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BGS Downhole Record Types for the National Borehole Information Capture Project

National Borehole Information Capture

Internal Report IR/06/067

BRITISH GEOLOGICAL SURVEY

NATIONAL BOREHOLE INFORMATION CAPTURE

INTERNAL REPORT IR/06/067

BGS Downhole Record Types for the National Borehole Information Capture Project

Emily A. Swain

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Foreword

This report is the published product of a study by the British Geological Survey (BGS) of downhole bore record types for the National Borehole Information Capture Project.

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Summary

This report describes typical borehole records that will be used for the National Borehole Record Capture Project (NBIC). A selection from Keyworth and Edinburgh records are assessed for their ease of capture, highlighting problems that have been encountered and can be expected to occur in the wider capture project. These problems and possible solutions are summarised in Appendix 1.

This report should be read in conjunction with the NBIC User Requirement Document (Lawrie and Kessler, In Prep)

1 Introduction

The BGS has a large and ever-expanding archive of down borehole information, mainly held as analogue borehole logs (journals). This vital dataset is used and reused to provide seed data for mapping and modelling across many projects in the BGS as well as being provided to external customers. In recent years as part of a process of preservation these archives have been largely scanned to tiff images. As part of a project to make the data held on the logs more accessible for BGS's internal and external customers models, these images are to be examined and a representative selection of them will be captured, and input to a database.

1.1 AIMS OF THIS REPORT

The aim of this report is to assess the different types of available borehole log datasets highlighting problems and suggested solutions to them. The overall aim of the National Borehole Information Capture (NBIC) project is to produce a corporately managed database for the selected borehole data that can be more readily accessed and queried than the existing non-standardised interpretative database information.

The main report objectives are:

- 1) Review Keyworth and Edinburgh borehole log record examples to create a list of the different types of data
- 2) For each representative log highlight the information to be captured
- 3) Point to areas of difficulty and recommend solutions where possible

2 Data Capture

2.1 WHAT WILL BE CAPTURED

Any geological information with a z-value. This would typically include lithological descriptions with depth and thickness, which are highlighted by red box in the following examples. Also, any information identified in the user requirement as imperative to internal and/or external users.

2.2 WHAT WILL NOT BE CAPTURED

Details identified as not relevant to the geological definitions will be excluded, for example test conditions and pumping equipment. These can still be accessed by examining the existing scanned records. Sample information or Piezometer notes may also be excluded. Additional notes added after the time of drilling, made by a second geologist are considered to be an interpretation and will be captured either separately or in a different process. It is yet to be decided whether certain properties recorded for each unit such as strength, groundwater or visible sulphide are included. They will not be captured unless the user requirement specifies the need and can be readily included in the methodology.

NOTE – In all cases, refer to the User Requirement document (Lawrie & Kessler, In Prep)

3 Examples of Borehole Records

A cross-section of Records available from the Keyworth and Murchison House collections have been examined and samples have been extracted for illustration. Included are examples of more typical borehole log types as well as some potentially problematic ones. Although an attempt was made to include records deemed to be representative, given that there are some 1.4 million records in the dataset, omissions and exceptions are expected.

3.1 TYPICAL STANDARD RECORDS

Many of the records are easily readable, modern logs of a standard format from which data can be simply extracted using automated or manual techniques. Throughout this report data areas for capture have been highlighted using red callouts and areas of question and potential problem have been highlighted using blue callouts. Below are some types of the ‘typical/normal’ borehole logs from the BGS collection.

There are also Trial Pit Records, some of which are of the same standard as borehole logs.

a) NT27SW BJ94 is a typical example of a bore journal in imperial measurements

SECTION OF Ring Motorway No. 11 Bore

94

for Edinburgh Corporation

Surface Level.....O.D.

Communicated..... by.....

Date of boring or sinking.....1965..... Borer.....G. Nicholson.....

One-inch Map.....32..... Six-inch Map.....NT 27 S.W.

	Thickness		Depth from Surface	
	Ft.	In.	Ft.	In.
Filling	2	6	2	6
Stiff intact brown sandy clay containing gravel	2	5	4	11
Sandstone boulder	2	0	6	11
Compact fine to medium brown clayey sand with occasional fine gravel	4	0	10	11
Broken sandstone	1	1	12	0
Core seen from SANDSTONE, micaceous, calcareous, grey, hard, compact, massive in upper part but wispy bedding developed in lower part, increasing down; partly broken core	3	8	24	9
SANDSTONE, light grey, with many fine shaly micaceous laminae; 9" core seen	3	10	32	3
SANDSTONE, grey, full of worm burrows; 9" broken core seen				
SANDSTONE, WITH WISPY bedding, 6" broken core seen				
SANDSTONE, light grey with many shaly laminae; 5" core seen	3	0	35	3
SANDSTONE, massive, hard, thinly banded bluish-grey/cream calcareous; occasional shaly parting; steep dip, false bedding				
SANDSTONE, as above, but with many more shaly partings, tendency to wispy bedding; 2' broken core seen	4	9	40	0
Total depth	40	0		

There will be difficulty here with 3 descriptions for one unit. No exact thickness given only an indication of broken core seen that does not add up to total depth.

Geological description, thickness and depth will be captured

b) NT27SW BJ187 is a typical metric measured bore

SECTION OF Sherriton Hotel site, Lothian Road Bore 7 187
NT.24671 73372

 Surface Level.....O.D.
 Communicated 16.2.1983 by R. Barnes
 Date of boring or sinking 2.2.1983 Borer Wimpey
 One-inch Map.....Six-inch Map..... NT 27 SW

		Thickness	Depth from Surface
		Metres	Metres
Tar	driller's log	20	20
Boulder, granite		29	49
Boulder clay with boulders		39	88
Sandstone, grey		38	1 26
Mudstone, grey		1 02	2 28
Sandstone, grey		28	2 56
Mudstone, grey		44	3 00
Sandstone, d.grey, massive bedded, fine-medium grained, <u>indurated, BRECCIATED and recemented with</u> <u>carbonate; slightly CALCAREOUS; dip : 70°</u>		73	3 73
Bore complete		3 73	3 73

Abbreviations
with no
explanation are
problematic

* strata strongly affected by faulting - possible
fault zone disordered strata

Is this an
interpretation?

c) SK87NW 121 slightly more complicated

DESCRIPTION and DEPTH captured

BOREHOLE RECORD - Cable Percussion

Project RAMPTON WRW				Client SEVERN TRENT WATER LTD				Borehole 1			
Location RAMPTON				Engineer SEVERN TRENT ENGINEERING				Sheet 1 of 2			
								Project No 92-7010			

Sampling		Properties			Strata		Depth		Legend		Level	
Depth	Sample Type	Depth Cased	Depth to Water	Strength kN/m ²	W %	SPN	Description	Depth	Legend	Level		
0.45 - 1.00	B			50	12		Turf over TOPSOIL.	G.L.		48.68		
1.05 - 1.30	B						Concrete. (Drillers description).	0.35		48.33		
1.05 - 1.50	SJ						Firm dark grey very silty very sandy coarse gravel. MADE GROUND.	0.45		48.23		
1.50 - 1.65	J	1.00	DRY		18	45	Very stiff brown sandy CLAY with much coarse gravel and crushed brick. MADE GROUND.	1.00		47.68		
1.65 - 2.10	SJ	1.65	DRY		17	25	Stiff green mottled red CLAY with occasional fine gravel size mudstone lithorelicts.	1.30		47.38		
2.30	J						Very stiff green very silty CLAY with siltstone zones.	1.35		47.33		
2.55 - 3.00	U60	2.50	DRY	45	18		Firm to stiff to very stiff friable red brown CLAY with some weak mudstone fragments.	2.30		46.38		
3.00	J											
3.30	J											
3.55 - 4.00	U80	2.50	DRY	83	21							
4.00	J											
4.30	J						Very stiff friable red brown occasionally mottled green MUDSTONE.	4.00		44.68		
4.55 - 5.00	SJ	3.20	DRY		14	34						
5.30	J											
5.55 - 6.50	B											
5.55 - 6.00	SJ	5.00	DRY		16	30						
6.55 - 7.00	SJ	6.00	5.20			50						
7.30	J											
7.55 - 8.00	SJ	6.00	DRY			50						
8.00	W											

Boring				Progress				Groundwater				Remarks on Groundwater	
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	an (A) Date	Depth Struck	Depth Cased	Depth after 20 mins	Depth Sealed		
11.10	150mm	Cable Percussion	LH	Start			06/03/92	4.50	3.20	2.40	5.00	NS	Very fast inflow rate.
				End			09/03/92	8.00	6.00	3.70			Very fast inflow rate.

Remarks Chiselling from 6.30-6.50m for ½ hour and from 10.60-11.00m for 1 hour. Piezometer installed to 8.00m bentonite seals at 9.50-8.50m, 7.50-6.50m, 1.00-0.00m. Sand cell at 8.50-7.50m.

geotechnics

Logged by: RCA Symbols and abbreviations are explained on the accompanying key. All linear dimensions are in metres. Scale: 1:50

Is this height above sea level or above Ordinance Datum

Is strength/depth to water needed?

Graphics do not add any information

Additional information on groundwater. How is this captured?

3.2 OLDER RECORDS

Within the Borehole Record Collection there is an assortment of older records of which many contain imperial measurements, occasionally some are measured in fathoms. Some of these records have already been converted into metric but not all. A number of the records are poor quality or hand written and may be difficult to read. See the following example:

SE33SW 1

RECORD of WELL or BORING 246 SE 33 SW 1

Messrs Lind & Co., Soap Works. Six-inch map. 218 NW.

LEEDS County Yorks. Sheet 62

Site (unless a trading from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on maps). E. end of New Station. one-inch map. Square

Surface level of ground 90 ft. above Ordnance Datum. Well or Bore commenced at 70 below surface level of ground.

Sunk 70 ft., diameter 6 ft. Bored 62 ft.; diameter of boring at top 6 in., at bottom 6 in.

Details of lining tubes (internal diameters preferred) 10 in tubes from 3 ft to 6 ft down.

Water struck at depths of (feet) 11 or 20 (tried off)

Rest-level of water below above top of well or bore 24 ft. Pumping level 61 ft. Time of recovery 62 hours.

Suction at 62 ft. depth. Yield: (i) on test 8000 galls. per hour, (ii) normal 62 galls. per

Quality (attach copy of analysis if available) Hardness 24.5°

Made by C. T. Slater & Co. Ltd. for Mr. Messrs. Lind & Co. Date of boring 1933, 1934.

Information from C. T. Slater & Co. Ltd. Cores examined 46' to 128' W. Chanda.

GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
thin deposits Lower Coal Measure ↑ Thick Stone	Made ground, clay & loam	3.35	11	0	11
	Sand & pebbles	2.74	7	0	20
	Sandy clay & loam	1.22	4	0	24
	North	7.32	24	0	48
	Pale grey fine sst	4.42	16	6	62
	Grey silty clay	1.83	6	0	68
	Soft grey shale. <u>Calcareous</u>				
	cf. <u>fulvovirens</u> (Brown) at about				
	65 ft...	1.52	5	0	73
	penning down into:				
	Hard grey shale	1.83	6	0	79
	Soft grey shale with <u>granular</u>				
	beds & nodules. <u>A. laticostatus</u> 22.36				
	<u>lenticular</u> (Schlotheim) at 75 ft	2.13	7	0	86
	Dark calcareous shale	0.10	4		86
Soft grey fine clay. <u>Tidicula</u>					
nodules in lower part.	0.81	2	8	89	
penning down into:					
Hard grey micaceous shale with					
nodules & <u>granular</u> beds.	1.22	4	0	88	
Very hard grey sst	0.20	8		94	
Grey micaceous shale	1.01	3	4	97	
Hard shaly micaceous sst.	0.15	0	6	98	
Hard bedded sandy shale	0.30	1	0	99	
Hard shaly micaceous sst	0.30	1	0	100	
Hard blocky siltstone	1.07	3	6	103	
Dark grey mudstone with <u>granular</u> bed.	6.42	1	0	124	
Dark brown shale	0.61	0		126	
Shiny black shale	0.30	1	0	127	
COAL mostly good w.	0.46	1	6	129	
Soft grey-brown fine clay	0.61	2	0	131	
Hard grey fine clay with small					
nodules.	0.61	2	0	133	
Blocky dull grey mudstone with					
nodules, bedded below & penning					
down into: -	2.29	7	6	140	
Hard grey micaceous siltstone.	0.91	3	0	143	

Site on 218 NW.

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.
----------------	--------	--------------------	------------------------

(11909B)

Conversion to meters has been made but is unclear. Also up to 3 decimal places.

