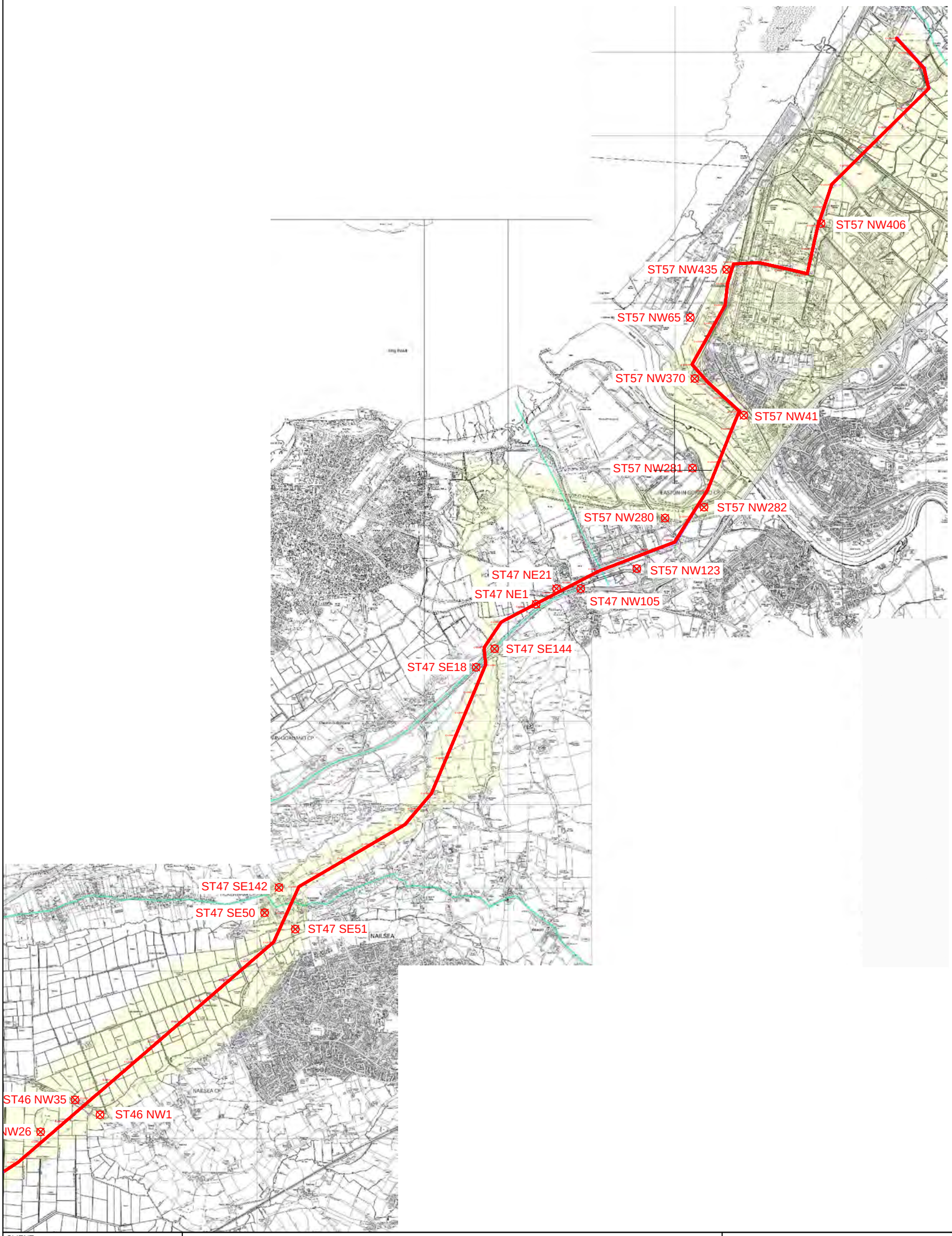
HINKLEY POINT - SEABANK PREFERED NEW BUILD ROUTE

Figure 1 - Route Location Map - Historical Borehole Locations 2 of 3

SCALE:

0 0.5 1.0 1.5 2.0 2.5

KILOMETRES 1:50,000



CLIENT:

Electricity Alliance

PROJECT / TITLE:

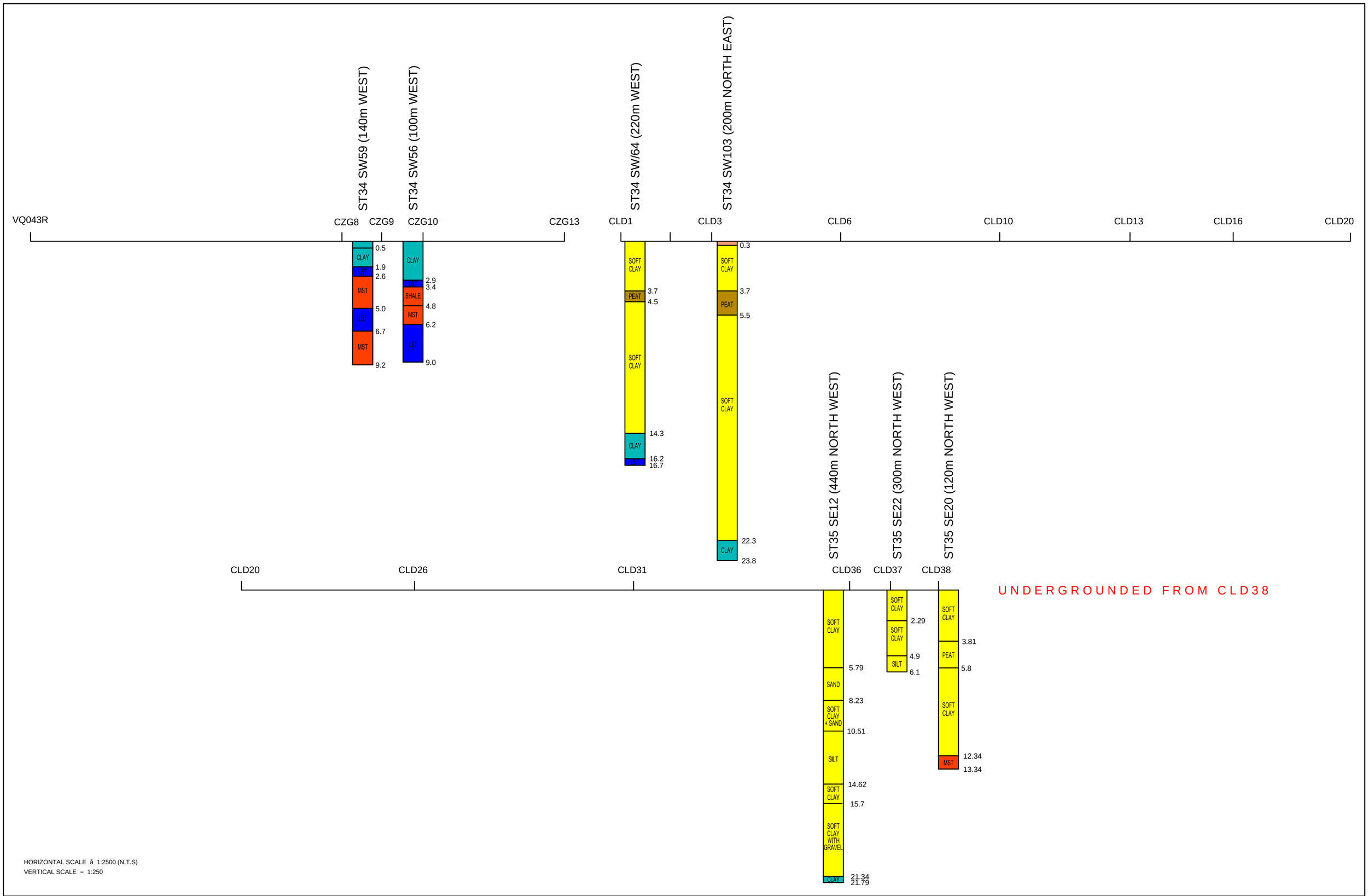
HINKLEY POINT - SEABANK PREFERED NEW BUILD ROUTE
Figure 1 - Route Location Map - Historical Borehole Locations 3 of 3

SCALE:

0 0.5 1.0 1.5 2.0 2.5

KILOMETRES 1:50,000

Figure 2: Historical Borehole Log Plot



HORIZONTAL SCALE å 1:2500 (N.T.S)
VERTICAL SCALE = 1:250

CLIENT:

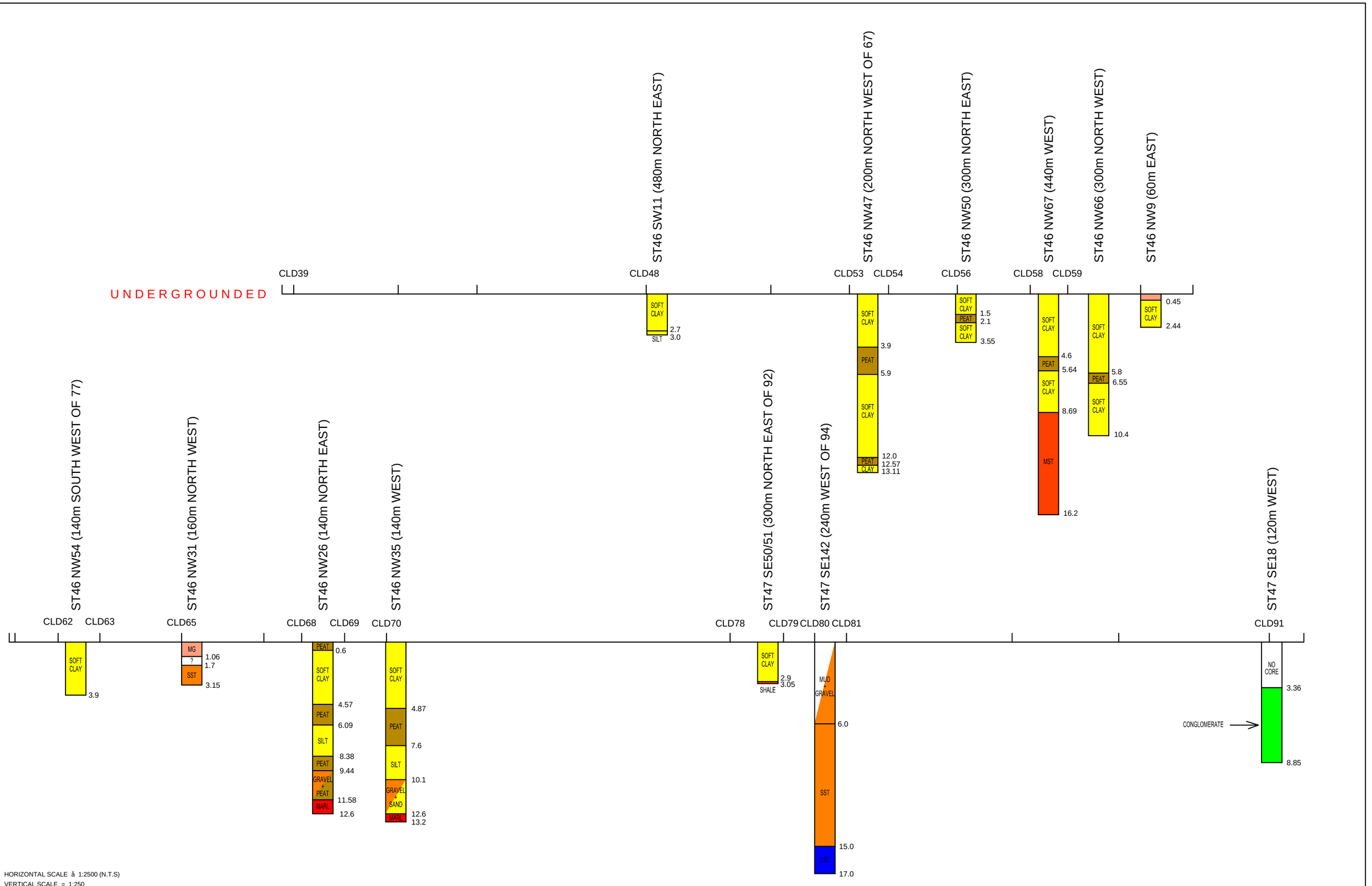
Electricity Alliance

PROJECT / TITLE:

HINKLEY POINT - SEABANK PREFERED NEW BUILD ROUTE
Figure 2 - Historical Borehole Logs 1 of 3 - RevA

LEGEND:

- MG, MADE GROUND
- PEAT
- CLAY
- ALLUVIUM / TIDAL DEPOSITS
- GRAVEL
- MARL
- MST, MUDSTONE
- LST, LIMESTONE
- ST34 SW59 — BOREHOLE LOG REFERENCE
- 140m WEST — APPROXIMATE OFFSET FROM LINE
- R1-8 — TOWER NUMBER



CLIENT:

