

LAND AT

GILLINGHAM

DORSET

NEWHOUSE FARM AND HAM FARM



GEOTECHNICAL INVESTIGATION AND
CONTAMINATION ASSESSMENT REPORT

DECEMBER 2017



Ruddlesden geotechnical

Geotechnical Investigation and Contamination Assessment Report



Land at Gillingham, Dorset –
Newhouse Farm and Ham Farm

Welbeck Land

December 2017

TB/SR/14114/GICAR/WL

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APPENDIX A EXPLORATORY HOLE RECORDS AND FIELD DATA

Trial Pit Logs (53 pages)

Soakaway Test Results (30 pages)

APPENDIX B PHOTOGRAPHS (8 pages)

APPENDIX C LABORATORY TESTING RESULTS

Geotechnical Laboratory Testing (9 pages)

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Generic Assessment Criteria (2 pages)

APPENDIX D DESK STUDY INFORMATION

Historical Ordnance Survey Maps (11 pages)

Geological Information (38 pages)

Environmental Information (50 pages)

APPENDIX E SITE PLANS

Site Location Plan (1 page)

Aerial Photograph (1 page)

Trial Pit Location Plan (1 page)

Proposed Site Masterplan (1 page)



EXECUTIVE SUMMARY

Proposals	It is proposed to develop the site for primarily residential purposes with the construction of residential housing and associated local centre, public open spaces and infrastructure.
Site History	Past edition Ordnance Survey maps showed the site has comprised many fields of varying sizes separated by hedgerows since first edition maps (late 1800s). Orchards were present in the northeast of the site and a 'smithy' was present off-site to the southeast of the site from the late-1800s until the mid-1900s.
Site Geology	<p>The British Geological Survey (BGS) map of the area indicates the site to be underlain by Late Jurassic Kimmeridge Clay Formation, overlain by Quaternary Head deposits across much of the site, particularly around the site's periphery, and also overlain by Quaternary Alluvium adjacent to the stream and drainage channel.</p> <p>The Kimmeridge Clay is described as mudstones with thin siltstone and cementstone beds and locally sands and silts. The Head deposits are described as silty to sandy clay with angular clasts of local rock fragments up to boulder size. The Alluvium is described as clay, silt, sand and gravel.</p>
Ground Conditions Encountered	Fifty-three trial pits typically encountered ground conditions of topsoil, underlain by firm to stiff silty clay, with occasional softer horizons and beds of (loose to medium dense) clayey sandy gravel. Groundwater was encountered in approximately 20% of the trial pits.
Foundations	<p>The results of this investigation indicate that strip or trench-fill foundations are generally suitable to support the proposed structures.</p> <p>However, it is noted that the bearing capacity of the soils varies across the site. Similarly, the volume change potential of the soil varies across the site: although much of the site is underlain by clays of medium volume change potential, locally, soils of high and low volume change potential are also present.</p> <p>Prior to development, further, more intensive, investigation is recommended to confirm the bearing capacity and volume change potential of the soils in a particular area.</p>
Buried Concrete	Elevated levels of soluble sulphate (exceeding 6,000mg/kg) have been recorded. Design Sulphate Class DS-4, Aggressive Chemical Environment for Concrete (ACEC) Class AC-4, is required for all buried concrete at this site.



Roads	From an assessment of the ground conditions encountered and laboratory testing results, a CBR value of 2% is recommended for road pavement design.
Soakaways	In-situ soakaway testing showed that the ground has a low permeability and is unsuitable for the use of soakaway drainage. Off-site discharge, possibly combined with on-site attenuation, is considered to be the most suitable drainage solution.
Contamination Risk Assessment	A contamination risk assessment has shown that the levels of contamination recorded in this investigation are not potentially harmful to human health given the proposed end use or to the water environment.
Contamination Remedial Measures	No further action or specific remedial measures are required given the proposed end use.
Radon/ Ground Gas	No radon protection measures are required and no additional ground gas protection measures are considered to be necessary.