It is not clear which description relates to which measurement.

Thickness and Depth preferably taking the original measurements

Description

3.3 DETAILED RECORDS

There is also a large quantity of IGS (Institute of Geological Sciences) Records, which can be very detailed, see below an example of the first page of a ten-page record:

a) NY70SW 1

IGS 1372 (1383) 5000 5/79

Institute of Geological Sciences
RECORD OF SHAFT OR BOREHOLE

6-in or 1:10 000 Map Registration No.
NY 70 SW / 1

National Grid Reference
NY 7201 0355

Name and Number of Shaft or Borehole:
WYEGARTH GILL BOREHOLE

For whom made
Dept. of Geology, University of Sheffield

Town or Village
Ravenstonedale County Cumbria

Exact site (reference to a fixed point on 1-in or 1:50 000 Map)
640m at 292° from school adjacent to St Oswalds Church,

Purpose for which made
Academic research

1-in or 1:50 000 New Series Map No.
40

Enter 'C' if Confidential

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

Made by _____ Date of sinking August 1975

Information from Core examination Examined by D.W. Holliday B.Owens

Specimen Numbers and Additional Notes

Both metric and imperial. How will incorrect conversions be dealt with? Also mistakes between thickness and depth?

Geological Classification	Description of Strata	Thickness metres	Depth metres
	No core to 7.62 (25')	7.62	7.62 (25')
	Limestone, pale grey to pale rusty brown, faintly laminated, bioclastic	0.51	8.13 (26'9")
	Core broken, calcite vein, slickensided surfaces; ? fault	0.51	8.64 (28'4")
	Limestone pale grey to rusty brown, as above, numerous calcite veins	0.48	9.12 (29'11")
	Mudstone, grey, calcareous, broken, ? core lost	0.05	9.17 (30'1")
	Limestone as above, numerous calcite veins	0.96	10.13 (33'3")
	Broken limestone fragments; rounded fragments in mudstone matrix	0.08	10.21 (33'6")
	Limestone grey, finer grained than above, finely scattered bioclastic material, some calcite veins	0.20	10.41 (34' 2")
	Broken limestone & mudstone, slicken sided surfaces	0.05	10.46 (34' 4")
	Limestone, grey, fine grained, very rare bioclastic	0.21	10.67 (35'0")

Suggested interpretation indicated here with a ?

Additional information

Indicates it has the same description but what exactly should be repeated?

Some of the other records are also very detailed and have multiple pages these can be typed or hand written.

b) Detailed type written record (Page 1 of 12) SD70SE 28

SD70 SE 103 NE 28

Borehole A1/19 (Swinton)
No. 1 (Manchester) Area.

Exact Site Latitude:- 55°-30' - 15"
Longitude:- 2°-49' - 15"

Level at which bore commenced relative to O.D. 187.98 Ft. A.O.D.

Date of sinking or boring 2/7/53 to 5/10/53.

Sinker or Borer Messrs. Graellius, Ltd., Sweden.

One Inch Geological Map 85

Six Inch Map (County and Quarter Sheet) Lancs. 103 N.E.

7874 0092

Detail to nearest foot

NATURE OF STRATA	THICKNESS Ft. In.	DEPTH Ft. In.
Soil and brown peat	6 0	6 0
Brown peat	6 0	12 0
Sandy gravel assorted size; quartzite fragments and stained coal measures fragments	3 0	15 0
Ritto but fewer pebbles	3 0	18 0
Fine to medium grained sand; fewer stones in depth	15 0	33 0
Light brown sand; small green stained fragments; quartzite pebbles.	6 0	39 0
Light brown silty clay; coal fragments	3 0	42 0
Gravel with fine rounded millet seed sand; some silt in depth; fewer pebbles	12 0	54 0
Light brown - red sand, fine to medium grained; black shale fragments; coal fragments.	15 0	69 0
Light brown red sand; fine to medium grained; black shale fragments and coal fragments	3 0	72 0
Very fresh looking medium pink red sand few shale fragments	3 0	75 0
Buff brown clay; occasional shale fragments	12 0	87 0
Gravel various grain sizes; millet seed sand and quartzite fragments present	3 0	90 0
Reddish grey sandstone (Coal Measures) 70% sample micaceous red stained	3 0	93 0
Red-buff silty clay; few pebbles	3 0	96 0
Fine grained red-brown sand; gravelly; Coal Measures shale fragments	3 0	99 0
Buff-red silty clay; few pebbles	6 0	105 0
Brick red sandy clay purple red stained pebbles. Coal measures fragments. Some rotten purplish stained sandstone fragments.	9 0	114 0
Silty light brown fine grained sand with white powder	6 0	120 0
Light red-brown fine grained sand	12 0	132 0
Bluish-grey powdered clay with medium grained red-brown sandstone; more sandy in depth	9 0	141 0
Light grey-bluish clay; small pebbles; darker colour in depth	7 0	148 0
As above with red brown micaceous sandy mudstone pebbles	3 0	151 0
As above with mudstone pebbles.	3 0	154 0
Chipping samples	0 0	154 0
Grey micaceous mudstone	3 0	157 0
Slightly sandy grey micaceous mudstone	6 0	163 0
Carbonaceous dark grey fireclay	3 0	166 0
Lighter grey fireclay with carbonaceous fragments	3 0	169 0
Slightly sandy grey fireclay with dark rootlets	1 0	170 0
Core commences at 170'6"	0 0	170 6
Continuous coring started at 170'6"	0 0	170 6
Grey siliceous fireclay with brown ironstone nodules and black plants and roots.	2 0	172 6

Surface Drift to 148'0"

Base of Drift @ 148'0"

Coal Measures

What are these?

- 1 -

c) Detailed Hand Written Record (Page 2 of 7) SE33NE 36

Institute of Geological Sciences		6-in or 1:10 000 Map Registration No.	Page
Name and Number of Shaft or Borehole:		SE 33 NE / 36	2
HOWSON-ALGRAPHY BOREHOLE, 1976		National Grid Reference	
Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brought Forward		56.74
	Siltstone, grey, finely laminated with much mica, and thin partings of dark mudstone. Silt in lenticular laminae, and also in thin beds of crowded cross laminated bedding. A number of mineralised fractures at about 57.80m contain a carbonate. Mudstone rather more important 58.80-59.50, with plant debris.	2.93	59.67
	Siltstone grey, somewhat coarser, typical with muddy partings. Partings mica dense, beds cross laminated lenses. Some minor slumping deforms beds in lower part.	0.88	60.55
	Mudstone grey silty, and siltstone; the middle part mainly structureless, with numerous slump-pouches. Bedding and cross laminated lensing evident at top and base.	1.04	61.59
	Mudstone mid grey, rather silty, with slumped siltstone bands; mica most abundant at the top. Numerous fractures due to extensive pitting, some of which is sagittally polished, and some mineralised with pyrite and carbonate. Increasing trouble with casing, much of core reduced to small fragments in the lower part. <u>POSSIBLY ENTERING FAULT ZONE</u> . [Occasional plant fragments seen].	2.73 4.69	64.32
	It was now planned to case the hole to 12m depth, to flush off the casing taking the drilling return. Drilling then to 80m, to see what lay below fault. Driller to collect chippings every 2 or 3ft.		

Details of features at certain depth

Interpretation

3.4 EXTRA INFORMATION

a) There are a number of Well Logs where the first page contains information, not considered relevant to the capture of geological data but the second page contains the geology.

NZ61NW 4 First page of Well Log:

RECORD OF WELL		For Survey use only Licence No. N.10926																									
At PARK HOUSE FARM, GUISBOROUGH, YORKS.		34/110 NZ 61 NW/4																									
Town or Village DUNSDALE County YORKS.																											
EXACT SITE OF WELL	Six-inch sheet 7 SE/W	Six-inch National Grid sheet NZ 61 NW																									
	For W.G. JACKSON ESQ.	State whether owner, tenant, builder, contractor, consultant, etc.:	OWNER																								
DELETE WHICHEVER IS INAPPLICABLE	Address (if different from above) 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 276 ft.; diameter of bore: at top 10 in.; at bottom 10 in.																										
	Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.) 41'0" of 10" Welded Tube 0'0" to 41'0"																										
	Water struck at depths of 123 - 127'0", 201'0" & 250'0" ft. below well top.																										
TEST CONDITIONS	Rest level of water 110 ft. above* well top. Suction at 260 ft. Yield on 2 hours* test pumping at 5,000 galls. per hour with depression to 220 ft. below well top.																										
	Recovery to rest level in 3 hours Capacity of pump 10,000 g.p.h. Date of measurements 6/5/63																										
NORMAL CONDITIONS	DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:																										
	Make and/or type Bensaaford 15J3 Motive power Electricity																										
	Capacity 2,000 galls. per hour. Suction at 252 ft. below well top.																										
	Amount pumped 20,000 galls. per day when irrigating only. Estimated consumption 140,000 galls. per week.																										
	Well made by FARRODS LTD., RIPON. Date of sinking 6/5/63																										
	Information from Farrods Ltd.																										
	ADDITIONAL NOTES ANALYSIS (please attach copy if available)																										
	<table border="1"> <thead> <tr> <th colspan="2">For Survey use only</th> </tr> </thead> <tbody> <tr> <td>Date Received</td> <td>12.9.63</td> </tr> <tr> <td>Section</td> <td>6</td> </tr> <tr> <td>Pumping test</td> <td></td> </tr> <tr> <td>Observ. well</td> <td></td> </tr> <tr> <td>Recorder</td> <td></td> </tr> <tr> <td>E.R. log</td> <td></td> </tr> <tr> <td>Site marked on</td> <td></td> </tr> <tr> <td>1" map</td> <td>0</td> </tr> <tr> <td>6" map</td> <td>0 14/5/63 (use symbol)</td> </tr> <tr> <td>Record forwarded to</td> <td>Mr. C. G. O. G.</td> </tr> <tr> <td>date</td> <td>12 Sept 1963</td> </tr> </tbody> </table>			For Survey use only		Date Received	12.9.63	Section	6	Pumping test		Observ. well		Recorder		E.R. log		Site marked on		1" map	0	6" map	0 14/5/63 (use symbol)	Record forwarded to	Mr. C. G. O. G.	date	12 Sept 1963
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Record forwarded to	Mr. C. G. O. G.																										
date	12 Sept 1963																										

All this
need not be
captured

Second page of Well Log:

(7) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far ...	THICKNESS Feet Inches METERS	DEPTH Feet Inches METERS
	Turf & Soil	1' 0" 30	1' 0" 30
	Red Clay	15' 4" 57	16' 4" 88
	Hard Light Grey Shale	39' 11" 89	16' 76
	Beds Light Brown Sandstone & Shale	25' 7" 62	80' 24" 39
	Hard Grey Sandstone	13' 3" 96	29' 35
	Hard Grey Shale & Stone Beds	172' 52" 42	80' 77
	Light Grey Shale	11' 3" 35	276' 84" 12

Conversion to metres could be confusing; in this case they are separated meters/cm over ft/in boxes.

b) A few records for the Highlands and Islands have additional information to the normal borehole logs, that may be required (See User Requirement).

NC14NE BJI has visible sulphide information.

COMMERCIAL-IN CONFIDENCE

SECTION OF DI Fiscal Incentives: Consolidated Gold Fields Ltd.

Borehole No. SBH No. 5 Foindle

Surface Level approx. 99m O.D.

Communicated March 1976 by M.J. Gallagher

Date of boring or sinking Feb. 1976 Borer Encore Drilling

One-inch Map 107 Six-inch Map NC 14 NE NGR 1939 4830

958116 4M 275 LEAS 275

Additional
information
on visible
Sulphide

Visible
Sulphide
%

An age
rather than
description

Location 430m E 27°S of Foindle hamlet and some 4.8km WNW of
Laxford Bridge, Sutherland

ANGLE 50° AZIMUTH 045°

RECENT

PRECAMBRIAN: LEWISIAN (SCOURIAN)

(?) ULTRABASIC GNEISS composed of a dense aggregate of
green and black minerals, fine grained and poorly banded.