Electricity Alliance

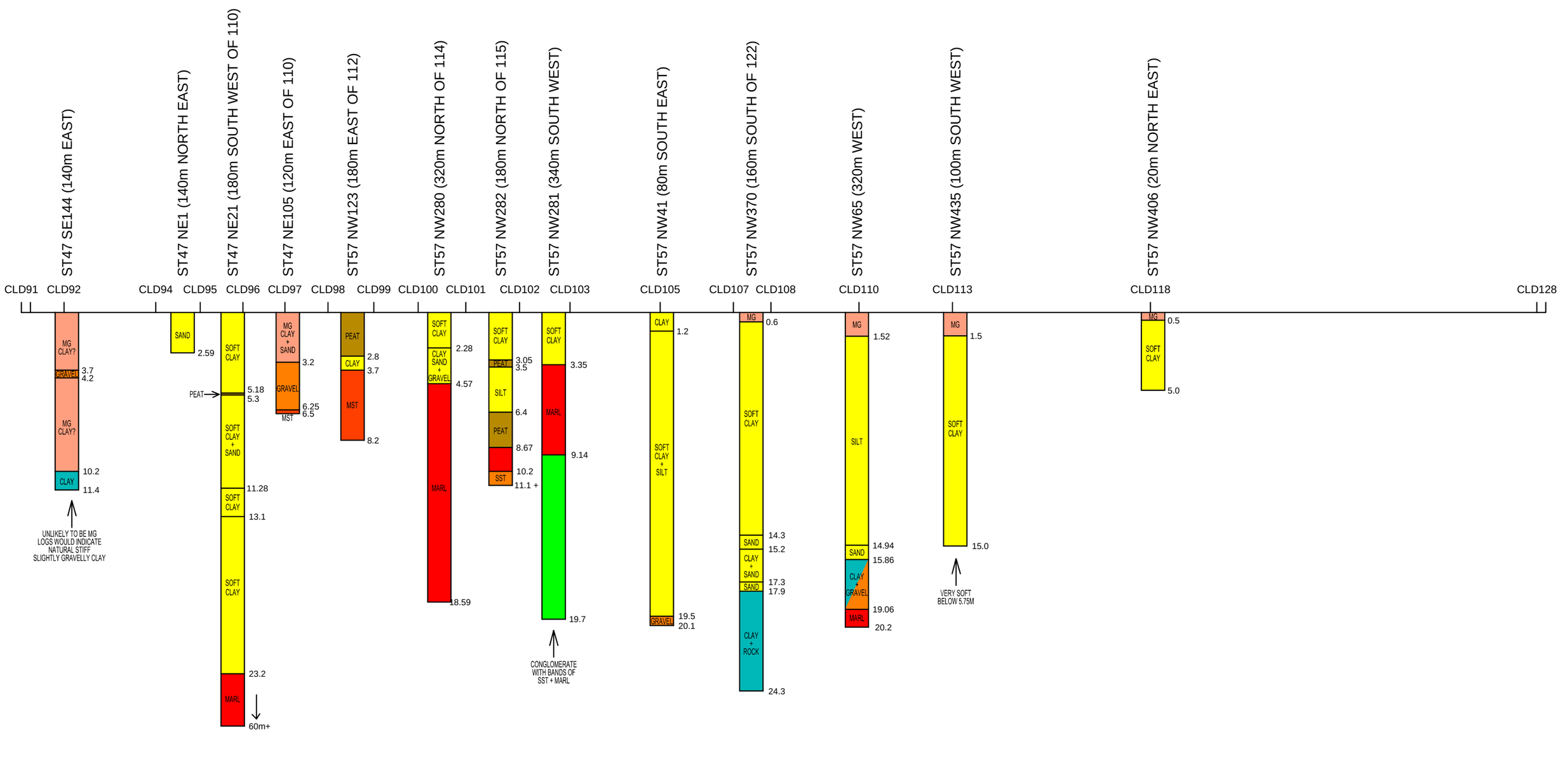
PROJECT / TITLE:

HINKLEY POINT - SEABANK PREFERED NEW BUILD ROUTE

Figure 2 - Historical Borehole Logs 2 of 3 - RevB

LEGEND:

- MG, MADE GROUND
- PEAT
- CLAY
- ALLUVIUM / TIDAL DEPOSITS
- GRAVEL
- MARL
- MST, MUDSTONE
- LST, LIMESTONE
- ST34 SW59 — BOREHOLE LOG REFERENCE
- 140m WEST — APPROXIMATE OFFSET FROM LINE
- R1-8 — TOWER NUMBER



HORIZONTAL SCALE å 1:2500 (N.T.S)
VERTICAL SCALE = 1:250

CLIENT:

Electricity Alliance

PROJECT / TITLE:

HINKLEY POINT - SEABANK PREFERED NEW BUILD ROUTE
Figure 2 - Historical Borehole Logs 3 of 3 - RevC

LEGEND:

- MG, MADE GROUND
- PEAT
- CLAY
- ALLUVIUM / TIDAL DEPOSITS
- GRAVEL
- MARL
- MST, MUDSTONE
- LST, LIMESTONE
- ST34 SW59 — BOREHOLE LOG REFERENCE
- 140m WEST — APPROXIMATE OFFSET FROM LINE
- R1-8 — TOWER NUMBER

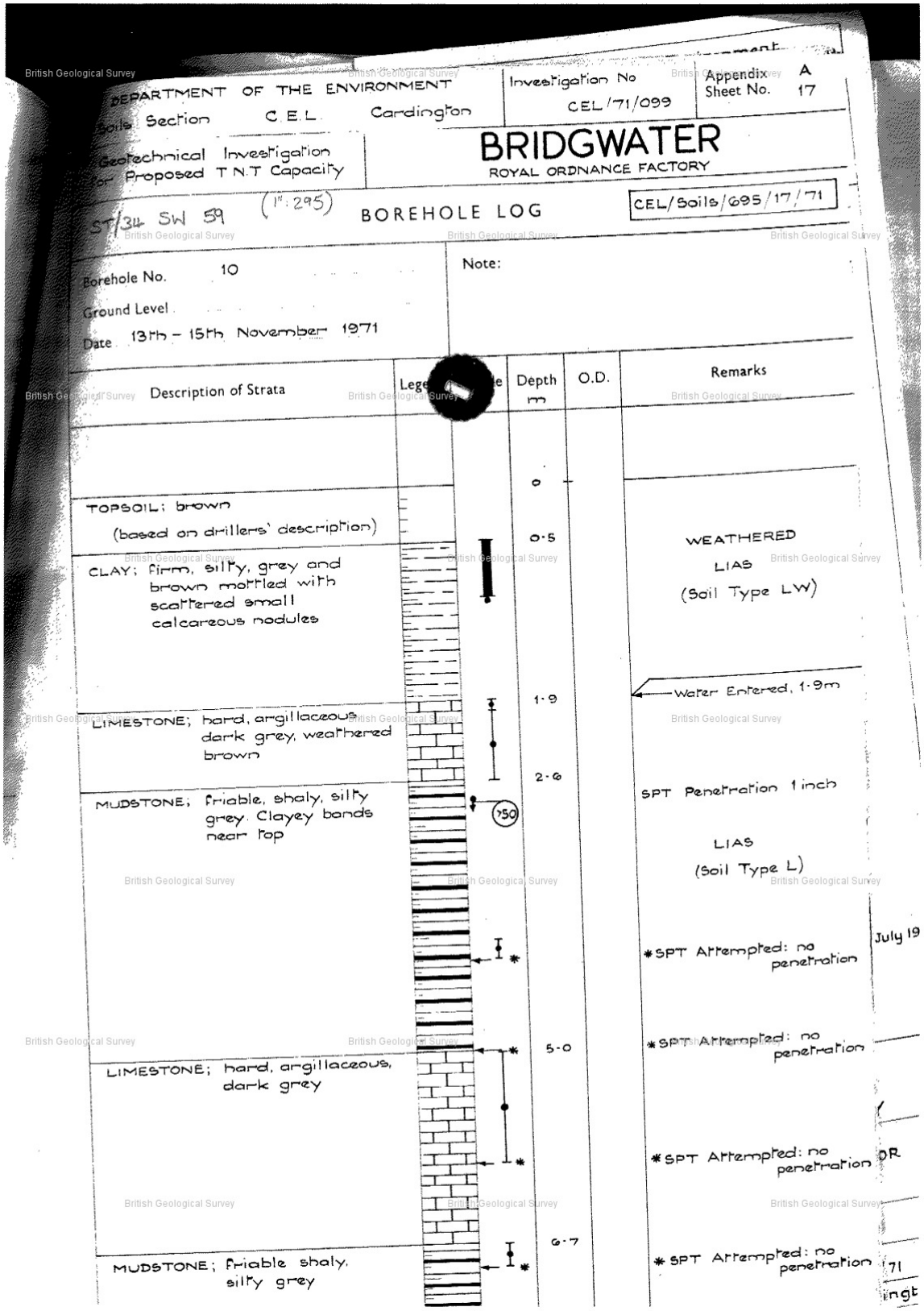
APPENDICIES

Appendix A:-Historical Borehole Logs

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 2 Next > >>



DEPARTMENT OF THE ENVIRONMENT
Soils Section C.E.L. Cardington
Investigation No CEL/71/099
Appendix A
Sheet No. 17

Geotechnical Investigation for Proposed T.N.T Capacity

BRIDGWATER
ROYAL ORDNANCE FACTORY

ST/34 SW 59 (1":295) BOREHOLE LOG

CEL/Soils/695/17/71

Borehole No. 10
Ground Level
Date 13th – 15th November 1971

Note:

Description of Strata	Depth m	O.D.	Remarks
	0		
TOPSOIL: brown (based on drillers' description)	0·5		WEATHERED LIAS (Soil Type LW)
CLAY; firm, silty, grey and brown mottled with scattered small calcareous nodules			
	1·9		Water Entered, 1·9m
LIMESTONE; hard, argillaceous, dark grey, weathered brown			
	2·6		SPT Penetration 1 inch
MUDSTONE; friable, shaly, silty grey. Clayey bands near top			LIAS (Soil Type L)
			*SPT Attempted: no penetration
	5·0		*SPT Attempted: no penetration
LIMESTONE; hard, argillaceous, dark grey			*SPT Attempted: no penetration
	6·7		*SPT Attempted: no penetration
MUDSTONE; friable shaly, silty grey			

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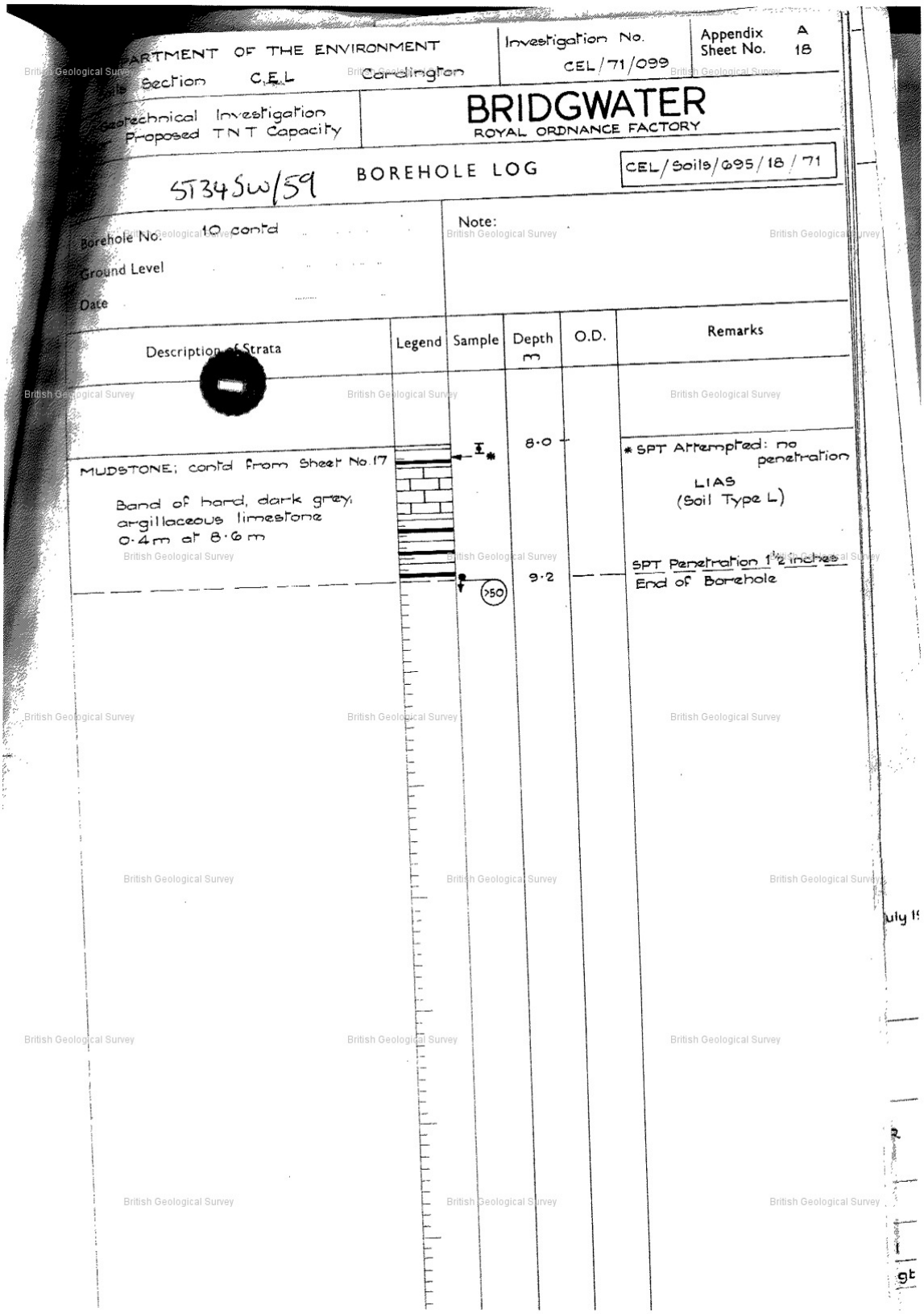
<< < Prev Page 2 of 2 Next > >>



ARTMENT OF THE ENVIRONMENT
Section C.E.L Cardington
Investigation No. CEL/71/099
Appendix A
Sheet No. 18

Geotechnical Investigation
Proposed TNT Capacity

BRIDGWATER
ROYAL ORDNANCE FACTORY

ST34SW/59 BOREHOLE LOG

CEL/Soils/695/18/71

Borehole No. 10 contd
Ground Level
Date

Note:

Description of Strata	Legend	Sample	Depth m	O.D.	Remarks
MUDSTONE; contd from Sheet No 17			8.0		* SPT Attempted: no penetration
Band of hard, dark grey, argillaceous limestone 0.4m at 8.6m					LIAS (Soil Type L)
		(>50)	9.2		SPT Penetration 1½ inches End of Borehole