This executive summary is to be read in conjunction with, and not in isolation from, the full report text and appendices.



1 INTRODUCTION

1.1 General

In May and July 2014, a combined Phase 1 and Phase 2: Geotechnical Investigation and Contamination Assessment was undertaken by Ruddlesden geotechnical Ltd on behalf of Welbeck Land at land at Gillingham, Dorset – Newhouse Farm and Ham Farm.

The investigation was undertaken to determine subsurface ground conditions, to provide recommendations for foundations and associated structures, and to assess the extent of any contamination at the site.

The investigation comprised a desk study and walkover survey followed by the formation of fifty-three trial pits with in-situ and laboratory testing.

It is noted that during the site works, a total of sixty-three trial pits were undertaken across the currently proposed development site, as well as within adjacent fields. Ten of these trial pits now fall outside of the proposed development area (TPs 01 to 06, 10, 11, 17 & 18) and have therefore not been referred to within this report. It is considered that the findings of these excluded trial pits, and all testing undertaken within them, do not have any significant impact on the currently proposed development site.

For clarity, the results of laboratory testing undertaken within these locations have been highlighted in the relevant appendices and these results should be disregarded.

In addition, the desk study information included within this report refers to the previous, larger, development area and therefore some information, primarily distances and site layouts, given within it may be incorrect.

1.2 Development Proposals

It is proposed to develop the site for primarily residential purposes with the construction of residential housing and associated local centre, public open spaces and infrastructure. The proposed site masterplan is presented in Appendix E of this report.

1.3 Scope of Investigation

The investigation covers geotechnical and contamination aspects relating to the development. The brief was understood to comprise the following:

- carry out a desk study and walkover survey;
- undertake exploratory holes;
- schedule geotechnical and contamination laboratory testing;
- establish the ground conditions across the site;
- make recommendations for foundation design;
- carry out in-situ CBR (TRL DCP method) testing and provide recommendations for road pavement design;
- carry out in-situ soakaway testing and provide recommendations for soakaway design;



- make recommendations covering other geotechnical aspects, including excavations and groundwater;
- undertake a contamination risk assessment;
- undertake a ground gas assessment; and
- provide details of any contamination remedial measure requirements.

1.4 Scope of Report

The report is presented as a description of the procedures employed and the data obtained. This is followed by a thorough description of the ground and groundwater conditions, together with an assessment of the ground profile. The final part of the report comprises analysis, recommendations and conclusions, which are provided in two separate parts: geotechnical and contamination.

The presence of asbestos containing materials (ACM) within buildings and invasive plants are outside the scope of this report and should be addressed by respective suitably qualified experts, if necessary.



2 THE SITE

2.1 Site Location

The site is located between Shaftesbury Road (to the east) and New Road (to the west), to the south of the town of Gillingham, in Dorset, see Appendix E (Dwg. Nos. 14114/01 and 14114/AP). The British National Grid Reference of the site is 318558, 125336, and the postcode is SP8 5JJ.

The site is located within a predominantly rural area, approximately 1.5km to the southeast of the town of Gillingham, Dorset. The surrounding topography is gently undulating.

Access to the site is gained via gates off the B3092 (New Road), to the west, Cole Street Lane, to the south, and Pheasant Way or The Meadows, to the north.

2.2 Site Description

The site is irregular in shape, measuring approximately 1km x 0.85km (85 hectares), and is slightly hilly with a slight overall slope down to the west.

The site comprises approximately 20 (twenty) fields, which are predominantly used for pastoral farming. The fields are separated, for the most part, by mixed deciduous hedgerows with occasional trees (typically no taller than approximately 20m). Some fields in the southwest of the site are bounded by wire or electric fences.

Gravel tracks are present in the southwest of the site, leading from Cole Street Lane to the western fields; these are used for driving cattle. A lane is also present in the northeast of the site, leading from Pheasant Way; this lane is used to gain access to the eastern fields. Gated entrances are present in most hedgerows to allow access between fields.