0.1 Weathered along joints (2.3 and 2.6m) [BO 9939:2.30-2.42m]
BIOTITE GNEISS, garnetiferous, foliation ?50°, with irregular
quartz bands at junction with gneiss above possibly

0.1 representing a structural seal

0.4 GARNET AMPHIBOLITE, sulphide band at 3.4m

0.2 HORNBLENDE-BIOTITE GNEISS with quartz bands

PYRRHOTITIC AMPHIBOLITE or ULTRABASIC GNEISS in which
pyrrhotite, minor pyrite and possible chalcopyrite form

stringers parallel to the foliation and a sub-massive

sulphide zone at 4.14-4.24m [forms BO 9940]

The sulphides also occur with quartz in lenses or veins as at
4.9m [BO 9941:4.82-4.92m] A cross-cutting quartz-sulphide

vein 4mm thick occurs at 4.6m and a cube of probable pyrite
8mm across is set in quartz at 4.7m

0.1 GARNETIFEROUS BIOTITE GNEISS, dark grey, foliation ?70°

(?) ULTRABASIC GNEISS, fine-grained and hard. Very well

foliated in places with alternating green and black bands

0.4 AMPHIBOLITE, greyish black, poorly foliated

(?) ULTRABASIC GNEISS - a greyish black hornblende rock,
poorly foliated. A 1cm thick pyrite band occurs at 7.3m and

a pyrite-quartz band at 7.40-7.43m. Chalcopyrite forms a

1 (?) flat lying lense up to 5mm thick at 7.35m

c/forward

Thickness Depth
from Surface
Metres Metres

1 25 1 25

1 41 2 66

- 47 3 13

- 30 3 43

- 58 4 01

1 03 5 04

- 47 5 51

- 89 6 40

- 32 6 72

- 71 7 43

7 43

What is this?

Details
and depth
of a zone
within
the unit

	Thickness		Depth from Surface		Visible Sulphide %
	Metres		Metres		
b/forward	7	43			
GARNET AMPHIBOLITE, very mafic (?BASIC GNEISS)	-	87	8	30	0.4
AMPHIBOLITE or basic gneiss, hard and fresh with a few garnets and light brown micas	2	92	11	22	0.2
GARNET AMPHIBOLITE, quartzose 11.70-12.05, sulphides locally form 20%	-	85	12	07	2
(?) ALTERED AMPHIBOLITE, closely jointed, biotitic	-	23	12	30	0
AMPHIBOLITE, well foliated (?70°), biotitic. Sulphides scarce except over 13.60-13.83m where they form about 4% and the rock is garnetiferous	1	53	13	83	0.2
(?) ULTRABASIC GNEISS composed of and aggregated green and black minerals. Softer than around 7m due to presence of micas especially near 15.4m where the rock is schistose with asbestiform minerals [BO 9942:15.36-15.46m] Closely jointed and apparently bleached 15.90-16.38m	2	55	16	38	0.1
HORNBLende GNEISS, quartzose. Locally garnetiferous at 17.3m where pyrite is initially associated with a garnet cluster, also at 17.7m	1	42	17	80	0.2
(?) ULTRABASIC GNEISS, micaceous [BO 9943:18.01-18.13m]	-	85	18	65	0.1
HORNBLende GNEISS, garnetiferous to 18.85m, plagioclase-rich around 19m. Some greenish-white spots of (?) apatite	-	95	19	60	0.4
(?) Ultrabasic Gneiss with some dark net veining, locally green. Soft dark brown and green minerals on joints. Apparently bleached 20.00-20.10m [9944:20.0-20.1m]	2	02	21	62	0.1
HORNBLende GNEISS, locally garnetiferous with some greenish-white spots of (?)apatite	-	81	22	43	0.4
GARNETIFEROUS BIOTITE GNEISS, fairly mafic, foliation (?)80°, fresh	1	52	23	95	0.1
HORNBLende BIOTITE GNEISS with minor garnet, hard, foliation (?) 80°	1	05	25	00	0.1
ACID GNEISS with zones rich in quartz, plagioclase and pinkish-coloured K-spar. One plagioclase-quartz band where pyrrhotite is common displays a tight minor fold around 25.3m [BO9945:25.26-25.40m]	-	42	25	42	0.2
BIOTITE GNEISS, grey, mostly well banded and foliated (80°?), locally rich in quartz and plagioclase. Iron sulphides occur mainly in darker bands but at 27.45m, fine grained <u>molybdenite</u> occurs with pyrite in a quartz rich area band.					

(349/1589) D. No. 248420 5,000 7/72 M. & S. Ltd. G249

COMMERCIAL-IN CONFIDENCE

SECTION OF Borehole No. 5 Foindale
Six-inch Map (County and Quarter Sheet) NC 14 NE

Visible Sulphide %		Thickness		Depth from Surface	
		Metres		Metres	
1	[BO 9946:27.38-27.50m] The gneiss can be locally garnetiferous. The foliation appears to alter at 27.6m to 70-80° in the reverse azimuth. GARNET-RICH GNEISS, some biotite even grained	9	46	34	88
0.1		-	46	35	34
		35	34		

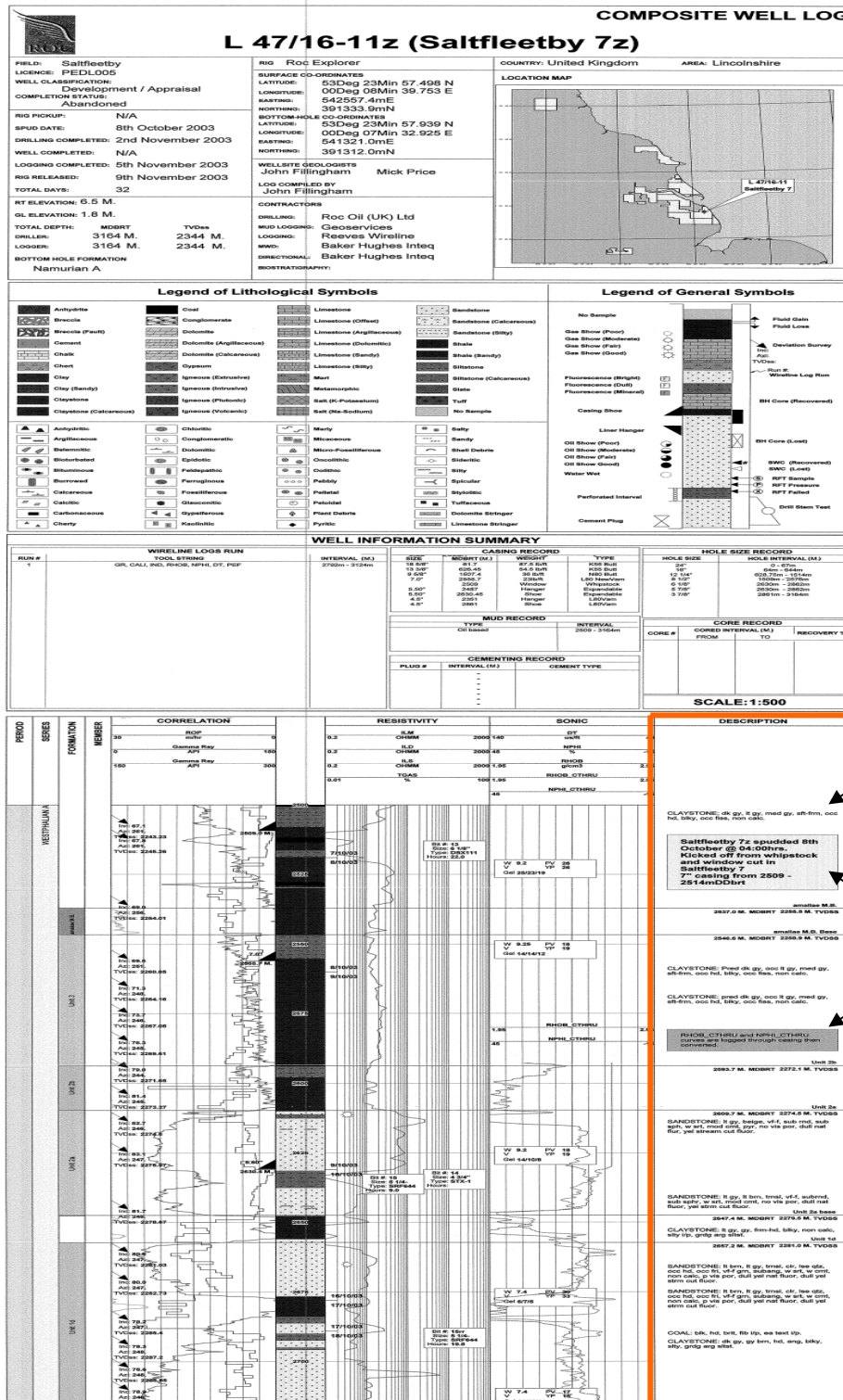
BORE COMPLETE

*Original bore log filed
in Meigs file Reg. 3(v)*

3.5 COMPOSITE WELL LOG

There are some modern composite oil well logs that often contain geophysical information as well as geological information. The strata description is shown on the right hand side of the record. These records generally go down very deep.

TF49SW 131



Capture description but what is exact depth for each?

Irrelevant information needs to be excluded from the description

3.6 RECORD WITH GEOLOGIST'S NOTES ADDED

Some records contain more than one interpretation of the data. For example some records may have geologist's notes added or there may be a hand written and a printed record with different details.

NS66NW BJ5 has fathom, feet and inches and has a little map at the end to help with the location.

(68/540) W.L. 6026/35 5000 6/41 M. & S.L. Ltd. G.S.S.

CONFIDENTIAL **NS66NW/5** 150

SECTION OF No. 15 Bore Lands of Cardyke.
for Jas. Nimmo & Co. DRAWN

Surface Level 243.42 O.D.

Communicated Oct. - Nov. 1942 by D. W. S. Cameron, Esq., Mining Engineer

Date of boring or sinking 1942 Borer Alex. Baird, West-Quarter, Polmont

One-inch Map 31 Six-inch Map (County and Half-Quarter Sheet) Lanark 2 S.W.

D

Interpretation

Geologists interpretation added, not made at the time of boring

	Thickness.			Depth from Surface.		
	Fathoms.	feet.	ins.	Fathoms.	feet.	ins.
Original data						
Soil		1	6		1	6
Sand & loose sandst.	1	4	6	2	-	-
Soft dark clay & stones		3	-	2	3	-
Sandstone, slightly faky	1	3	6	4	-	6
Yellow sandstone		1	6	4	2	-
Sandy fakes		-	3	4	2	3
Fakes		1	-	4	3	3
Sandstone		3	6	5	-	9
do. faky		4	-	5	4	9
Fakes & faky sandstone	1	2	-	7	-	9
Sandy fakes		3	3	7	4	-
Dark fakes		3	-	8	1	-
Faky sandstone		3	-	8	4	-
Fakes & sandy fakes	1	3	-	10	1	-
Fakes & faky rst.		1	6	10	2	6
Fakes & sandy fakes	1	1	-	11	3	6
Fakes & sandst. balls	2	-	-	13	3	6
Dark fakes		-	-		-	-
& sandst. balls	4	1	-	14	4	6
Blaes & ironst. balls	1	2	6	19	1	-
Limy blaes		5	-	20	-	-
LIMESTONE		1	8	20	1	8
LIMY blaes		-	6	20	2	2
LIMESTONE		3	3	20	5	5
LIMY blaes		1	1	21	-	6

Geologist's notes (left margin):

Med. grained, clayey with some faky strains

Light grey, weathering yellow

Grey fakes with some small pebbles of ironst. and fakes

Thinly bedded sandstone with micae. planes

Medium grained sandstone with some hard bands & faky strains at top & base

Dr. micaceous fakes & faky rst. in thin fakes

Grey sandy fakes with some darker thin bands

Tough, dark fakes

Strong striped sandy fakes. 1/16"

Sandy fakes & faky rst. in bands 2/3"

Thinly bed. faky rst. w. partings of dark fakes

dk. fakes passing down into sandy fakes

sandy fakes & faky rst. in bands beds nearly flat

dk. fakes & faky rst. /

dk. fakes & sandy fakes in bands 2"

sandstone rst.

dk. fakes & faky blaes with small pale tabular iron. balls 3"

dk. faky blaes with small iron. balls, a few limonite brownish also orthoquartz. & dk. blaes w. small iron. balls with a few fossils (shells) 2/16"

dk. grey blaes with some shell frags. Productella, Streptelasma, Spirifer, etc. 1/16" & grey blaes some shell fragments. Camerotoechia, etc.

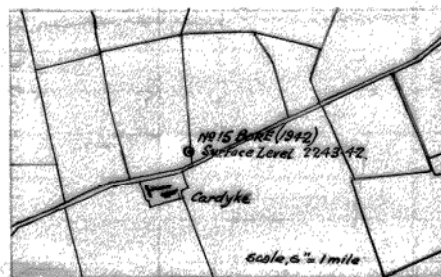
clean grey limonite with some small conchoidal & shell frags.

earthy cgl. blaes with limonite ribs. Productella & other shell frags.

clean, strong, grey, fine fraction shell frags in places, base shelly

grey cgl. blaes with narrow, brachiopods, etc. (Goniatites) Orthis, etc. etc. etc.