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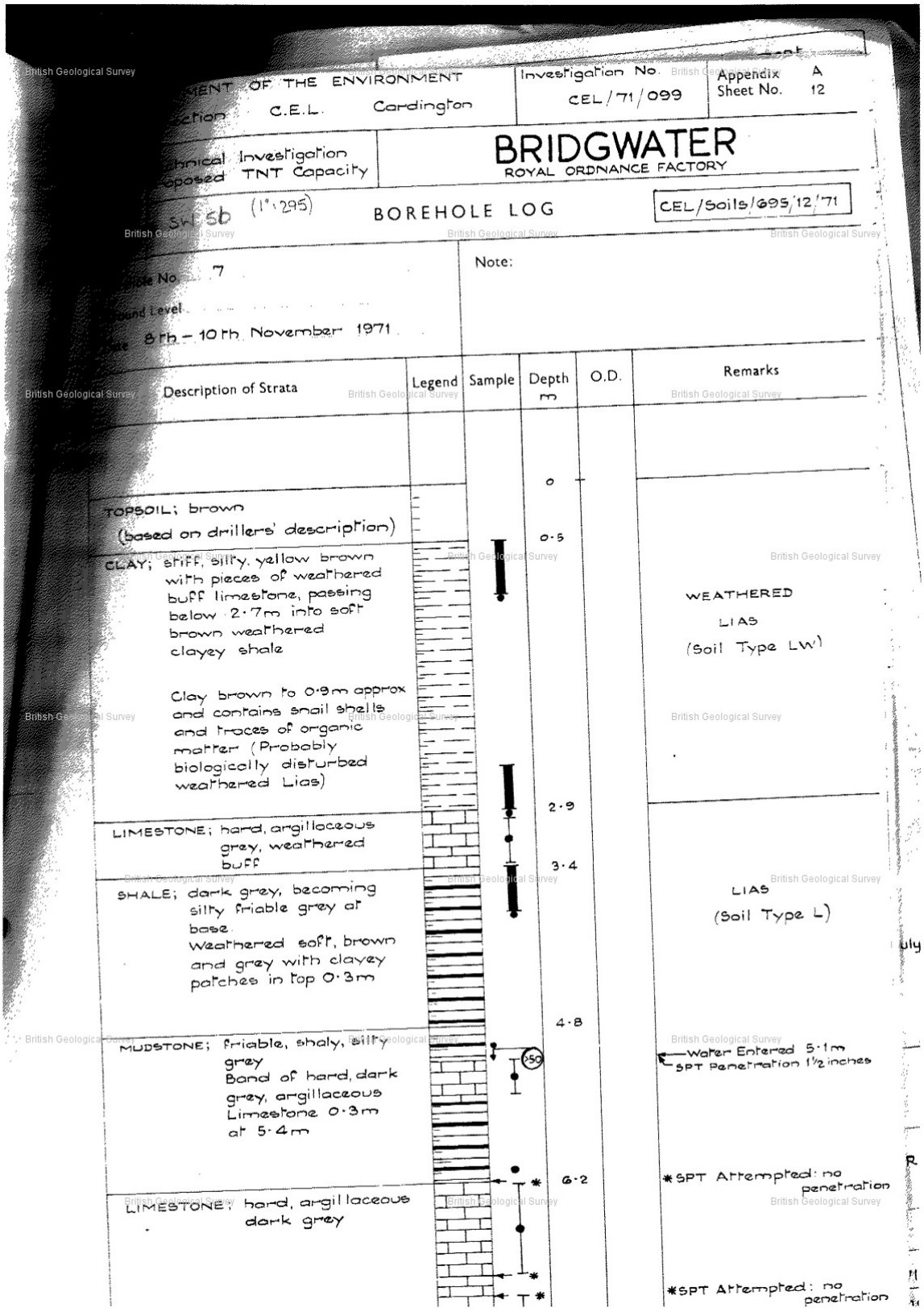
<< < Prev Page 1 of 2 Next > >>



...MENT OF THE ENVIRONMENT
...ction C.E.L. Cardington
Investigation No. CEL/71/099
Appendix A
Sheet No. 12

...hnical Investigation
...posed TNT Capacity

BRIDGWATER
ROYAL ORDNANCE FACTORY

SW 56 (1"=295)

BOREHOLE LOG

CEL/Soils/695/12/71

...le No. 7
...und Level
...te 8th – 10th November 1971

Note:

Description of Strata	Legend	Sample	Depth m	O.D.	Remarks
			0		
TOPSOIL; brown (based on drillers' description)			0·5		
CLAY; stiff, silty, yellow brown with pieces of weathered buff limestone, passing below 2·7m into soft brown weathered clayey shale Clay brown to 0·9m approx and contains snail shells and traces of organic matter (Probably biologically disturbed weathered Lias)					WEATHERED LIAS (Soil Type LW)
LIMESTONE; hard, argillaceous grey, weathered buff			2·9		
SHALE; dark grey, becoming silty friable grey at base Weathered soft, brown and grey with clayey patches in top 0·3m			3·4		LIAS (Soil Type L)
MUDSTONE; friable, shaly, silty grey Band of hard, dark grey, argillaceous Limestone 0·3m at 5·4m		50	4·8		Water Entered 5·1m SPT Penetration 1½ inches
LIMESTONE; hard, argillaceous dark grey		*	6·2		*SPT Attempted: no penetration
		*			*SPT Attempted: no penetration

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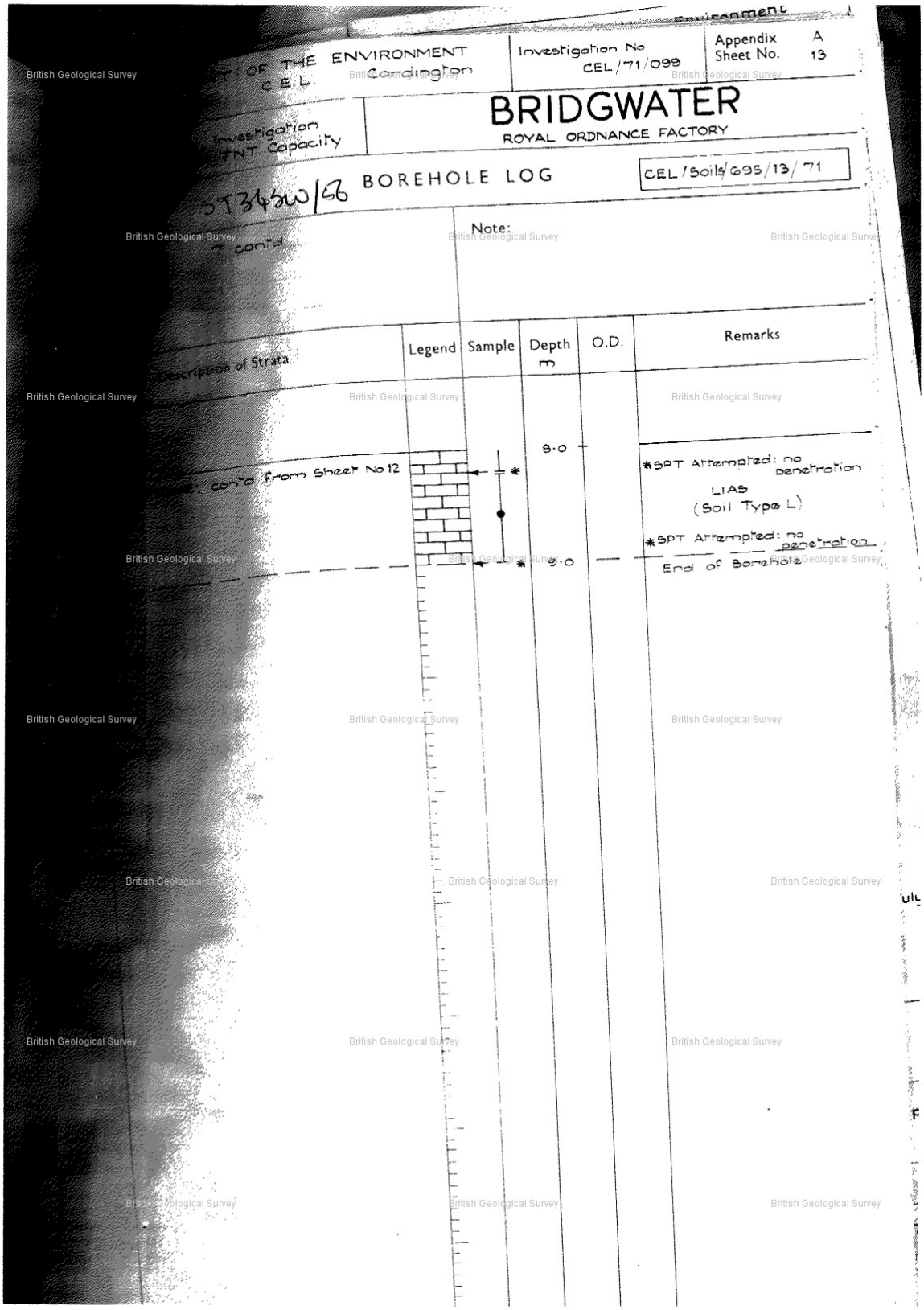
<< < Prev Page 2 of 2 Next > >>



T OF THE ENVIRONMENT
C E L
Cardington

Investigation No
CEL/71/099

Appendix A
Sheet No. 13

Investigation
TNT Capacity

BRIDGWATER
ROYAL ORDNANCE FACTORY

ST34SW/56 BOREHOLE LOG

CEL/Soils/695/13/71

Note:

Description of Strata	Legend	Sample	Depth m	O.D.	Remarks
cont'd from Sheet No 12			8.0		*SPT Attempted: no penetration
					LIAS (Soil Type L)
			9.0		*SPT Attempted: no penetration
					End of Borehole

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Report an issue with this borehole

<< < Prev Page 1 of 2 Next > >>

Department of the Environment
CIVIL ENGINEERING LABORATORY Cardington

Investigation No. FGE / 1796

Appendix A
Sheet No 10

Project HARM

BRIDGWATER
R.O.F.

BOREHOLE LOG

ST 34 SW/64
3370. 4280

Borehole No 5
Ground Level 5·0m A.O.D. approx
Date 20th & 21st November 1982

Note:-
1. Light Cable Percussion Borehole
2. Casing - 200mm dia. to 9·0m below G.L
- 150mm dia to 13·5m below G.L
3. No standpipe installed - borehole backfilled on completion

Description of Strata	Legend	Sample	Depth (m)	O D (m)	Remarks
TOPSOIL, Turf over dark brown clay, numerous roots	T		G.L	8·0	
			0·5	4·5	
CLAY, Grey mottled brown, silty, with numerous small pockets of brown iron pan, friable and blocky structure - Soft to Firm		30	0·7		
			1·0	4·0	Water entry observed at 1·0m below G.L. subsequently sealed by casing at 9·0m below G.L.
			1·2		
CLAY, Light grey, silty, with occasional organic flecks and root remains, blocky structure - Soft (ALLUVIUM)	A	25	2·0		
			2·2		
			2·7		
PEAT, Black brown, mainly amorphous with some fibrous plant debris. Compact with a spongy texture 82% Carbonaceous material	P	25	3·7	1·3	
			4·2		
			4·5	0·5	
CLAY, Light grey, silty, with occasional small peaty pockets and root remains blocky structure - Soft to Very Soft		15	5·2		
			5·7		
	A	15	6·7		
			7·2		
CLAY, As above, very soft, sampling tube sank under own weight - no sample recovery (ALLUVIUM)			8·2		
			8·7		
CLAY, Dark grey, very peaty, with numerous organic streaks and flecks - Soft to Firm		35	9·1		
			9·2		
			9·7		
			9·8		
CLAY, See next sheet			10·0	-5·0	

cont'd

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Report an issue with this borehole

<< < Prev Page 2 of 2 Next > >>

Department of the Environment
CIVIL ENGINEERING LABORATORY Cardington

Investigation No. FGE/1796

Appendix A
Sheet No 11

Project HARM

BRIDGWATER
R.O.F.

ST 34 SW/64
3370 4280

BOREHOLE LOG

Borehole No 5 contd
Ground Level
Date

Note:-

Description of Strata	Legend	Sample	Depth (m)	O D (m)	Remarks
			10·0	-5·0	
CLAY, Grey, fairly silty, with occasional small pockets and lenses of coarse silt, scattered organic flecks. Poorly defined laminae structure - Soft		35	10·7		
			11·2	-6·2	Borehole dry in evening, water seeped in overnight, rose to 10·7m below G.L
	A	40	12·2		
			12·7		
CLAY, Dark grey, very silty, with occasional very thin carbonaceous layers and scattered limestone fragments - Soft (ALLUVIUM)		45	13·5		
			13·7		
			14·2		
		(31)	14·3	-9·3	
			14·4		
CLAY, Yellow brown mottled light grey, very silty and sandy, with a banded appearance, contains very variable amounts of limestone fragments and calcareous nodules - Very Stiff (WEATHERED LIAS)	WL				
		75	15·7		
			16·2		Water level at 8·0m below G.L on completion of boring and prior to pulling casing
			16·3	-11·3	
CLAY/LIMESTONE, Grey, brown interbedded limestone and stiff clay, borehole advanced by chisel - Hard and Stiff (LOWER LIAS)	L	(*)	16·4		
			16·7	-11·7	End of borehole

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<< < Prev Page 2 of 4 Next > >>

1063 Wt. 22438/0384 10M 7/45 (51) F.&S.

RECORD OF WELL (SHAFT OR BORE)

(For Survey use only)
1-inch Map Registered No. 279/21

At Causeway Bridge

Town or Village

County Six-inch quarter sheet 39 SW

For Mr.

Exact site of well Sited on Somerset 39SW/10 7-3-47. ST. 3453 4368 { Attach a tracing from a map, or a sketch-map, if possible.

Level of ground surface above sea level (O.D.) 17·52 ft. If well-top is not at ground level, state how far ... { above; below; ft.

SHAFT ft.; diameter ft. Details of headings ST34/10

BORE ft.; diameter of bore: at top ins.; at bottom ins. Lengths, diameters, perforations, etc., of lining tubes

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

Rest-level of water ft. above / below well-top. Suction at ft. Yield on hours' / days' pumping, gal. per with depression to ft. below well-top, Capacity of pump g.p.h. Recovery to rest level in mins. / hours Date of measurements Date of well 1942

Quality of water (*attach copy of analysis if available*)

Well made by

Information from County Surveyor, Taunton per G.A.K.

Additional notes in space overleaf.

(For Survey use only) Geological Classification	Nature of Strata (If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far)	Thickness Feet	Thickness Ins.	Depth Feet	Depth Ins.
	Made ground	1		1	
	Soft brown clay	11		12	
	Peat	6		18	
	Soft blue clay	55		73	
	Hard stony brown clay	6		79	

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LOG for BOREHOLE No. 2338

Fig.

Location No. 4847

ST 13 SE 1/2

Sheet 1 of 1

Carried out ~~for~~ by mechanical auger

NGR.: 3705. 5427

1" NS. 279

Date 5th DECEMBER 1966 EAST BRENT

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
Ground Level (Ft. above N.D.)	22·3 [6·80m]		1	0 0			
TOPSOIL				1 0 [0·3m]	1 0 [0·3m]		
Firm to stiff, becoming soft to firm with depth, brown slightly silty ~~brown~~ CLAY, occasionally weakly laminated.			2				
			3		7 3		
			4				
[Dessicated Alluvium]				8 3 [2·51m]			
Very soft grey and light brown silty CLAY.			5				
	mottled		6				
			7		10 9		
			8				
			9				PISTON
			10	19 0 [5·79m]			PISTON
Medium dense dark yellow brown and green grey clayey silty fine and medium SAND.			11		8 0		PISTON
			12				PISTON
				27 0 [8·23m]			
Soft to firm blue grey silty CLAY and medium dense blue grey fine and medium sand.			13				PISTON
			14		7 6		PISTON
			15	34 6 [10·51m]			PISTON
			16				PISTON
			17		13 6		PISTON
[All Alluvium]			Δ18			42 6 12"	13
Medium dense and loose blue grey and light brown slightly clayey SILT			•19				
			•20				
clayey				48 0 [14·62m]			
loose green brown fine sandy SILT with patches of fine and medium sand	-27·7				(3 6)		

Scale 1 in.=5 ft.