	Thickness.			Depth from Surface.		
	Fathoms.	feet.	ins.	Fathoms.	feet.	ins.
hard shaly blaes 2" with gastropods, dwarfed <i>Helicospira</i> & <i>Orthoceras</i> , ostracods, frags of <i>Strophomena</i> , <i>productella</i> , <i>Strophomena</i> , <i>productella</i> , <i>Strophomena</i> frags.				21	0	6
Shaly blaes and iron pyrites		1		21	1	6
Hard rib, limy		2		21	1	8
Shaly blaes		3		21	1	11
COAL		2		21	2	1
Black blaes and iron pyrites		2	3	21	4	4
COAL		3		21	4	7
COAL, blind		2		21	4	9
COAL		1	6	22		3
Stone		1		22		4
COAL		1	5	22	1	9
Fireclay		1		22	2	9
	22	2	9			



3.7 MULTIPLE DESCRIPTIONS

Sometimes there is more than 1 description of a single borehole.

NY00NW BJ4. There is a 6 line description of the bore on 1 log and a more detailed 4 page description of the same record.

137
Cumb 72 SE/E
For Survey use only

RECORD OF WELL (SHAFT OR BORE)

At Beckermat Mining Co. No 7 Bore
(previously Egremont Mining Co.)

EXACT SITE OF WELL

Town or Village Haile,

County Cumberland Six-inch quarter sheet 72 SE/E

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

Address (if different from above) NY 00 NW/4

Level of ground surface 76.43 ft. If well-top is not at ground level, state how far .. { above: .. below: .. ft.

above sea-level (O.D.) 250.36 ft.

SHAFT .. ft.; diameter .. ft.; Full details of headings (dimensions and directions)

BORE 1896 ft.; diameter of bore: at top .. ins.; at bottom .. ins.

Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.)

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

TEST CONDITIONS

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

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

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

NORMAL CONDITIONS

Make and/or type .. Motive power ..

Capacity .. gallons per hour. Suction at .. ft.

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

Well made by .. Date of well Before 1920.

Information from Beckermat Mining Co.

ADDITIONAL NOTES

ANALYSIS (please attach copy if available)

Bore now plugged.

Sited by O on 6" map Cumberland 73 SW/W from plan at mine.

1/5/56. R.E.A.

LOG OF STRATA OVERLEAF.

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.	Section 6.	Date Received <u>1.5.56</u>	1" O.S. Map No.	Site marked on 1" Map <u>0</u>	(use symbol) on 6" Map <u>0</u>
--	------------	--------------------------------	-----------------	-----------------------------------	------------------------------------

(1927) D4574/W137583 12,000 8/54 JCS Gp688

[illegible]

WELL LOG at **7284** (Town End) County **Cumberland**
 Geol. map **7284** Series **6 in. map 72.85**
 Made by **Epworth Mining Co. Ltd. (R. Hartley)** Date **Feb. 1919 - Jan. 30 1920**
 Sunk **feet.** Bored **feet.**
 Communicated by **R. Hartley Eng.** Best level of water **c. 76m**
 Height above Ordnance Datum **c. 76m**
 Yield
 Quality (with copy of analysis on separate sheet)

NY 00 NW 4

Second part
with more
detailed
descriptions

GEOLOGICAL FORMATION	NATURE OF STRATA.	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
	Soil & sub-soil	3	0	3	0
	Fine gravel (a little water)	4	0	7	0
	Peas & cobbles	3	0	10	0
	Silt - loose sandstone	2	0	12	0
	" Red " (loose)	6	6	18	6
	Red sandstone (solid & strong mostly jointy in places)	421	0	439	6
	Red shale	2	0	441	6
	Red sandstone (solid)	75	5	517	2
	Red shale	22	4	577	6
	Red sandstone (solid, 1 ft. thick)	17	10	540	4
	Red shale	3	4	520	8
	" Silt.	3	8	544	4
	" Shale	4	4	548	8
	" Silt. (solid)	4	8	549	4
	" Shale	113	8	580	0
	" Silt. (solid & strong)	77	7	663	7
	" Shale	2	4	663	11
	" Silt.	77	5	741	4
	" Shale	2	4	743	8
	" Silt. (solid, jointy in centre)	13	9	757	5
	Grey shaly silt.	2	5	759	10
	Red Silt. (solid)	17	3	777	1
	Red shale	1	6	778	7
	Red sandstone (solid)	45	2	826	9
	" Shale	9	9	827	6
	" Silt. (mostly solid)	45	9	873	3
	" Shale	5	0	878	3
	" Silt. (solid)	9	6	887	9
	" Shale	3	0	890	9
	" Silt. (solid)	72	3	963	0
	" Shale	1	3	964	3
	" Silt. (solid)	15	9	980	0
	" Shale	2	3	982	3
	" Silt. (solid above, jointy w. layer below)	7	3	989	6
	" Silt. (")	1	5	990	11
	" Shale	7	7	991	6
	" Silt. (solid)	19	0	1010	6
	Dark red silt. jointy & grey	1	6	1012	0
	Red Silt. (solid)	1	7	1013	7
	" " Dark & grey	12	0	1025	7
	" " w. sparry joints, v. jointy	4	0	1029	7
	" " + shale (jointy broken)	8	0	1037	7
	" " (jointy 2' 11" on solid)	21	5	1059	0

GEOLOGICAL SURVEY AND MUSEUM,
JERMYN STREET, LONDON, S.W. 1.

(S. 1056.) Wt. 5621/69. 2000. 2-19 Ph. & Ty. Ltd.

CUMBERLAND 72SE4 NY 00 NW 4

Geol. map Made by Sunk feet. Bored feet.

Communicated by Height above Ordnance Datum Rest level of water

Yield

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
	Red shale	4	0	1059	0
	" Sst. (solid)	9	0	1063	0
	" Shale		6	1072	0
	" Sst.	4	6	1078	0
	" Shale	2	6	1080	0
	" Sst.	1	9	1081	3
	" Shale		6	1087	9
	" Sst.	2	0	1089	9
	" Shale		6	1095	3
	" Sst.		9	1096	0
	" Shale	2	6	1097	0
	" Sst.	4	0	1097	0
	" Shale	1	0	1098	0
	" Sst.	1	0	1099	0
	" Shale	1	0	1100	0
	" Sst.	2	6	1102	0
	" Shale		6	1107	0
	" Sst.		6	1109	0
	" Shale	1	0	1109	0
	" Sst.	6	4	1105	4
	Conglomerate		8	1106	0
	Red sst. (mostly solid, jointy limestone)	41	6	1147	6
	" Shale (jointy)	2	0	1149	6
	" Sst. (")	7	0	1156	6
	" Shaly sst.	1	6	1159	0
	" Sst.	6	0	1164	0
	" Shale		6	1164	6
	" Sst.		6	1165	0
	" Shale	1	0	1166	0
	" Sst.	1	6	1167	6
	" Shale		4	1167	10
	" Sst.		8	1168	6
	" Shaly sst.	1	6	1170	0
	" Shale	1	0	1171	0
	" Sst. w. shale partings + v. shaly	17	0	1188	0
	" Shale	22	0	1210	0
	Conglomerate (solid)	116	0	1326	0
	" (shaly)	4	0	1330	0
	" (solid)	71	0	1401	0
	" (Ore)		6	1401	6
	" (shiny)	28	6	1430	0
	" (rather broken)	8	6	1438	6
	" (shiny)	9	0	1447	6

GEOLOGICAL SURVEY AND MUSEUM,
JERMYN STREET, LONDON, S.W. 1.

(S. 1466.) Wt. 5621/69. 2000. 4-19 Ph. & Ty. Ltd.

CUMBLAND
WELL BORING at 72SE4
Geol. map
Made by

County Cumbria
Date
NY 00 NW 4

Sunk

feet.

Bored

feet.

Communicated by

Height above Ordnance Datum

Rest level of water

Yield

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
	Conglomerate (rough)	38	0	1447	6
	" (shaly)	18	0	1465	6
	" (with fine ls. bks.)	15	0	1503	6
	" (limy)	1	0	1518	6
	Red shale	4	1	1519	6
	Red & grey shale	1	0	1523	7
	Grey ls. sh. (fairy, jointy, thin g. ore in joints)	3	5	1524	7
	" " Grey (jointy, solid & jointy, some sh.)	5 1/2	2	1528	0
	Red shale	3	10	1532	2
	Grey ls. sh. (solid)	6	9	1536	0
	Red shale	2	4	1539	9
	Light grey limestone, solid (jointy, blue)	26	8	1543	1
	Red & grey shale	1	0	1548	9
	Grey ls. sh. (mostly solid, jointy, blue ls.)	19	11	1549	8
	Grey flinty grit (lumpy, very hard)		6	1562	2
	" " (jointy, ls. sh. joints)	1	5	1563	2
	Grey ls. sh. (jointy, ls. sh. joints)	2	5	1564	19
	" ls. sh. (darker w. sh. partings)	3	0	1566	0
	Red shale (dark)	1	0	1569	0
	Dark grey ls. sh.	1	6	1570	0
	" red shale		9	1571	0
	" grey ls. sh.		6	1572	3
	" red shale		5	1573	8
	" grey ls. sh.	1	4	1574	0
	" red shale		6	1575	6
	" grey ls. sh. (jointy on solid)	7	0	1576	0
	Grey ls. sh. (darker than ls. sh. w. sh. partings)	12	6	1577	0
	do. do.	2	2	1578	2
	" (solid & jointy)	10	1	1579	3
	" (with sh. partings)	3	9	1580	0
	" (solid & jointy, blue ls.)	6	6	1581	6
	Grey ls. sh. (hard)	9	6	1582	0
	Red & grey shale		3	1583	3
	Grey ls. sh. (darker)	3	7	1584	10
	Red & grey shale		4	1585	2
	Grey limestone w. sh. partings	1	4	1586	6
	" " lighter, solid (occ. jointy)	29	9	1587	3
	Grey flinty grit (v. hard)		9	1588	0
	" ls. sh. (hard, grey)	15	3	1589	3
	" " (v. jointy w. dark sh. joints)	5	9	1590	0
	Grey ls. sh. (hard)	5	9	1591	9
	" " (v. jointy w. sh. joints)	5	1	1592	10
	" " (darker, jointy, grey ls. sh.)	18	2	1593	0

Corrections
have been
made but
are very
unclear

GEOLOGICAL SURVEY AND MUSEUM,
JERMYN STREET, LONDON, S.W. 1.

(S. 1436.) Wt. 5621/69. 2000. 4-19 Ph. & Ty. Ltd.

WELL BORING at No. 7 A. H. Hall (Tan Ls) County Camb
Geol. map 1 in. map New Series 6 in. map
Made by NY 60 NW 4
Sunk feet.
Communicated by
Height above Ordnance Datum Rest level of water
Yield
Quality (with copy of analysis on separate sheet)

[illegible]

3.8 HYDROGEOLOGICAL LOG

Other common records to be found are Hydrogeological Logs which often have more than one page; usually the second page contains the a description of the strata.

First page of Hydrogeological Log

NY70SW 9

NY 70/26

FORM WR 38

Agency No:

BOREHOLE RECORD

NY 70SW 9

GROUNDWATER

DATE RECEIVED 19.11.97

A. SITE DETAILS

Borehole drilled for	P BUZZARD AND A DANSON	
Location	ASHFELL FARM, RAVENSTONEDALE, CUMBRIA.	
NGR (8 fig) Ground Level (if known)	NY 736 041 294 M AOD	Please attach site plan
Drilling Company	DALES WATER SERVICES LTD	
Date of drilling	Commenced: 23 9 97 Completed: 26 9 97	

B. CONSTRUCTION DETAILS

NY 70/26

Borehole datum (if not ground level).....	EDGE OF MANHOLE CHAMBER		above m below GL
(point from which all measurements of depth are taken eg flange, edge of chamber, etc)			
Borehole drilled diameter	150 mm from GL	to 57	m/depth
	mm from	to	m/depth
	mm from	to	m/depth
Casing material <u>PLAIN</u> STEEL diameter	150 mm from GL	to 13	m/depth
and type (eg plain steel, plastic slotted)			
<u>SLOTTED</u> STEEL diameter	125 mm from 12	to 57	m/depth
diameter	mm from	to	m/depth
diameter	mm from	to	m/depth
Grouting details			
Water struck at	31 M	m (depth below datum - mbd)	
	47 M	m (depth below datum - mbd)	
Rest water level on completion	26.52	m (depth below datum - mbd)	

Second page of Hydrogeological Log containing geology

NY 70 SW 9

GROUNDWATER

DATE RECEIVED 19.11.97

C. TEST PUMPING SUMMARY (Please supply fully details on Form WR - 39)

Test Pumping Datum (if different from borehole datum)	<u>AS BOREHOLE</u>	above m below borehole datum (mbd)
Pump Suction Depth	<u>46</u>	mbd
Water Level (Start of Test)	<u>26M 48cm</u>	mbd
Water Level (End of Test)	<u>31M 82cm</u>	mbd
Pumping rate	<u>42.72</u>	m ³ /d hrs
for	<u>2</u>	days/hrs
Recovery to (from end of pumping)	<u>26.46mbd</u> in <u>4</u> mins-hrs : days	
Date(s) of measurements	<u>1 11 97</u> To <u>10 11 97</u>	
Please Supply Chemical Analysis If Available		

D. STRATA LOG NY70/26 ASHFELL FARM ABH,

Geological Classification (BGS only)	Description of Strata	Thickness m	Depth m
	BROWN CLAY	0.70	0.70
	LIMESTONE	6.80	7.50
	RED MUDSTONE	0.50	8.00
	LIMESTONE	18.00	26.00
	BROCKEN LIMESTONE + BROWN CLAY	1.50	27.50
	LIMESTONE + RED MUDSTONE	29.50	57.00
	[continue on separate page if necessary]		
	Other Comments (eg gas encountered, saline water intercepted, etc)		

Only information from strata log is important.

FOR OFFICIAL USE ONLY

FILE CONSENT NO BGS REF NO
 LICENCE NO USE OF BH NGR.....

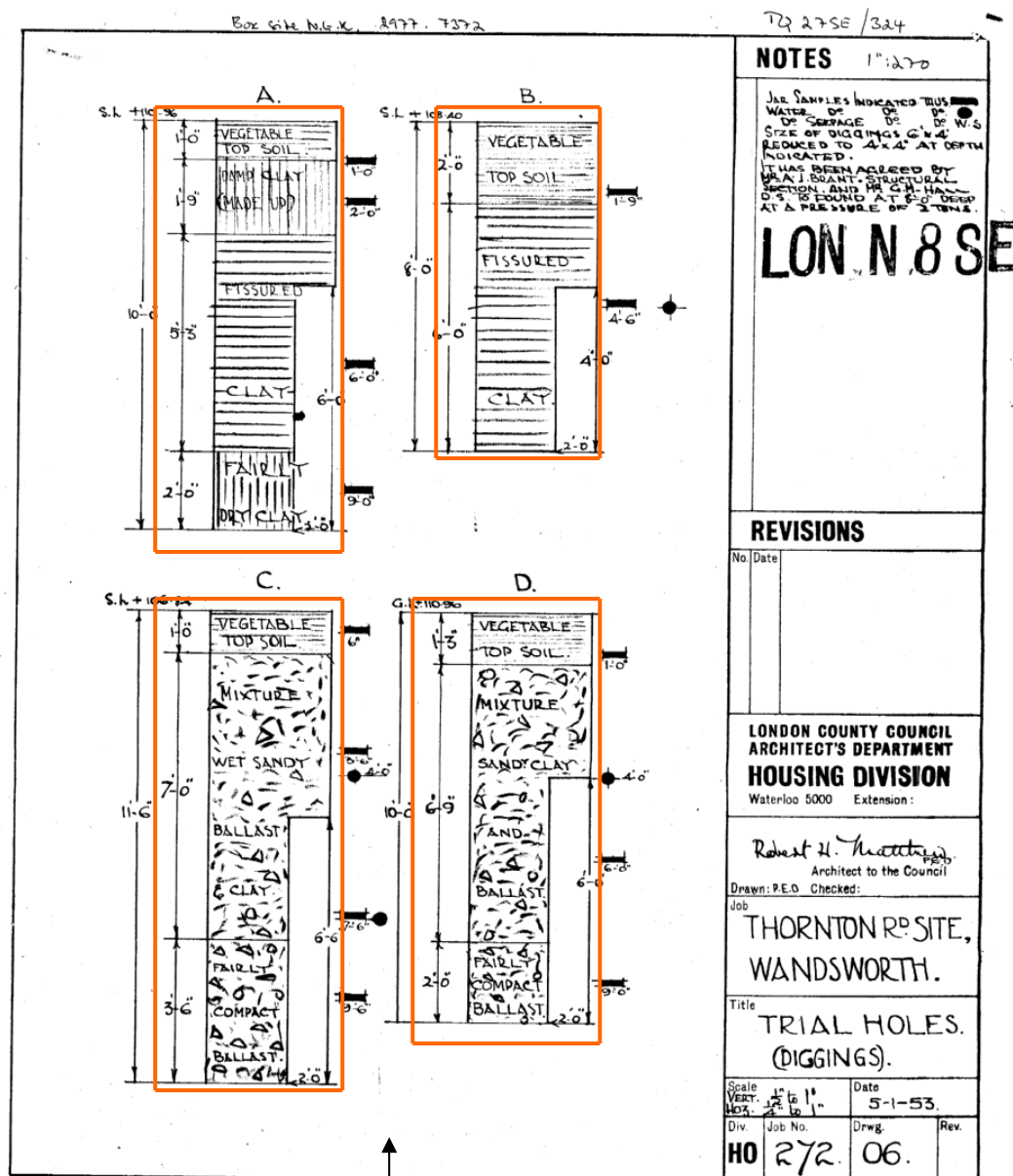
3.9 MULTIPLE RECORDS

Many borehole logs have multiple records contained on one page, these may have been registered in a variety of ways:

- Registered under one number with the same grid reference
- Registered separately with the same grid reference
- Registered separately with different grid references

a) Multiple boreholes registered together under one number with a single grid reference (box site)

TQ27SE 324



Four records with single
grid and number reference

b) Multiple boreholes registered separately with the same grid reference

SE79SE 811 - 813

RECORD OF WELL (SHAFT OR BORE) 811 812 N.S. 98.

At Eye Platt Bridge **SJ79SE/8** 1" O.S. 3

Town or Village Stafford County Tamworth Six-inch quarter sheet 110NE

Exact site _____ (A rough sketch-map or a tracing from a map is very desirable)

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

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

Details of permanent lining tubes (internal diameters preferred) _____

Water struck at depths of (feet) _____

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

Quality (attach copy of analysis if available) _____

Sunk by Thomas J. O'Brien for Mr. J. O'Brien Date of well 1937

Information from Thomas J. O'Brien

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA (and any additional remarks)	THICKNESS		DEPTH		T/m	D/m
		Feet.	Inches.	Feet.	Inches.		
No. 1 bore SJ 79SE/8 811							
Surface soil				1	0		0.30
Fine black sand				5	0		1.52
Dark grey coarse sand				9	0		2.74
Dark grey soft clay				15	8		4.75
Coarse gravel				21	8		6.61
Water level - 3 ft.							
No. 2 bore SJ 79SE/8 812							
Dark grey soft clay				7	0		2.13
Coarse gravel				13	6		4.11
Water level at surface							
No. 3 bore SJ 79SE/8 813							
Soft blue sandy clay				10	0		3.05
Grey stony clay				11	0		3.35
Coarse gravel				17	4		5.23
Water level at surface							

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

For Survey use only

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

(7005) W150084/0240 5,000 12/88
A.B.W.145, Op.486

Three boreholes
under same grid
reference

c) Multiple boreholes registered separately with different grid references

SK89SE 40 – 52

SK89SE/40-52 a SK 89 SE

		<u>CORRINGHAM 230</u>	89399320	
SK89SE/40		Clay and hard bands of shale	50	15.24
		<u>CORRINGHAM 231</u>	89299335	
41		Sand and clay	9	2.74
		Shale with limestone bands	50	15.24
		<u>CORRINGHAM 232</u>	89069336	
42		Shale and clay	70	21.34
		<u>CORRINGHAM 233-4</u>	88909344	88789357.
43-44		Clay and hard bands of shale	50	15.24
		<u>CORRINGHAM 235</u>	88599362	
45		Sand and clay	10	3.05
		Shale with limestone bands	50	15.24
		<u>CORRINGHAM 236</u>	88409374	
46		Clay with hard bands of shale	50	15.24
		<u>CORRINGHAM 237</u>	88209380	
47		Sand and clay and rubble	35	10.67
		Shale	50	15.24
		<u>CORRINGHAM 238</u>	88049392	
48		Sand, clay and rubble	40	12.19
		Shale	46	14.02
		Limestone	50	15.24
		<u>CORRINGHAM 239</u>	87939406	
49		Clay and rubble	22	6.71
		Sand	40	12.19
		Shale	50	15.24
		<u>CORRINGHAM 240</u>	87769415	
50		Clay and rubble	30	9.14
		Clay and sand	40	12.19
		Shale	50	15.24
		<u>CORRINGHAM 241</u>	87619428	
51		Sand and clay	30	9.14
		Shale	50	15.24
		<u>GAINSBOROUGH 17</u>	85339002	
52		Subsoil	3	0.91
		Brown clay and sand with gravel	29	8.84
		Blue clay with layers of gravel	45	13.72

Units are not
indicated for
thickness

/Gainsborough 18

3.10 DAILY DRILLER'S LOGS

There are a number of Daily Driller's Logs that contain the driller's description of the strata recorded at the time of drilling.

SD33NW 311

Contract No.		SD33NW 311		HOLST & Co. Ltd.,	
Location..... <u>BLACKPOOL</u>		NGR 3191 3692		5-7, New York Road,	
Borehole No..... <u>7</u>		OD at 17.7m		LEEDS, 2.	
Level		Date..... <u>24.5.64</u>			

DRILLER'S LOG

STRATA	Depth	Sample or Test	Depth of Sample	No. of Blows	Remarks
FILL	2'-0"	Q	3'-6" 5'-0"		
SANDY CLAY	3'-6"	II	8'-6" 10'-0"		
BOULDER CLAY	36'-0"	II	12'-6" 15'-0"		
BAND AND CLAY	60'-0"	II	23'-6" 25'-0"		
	(15-24")	II	28'-6" 30'-0"		
		II	33'-6" 35'-0"		
		II	38'-6" 40'-0"		
		II	46'-0" 47'-6"		
		II	54'-0" 55'-6"		
		O	2'-6"		
		O	3'-6"		
		O	20'-0"		
		O	31'-0"		
		O	36'-6"		
		O	41'-0"		
		O	46'-0"		
		O	50'-0"		
		O	56'-0"		
		O	60'-0"		

SLIGHT WATER IN THIS BOREHOLE 46'-0" AND 60'-0"

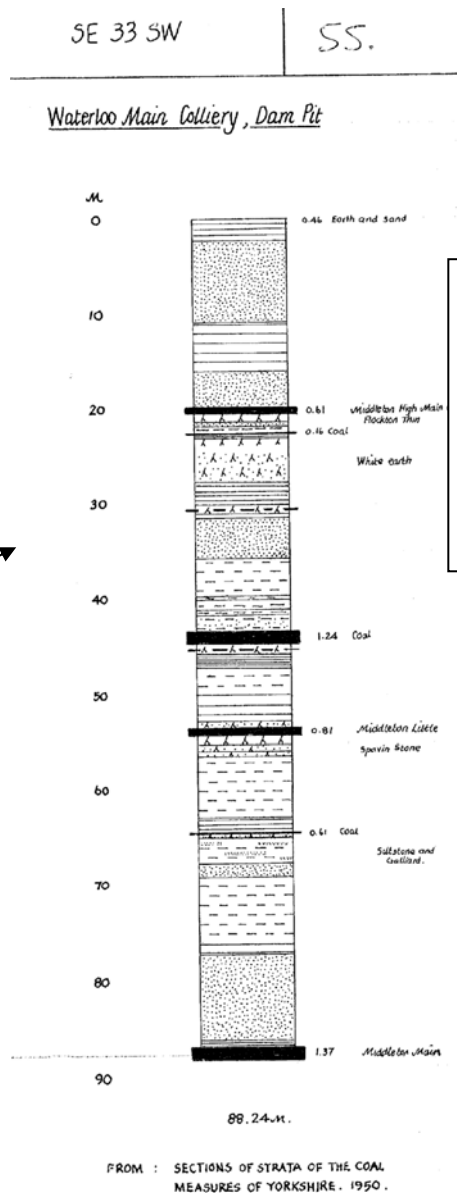
This remark may be useful as it has an indication of depth

Undisturbed Sample <input type="checkbox"/>	Date & Time of Start.....
Disturbed Sample <input type="radio"/>	Date & Time of Finish.....
Water Sample <input type="triangle"/>	Obstruction Time Total.....
Penetration Test <input type="I"/>	

3.11 GRAPHIC SECTIONS

There is an assortment of graphic sections contained within the records, some have detailed geological description, and some have limited or no written information.