● Disturbed Sample ♦ Bulk Sample ▮ Tube or Core Sample (Length to scale) △ Water Sample

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<< < Prev Page 2 of 2 Next > >>

CONTINUATION LOG for BOREHOLE No. 2337 Fig.
ST/35SE/12 Sheet 2 of 2

Loc. 4847

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
Sandy SILT (See sheet 1)	-27·7				3 6		
			●21			51 0 12"	28
			●22	51 6 [15·70m]			
Very soft green grey very silty CLAY, becoming dark green grey clayey SILT and light brown clayey SAND and fine GRAVEL with depth.							
			●23			57 0 12"	15
			24		18 6		
			●25			64 0 12"	36
[Alluvium] dark Hard blue grey and yellow green laminated silty CLAY (and fragments of mudstone) [Lower Lias]	-14·5[illegible]		●26	70 0 [21·34m]	1 6	70 6 7½" penetrated	>200 *
	-49·2			71 6 [21·79m]			
End of borehole							

Water Level Observations during boring:-

DATE	TIME	DEPTH OF B.H.	DEPTH OF CASING	DEPTH TO WATER
29.11.66	17.30	42'0"	40'0"	22'0"
30.11.66	08.00	" "	" "	3' 6"
[illegible].12.66	17.30	65'0"	65'0"	19'0"
[illegible].12.66	08.00	" "	" "	5' 6"
3.12.66	17.30	71'6"	70'0"	38'2"
5.12.66	08.00	" "	" "	9'3"

* Extrapolated value

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<< < Prev Page 1 of 1 Next > >>

LOG for BOREHOLE No. 232

Fig. 60

Sheet 1 of 1

Location No. 4765

Carried out by boring rig

Date 1st July 1966

ST 35 SE | 22

3727 · 5462

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	Natural Moisture Content (m)
Ground Level (Ft. above N.D.)	20.6 (6.28)							
TOPSOIL.			1	0 0	1 0			
				1 0 (0.3m)				
Stiff becoming firm grey and brown mottled silty CLAY. (Dessicated Alluvium)			2					m = 23
					6 6			
			3					m = 28
				7 6 (2.29m)				
			4					m = 39
Soft dark blue grey silty CLAY. (Alluvium)								
			5		6 6			m = 59
			6					
			7					m = 67
				14 0 (4.9m)				
Dark grey clayey fine SILT. (Alluvium)			8					m = 58
			9		6 0 pene-			m = 54
Trace of peat.			10		trated			m = 41
	0.6			20 0 (6.1m)				
Water encountered at 8' 6"		END OF BOREHOLE						

Scale 1 in. = 5 ft.

● Disturbed Sample ↕ Bulk Sample ▮ Tube or Core Sample (Length to scale) △ Water Sample

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<< < Prev Page 1 of 1 Next > >>

LOG for BOREHOLE No. 230B Fig. 57

Sheet 1 of 1

ST 35 SE/20
3749. 5498

Location No. 4765

Carried out by boring rig

Date 30th June to 1st July 1966

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	Natural Moisture Content (%)
Ground Level (Ft. above N.D.)	20.4			0 0				
TOPSOIL	(6.22m)				2 6			
			1	2 6 (0.76m)				
Stiff to firm grey and brown mottled silty CLAY. (Dessicated Alluvium) Trace of Peat.			2		4 6			m = 32
			3					m = 28
			4	7 0 (2.1m)				m = 36
Soft grey silty CLAY. (Alluvium)			5		5 6			m = 36
			6	12 6 (3.81m)				m = 180
Brown PEAT with some silty clay. (Fen Peat)					6 6			
	+1.4 (+0.42m)		7	19 0 (5.8m)				m = 122 m = 50
			8					m = 46
Soft grey silty CLAY with a little peat. No peat below 30'. (Alluvium)			9		21 6			m = 55
			10					
Very soft.			11					m = 31
	-20.1 (-6.12m)		12	40 6 (12.34m)				m = 29
Firm to stiff red, with a trace of green, calcareous silty CLAY becoming weak calcareous MUDSTONE. (Weathered Keuper Marl)			13		3 3	42 6		m = 15
			14		pene-	6	78●	m = 12
	-23.3		15	43 9	trated	43 6		
END OF BOREHOLE				(13.34m)		3	196●	

Observation of water levels during boring

Date	Time	Depth of Borehole	Depth of Casing	Depth to Water
30.6.66	1830	30'	30'	Wet
1.7.66	0730	"	"	27'

● Initial Penetration Extrapolated

Scale 1 in. = 5 ft.

● Disturbed Sample ↕ Bulk Sample ▮ Tube or Core Sample (Length to scale) △ Water Sample

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<< < Prev Page 1 of 1 Next > >>

Log Trial Pit

ST46SW

Site ..... CONGRESBURY .....
Job No. ..... 71052 .....
Date ..... 24.11.87. .....
Machine Type ..... HAND AUGER .....
Vertical Scale ..... 1.25 .....

c.j. associates

ST 42 20 63 80

Trial Pit No. 3
Sheet 1 of 1

Depth m	Type	Sample and Testing Details	Ground Water	d m	t m	Legend	Description of Strata	Datum m
0				0.40	0.40		Rough grass over friable grey brown clayey TOPSOIL	
1				1.20	0.80		Firm to stiff friable grey and brown silty CLAY	
	D1	1.50	WATER STRUCK AT 2.70m STANDING 1.50m	2.10	0.90		Firm bluish grey and brown silty CLAY	
2				2.70	0.60		Firm reddish brown silty CLAY	
	D2	2.70		3.00			Firm bluish grey silty CLAY/clayey SILT	
3							END OF TRIAL PIT	
4								
5								

Logged by

Client WESSEX WATER AUTHORITY

Key to symbols
t – thickness d – depth of strata

Remarks Permeability test at 3.00
1st attempt refusal at 1.00

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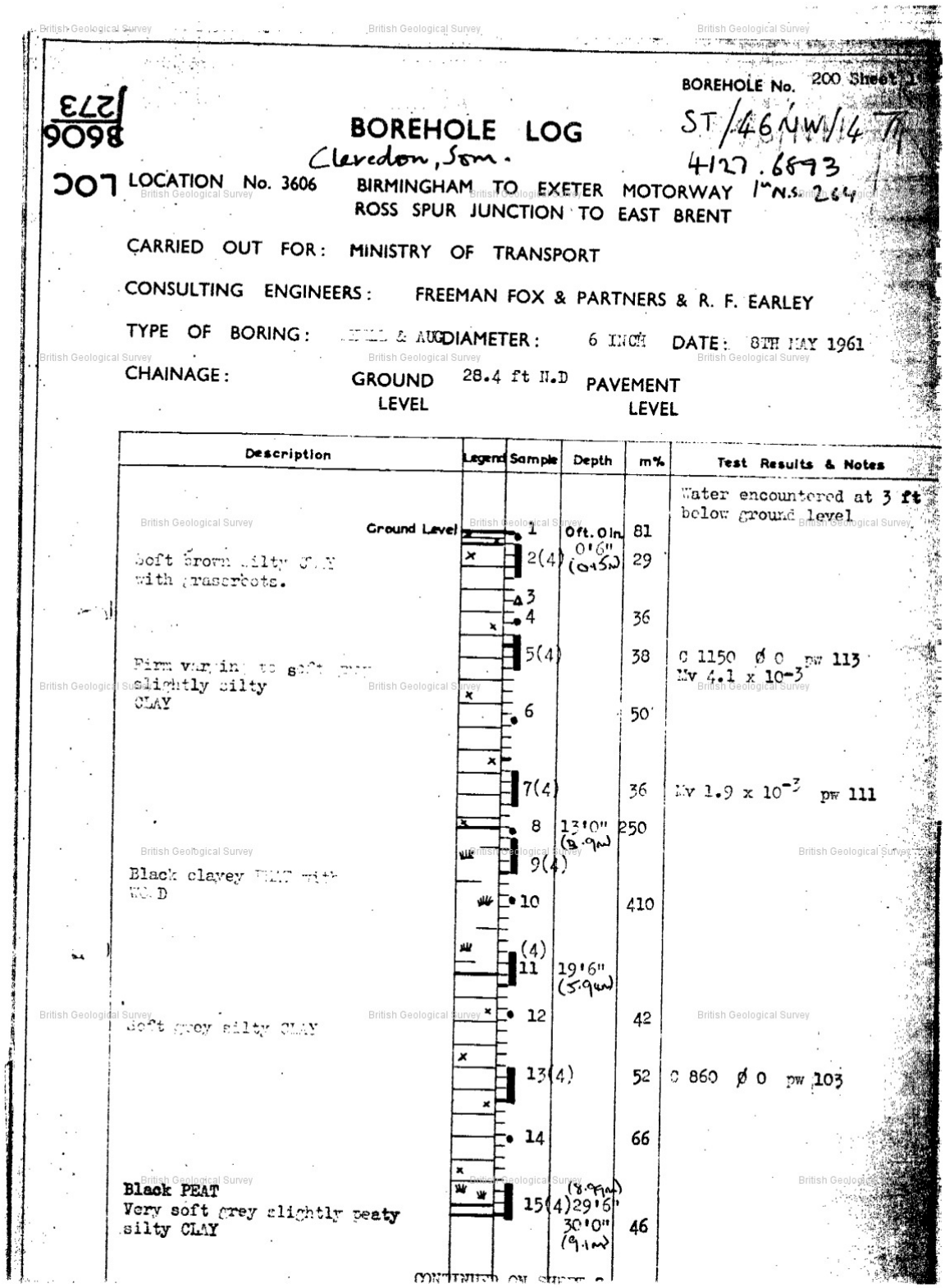
<< < Prev Page 2 of 2 Next > >>



273
9098

BOREHOLE No. 200 Sheet 1
ST/46NW/14
4127.6893

BOREHOLE LOG

Clevedon, Som.

207 LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY M.5. 264
ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: & AUG DIAMETER: 6 INCH DATE: 8TH MAY 1961

CHAINAGE: GROUND LEVEL 28.4 ft N.D PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Water encountered at 3 ft below ground level
Ground Level		1	0ft. 0in.	81	
Soft brown silty CLAY with rootlets.		2(4)	0'6" (0.15m)	29	
		3			
		4		36	
Firm varying to soft grey slightly silty CLAY		5(4)		38	C 1150 Ø 0 pw 113 Mv 4.1 x 10⁻³
		6		50	
		7(4)		36	Mv 1.9 x 10⁻³ pw 111
		8	13'0" (3.9m)	250	
Black clayey PEAT with WOOD		9(4)			
		10		410	
		(4) 11	19'6" (5.9m)		
Soft grey silty CLAY		12		42	
		13(4)		52	C 860 Ø 0 pw 103
		14		66	
Black PEAT Very soft grey slightly peaty silty CLAY		15(4)	(8.9m) 29'6" 30'0" (9.1m)	46	

CONTINUED ON SHEET 2

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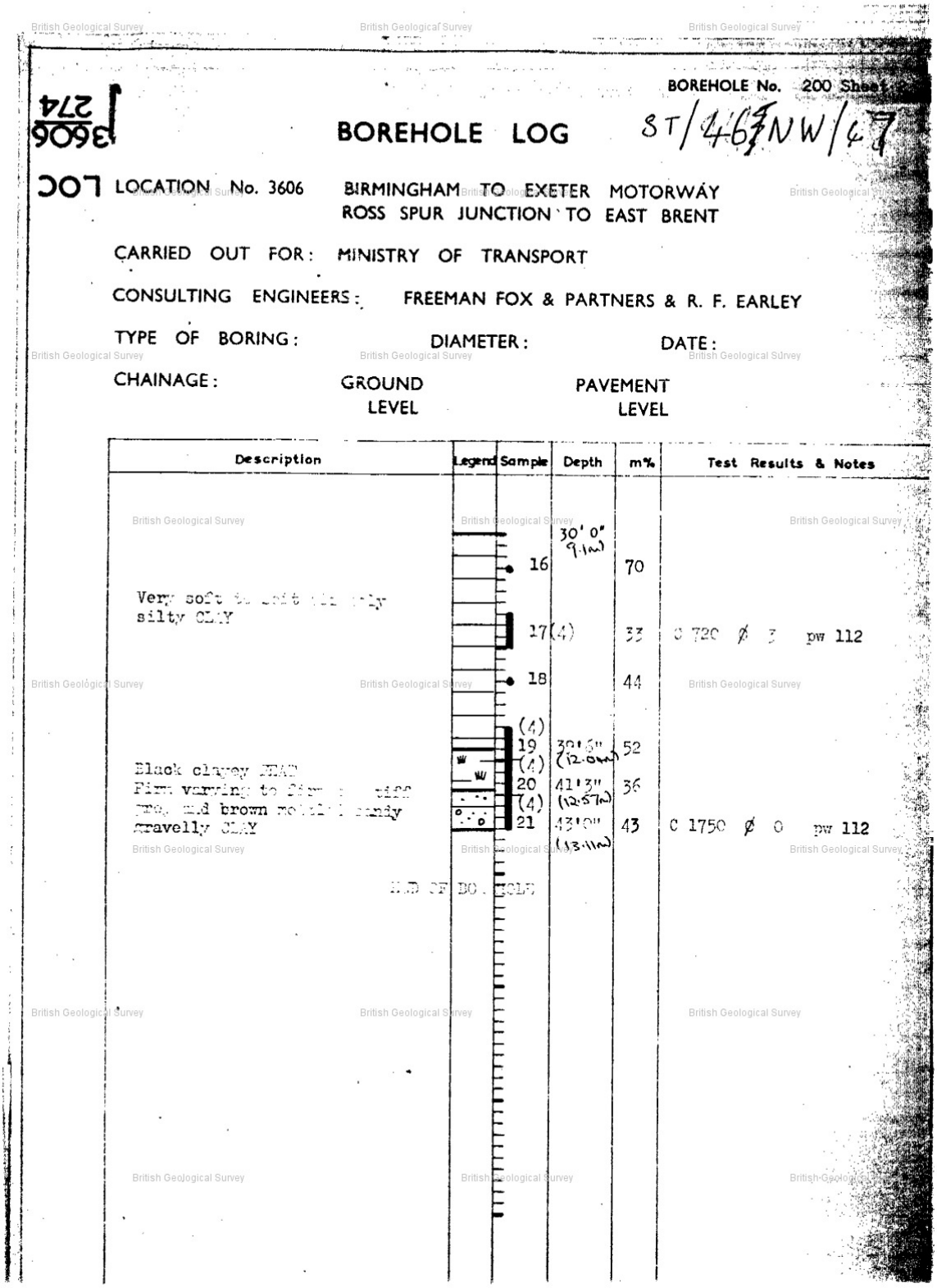
Report an issue with this borehole

<< < Prev Page 1 of 2 Next > >>



BOREHOLE No. 200 Sheet

3606 274

BOREHOLE LOG ST/46NW/47

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY
ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: DIAMETER: DATE:

CHAINAGE: GROUND LEVEL PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
			30' 0" (9.1m)		
		16		70	
Very soft ... silty CLAY		17	(4)	33	C 720 ø 3 pw 112
		18		44	
			(4)		
	W	19	39' 6" (12.04m)	52	
Black clayey ... Firm varying to ... stiff ... mid brown ... sandy gravelly CLAY	W		(4)		
		20	41' 3" (12.57m)	36	
			(4)		
		21	43' 0" (13.11m)	43	C 1750 ø 0 pw 112
END OF BOR... (CLAY)					

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<< < Prev Page 1 of 1 Next > >>

BOREHOLE No. 226

ST/46NW/50
4153.6633

BOREHOLE LOG

Clevedon, Som.