SE33SW 55



To measure thicknesses from side scale may be to time consuming

A lot of useful information displayed on a graphical section but it may have to be missed if there is no convenient way to decipher it.

N.B. Top Beeston indicated at 169.16m

Williamson 1983.

3.12 NO INFORMATION RECORDED

There are a few borehole logs that have been scanned with no information on the logs at all. Some of the North of England point to the boring and sinking book i.e. NZ36NE BJ3.

NZ 36 NE/31

(111923) WL30370/0370 10,000 D/39 A.E.E.W.L.L.S. G.W.L.S.

RECORD OF SHAFT OR BORE FOR MINERALS

Name and Number of Shaft or Bore given by Geological Survey : _____

Name and Number given by owner (if different from above) : _____

Town or Village Dunstan Date of sinking 16 Aug. 1873

Exact site 1/2 mile S.W. of Dunstan

Purpose for which made _____

Level at which bore commenced relative to O.D. _____

Made by WM. COULSON LTD. for Messrs. _____

Information from WM. COULSON LTD. Date received June 1941

Specimens _____

County Dunstan

6" Quarter Sheet 4 NW

1" N.S. Geol. Map 21

1" O.S. Geol. Map _____

Whether Confidential _____

A sketch-map or tracing from a large-scale map is desirable.

GEOLOGICAL CLASSIFICATION	DESCRIPTION	THICKNESS	DIP OF STRATA	DEPTH
	<p style="text-align: center;">BGS REGISTRATION NO. NZ 36 NE/31 PAGE NO. 2</p> <p style="text-align: center;">An alternative reference</p>			

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

G.S.M. Office
File No.

Site marked
on 6" Map by

Site marked
on 1" Map by

These are being rescanned with the referred to additional information included, as below:

NZ 36 NE/31

RECORD OF SHAFT OR BORE FOR MINERALS

County Southland
 6" Quarter Sheet A 101
 1" N.S. Geol. Map 21
 1" O.S. Geol. Map _____
 Whether Confidential _____

Name and Number of Shaft or Bore given by Geological Survey: _____
 Name and Number given by owner (if different from above): Wester
 Town or Village Wester Date of sinking 16 Jan 1873
 Exact site 1/2 mile S.W. of Wester
1/2 mile S.W. of Wester

Purpose for which made: _____
 Level at which base commenced relative to O.D. _____ If not down bore, state if horizontal or up.
 Made by WHL COULSON LTD for Monsr.
 Information from WHL COULSON LTD Date received Jan 1873
 Dip of shaft: _____

Geological Classification	DESCRIPTION	Thickness	Depth
	<u>fine sand</u>		
	<u>fine sand & shingle "H.C." & O.S.D.</u>		
	<u>dr. sh. bl. sh. & compact with thin plates of mica</u>		

AN ACCOUNT OF THE OPERATIONS OF
 No. 3,000—WESTER.
 DOWNED BY WHEEL, COULSON.
 Sheet 4 of Ordnance Map. Lat. _____ Long. _____
 Journal of events passed through in a bore-hole to a point adjoining the
 East side of the Country of Wester, by W. Coulson.
 Commenced August 1873, 1873.
 Approximately horizontal about 100 feet above sea (Ordnance datum).

By	To	By	To	By	To	By	To
Shall	0 1 4	Brought forward	0 1 4	By <td>To <td>By <td>To</td> </td></td>	To <td>By <td>To</td> </td>	By <td>To</td>	To
Strong brown clay	0 1 4	Loamy clay	0 2 0	By <td>To <td>By <td>To</td> </td></td>	To <td>By <td>To</td> </td>	By <td>To</td>	To
Loamy clay, with	0 2 0	Hard, with a little	0 2 0	By <td>To <td>By <td>To</td> </td></td>	To <td>By <td>To</td> </td>	By <td>To</td>	To
many pebbles,	0 2 0	stone	0 2 0	By <td>To <td>By <td>To</td> </td></td>	To <td>By <td>To</td> </td>	By <td>To</td>	To
and 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 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622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 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1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044,							

Unfortunately some borehole records point to Water Records **or Hydrogeological logs** that have not been scanned. It would be preferable to include the water records data.

For example NJ27SW BJ1 This is a photocopy of an unscanned log.

Water Record 95/11
(68/540) W.L. 6026/38 5000 6/41 M. & B.F., Ltd. Q 68

NJ 27 SW/1

B.

SECTION OF Well at West End, D Street,
Lossiemouth.

Owned by John T. McKilligan.

Surface Level _____ O.D.

Communicated 1942 by John T. McKilligan.

Date of boring or sinking ? Borer ?

One-inch Map 95 Six-inch Map (County and Half-Quarter Sheet) Elgin NJ 27 SW
2 SE.

	Thickness.			Depth from Surface.		
	Fathoms.	feet.	ins.	Fathoms.	feet.	ins.
<p>Depth not known.</p> <p>Sunk in mixed beach gravels.</p>						

3.13 EXTRACTS FROM OTHER SOURCES

Some records are extracts from reports or memoir.

Extract from a memoir

SE12NW 568

Hand written depths
calculated at a later stage
are in feet not yards like the
original data.

The scan has chopped
off information; in this
case it is numbering for
the first column

B.1.—FLATHERS PIT. SE 12 NW 568

Date of Sinking, 1882—1883.

Lat. 53° 44' 15" N. Long. 1° 46' 50" W.

Height above O.D., about 475 ft. Dip of Strata, 1 in 8 W. 20° S.

	YD.	FT.	IN.		YD.	FT.	IN.		YD.	FT.	IN.
Soil and clay	5/9	1	2	9	5	9			21	Clod	0 0 9
Rag	12/6	4	0	6	18	3			22	Black Bed Coal	3/- 1 0 0
Blue shale	22/6	7	1	6	40	9					
Black shale	0	1	6	42	3				23	Seat stone	5/3 1 2 3
Seat earth	5/-	1	2	0	47	3			24	Rag and stone	9/1 3 0 1
Blue rag	21/9	7	0	10	69	1			25	Blue bind	24/- 7 1 0
Blue shale	7/8	2	1	8	76	9			26	Blue rag	20/- 6 2 0
dstone	9/-	3	0	0	85	7			27	Blue shale	18/5 6 0 5
Black shale	57/9	12	1	9	123	6			28	Black shale	0 0 8
Black shale (fault)	8/-	2	2	0	131	6			29	COAL	0 0 3
COAL	0	0	8		132	2					
				44	0	2			30	Seat stone	57/1 1 2 1
Seat earth	8/-	2	2	0	140	2			31	Rag	4/- 1 1 0
Blue shale	27/-	9	0	0	167	2			32	Blue shale	8/2 2 2 2
Black shale	0	1	3		168	5			33	Warrells	4/6 1 1 6
COAL (fault)	0	0	11		169	4			34	Thorpels	12/9 4 0 9
				56	1	4			35	Red band	0 1 6
Blue shale	0	2	2		171	6			36	White shale	5/3 1 2 3
Crow Coal—									37	Black shale	0 0 9
COAL	0	11							38	Better Bed Coal	0 2 2
Seat earth	1	1									
COAL	0	7	0	2	7				39	Black seat	0 2 3
				174	1				40	White seat	0 1 9
Black seat earth	13/9	4	1	9	187	10			41	Cat heads	4/- 1 1 0
Warrells	19/6	6	1	6	207	4			42	Stone and rag	4/- 1 1 0
Black shale	0	2	6		209	10					

NGDC
ACCESSION
NUMBER
31910

It is not clear what the hand
written numbers refer to.

These measurements are recorded
in yards rather than fathoms

3.14 MORE COMPLICATED RECORDS

Some records contain test results and readings which need more careful examination to extract the relevant geological data.

Record with piezometer readings

TQ27SE 511

Thickness
needs to be
calculated

TUNNEL RING MAIN B13 (CONYERS ROAD)						TQ 27 - 298		TQ 27 SE																																																																												
Owner				Licence No.		Nat. Grid Ref. TQ 29581 71212		511																																																																												
Occupier				IGS Ref. No. 270		Status Piezometer Installed. (19mm diameter)																																																																														
Ground Level 37.0 m OD				ft. OD		Aquifer LONDON CLAY																																																																														
Level of Well Top m OD				ft. OD																																																																																
Rest Water Level m bwt				ft. bwt		<div style="border: 2px solid orange; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5">Summary of Geological Section</th> <th>Thickness</th> <th>Depth</th> </tr> <tr> <td colspan="5">Made (Tarmac/Hardcore)</td> <td></td> <td>0.5m</td> </tr> <tr> <td colspan="5">Clay - bound gravel</td> <td></td> <td>0.9m</td> </tr> <tr> <td colspan="5">Sandy Clay</td> <td></td> <td>1.3m</td> </tr> <tr> <td colspan="5">Orange brown (gray green) mottled sandy clay with some flint gravel. Organic matter</td> <td></td> <td>4.7m</td> </tr> <tr> <td colspan="5">Brown clayey sandy flint gravel</td> <td></td> <td>5.8m</td> </tr> <tr> <td colspan="5">Orange brown sandy clay to some gravel</td> <td></td> <td>7.0m</td> </tr> <tr> <td colspan="5">Gray brown clay with some sand silt</td> <td rowspan="2">LONDON CLAY</td> <td rowspan="2">54.0m</td> </tr> <tr> <td colspan="5">claystone bands flint pebbles, shells</td> </tr> <tr> <td colspan="5">Dark grey clay to shell fragments (London Clay?)</td> <td></td> <td>54.5m</td> </tr> <tr> <td colspan="5">Brown, green, grey, purple mottled W.R. CLAY</td> <td></td> <td>59.1m</td> </tr> </table> </div>				Summary of Geological Section					Thickness	Depth	Made (Tarmac/Hardcore)						0.5m	Clay - bound gravel						0.9m	Sandy Clay						1.3m	Orange brown (gray green) mottled sandy clay with some flint gravel. Organic matter						4.7m	Brown clayey sandy flint gravel						5.8m	Orange brown sandy clay to some gravel						7.0m	Gray brown clay with some sand silt					LONDON CLAY	54.0m	claystone bands flint pebbles, shells					Dark grey clay to shell fragments (London Clay?)						54.5m	Brown, green, grey, purple mottled W.R. CLAY						59.1m
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(Date) m OD				ft. OD																																																																																
Construction Piezometer in Borehole																																																																																				
Depth bwt	Dia.	Linings (below well top)																																																																																		
		From	To	Dia.	Type																																																																															
44.0m	300mm	Originally cased to 47.6m, but presumably																																																																																		
59.1m	200mm	removed to install piezometer																																																																																		
Abstraction Rates						Type of Pump																																																																														
gph						Chem./Bact. Anal. YES NO																																																																														
gpd						Well Driller Soil Mechanics Nov/Dec 1955																																																																														
If insufficient space has been allowed, continue in 'Notes' overleaf. <div style="float: right; font-size: 1.2em;">8-log by Soil Mechanics</div>																																																																																				

Made good to 0.5
 Int to 70
 London Clay to 540
 WRB to 591
 GRS7
 7/87

Site Plan

Notes

Could be confused with geological section

Piezometer Installed:

From:	To:	Filled with:
G.L.	1.0m	Concrete
1.0	46.0	Bentonite /cement grout
46.0	47.5	Bentonite Seal
47.5	50.5	Sand Filter (Piezometer hp at 49.5 m)
50.5	52.0	Bentonite Seal
52.0	59.1	Arisings Backfill

3.15 UNDERGROUND BOREHOLES

Some records do not commence from ground level. There are also underground boreholes that are drilled from seam beds. A record is included of a borehole that not only drilled downwards from the seam but also upwards from the same seam. However this would only be noticed and understood with careful reading of the sheet.

NZ36NE BJ62A is drilled upwards

NZ 36NE / 62a

SECTION OF Upover Borehole from Westoe 623 Level Drivage.		6-inch Map Dm. 4 N.W. (County, Sheet and Qtr.)	B/H Regd.No <i>37</i>
PURPOSE To prove Maudlin Seam (H).		NZ 36 N.E. (Nat.Grid,Sheet and Qtr.)	<i>26 U</i>
EXACT SITE NZ. 38799 68233.		Attach tracing from a map or sketch map if possible	
LEVEL AT WHICH start ^{bore} COMMENCED RELATIVE TO O.D. 610.48 B.O.D.		DGS REGISTRATION NO. NZ 36 NE / 62-a	
DATE OF SINKING OR BORING 20.1.61.		PAGE NO. 1	
SINKER OR BORER N.C.B.			