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY
ROSS SPUR JUNCTION TO EAST BRENT

1st N.S. 264

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: H. WG DIAMETER: 6 INCH DATE: 17TH MAY 1961

CHAINAGE: GROUND LEVEL 26.9 ft. O.D PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Water encountered at 3'6" below ground level.
Ground Level			0ft. 0in.		
		1		31	
Soft brown silty CLAY with some fine GRAVEL		2		31	
		3(1.)		30	C 710 pw 103
		4			
		5	5'0" (1.5m)	117	
Black PEAT		6(1.)	7'0" (2.1m)	28	C 960 pw 111
Soft to firm grey silty CLAY			10'0" (3.1m)		
Firm to stiff mottled brown and green to blue silty CLAY		7(1.)		11	C 950 pw 126
		8(1.)	11'9" (3.58m)	23	C 1750 pw 118
(Alluvium)					

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

LOG for BOREHOLE No. 158B Fig. 89

Location No. 4765 Sheet 1 of

Carried out by mechanical auger

Date 18th January, 1967

ST 46 NW/67

4061 · 6687

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	Natural Moistur Content (m)
Ground Level (Ft. above N.D.)	17.7 (5.39m)			0 0				
TOPSOIL			1		1 6			
				1 6 (0.46m)				
Firm grey and brown mottled silty CLAY (Dessicated Alluvium)			2		6 6			Piston m = 30
Blue grey			3					
			4					m = 39 Piston
Brown peat			5	8 0 (2.4m)				
Soft blue grey silty CLAY with traces of peat (Alluvium)			6		7 0			
			7					m = 53 Piston
			8					
Dark brown PEAT (Fen Peat)				15 0 (4.6m)	3 6			
Firm and soft to firm blue grey silty CLAY and traces of peat (Alluvium)			9	18 6 (5.64m)	3 6			
			10					
Firm red brown silty sandy CLAY with traces of fine and medium mudstone gravel			11	22 0 (6.7m)	3 6			Piston
			12					
			13					
Firm blue grey silty sandy CLAY, becoming dense pale grey slightly clayey SILT with traces of fine gravel (Alluvium)			14	25 6 (7.77m)	3 0	25 6 27 0	19 46	
			15			12		
				28 6 (8.69m)				
			16			30 6 32 0	28	
			17			12	83	
Weak red MUDSTONE								
			18			35 6 37 0	22	
(Weathered Keuper Marl)			19			12	50	
					24 6 penetrated			
			20			40 6 42 0	21	
			21			12	48	
						45 6 47 0	15	
			22			12	24	
Weak green siltstone			23					
	-32.3							

Scale 1 in. = 5 ft.

● Disturbed Sample ↕ Bulk Sample ▮ Tube or Core Sample (Length to scale) △ Water Sample

SOIL MECHANICS LTD., 65 Old Church Street, London, S.W.3.

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<< < Prev Page 2 of 2 Next > >>

ST 46 NW / 67

CONTINUATION LOG for BOREHOLE No. 158B

Fig. 89
Sheet 2 of 2

Loc. 4765 Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)
	-32.3						
(Weathered Keuper Marl)			● 24		(24 6)	50 6	
			● 25		pene-	12	67
Medium strong					trated		
	-35.3		Δ 26	53 0		52 0	
				(16.2m)		Nil	>200 ❶
END OF BOREHOLE							

Depth to water at completion was 7' 4"

❶ Initial penetration extrapolation

ST 46 NW / 67

4061 6687

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<< < Prev Page 1 of 1 Next > >>

LOG for BOREHOLE No. 157

Fig. 88

Sheet 1 of 1

Location No. 4765

Carried out by mechanical auger

Date 18th January, 1967

ST 46 NW/66

4068 · 6720

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	
Ground Level (Ft. above N.D.) TOPSOIL	19.2		1	0 0	1 0			
Sandy (5·8m)			2	1 0 (0·3m)				
Firm to stiff, becoming firm with depth, green grey and brown mottled silty CLAY (Dessicated Alluvium)			3		5 6			
			4					Piston
			5	6 6 (1·98m)				
Soft and soft to firm dark blue grey silty sandy CLAY (Alluvium)			6					
Traces of peat			7					
			8		12 6			Piston
Traces of Peat			9					
			10					Piston
Clayey			11					
Dark brown woody PEAT (Fen Peat)			12	19 0 (5·8m)	2 6			
			13	21 6 (6·55m)				
			14					Piston
			15					
Soft blue grey silty sandy CLAY with traces of peat (Alluvium)			16					
			17		12 6 pene-trated			Piston
			18					
Brown grey woody peat			19					
			20					Piston
	-14.8		21	34 0 (10·4m)				
END OF BOREHOLE								

Depth to water at completion was 0 ft.

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<< < Prev Page 1 of 1 Next > >>

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)
6-inch Map Registered No. ST/46NW/9

Name of Shaft or Bore given by Geological Survey: 9

Name and Number given by owner: Yeo Valley 11A

For whom made Maynard, Frond, Stevens

Town or Village Kenn County Som.

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

Purpose for which made Trial

Nat. Grid Reference 4140.6759

1"N.S.Map No.	1"O.S.Map No.	Confidential or not
264		

Ground Level at shaft bore relative to O.D. ... If not ground level give O.D. of beginning of shaft bore ...

Made by N.S.W. Brodie & Co Ltd. Date of sinking 1963

Information from ... Date received ...

Examined by ...

SPECIMEN NUMBERS AND ADDITIONAL NOTES

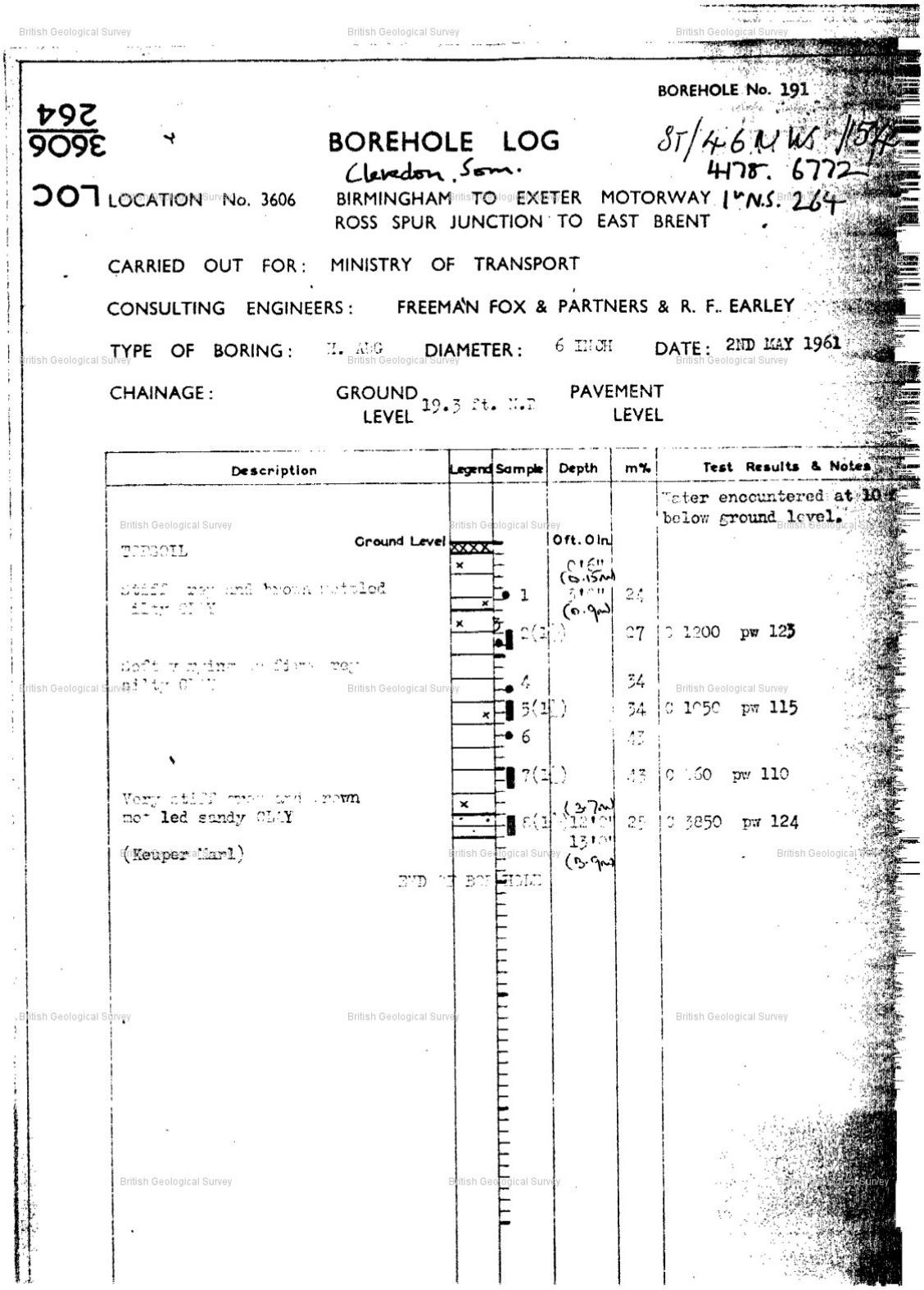
(For Survey use only) Geological Classification	Description of Strata	Thickness Ft Metres	Thickness in.	Depth Ft	Depth in.
	Topsoil	0.45m		1	6
	Brown clay	1.06m		3	6
	Grey blue clay	2.44m		8	
	Hole Bored 8ft.				

DS 9023/1 2585 4m 11/61 XL

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>



BOREHOLE No. 191

264
3606
207

BOREHOLE LOG

Clevedon Som.

ST/46NW5 15/4
4478. 6772

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY 1st N.S. 264
ROSS SPUR JUNCTION TO EAST BRENT

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: H. A&C DIAMETER: 6 INCH DATE: 2ND MAY 1961

CHAINAGE: GROUND LEVEL 19.3 Ft. O.D. PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Water encountered at 10 ft below ground level.
Ground Level			0ft. 0in.		
TOPSOIL			0'6" (0.15m)		
Stiff grey and brown mottled silty CLAY		1	2'0" (0.6m)	24	
		2(U)		27	C 1200 pw 123
Soft to firm grey and brown very		4		34	
silty CLAY		5(U)		34	C 1050 pw 115
		6		42	
		7(U)		43	C 1160 pw 110
Very stiff grey and brown mottled sandy CLAY		8(U)	12'4" (3.7m) 13'0" (3.9m)	25	C 3850 pw 124
(Keuper Marl)					
END OF BOREHOLE					

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

ST/46NW/31

NOTT. BRODIE & Co., Ltd.

BORING RECORD.

Site: Yeo Valley Kenn. Somerset
For: Maynard, Frood & Stevens
Boring Type:
Rig: Pilcon 1"NS.264
Diameters/Depths: 6" NGR: 4248.6846

Hole No: 61
Sheet: 14
N.B. Ref: 31/26
Dates - start: 6-4-63
finish: 7-4-63
Operative: K. Clark

Depths/RLs Strata	Depths/RLs Others	Sample Nos:	Strata:	Remarks:	Tests Etc.
GL.			Fill. ing gravelly rubble & boulders.		
3-6	3-8	D	Black. Appeared to be bed of old stream.		WS
5-8	5-8	D	Soft rock (?Permian sandstone).	Water ceased	
10-4	10-0	SPT D	Became hard.		96/5" on ¼

U.S. = 4" Undisturbed Sample. SPT = Standard Penetration Test. Scale 1" = 4-0
D. DISTURBED SAMPLE.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

SCOTT, BROWN & Co., LTD.

ST/46 NW/26

BORING RECORD.

Hole No: 55
Sheet: 9
N.B. Ref: 81/26
Dates - start: 26-3-63
finish: 28-3-63
Operative: A. Cotterell.

Site: Yeo Valley Kenn. Somerset
For: Maynard, Ford & Stevens
Boring Type: Rig: Sykes 1"NS. 264
Diameters/Depths: 6" NGR: 4340 . 6909

Depths/RLs Strata	Depths/RLs Others	Sample Nos:	Strata:	Remarks:	Tests Etc.
GL					
	1-3	D	Peat.		WT 1-6
2-0			Brown & grey clay		
3-3	3-6	D	grey clay.		
	8-0	U4	water stopped (from top) entering; began again 32-3.		30 flows.
15-0					
	16-0	D	Peat		
	17-8	U4			
20-0			Grey silt.		
	25-0	D			
27-6			Peat.		
	30-0	D			
31-0			Gravel & Peat.		
	32-3	D	water returned 1-6		
	32-6	W	probably from above.		
38-0		D	Red marl & grit.		

U4 = 4" Undisturbed Sample. SPT = Standard Penetration Test. Scale 1" = 8'
D = DISTURBED SAMPLE. WT = WATER TABLE.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

NOTT, BRODIE & Co., Ltd.

ST 14 6NW/35

BORING RECORD, Nailsea, Somerset

Site: Yeo Valley
For: Maynard, Frowd & Stevens.
Boring Type:
Rig: Ayles 1"NS. 264
Diameters/Depths: 6" NGR: 4377.6947

Hole No: 57
Sheet: 11
N.B. Ref: 31/26
Dates - start: 2-4-63.
finish: 4-4-63.
Operative: A. Cottrell.

Depths/RLs Strata	Depths/RLs Others	Sample Nos:	Strata:	Remarks:	Tests Etc.
GL			Topsoil		
1-10			Brown & grey clay.		WT at 1-11 on clay surface.
	3-0	D			
5-0			Grey clay.		
	7-9	U4			18/18"
16-0			Peat		
	21-6	U4			28/18"
25-0			Grey silt		
	27-6	D			
30-0	31-0	D	Light brown slurry (very soft 31-6 rose in casing overnight).	GW. NL	NIL 3-0
34-0			Gravel & grit		
	37-0	D			
39-0	39-6	D	Sand & grit		
41-6	42-6	SPT/0	Red Marl.		10/14, 14, 14, 14. (56)

U4 = 4" Undisturbed Sample. SPT = Standard Penetration Test. Scale 1" = 8-0
D = DISTURBED SAMPLE. WT = WATER TABLE.