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
	Excavation			28	6
	Mudstone, grey, silty, with sandstone bands and partings, occasional roots			35	0
	Shale, grey, jointed, finely micaceous in places, with slickensided bands, very broken, occasional leaves			39	0
	Siltstone, grey, shaly, micaceous, broken and slickensided			42	0
	Mudstone, dark grey, shaly, micaceous, slickensided and broken, with occasional roots, silty, with abundant plants at top			50	0
	Mudstone, grey, silty, slickensided, with ironstone nodules			54	10
	Sandstone, white, fine grained, micaceous, jointed, with thin cross bedding			58	0
	Mudstone, breccia, soft, broken			59	0
	Fault				
	Sandstone, white, fine, micaceous, with cross bedding			64	0
	Mudstone, pale grey, shaly, with sandstone bands, jointed and broken			71	6
	Mudstone, pale grey, silty, bands, abundant plant debris, thin sandstone bands, and roots at top			78	0
	Mudstone, very slickensided and broken, with plant debris			79	9
	Seat-earth mudstone, black, carbonaceous			79	10
	Sandstone, white, very fine grained, jointed, with thin current bedding, broken at top			84	0

P621T-OM

NZ 36 NE 62b

<p>SECTION OF <u>Westoe 623' Drift. Down Borehole to the Brookwell Seam</u></p> <p>PURPOSE <u>N.G.</u></p> <p>EXACT SITE <u>NZ. 38799 68233</u></p> <p>LEVEL AT WHICH ^{shaft}_{bore} ^{drift} COMMENCED RELATIVE TO O.D. <u>610.48' B.O.D.</u></p> <p>DATE OF SINKING OR BORING <u>1961</u></p> <p>SINKER OR BORER <u>N.C.B.</u></p>	<p>6-inch Map</p> <p><u>Dm. 4 N.W.</u> (County, Sheet and Qtr.)</p> <p><u>NZ. 36 N.E.</u> (Nat. Grid, Sheet and Qtr.)</p> <p>B/H Regd. No <u>38</u></p> <p><u>27 d</u></p> <p>Attach tracing from a map or sketch map if possible</p> <p>BOS REGISTRATION NO. <u>NZ 36 NE / 62 - b</u> PAGE NO. <u>1</u></p>
---	--

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
	No core to 7'0"				
	Shale, black, silty with fish scales near top (badly broken and deficient core, fragmentary lingula at 9')			9	10
	Seat-earth, light grey, leached appearance with small ironstone nodules at 12', some slickensided partings, indicative of broken ground, silty from 15'.			18	0
	Sandy mudstone, light grey, finely micaceous, occasional roots			22	10
	Sandstone, grey, fine to medium grained, current bedded with micaceous bedding planes and fracture running down out of core (no movement)			30	0
	Sandy mudstone, grey, finely micaceous with occasional plants, broken core, dip about 15', probably tectonic, core fracture with some slickensides and polished on bedding planes, occasional thin sandstone bands			41	0
	Seat-earth, grey with plant debris and roots			42	0
HOPKINS BAND	Mudstone, with fragmentary mussels and Ostracods, core broken and slickensided at 44', mussels at 44'6"			44	6
	Silty mudstone, grey, with plants and rootlets near base			46	6
	Seat-earth (1' thick) grey, pseudoconglomeratic			48	4
	COAL	1	4		
	Band	0	2		
HARVEY SEAM (N)	COAL	0	5		
	Band	0	0½		
	COAL	0	5		
	Band	0	0½		
	COAL	1	1	51	10

3.16 PROJECT SPECIFIC BORES

We also have borehole logs that were created for specific projects.

a) NJ14SW BJ4 is an example of a borehole recorded for the sand & gravel project carried out by the BGS

Institute of Geological Sciences
 IMAU Sand and Gravel Borehole Log Form

34

NK 14 SW 4	NK 1111 4375	Wellbank Farm, Peterhead	Block 84
------------	--------------	--------------------------	----------

Surface level	+43.3m (+142 ft)		
Water not struck			
250mm percussion			
December 1977			

Waste	10.4+

LOG

[illegible]

b) The Site Investigations provided for specific projects generally follow a standard format, below is a copy received from Findlay Black, one of the private consulting Engineers who deposits records with the BGS.

Acc. No. 15406104
 V. No. 15406207
 COMMERCIAL IN CONFIDENCE
 DOCUMENT
 ADDITIONAL NUMBER
 SI 21297
RAEBURN DRILLING & GEOTECHNICAL LIMITED
BOREHOLE RECORD

CONTRACT NO. 16/25
 BOREHOLE NO. 1
 LOCATION: ALLOA ROAD, 22 ALLOA, Fife KY12 7AA
 SHEET NO. 1
 RIG TYPE: _____
 FLUSH TYPE: _____
 DATE STARTED: 7/9/03
 DATE FINISHED: _____
 INITIAL WATER LEVEL: _____
 DEPTH GAINED: _____
 BIT SIZE: 6" MC
 TOTAL DEPTH: _____

STRATA DESCRIPTION	DEPTH		TACKONITE	MAGNET	CORRECTION	
	FROM	TO			FROM	TO
Hard clay	0.00	0.20				
Soft clay		2.20				
Sand-gravel		7.50				
Very sandy, banded clay		13.00				
Sand-gravel		16.40				
Sandstone		16.80				
Start casing at 16.80.						
Med. strong & strong, some bedded pale grey fine-medium grained sandstone. Fresh, hard, many numerous laminae. fairly red stained part in top 20m.	18.30			170	1870	18.50
				300		21.50
				300		24.50
				230		26.80
Med. weak & weak, fairly well bedded grey med. fine, hard, broken with short sharp jointing to an silty, massive at 18.85, plant carbonaceous in base at 3m.	19.35			300		29.80
				140		31.25
				280		34.25
				110		35.35
COAL, hard, bright with a few small bands that broken 100% massive	19.95	0.60	180			37.15
Weak, dark grey, 5-6" med. sandstone hard.	20.05					
Med. weak - med strong, poorly bedded grey med. fine, hard, many nodules, plants & roots	22.10					

c) An example of a standard log from Norwest Holst

Norwest Holst Soil Engineering Ltd.						Borehole No.
BOREHOLE LOG						1
Contract No. <u>14743</u>		Location <u>WOLFE</u>		Sheet <u>1</u> of <u>1</u>		
Client <u>Norwest Soles</u>		Drainage		Ground Level <u>M.A.D.S.</u>		
Method of Boring <u>Perforation</u>		Date <u>2/12/80</u>				
Diameter of Borehole <u>150mm</u>						
Description of Strata	Depth (m)	Depth (ft)	Drainage	Sampling and Testing	Notes	Remarks
TOPSOIL	0.00					
Brown coarse SAND and Fine to medium GRAVEL	0.75					
Red/brown slightly silty Fine to medium SAND	8.00					
<p>Type of Sample</p> <p> <input checked="" type="checkbox"/> S.P.T. <input type="checkbox"/> Undisturbed <input type="checkbox"/> S.P.T. <input type="checkbox"/> V. Vane <input type="checkbox"/> Jet <input type="checkbox"/> Flow <input type="checkbox"/> Bulk <input type="checkbox"/> Perforation </p> <p>Remarks: (Observations of Ground Water etc.)</p> <p>water struck at 5.75m rising after 15 mins to 2.80m dry 24 hrs after penetration (collapsed to 5.20m)</p> <p>When tests are subject to special or full conditions additional not to be referred to</p>						

3.17 OTHERS

There are a variety of anomalies that may include useful information contained within the records, it is impossible to show all of these, but a few are included below for information.

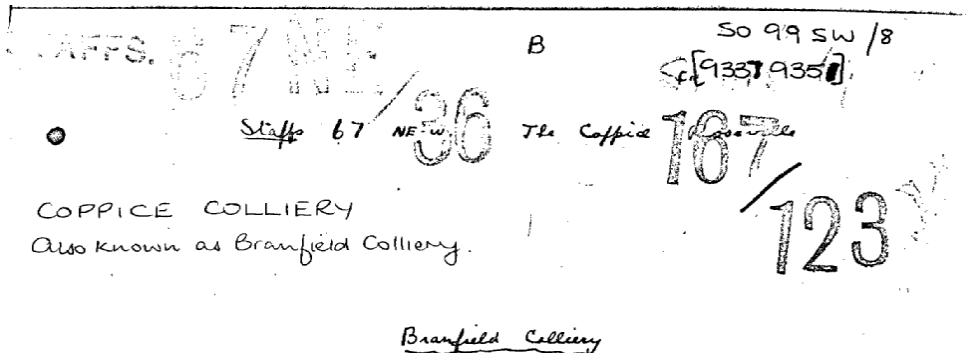
a) Department of the Environment Waste Disposal Site

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DEPARTMENT OF THE ENVIRONMENT		(1) Name and Address of site		NZ6 GINE / 85	
Review of sites for waste disposal and/or treatment 1972-1973		BOOSBECK TIP HUTTON SCALD ROAD BOOSBECK		66000 16325	
(2) Local Authority	SHELTON & BROTON U.D.C.	Progress of Survey			CLASSIFICATION
		TO	LA	IGS	RA
		ON	18.7.72	15.7.72	18.7.72
(3) Brief description of site	THE TIP IS SITUATED SOUTH OF BOOSBECK AND 250 YDS. FROM THE NEAREST DWELLING. THIS TIP IS ONLY USED BY THE ODD BUILDER WHO DEPOSITS THE OCCASIONAL LOAD OF ROBBLE BUT STILL UNDER THE CONTROL OF THE LOCAL AUTHORITY THIS TIP HAS CAUSED NO TROUBLE IN THE DIST ORDNANCE SHEET NZ 61 NE YORKSHIRE [NORTH RIDINGS]				Copies to CC/IGS
(4) River Authority area in which site lies	NORTHUMBRIAN RIVER AUTHORITY				Current Uses
(5) INSTITUTE OF GEOLOGICAL SCIENCES	Geology of site Geological 1 inch Sheet 34.. Geological 6 inch Maps 18 NW Information from 6 inch maps and 1 inch sheet Memoir (1988) Booklets NZ61 NE (16A) Reliability Grade D				Final Uses
535	<u>Stratigraphical Succession</u> <u>Superficial Deposits</u> Sand and gravel. Boulder Clay <u>Lithic Deposits</u> <u>JURASSIC</u> . ESTUARINE BEDS - - - - Shales and Sandstones - - - - 50 ft (e) ALUM SHALE, HARD SHALE } Shales with ironstone AND GREY SHALE BEDS } at base IRONSTONE SERIES. - - - - 250 ft (e)				OPERATION Residential LA Education Private DISPOSAL LA Private Industrial Plg permission TP with conditions. Warehouses Decided Reclaimed Hospital TREATED Purified Open Space Compost Allotment C Rejects Other use IPR Ash Whiteland IPR Screen Water UNTREATED Collected S Disposal Delivered INDUSTRIAL Fuel Rub L " " SI " " So Road Acc Inert L Car Park " " SI " " So Toxic L Waterway " " SI " " So Oily L " " SI " " So TIP OTHER C & D Greenbelt Ceaspool Agric N Park ACNB TIPPING Scenic A CP Controlled Nature Res Part " Un " AGRICULTURE" None Caddys Some Camp Serious WATER Ground Surface
(6) Pollution risk to major/minor aquifer(s):	a) None b) Some c) Serious				
(7) RIVER AUTHORITY	Is continuing use of site acceptable with regard to a) Ground water b) Surface water				
(8) Site plan	<p>Diagram illustrating the site plan, showing the location of the Boosbeck Tip relative to surrounding features like Boosbeck Farm, Hollingdon Farm, School, Vicarage, and various roads (Hutton Scald Road, Long Sale Road). The tip is located near the intersection of Hutton Scald Road and a path leading to Hollingdon Farm. Elevation contours are shown around the tip.</p>				
(9) Original surface elevation of a point marked on diagram in feet AOD	525				
(10) Approximate maximum original depth at tip	65' 0"				
(11) Site area					

b) Record showing only coal seams

SO99SW 8



Section	Depth from surface
Thick Coal . Top	58 ft.
Bottom	82 ft. (25.3m)
Heathen Coal Top	98
Bottom	104
New Mine Coal Top	136 ft.
Bottom	135 ft. (quoted)
Fine Clay Coal Top	158 ft.
Bottom	159' (quoted)
Bottom Coal Top	202 ft.
Bottom	206 ft. (quoted)

This section comes from Mine Abandonment Plan 3801; depths are measured from a drawn section, except for those at the base of the Fredday, New Mine & Bottom Coal which are quoted. It is not stated whether the section refers to No 5 B2 (9337 9351) or No 5 B2 (9357 9355)!