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NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)

6-inch Map Registered No.

ST/47SE/50

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Yeo Valley 40

For whom made Long Ashton RDC.

Town or Village Tickenham County Som

Exact site

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

Purpose for which made Trial

Nat. Grid Reference 4611.7171

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
264		

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking 1983

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) Geological Classification	DESCRIPTION OF STRATA	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
	Topsoil	0·30m		1	
	Brown ~~Grey~~ clay	1·83m		6	
	Grey clay	1·98m		6	6
	Brown clay	2·90m		9	6
	Grey shale	3·05m		10	
	Hole Ends: 10ft.				

(5412) Wt.32837/PS.154 2m 10/64 G.W.B.Ltd. Gp.863

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(*For Survey use only*)

6-inch Map Registered No.

ST/47SE/51

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Ivy Valley 42

For whom made Long Ashton R.D.C.

Town or Village Tickenham County Som.

Exact site

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

Purpose for which made

Nat. Grid Reference 4852.7162

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
264		

Ground Level at shaft bore relative to O.D. If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking 1913

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(*For Survey use only*) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.
	Topsoil	0.15m			6
	Sandy sub-soil	2.93m		9	6
	Red Rock	2.93m		9	6
	Hole Ends: 9ft 6ins				

(5412) Wt.32837/PS.154 2m 10/64 G.W.B.Ltd. Gp.863

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Report an issue with this borehole

<< < Prev Page 2 of 2 Next > >>

ST47/24

D STRATA LOG

Geological Classification (BGS only)	Description of strata	Thickness m	Depth m
	1st 6m mud and gravel, 6-15mbd sandstone, from 15m-depth limestone.		

(continue on separate page if necessary

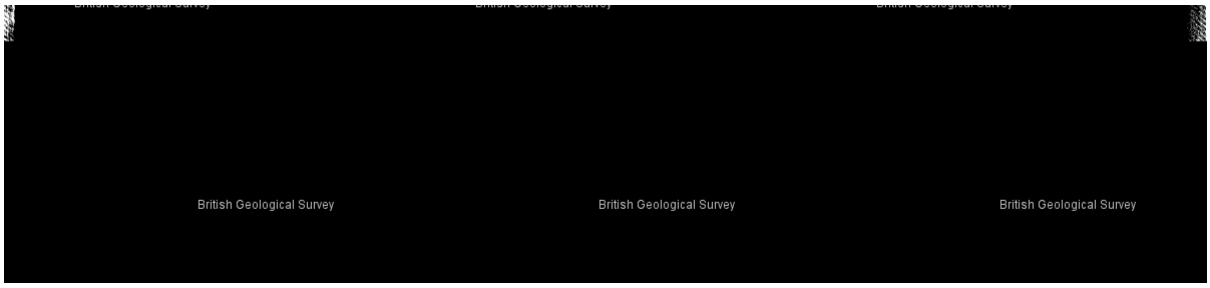
Other comments (e.g. gas encountered, saline water intercepted, etc.)

FOR OFFICIAL USE ONLY

FILE CONSENT NO. NGS REF NO.

LIC NO. PURPOSE NRA REF NO.

DATE REC: COPY TO: ENTERED BY: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GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No. ST/47SE/18

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: M5 Motorway (R. Avon - E. Brent) 1114

For whom made Freeman, Fox & Partners

Town or Village Clayton in Yatton County Somerset

Exact site (Attach a tracing from a map, or a sketch-map, if possible.)

Purpose for which made trial

Nat. Grid Reference 4864. 7468

1"N.S. Map No.	1"O.S. Map No.	Confidential or not
264		

Ground Level at shaft bore relative to O.D. ..... If not ground level give O.D. of beginning of shaft bore .....

Made by Soil Mechanics Ltd Date of sinking 1966

Information from examination of cores Date received 26/8/66

Examined by D.B. Travers

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	Description of Strata	Thickness Ft	Thickness in.	Depth Ft	Depth in.
	No core	11	—	11	—
				3.36m	
	Conglomerate well cemented, mainly large pebbles & grey limestone				
Dolomitic Conglomerate (Kenn)	in fine matrix	2	6	13	6
				4.12m	
	Conglomerate, probably poorly cemented with small pebbles —				
	core recovery very poor	1	—	14	6
				4.42m	
	Conglomerate & large grey limestone pebbles with occasional red and grey sandstone, calcite and soft limonite in a matrix of hard fine marl and with occasional cavities with limonite and haematite	14	6	29	—
				8.85m	

C.B.H. 34134-Wt.58370-Dd. PS 54-2000-2/60

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<< < Prev Page 1 of 2 Next > >>

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Borehole Number
M4/M5 Improvement Scheme : M5 Naish Hill	BHF6

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion		27.72	Birse Civils Limited	J5005
	Location	**Dates**	**Engineer**	**Sheet**
	348849.86 E 174847.28 N	16/02/2005-18/02/2005	Faber Maunsell Ltd.	1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	B1					(0.50)	MADE GROUND: Grass over red-brown sandy gravelly CLAY with many cobbles of sandstone. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. Sand is fine.		
0.50-1.00	B2				27.22	0.50			
						(0.50)	MADE GROUND: Red-brown very clayey sandy angular to sub-rounded fine to coarse GRAVEL of sandstone with some cobbles. Cobbles are angular to sub-rounded of sandstone.		
					26.72	1.00			
1.20-1.52	SPT 50/170			3,7/12,31,7			MADE GROUND: Very stiff red-brown slightly sandy gravelly CLAY with occasional cobbles and possible boulders. Gravel and cobbles are angular to sub-rounded fine to coarse of sandstone.		
1.20-1.70	D3								
1.70-2.20	B4								
2.20-2.43	SPT 25*/100 50/125			15,10/27,23		(2.70)			
2.20-2.70	B5								
							Stiff.		
3.20-3.65	SPT N=28			9,7/7,7,7,7					
3.20-3.70	D6								
					24.02	3.70			
3.70-4.20	B7					(0.50)	Very clayey very sandy GRAVEL. Gravel is angular to sub-rounded fine to coarse of sand stone.		
					23.52	4.20			
4.20-4.59	SPT 25*/90 N=44			21,4/13,15,8,8			MADE GROUND: Very stiff red-brown slightly sandy gravelly CLAY with occasional cobbles and possible boulders. Gravel and cobbles are angular to sub-rounded fine to coarse of sandstone. Dark brown		
4.20-4.70	D8								
4.70-5.20	B9								
							Stiff.		
5.70-6.15	SPT N=25			5,5/7,6,6,6			Slightly gravelly		
5.70-6.20	D10								
6.20-6.70	B11								
						(6.00)			
7.20-7.65	SPT N=27			6,5/8,6,6,7					
7.20-7.70	D12								
7.70-8.20	B13								
8.70-9.15	SPT N=31			11,9/7,8,9,7					
8.70-9.20	D14								
9.20-9.70	B15								

Remarks	Scale (approx)	Logged By
	1:50	CG
	Figure No.	

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NATURAL ENVIRONMENT RESEARCH COUNCIL

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<< < Prev Page 2 of 2 Next > >>

British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL				Site: M4/M5 Improvement Scheme : M5 Naish Hill	Borehole Number: BHF6
Boring Method: Cable Percussion	Casing Diameter:	Ground Level (mOD): 27.72		Client: Birse Civils Limited	Job Number: J5005
	Location: 348849.86 E 174847.28 N	Dates: 16/02/2005-18/02/2005		Engineer: Faber Maunsell Ltd.	Sheet: 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					17.52	(6.00) 10.20			
10.20-10.65	SPT N=18			4,2/3,3,4,8			Firm to stiff red-brown sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. Sand is fine to medium.		
10.20-10.70	D16								
10.70-11.20	B17					(1.20)			
11.20-11.36	SPT 25*/80 50/75			22,3/45,5	16.32	11.40	Very stiff.		
11.20-11.40	D18						Complete at 11.40m		

Remarks	Scale (approx)	Logged By
	1:50	CG
	Figure No.	

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NATURAL ENVIRONMENT RESEARCH COUNCIL

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<< < Prev Page 1 of 1 Next > >>

BOREHOLE No. 179

252
3606

BOREHOLE LOG

NGR. 4936. 7541 1" N.S. 264

LOCATION No. 3606 BIRMINGHAM TO EXETER MOTORWAY
ROSS SPUR JUNCTION TO EAST BRENT ST 14 NE/1
PORTBURY

CARRIED OUT FOR: MINISTRY OF TRANSPORT

CONSULTING ENGINEERS: FREEMAN FOX & PARTNERS & R. F. EARLEY

TYPE OF BORING: H. Aug. DIAMETER: 6 inch DATE: 6th May, 1961

CHAINAGE: GROUND LEVEL 26.2 ft. O.D. PAVEMENT LEVEL

Description	Legend	Sample	Depth	m%	Test Results & Notes
					Water encountered at 7'0" below ground level and rose to 3'3"
Ground Level			0'0 in.		
			1'0" (0.3m)		
Brown fine and medium SAND, slightly clayey in places, gravelly near base.		1		18	
		2		21	Class 3F - CL
		3		14	
		4		31	Class 3F - CL
(Keuper - Trias)		5	8'6" (2.59m)	16	
END OF BOREHOLE					

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

ST 47/11

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: 93 Broad Street.
LEEDS BRANCH: [redacted]don Chambers, King Street.

CHART

of Borehole at Portishead Water Co., Portishead, Somerset.

Bored by ..... Date Commenced 7. 4. 1916. 19

Water Levels: Standing Overflow. Ft. Pumping 48 Ft. „ Completed 6. 6. 1916. 19

Supply 7,158 Galls. per hour. Analysis if made .....

Lined with 127' ft. 6 Ins. of 11½ Ins. Tubes 2'0" Ft. ~~above~~ below Surface.

Boring Stage above below Ground or Street Level ..... Ft. Height above Sea Level ..... Ft.

Stratum	Thickness.		Total.		Water level. Rods in	Rods out
Mould	1	0	1	0		
Brown Clay	5	0	6	0		
Blue Clay	11	0	17	0		
Peat	-	6	17	6		
Sand & Clay	19	6	37	0		
Brown Clay	6	0	43	0		
Red Marl	33	0	76	0		
Red Marl	53	6	129	6		
Marl & Limestone	9	0	138	6		
Marl Marl	36	6	175	0		
Marl & Sandstone	21	0	196	0		
Hard Marl	4	0	200	0		

Alluvium

Keuper Marl & Sandstone

copied for well box 5.4.32 RJ.

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Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Site	Number
M4/M5 Improvement Scheme : M5 Naish Hill	WSF15

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler		7.54	Birse Civils Limited	J5005
	Location	**Dates**	**Engineer**	**Sheet**
	349792.38 E 175585.19 N	16/02/2005	Faber Maunsell Ltd.	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.40	B1				(0.40)	MADE GROUND: Soft to firm brown gravelly CLAY. Gravel is sub-angular fine to coarse of siltstone. Abundant rootlets and roots with occasional wood fragments.		
0.40-1.20	B2			7.14	0.40			
			Water strike(1) at 0.80m.		(0.80)	MADE GROUND: Light brown very clayey gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of siltstone and flint with occasional rootlets.		▽1
1.20-1.40	U10			6.34	1.20			
1.60-1.90	D3				(1.30)	MADE GROUND: Red-brown slightly gravelly fine to coarse SAND. Gravel is sub-angular fine of siltstone.		
2.10-2.40	D4							
2.50-2.80	D5			5.04	2.50			
					(0.70)	MADE GROUND: Soft red-brown sandy slightly gravelly CLAY. Gravel is sub-angular fine to medium of siltstone.		
3.30-3.60	D6			4.34	3.20			
3.80-4.10	D7					Red-brown sandy sub-angular to sub-rounded fine to coarse GRAVEL of siltstone and flint. Sand is fine to coarse.		
4.40-4.70	D8				(3.05)			
6.30-6.50	D9			1.39	6.25			
				1.24	(0.05)	Soft red-brown sandy CLAY.		
6.50	W12			1.04	6.30	Weak red-brown MUDSTONE		
					(0.20)			
					6.50	Complete at 6.50m		

Remarks	Scale (approx)	Logged By
	1:50	DE
	Figure No.	

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<< < Prev Page 1 of 1 Next > >>

LOG for BOREHOLE No. 303 Fig. 19

Sheet 1 of 1

Location No. 4765

Carried out by mechanical auger

Date 20th July 1966

ST 57 NW /123
5054 · 7583

Description	Reduced Level: ft.	Legend	Sample	Depth ft. in.	Thickness ft. in.	Standard Penetration test: Depth and Penetration ft. in.	Standard Penetration test: No. of Blows (N)	Natural Moisture Content (m)
Ground Level (Ft. above N.D.)	20.0 (6.1m)			0 0				
TOPSOIL clayey			1	0 6 (0.15m)	0 6			m = 132
			2					m = 352
Spongy dark brown to black PEAT			3		8 9			
(Fen Peat) clayey			4					
				9 3 (2.82m)				
Brown silty CLAY with traces of fine gravel and red silty clay			5		3 0			m = 48
(Alluvium)			6	12 3 (3.73m)		13 0 12	43	m = 15
			7					m = 18
Weat red MUDSTONE and Stiff, red, feebly calcareous, silty CLAY, with traces of yellow sandstone			8		14 9	18 0 12	31	m = 14
(Weathered Keuper Marl)			9					m = 13
			10			23 0 12	26	m = 10
red and green mottled	-7.0		11 12	27 0 (8.2m)				m = 3
END OF BOREHOLE								

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<< < Prev Page 1 of 2 Next > >>

TERRESEARCH LIMITED

BOREHOLE NO. 12 ST57NW/280

Contract Name PORTBURY Report No. S.963/16

Ground Level + 23.8 Diameter of Boring 8" and HX

Water Struck 7' 6" and 21' 0" Method Shell/auger and Rotary Diamond

Standing Water Level 6' 0" Start 5.10.66 Finish 14.10.66

REMARKS: 2 hours CHISELLING HARD MARL. from 21' 0" - 23' 0"

CR 5087.7645.

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
				0' 3" J1118	
Topsoil	0' 6"	0' 6"	23.3	2' 6" J1119	3' 0" U1120
Firm to soft mottled silty clay	7' 0"	7' 6"	16.3	8' 0" B1121	8' 0" N = 12
Medium sand gravel and silty clay	7' 6"	15' 0"	8.8	10' 6" J1122	15' 0" U1123
Firm to hard red marl	4' 0"	19' 0"	4.8	17' 6" J1124	19' 6" U1125
Hard red marl	4' 6"	23' 6"	+ 0.3	22' 6" J1126 23' 0" J1127	23' 0" N = 53
DIAMOND CORE DRILLING Red marl with clay and pebbles	3' 6"	27' 0"	- 3.2	W1128 Core length 0' 11" Recovery % 25	Remarks thick red water return
Red marl with clay and pebbles	5' 0"	32' 0"	- 8.2	1' 0" 20	thick red water return
Red marl with clay and pebbles	5' 0"	37' 0"	- 13.7	1' 0" 20	thick red water return
Red marl with clay and pebbles	5' 0"	42' 0"	- 18.2	2' 0" 40	
Red marl with clay and pebbles	5' 0"	47' 0"	- 23.2	2' 5" 50	
Red and grey marl with pebbles	3' 0"	50' 0"	- 26.2	2' 6" 83	
TOTALS				continued.....	

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<< < Prev Page 2 of 2 Next > >>

TERRESEARCH LIMITED

BOREHOLE NO. 12 (continued) ST57NW/280

Contract Name PORTBURY
Report No. S.963/16
Ground Level +23.8
Diameter of Boring 8" and NX
Water Struck 7' 6" and 21' 0"
Method Shell/auger and Rotary Diamond
Standing Water Level 6' 0"
Start 5.10.66 Finish 14.10.66

REMARKS:

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
DIAMOND CORE DRILLING				Core length / Recovery %	
Red and grey marl with layers of clay	5' 0"	55' 0"	- 31.2	4' 5" 88	
Grey marl	1' 6"	56' 6"	- 32.7	1' 3" 94	
Red marl.	3' 6"			2' 9" 61	
		61' 0"	- 37.2		
Bottom of borehole					
TOTALS	61' 0"	61' 0"			

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Report an issue with this borehole

<< < Prev Page 1 of 2 Next > >>

TERRESEARCH LIMITED

BOREHOLE NO. 14 ST57NW/282.

Contract Name PORTBURY
Report No. S.963/16
Ground Level + 22.1
Diameter of Boring 8" and NX
Water Struck 10' 0"
Method Shell/auger and Rotary Diamond
Standing Water Level 16' 0"
Start 7.10.66 Finish 19.10.66

REMARKS:

GR 5130. 7660.

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
Topsoil	1' 6"	1' 6"	20.6	1' 0" J0902	
				2' 6" J0903	
Stiff to soft mottled silty clay	8' 6"				4' 0" U0904
				7' 6" J0905	
Peat	1' 6"	10' 0"	12.1	10' 6" J0906	
		11' 6"	10.6		11' 6" U0907
Soft grey silt with some clay in places	10' 6"			14' 6" J0908	16' 0" U0909
Peat with some layers of grey silt	2' 0"	21' 0"	1.1	21' 0" B0910	
		23' 0"	- .9	22' 6" J0911	
Peat	5' 6"			24' 0" J0912	
		28' 6"	- 6.4		28' 6" U0913
Firm to stiff red marl	3' 8"			31' 6" J0914	
		32' 2"	- 10.1	32' 1" J0915	32' 1" N = 55 for 2 inches
DIAMOND CORE DRILLING				W0916	
Red marl	1' 4"	33' 6"	- 11.6	Core length 0' 6" Recovery % 41	
Sandstone	3' 0"			3' 0" 100	
		36' 6"	- 14.4		
TOTALS				continued	

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Report an issue with this borehole

TERRESEARCH LIMITED

ST57NW/282

BOREHOLE NO. 14 (continued)

Contract Name PORTBURY Report No. S.963/16

Ground Level + 22.1 Diameter of Boring 8" and NX

Water Struck 10' 0" Method Shell/auger and Rotary Diamond

Standing Water Level 16' 0" Start 7.10.66 Finish 19.10.66

REMARKS:

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples		Undisturbed Samples and Insitu Tests
DIAMOND CORE DRILLING				Core length	Recovery %	
Conglomerate	16' 6"	53' 0"	- 31.1	16' 6"	100	
Conglomerate with bands of sandstone	10' 0"	63' 0"	- 41.1	10' 0"	100	
Bottom of borehole						
TOTALS	63' 0"	63' 0"				

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Report an issue with this borehole

TERRESEARCH LIMITED

BOREHOLE NO. 13

ST57NW/281

Contract Name PORTBURY

Report No. S.963/16

Ground Level + 22.2

Diameter of Boring 6" and NX

Water Struck 20' 0"

Method Shell/auger and Rotary Diamond

Standing Water Level 3' 0"

Start 8.10.66 Finish 22.10.66

REMARKS:

GR 5121. 7699.

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
		0' 6"	21.7		
Topsoil	0' 6"				
				2' 6" J1686	
Firm grey silty clay	5' 6"				3' 6" U1687
		6' 0"	16.2		
Soft blue mottled silty clay	5' 0"			7' 6" J1688	8' 6" U1689
		11' 0"	11.2		
				12' 6" J1690	
Red silty marl	7' 0"			13' 6" B1691	13' 6" N = 4
				17' 6" J1692	
		18' 0"	4.2	18' 6" B1693	18' 6" N = 28
Red marl with gravel	2' 0"				
		20' 0"	2.2		20' 6" U1694
Very stiff marl	1' 0"	21' 0"	1.2		
				W1695	
DIAMOND CORE DRILLING				Core length / Recovery %	
Sandstone with bands of blue clay	1' 0"	22' 0"	+ 0.2	1' 0" 100	
Red marl with layers of sandstone	8' 0"			8' 0" 100	
		30' 0"	- 7.8		
Conglomerate with bands of red marl	5' 6"			5' 6" 100	
		35' 6"	- 13.3		
Conglomerate with bands of sandstone	5' 0"			5' 0" 100	
		40' 6"	- 18.3		
Conglomerate	1' 4"	41' 10"	- 19.6	1' 4" 100	
Sandstone with bands of red marl	3' 8"			3' 6" 97	
		45' 6"	- 23.3		
Red marl	1' 9"			1' 9" 100	
		47' 3"	- 25.0		
Conglomerate	1' 4"	48' 7"	- 6.4	1' 4" 100	
TOTALS				continued.....	

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Report an issue with this borehole

<< < Prev Page 2 of 2 Next > >>

TERRESEARCH LIMITED

BOREHOLE NO. 13 (continued) ST57NW/281

Contract Name PORTBURY
Report No. S.963/16
Ground Level + 22.2
Diameter of Boring 6" and NX
Water Struck 20' 0"
Method Shell/auger and Rotary Diamond
Standing Water Level 3' 0"
Start 8.10.66 Finish 22.10.66

REMARKS:

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
DIAMOND CORE DRILLING				Core length / Recovery %	
Sandstone with bands of red marl	2' 5"	51' 0"	- 28.8	2' 5" 100	
Conglomerate with bands of red marl	13' 8"			13' 8" 100	
		64' 8"	- 42.4		
Bottom of borehole		21m			
TOTALS	64' 8"	64' 8"			

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Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)

6-inch Map Registered No. ST/57NW/41

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Shell Mex Site B.H. 2

For whom made: Ground Exploration Ltd.

Town or Village: Aberavon County:

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

Nat. Grid Reference 5181.7761

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
264		

Purpose for which made: test

Ground Level at shaft bore relative to O.D. ? If not ground level give O.D. of beginning of shaft bore

Made by C. Isler & Co. Ltd. Date of sinking 1947

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	Description of Strata	Thickness Ft.	Thickness In.	Depth Metres	Depth In.
	Brown clay	4	0	1.224	0
	Blue sandy clay & silt	60	0	19.524	0
	Tight compact gravel	2	0	20.1366	0

(3412) Wt.12837/P8.154 2m 10/64 G.W.B.Ltd. Gp.853

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 2 of 3 Next > >>

3

GEOLOGICAL SURVEY AND MUSEUM. BOREHOLES AND SHAFTS.

264

ST 57 NE

(2) bhs

County Glos.

6-in. Map 71

530

BORE for SHAFT Nos. 1 + 4

Avonmouth Docks, Bristol

GSM

at Messrs Spillers, Ltd, Exam. Faber, Eng. Consulting Engineer

Surface level ____ O.D. ____ One-inch Map 264.

Communicated March, 1934 by ?

Date of sinking Feb/Mar, 1933 Borer Messrs R. Richards & Co.

Specimens

Description.	Thickness. Feet.	Thickness. Inches.	Depth. Feet.	Depth. Inches.
Made ground	2	.	2	.
Brown clay	4	.	6	.
Blue clay	12	.	18	.
Grey sandy clay	29	.	47	.
Grey sand	3	.	50	.
Grey clay	2	.	52	.
Grey sand	2	.	54	.
Small stones	1	.	55	.
Sandy clay	2	.	57	.
Running sand	2	.	59	.
Green sandy clay	1	.	60	.
Running sand	2	.	62	.
Sandy clay	2	.	64	.
Sandstone rock	1	6	65	6
Brown clay	1	.	66	6
Sandstone & rock	2	3	68	9
Red clay & sand	11	3	80	.

(B12268) Wt. 13119—0014 5000 9/27 Gp. 160 O.A.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>

GEOLOGICAL SURVEY OF GREAT BRITAIN

RECORD OF SHAFT OR BORE FOR MINERALS

(For Survey use only)
6-inch Map Registered No.
ST/57NW/65

Name of Shaft or Bore given by Geological Survey:

Name and Number given by owner: Royal Edward Dock B.H. 4

For whom made B.P.A.

Town or Village Avonmouth County

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

Purpose for which made trial

Nat. Grid Reference 5120. 7894

1" N.S.Map No.	1" O.S.Map No.	Confidential or not
264		

Ground Level at shaft bore relative to O.D. 34.33 ft If not ground level give O.D. of beginning of shaft bore

Made by Date of sinking 1903

Information from Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only) Geological Classification	Description of Strata	Thickness Ft.	Thickness ~~In.~~	Depth Ft.	Depth ~~In.~~ metres
	Made ground	5·0		5·0	1·52
	Silt	44·0		49·0	14·94
	Dark sand	3·0		52·0	15·86
	Clay & gravel	10·5		62·5	19·06
	Red marl	3·8		66·3	20·20

L.32837/PS.154 2m 10/64 G.W.B.Ltd. Gp.863

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Report an issue with this borehole

<< < Prev Page 1 of 3 Next > >>

ST57NW 435

C L Associates 5168 1953

BOREHOLE No. 3

Sheet 1 of 3

Equipment & Methods: Cable tool boring from 0.00 to 15.00 m, 150 mm diameter; casing from 0.00 to 13.50 m, 150 mm diameter; hole advanced by Pilcon 150 rig.

Location No. 8693

Location: KINGS WESTON CRUDE DISCHARGE, AVONMOUTH

Carried out for: Wessex Water

Ground Level: - - - - -

Coordinates: See site plan

Date: 20.06.94 to 22.06.94

Description	Reduced Level	Legend	Depth (Thick)	Samples/Tests: Depth	Sample Type	Sample No.	Test	Field Records
Dense dark brown and black slightly clayey fine to coarse ash SAND with some subangular to subrounded fine to coarse gravel of brick and bright coal. Some to a little wood fragments. (MADE GROUND)			(1.50)	0.20	D	1a		
				0.20 - 0.80	B	1		
			1.50	1.50 - 1.95	D	2	S N=2	1,-/1,-,1,-
				1.50 - 2.00	D	3		
Soft becoming soft to firm, dark grey brown mottled occasionally black organic very silty CLAY. (DESICCATED ESTUARINE ALLUVIUM)			(2.00)	2.50	D	4		Vane test aborted as clay to firm
				2.50 - 3.50	P	5		0.11 m recovery
			3.50	3.50	D	6		
				3.50 - 3.95	U	7		105 blows 0.33 m recovery
Firm, becoming soft to firm below 5.50m, grey brown mottled blue grey slightly organic very silty CLAY with occasional partially decomposed rootlets. (DESICCATED ESTUARINE ALLUVIUM)				4.30	D	8		
			(2.25)	4.50 - 4.95	D	9	S N=10	1,-/2,2,3,3
Occasional shell fragments				5.40	D	10		
			5.75	5.50 - 6.50	P	11		0.93 m recovery
				6.80	D	12		
				7.00				Aborted vane test
Soft to very soft, becoming very soft below 7.80 m, dark grey and black organic very silty CLAY. (ESTUARINE ALLUVIUM)				7.80	D	13		
Mottled light brown thinly laminated. Laminations have light brown silt coatings. Occasional subhorizontal planar fissures with light brown silt coatings			(4.75)	8.00 - 9.00	P	14		0.98 m recovery
				9.50	D	15		

Remarks
1. Hand dug inspection pit 0.00 to 1.20 m.
2. On completion of boring piezometer was installed at 10.00 m.

Logged by: GAJ

Scale: 1:50

Notes:
Materials are described in accordance with Appendices. For explanation of symbols and abbreviations see Fig. 1. (c) C L Associates 05.08.94/09.40 (Ver 4.1.28)

Fig. B2.4

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Report an issue with this borehole

<< < Prev Page 2 of 3 Next > >>

ST57NW 435

C L Associates

BOREHOLE No. 3

Sheet 2 of 3

Equipment & Methods: As sheet 1	Location No. 8693 Location: KINGS WESTON CRUDE DISCHARGE, AVONMOUTH
Carried out for: Wessex Water	Ground Level: — Coordinates: As sheet 1 — Date: —

Description	Reduced Level	Legend	Depth (Thick)	Samples/Tests: Depth	Sample Type	Sample No.	Test	Field Records
As Sheet 1 - Very soft dark grey and black organic very silty CLAY. (ESTUARINE ALLUVIUM)			(4.75) 10.50	10.00 - 11.00	P	16		1.00 m recovery
Very soft to soft light brown and grey brown possibly very closely fissured very silty CLAY. Fissures randomly orientated smooth and planar. (ESTUARINE ALLUVIUM)			(1.00) 11.50	11.50	D	17		
Very soft dark grey mottled dark grey brown very silty CLAY. (ESTUARINE ALLUVIUM)			(1.00) 12.50	12.00 - 13.00	P	18		1.00 m recovery
Soft to firm light grey mottled light grey brown extremely closely fissured very silty CLAY. Fissures subhorizontal and subvertical orientated smooth to irregular with light brown silt coatings. (ESTUARINE ALLUVIUM)			(2.25)	13.50	D	19		
Loose light grey very thinly laminated SILT. (ESTUARINE ALLUVIUM)			14.75 (0.25p) 15.00	14.00 - 15.00	P	20		1.00 m recovery
BOREHOLE ENDS AT 15.00 m.								