~~No. This appears to be a section of the pit shown on the~~

~~1924 Ed. Geol. Survey 6" Map Shaft LXVII NE, and located at [9337 9351]~~

Mine Abandonment Plan 764 refers to shaft at [9337 9351] and [9338 9352] as Coppice Colliery; depths at the former, measured from vertical section: Griston Stone 79'0", Heathen Coal 85'.

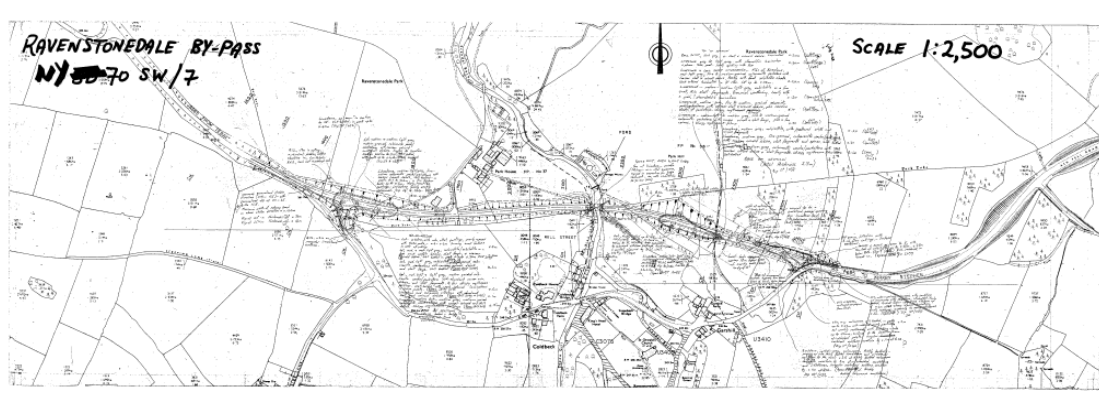
Messrs. Johnson, Pook & Bloomer also quote a depth of 83'0" to the Thick Coal at [9338 9358] and [9338 9355]

T.H.W. quotes 83' to Thick Coal at 2 shafts at [9337 9351] called Coppice or Branfield No.3.

Plan 7422: Shaft at [9337 9351], depth 78' to Thick Coal.

c) A Field Slip which has been registered into SOBI

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4 Discussion and Conclusion

Only a portion of the records could be checked and although a comprehensive cross-section have been shown here, inevitably there will be some anomalies that have slipped through the net. Some records, which have not been included here, show very little or no geological details and maybe of little or no use to the overall project. In most cases, however, the relevant information can be identified and subsequently captured.

The main problem that will be encountered when entering data are unclear records due to poor handwriting, missing information or a poorly scanned image. There are often confusing corrections, conversions and headings within the description or no labels for measurements. Careful examination of the record may be needed to select simple descriptions, thickness and depth from other information and interpretations. It is recommended that new conversions from imperial to metric (or other) are made from the original data, rather than inputting handwritten conversions to the database.

This report recommends that, as a solution to capturing data from the disparate record types, NBIC creates visual and textual templates for the most common record types in our collections. These templates can then form the foundation for the NBIC capture process.

Appendix 1 Current Issues

Ref No	Who	Question	Solution
1	ES	3 descriptions for one unit	Kigl – Just put in all three descriptions
2	JW	Inclusion of lithostratigraphical as well lithological descriptions	Kigl – put both in
3	JW	Many descriptions by driller, geologist, others	Kigl - put all in
4	ES	Abbreviations	Kigl - As they are
5	ES	Is groundwater (strength/depth to water) information needed?	Kigl – Add “water strike” field *
6	JW	Are chemical (or other properties) such as visible sulphide required?	Kigl – If it’s in the main text it will be captured
7	JW	Are very detailed records included? If so, how?	Kigl – Yes but time dependent, is it worth it?
8	ES	How are incorrect conversions dealt with?	Kigl – Capture in original units only
9	JW	Should the only original (possibly fathom) measurements be input and digitally converted or the hand-written translation input?	Kigl – Capture in original units only
10	ES	Details in the text that are not lithological description i.e. core lost, as above, ?fault	Kigl – Put it in
11	ES	Additional details of a zone within a unit inc. a depth, (or a remark)	Kigl – Enter as new row
12	ES	Headings within description i.e. ages	Kigl – Put it in
13	JW	Some measurements from ground level, underground, others sea level/AOD	Kigl – Deal with case by case
14	ES	How to deal with multiple bore records at one location	Kigl – To be decided
15	JW	Trial pits and well logs	Kigl – If selected do it

Ref No	Who	Question	Solution
16	JW	How to deal with graphical sections – especially if these duplicate a scanned record	Kigl – Don't capture
17	JW	Inclusion of details on un-scanned records	Kigl – Don't capture
18	ES	Skeleton records contain important information such as coal seams but how are these recorded?	Kigl – As you find them
19	JF	Is the overall aim is to capture all available information for a unit and hold that information as a “block” of text, or if the intention is then to parse that information into the respective fields (LEX, ROCK, COLOUR, STRENGTH etc). Clearly the latter approach is preferable for the end user. Is the issue of decomposing the text explored in a corresponding report (i.e., would entries be dictionary constrained, how would obsolete or colloquial terms be dealt with etc?)?	Kigl – Yes/no, block of text only
20	JF	I would require that both the lithological and the lithostratigraphic description were available for each unit. Am I correct in understanding from the Downhole Records report that lithostratigraphy (as an interpretation) would be excluded from capture?	Kigl – If there is lithostrat include in text block
21	JF	<p>Should lithostratigraphic information be captured?</p> <p>Although the lithostratigraphy is an interpretation, it is common that this has been made at the time of boring by the geologist (in direct reference to the core), and that this represents the most confident interpretation possible. However, where a geologists interpretation postdates a <u>drillers</u> log, the converse <u>may</u> be true (page 16).</p> <p>Equally, it is important to know if a secondary/alternative lithostratigraphic interpretation is presented on a record – this may be a valid interpretation, or it may simply highlight the fact that the</p>	Kigl – If there is lithostrat include in text block

Ref No	Who	Question	Solution
		initial interpretation is questionable.	
22	JF	Page 4 – Will the OCR system recognise that the brackets group relates to “driller’s log” (as opposed to the depths), and more importantly, that the depths shown in the second column (“20, 29, 39, etc”) are actually in centimetres, even though this is not explicit from the header?	Repeat for each line? Kigl- yes
23	JF	Page 8 – Are these mining drifts (“drives”) as opposed “superficial deposit” drift? This may have implication for the start height of the boring?	Kigl – Drift as in drift deposits
24	JF	Page 9 - Interval information held in text descriptions can often be manually extracted and recorded as a separate unit. Typically this involves subdividing the single “parent” unit (in which the interval is described), resulting in a sequence of parent-interval-parent. I have found that this approach is commonly required when describing faults and specific marker horizons.	EE’s - Type as seen then create new interval and repeat specific information
25	JF	Page 10 – Although the SOBI-type information need not be captured (as this is presumably the remit of other projects), it must still be considered when interpreting the downhole information – it may be the only indication if the borehole was collared at surface, or underground, drilled vertically up, down or inclined.	Kigl – We are only looking at scanned SOBI records
26	JF	Page 12 - I consider that attributes such as “visible sulphide” are important lithological descriptors, and should be captured (i.e., it is a physical property of the rock or soil). Other inherent properties such as “strength” “water table” may be less easy to deal with, as the depths involved may not necessarily coincide with the depth of a given lithological / lithostratigraphical unit (see below). However, I am aware that other uses of digital borehole data do rely on this type	Kigl – If it can be readily associated with an interval. Include in the description place in brackets.

Ref No	Who	Question	Solution
		of information.	
27	JF	Property information may be described in terms of depth intervals that do not coincide with the limits used for lithological (or lithostratigraphical) units. This may require that multiple depth ranges are held for a record, or that the primary unit is subdivided to accommodate the limits used to describe the secondary information.	Kigl – What does the panel think?
28	JF	Page 20 – How to interpret “ditto”, or more likely, an entry such as: “ ditto ditto SANDSTONE”	EE’s - Rewrite, not suitable for OCR or manual correction
29	JF	Page 25 – I have recently worked with a set of EA logs where the base depth for each unit was given on the line below, and the total depth was recorded only on the front of the printed record. Although this is a specific case, it highlights the fact that depth information is not always presented in the same format, or available on the same page of a record.	Kigl – Recording by coders discretion
30	EC	What to do if “not known” given for thickness or depth?	Kigl – Recording by coders discretion
31	JF	Page 28 – Although units are not indicated, it is often possible to recognise a conversion from feet to metres (i.e. 10ft = 3.05m). Although Imperial measurements are often given as integer feet and inches (i.e., the latter ranging from 0-12 only), some logs are described as decimal feet, and may be easily confused with Metric measurements.	Kigl – All measurements will be recorded in their original units
32	ES	½ inches?	EE - 0.5
33	JF	Page 29 – Some logs can indicate depth ranges over which cores were not taken (“open hole”), and for which the information was derived from geophysical logs only. Other logs indicate ranges over which problems were experienced (“caved hole”), and for which the	Kigl – Capture what you see

Ref No	Who	Question	Solution
		data is uncertain. In all such cases, the digital data should reflect this increased level of uncertainty.	
34	JF	Page 30 – Graphic logs may provide the only lithological information, or they may provide supplementary data. Automating the capture of this information may be extremely difficult, however, it would be helpful if the digital record could indicate that a graphic log was available, and that the user may wish to consult this in conjunction with the digital text.	Kigl – We are not going to capture graphical logs
35	JF	Page 35 – OK, so the question is rhetorical to show the difficulty of interpreting multiple depths (in this case, the hand written numbers refer to a conversion from yards, feet and inches to feet and inches). This highlights the problem that a range of conversion factors is used, and a range of generalisation (rounding / truncation) can be applied. Although this does not pose a particular problem to the accuracy of a model at usual scales, slight differences in depths may be considered by the system as multiple interpretations of the same record.	Kigl – We capture in the original units
36	JF	Page 41 – Horizontal lines that mark the tops/bases of units are in this case qualified with a written depth. However, on many logs, the line is present without the depth text, and the depth has to be calculated from the depth axes. I expect that this would be difficult to automate? In many cases (especially with modern logs), the lines may not be horizontal, and typically enter the text description area at an angle to accommodate text description for small intervals.	Kigl – Depth/ thickness is manually captured
37	JF	Lithological descriptions of gravely superficial deposits may be misleading when individual clast lithologies are described (e.g. “Sand with <u>limestone</u> gravel”)	Kigl – We capture what we see

Ref No	Who	Question	Solution
38	JF	The ability to distinguish between generations of text is key to successfully capturing the written information. This is comparatively easy to perform manually – it is possible to differentiate between an original typed word on a log and a subsequent hand written note (that may add to the initial description, supersede it or discount it). How would a modern OCR system deal with this (common) situation?	Kigl – OCR only used when it is obvious that it will be of benefit
39	JF	However the procedure may be implemented, it must provide sufficient (or an excess of) information to the user to allow them to make their interpretation. If the user has to revisit the scan for every hole to ensure accuracy or include additional data, then any efficiency gains will be lost.	Kigl – We'll do our best
40	JF	What facilities will be put in place to allow users to correct / modify / update / add to an automatically captured log?	Kigl – none
41	EC	Do we add Class in viewer or spreadsheet or both?	Just use the s/sheet – option in Viewer Application to be removed by KIGL
42	EC	Should a remarks column be added for additional information on the bore that adds information to the bore as a whole rather than at a particular depth? E.g. The pit cuts across a vertical contact between sandy boulder clay and ice contact deposits, or bore terminated due to boulder obstruction.	Kigl – Need to think further
43	EC	Confusion with differences in BSUFF, varies with scans!	EE - solved
44	JW	Was a decision made over whether to include trial pits?	Kigl – If selected, yes
45	JW	Do you recommend an automated translation to metric in the system to maintain consistency or using the hand converted metrics?	EE - Use original rather than conversion
46	JW	It would be preferable to include water records data	Kigl – Dealt with earlier