Water Level Observations During Boring

Date	Time	Depth of Hole (m)	Depth of Casing (m)	Depth to Water (m)	Remarks
1994					
20.06	1610	1.20	0.00	DRY	End of shift
21.06	0800	1.20	0.00	DRY	Start of shift
21.06	1600	6.80	6.80	DRY	End of shift
22.06	0800	6.80	6.80	DRY	Start of shift
22.06	1300	15.00	13.50	DRY	Borehole complete - no water struck

Remarks

Logged by: GAJ

Scale: 1:50

Notes:
Materials are described in accordance with Appendices. For explanation of symbols and abbreviations see Fig. 1. (c) C L Associates
All depths and reduced levels in metres. Thicknesses given in brackets in depth column. 05.08.94/09.40 (Ver 4.1.28)

Fig. B2.4

British Geological Survey
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Report an issue with this borehole

<< < Prev Page 1 of 2 Next > >>

Shell and Auger Borehole Log Sheet ST57NW 406

Site:– KINGS WESTON CRUDE DISCHARGE
Job Number:– E0718 5278
Machine Type:– PILCON 7981
Date:– 3.8.94.

Number BH1
Sheet 1 of 1

C.J. associates

Sampling Details	Depth m	Penetration Tests [mm] 75 75 75 75 75 75	Boring Details	Depth m	Thickness m	Legend	Description of Strata	Datum m O.D
D1	0.20			0.15	(0.150)		MADE GROUND (Grey–brown clay – Drillers description)	
				0.50	(0.350)		MADE GROUND (Gravel, cobble size fragments of slag/furnace waste)	
D2	1.20							
U3	1.50		24b 100%r		(2.000)		Firm mottled brown and grey silty CLAY, with occasional small fissures and some live and partly decayed roots. (Alluvium)	
D4 W10	2.20							
U5	2.50		17b 100%r	2.50				
D8	3.20							
U7	3.50		8b 100%r		(2.500)		Soft grey silty CLAY with some black mottling, some decayed roots and an organic odour. (Alluvium)	
D8	4.20							
U9	4.50		6b 100%r					
				5.00			END OF BOREHOLE	

Client WESSEX WATER

Remarks

Inspection pit excavated to 1.20m depth 150mm dia casing to 1.60m depth Small amount of water added to assist drilling from 1.50m onwards.

Chiselling

From [m]	To [m]	Time [hours]

Water Level Observations During Boring

Date	Time	Depth in metres Hole	Casing	Water	Remarks
3.8.94.		5.00	1.60	DAMP	END OF BOREHOLE

Appendix B:-Ground Investigation Requirements

REQUIREMENTS FOR GROUND INVESTIGATION FOR THE PURPOSES OF TOWER FOUNDATION STRENGTHENING

Method

- Trial Pits – Preferred method for ground bearing foundations where conditions allow.
- Cone Penetration Tests (CPT's)/ Window Sampler – Ground profile and design bearing strength parameters for drift deposits.
- Cable Percussive Boreholes - If trial pits unable to assess relative density of granular soil and/or if groundwater encountered restricts target depths of excavation.
- Rotary Boreholes - If rock parameters required for pile/ mini pile/ rock anchor design.

Minimum Requirements

- Companies to be employed with appropriate resources who have experience in working within the Power Industry and in the vicinity of live overhead lines.
- Companies to be employed who have Geotechnical Engineer with a minimum of 3 years relevant experience on site at all times to supervise and log work.
- Sampling and testing in accordance with Specification for Ground Investigation Second Edition (ICE Publishing 2012), BS 5930 and BS 1377.
- Risk Assessments and Method Statements to be provided prior to work commencing.

Aim of Investigation

- Determine soil profile – description on site by a Geotechnical Engineer in accordance with BS5930.
- Ground water – monitor level struck and any rise rate. End of shift/start of shift record water level. Installation as scheduled/site instruction.
- Determination of cohesive strengths.
- Determination of relative density of granular soils (SPT's).
- Determination of rock strength.
- Laboratory testing - minimum: soil (water soluble sulphate), groundwater (sulphate) and pH.
- If encountered determine contaminates in made ground for waste disposal and human health.
- Engineers log/trial pit log/ CPT log fully detailed.
- Report (Factual/interpretative-ref Specification).

Appendix C:-Desk Study Data Sheets

Tower No	Tower Type	Geology - Drift	Geology – Solid	Historical Map Features
VQ043R	L8c_DJT_E3.7_BK_TGN_MET_9XA	Estuarine Alluvium	Mercia Mudstone Group	No historical maps.
CZG1	L8(c)_BK_DT_E3.7	Estuarine Alluvium	Mercia Mudstone Group	No historical maps.
CZG2	L8(c)_BK_D_E3.7	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CZG3	L8(c)_bk_d15_sh	Estuarine Alluvium	Mercia Mudstone Group	Embankment shown to south after 1931, no other issues, field, adjacent drain.
CZG4	L8(c)_BK_D_M3.7	No drift	Blue Anchor Formation	No historical issues, field.
CZG5	L8(c)_BK_d30_sh	No drift	Blue Lias	No historical issues, field.
CZG6	L8(c)_BK_D_E3.7	No drift	Blue Lias	No historical issues, field.
CZG7	L8(c)_BK_d30_sh	No drift	Blue Lias	Located just outside Cats Quarry, field.
CZG8	L8(c)_BK_D_SH	No drift	Blue Lias	Located just outside Cats Quarry, field, adjacent drain.
CZG9	L8(c)_BK_D_SH	No drift	Blue Lias	ROF Bridgewater Factory shown to west, no historical issues at location, field.
CZG10	L8(c)_bk_d15_sh	No drift	Blue Lias	ROF Bridgewater Factory shown to west, no historical issues at location, field.
CZG11	L8(c)_BK_D_E3.7	Estuarine Alluvium	Mercia Mudstone Group	ROF Bridgewater Factory shown to west, no historical issues at location, field, adjacent drain.
CZG12	L8(c)_BK_D_E3.7	Estuarine Alluvium	Mercia Mudstone Group	ROF Bridgewater Factory shown to west, no historical issues at location, field, adjacent drain.
CZG13	L8(c)_BK_D90_SH	Estuarine Alluvium	Mercia Mudstone Group	ROF Bridgewater Factory shown to west, no historical issues at location, field.
CLD1	L12 DJ E3	Estuarine Alluvium	Lower Lias	ROF Bridgewater Factory shown to south, no historical issues at location, field, adjacent drain.
CLD2	L12 D E3	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD3	L12 D E3	Marine and Estuarine Alluvium	Lower Lias	Huntspill River shown to north after 1932 and before 1961, no issues at location, field.
CLD4	L12 D E3	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, Huntspill River to south, adjacent drain.
CLD5	L12 D E3	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, potentially near small building shown in 2009 plan, adjacent drains.
CLD6	L12 D25 E3	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD7	L12 D STD	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD8	L12 D STD	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD9	L12 D STD	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field.
CLD10	L12 D25 E3	Marine and Estuarine Alluvium	Lower Lias	Located next to old track, no further issues, field, adjacent drain.
CLD11	L12 D E3	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD12	L12 D E3	Marine and Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD13	L12 D25 E3	Marine and Estuarine Alluvium	Lower Lias	Potentially located on old building and track prior to 1999, adjacent drain.
CLD14	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD15	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD16	L12 D55 M3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD17	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD18	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, development to east in adjacent field, adjacent drain.
CLD19	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD20	L12 D55 STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD21	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD22	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD23	L12 D25 STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD24	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD25	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD26	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD27	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD28	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD29	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD30	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.

Tower No	Tower Type	Geology - Drift	Geology – Solid	Historical Map Features
CLD31	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD32	L12 D E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain and orchard.
CLD33	L12 D25 E3	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD34	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD35	L12 D STD	Estuarine Alluvium	Lower Lias	No historical issues, field, adjacent drain.
CLD36	L12 D STD	Estuarine Alluvium	Lower Lias/Mercia Mudstone Formation	No historical issues, field, adjacent drain.
CLD37	L12 D M3	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD38	L12 DT (Mk3) M6	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD39	L12 DT (Mk3) STD	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field.
CLD40	L12 D STD	Head Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD41	L12 D STD	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD42	L12 D STD	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD43	L12 D STD	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD44	L12 D25 STD	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD45	L12 D E3	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD46	L12 D E3	Estuarine Alluvium	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD47	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD48	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD49	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD50	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD51	L12 D25 STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD52	L12 D E3	Head/Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD53	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD54	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD55	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD56	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD57	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD58	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD59	L12 D55 STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD60	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD61	L12 D25 STD	Tidal Flat Deposits	Mercia Mudstone Group	Old railway to west now a track (gone by 1975), road to east, field, adjacent wood farm and drain.
CLD62	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD63	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD64	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD65	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD66	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD67	L12 D25 E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD68	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD69	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD70	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD71	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD72	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD73	L12 D25 E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD74	L12 D E3	Peat	Mercia Mudstone Group	Field, possible refuse/slag heap in field to west (1981-1982), no historical issues at location.

Tower No	Tower Type	Geology - Drift	Geology – Solid	Historical Map Features
CLD75	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD76	L12 D E3	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD77	L12 D STD	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD78	L12 D25 E3	Peat/Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field, old coal pit/shaft approx. 1km to the south east.
CLD79	L12 D STD	No drift	Clifton Down Limestone	No historical issues, field.
CLD80	L12 D55 E3	No drift	Mercia Mudstone Group	No historical issues, field. Old quarry and kiln to south east.
CLD81	L12 D STD	No drift	Mercia Mudstone Group	No historical issues, field. Old lime kiln and quarry to south west.
CLD82	L12 D E3	No drift	Mercia Mudstone Group	No historical issues, field.
CLD83	L12 D STD	No drift	Mercia Mudstone Group	No historical issues, field, lime kiln in field to south east.
CLD84	L12 D25 STD	No drift	Mercia Mudstone Group	No historical issues, field.
CLD85	L12 D STD	No drift	Dolostone/Black Rock Limestone	Filed, more recently possible small access track. Quarries to the east.
CLD86	L12 D25 STD	No drift	Black Rock Limestone	DESERTED MEDIEVAL VILLAGE. Quarry to south east (Marl Pit).
CLD87	L12 D STD	No drift	Pennant SST/Portishead Formation	No historical issues, field, farmstead shown to east.
CLD88	L12 D STD	No drift	Portishead Formation-Old Red Sandstone	No historical issues, field.
CLD89	L12 D STD	No drift	Portishead Formation-Old Red Sandstone	No historical issues, field.
CLD90	L12 D E3	No drift	Portishead Formation-Old Red Sandstone	Old field system, no further historical issues, field.
CLD91	L12 D25 E3	No drift	Mercia Mudstone Marginal Facies	No historical issues, field, located next to Caswell Hill Road, adjacent drain.
CLD92	L12 D55 E9	Head Deposits	Mercia Mudstone Group	No historical issues, field, adjacent to Caswell Lane.
CLD93	L12 D25 STD	Head/Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, field.
CLD94	L12 D STD	Peat	Mercia Mudstone Group	No historical issues, field, adjacent drain.
CLD95	L12 D STD	Head Deposits	Mercia Mudstone Group	No historical issues, field, embanked drain shown next to location, adjacent drain.
CLD96	L12 D E3	Head Deposits	Mercia Mudstone Group	No historical development, new roads surrounding location over time.
CLD97	L12 D25 E3	Tidal Flat Deposits	Mercia Mudstone Group	Adjacent to old drovers road, railway, depot and development surrounding over time, drains from 2006.
CLD98	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	Development to north, railway to south, nothing historically at location.
CLD99	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	Possible gravel pit to south shown on 1981 plan, railway to south, drain to south.
CLD100	L12 D55 STD	Head Deposits (Made Ground)?	Mercia Mudstone Group	Next to railway to south and Marsh Lane to east.
CLD101	L12 D E3	Head Deposits (Made Ground)?	Mercia Mudstone Group	Located near drain, adjacent embankment.
CLD102	L12 D25 E3	Head/Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	No development until 1981, area shown as slag heap/coal stockyard.
CLD103	L12 D E30	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	No historical development, adjacent old sea bank and drains.
CLD104	L12 D E30	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Oil tanks shown at location on 1904 map, compound mill between 1938-1972.
CLD105	L12 D90 M3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Located near air shafts railway sidings shown at location and petroleum works to south. Old pier and oil tanks also shown.
CLD106	L12 D STD	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Old sidings at location and dock buildings to south.
CLD107	L12 D25 E6	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Historic road and possibly old buildings and railway line on site.
CLD108	L12 D90 E3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Historic sidings and old buildings shown at location, adjacent lighthouse.
CLD109	L12 D E3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Old road at location, adjacent railway and possibly historic building at location.
CLD110	L12 D E3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Adjacent railway, historic building on site/scrap yard/workshops.
CLD111	L12 D25 E6	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	HMEF Avonmouth/Henbury to the east, old railway lines on site, adjacent transit shed.
CLD112	L12 D25 E6	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	HMEF Avonmouth/Henbury to the east, adjacent timber yard, possibly historic area of hard standing.
CLD113	L12 D90 E3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	HMEF Avonmouth/Henbury to the east, old sidings and coal yard, adjacent watercourse.
CLD114	L12 D25 STD	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Located within the boundary of HMEF Avonmouth/Henbury, possibly small sidings and roads within Avonmouth works, adjacent drain.
CLD115	L12 D E6	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Located within the boundary of HMEF Avonmouth/Henbury, historic building within Avonmouth works adjacent conveyor.

Tower No	Tower Type	Geology - Drift	Geology – Solid	Historical Map Features
CLD116	L12 D90 E6	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Located within the boundary of HMEF Avonmouth/Henbury, adjacent chemical and smelting works, adjacent drain.
CLD117	L12 D E3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Located within the boundary of HMEF Avonmouth/Henbury, historic road (Kings Western Rhine), adjacent chemical works and buildings.
CLD118	L12 D25 E3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	HMEF Avonmouth/Henbury to the west, adjacent a Roman Road, location of drain, reservoir (drained) to east.
CLD119	L12 D STD	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	HMEF Avonmouth/Henbury to the west, adjacent buildings and reservoir after 1955.
CLD120	L12 D25 STD	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	HMEF Avonmouth/Henbury to the south west, depot.
CLD121	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	Depot and adjacent drain.
CLD122	L12 D E3	Tidal Flat Deposits	Mercia Mudstone Group	Adjacent warehouse, and drain.
CLD123	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, adjacent drain.
CLD124	L12 D STD	Tidal Flat Deposits	Mercia Mudstone Group	No historical issues, adjacent drain.
CLD125	L12 D55 E3	Tidal Flat Deposits	Mercia Mudstone Group	No historic issues, adjacent drain and former landfill.
CLD126	L12 D25 STD	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Landfill site after 1975 and before 1999, not shown on 2006 plan, adjacent drain.
CLD127	L12 D M3	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Landfill site dis.
CLD128	L12 DT (Mk3) STD	Tidal Flat Deposits (Made Ground)?	Mercia Mudstone Group	Sidings shown on 1974-1975 plan, possibly landfill site dis.

Angle Towers

Terminal Towers