A natural stream meanders generally from the northeast to the southwest bounding the northwest of the site, with a man-made (or man-modified) irrigation ditch running to the natural stream in the west, from the fields in the south of the site.

An overhead electricity line runs from west to east across the centre of the site.

Much of the site (particularly the lower lying areas) was waterlogged in May 2014 and, anecdotally, for much of the early months of the year.

The site is bordered to north by Ham Common residential estate, to the northeast by commercial and industrial units, to the east by Shaftesbury Road, before commercial properties with associated parking, to the south by Cole Street Lane before arable farmland, to the west by the B3092 (New Road) before arable farmland and to the northwest by the River Lodden and pastoral fields before Lodden Lakes and commercial properties.

Photographs of the site are presented in Appendix B of this report.



3 DESK STUDY

3.1 General

A desk study was undertaken to provide background information, comprising the consultation of:

- historical Ordnance Survey maps;
- geological maps and information; and
- environmental information.

This information was used to produce a 'conceptual site model' so that an appropriate intrusive investigation could be carried out.

3.2 Site History

A full set of historical Ordnance Survey maps of the site was obtained as part of the desk study (Appendix D of this report). The salient points are listed below:

- 1886** The site comprises many fields of varying sizes, separated by hedgerows. Several footpaths cross the site with small bridges being shown to cross the stream which bounds the northwest of the site. The far northeast of the site is used as orchards and a 'smithy' is present off-site to the southeast of the site.
- 1890** Generally as 1886.
- 1902** Generally as 1890.
- 1938** Generally as 1902.
- 1956** Generally as 1938.
- 1988** Generally as 1956, although two lakes (Lodden Lakes, assumed to be flooded clay/ brick pits) are now present to the northwest of the site. The 'smithy' is no longer labelled and the orchards in the northeast of the site have been removed and replaced by fields.
- 1992** Generally as 1988.
- 2002** Generally as 1992.
- 2012** Generally as 2002.

In summary, the site has comprised many fields of varying sizes separated by hedgerows since first edition maps (late 1800s). Orchards were present in the northeast of the site and a 'smithy' was present off-site to the southeast of the site from the late-1800s until the mid-1900s.

3.3 Site Geology

The British Geological Survey (BGS) map of the area indicates the site to be underlain by Late Jurassic Kimmeridge Clay Formation, overlain by Quaternary Head deposits across much of the site, particularly around the site's periphery, and also overlain by Quaternary Alluvium adjacent to the stream and drainage channel.

The Kimmeridge Clay is described as mudstones with thin siltstone and cementstone beds and local sands and silts. The Head deposits are described as silty to sandy clay with angular clasts of local rock fragments up to boulder size. The Alluvium is described as clay, silt, sand and gravel.



The following additional information was also obtained from the GroundSure GeoInsight (Appendix D of this report):

- No artificial ground is recorded on-site. Made ground is recorded 64m to the west of the site (industrial estate).
- Historical ground workings (lakes) are shown to border the northwest of the site.
- A geological fault is shown to be present in the west of the site.
- The permeability of the bedrock geology is typically low to very low.

3.4 Environmental Information

The key environmental information contained within the Groundsure report (Appendix D of this report) is listed below:

- There are no recorded registered landfill sites within 1000m of the site.
- There are no recorded historical registered landfill sites within 1500m of the site.
- There are twenty records of potentially contaminative land uses within 250m of the site, the closest and most significant of which are considered to be:
 - 28m to the south; Newhouse Farm Dairy;
 - 58m to the west; electricity substation;
 - 90m to the south; slurry pit; and
 - 129m to west; Autotechnics (vehicle repair, testing and servicing).
- There are no records of petrol or fuel sites within 250m;
- The superficial deposits are classified as a Secondary A Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers;
- The bedrock deposits are classified as an Unproductive Strata. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow;
- There are no recorded groundwater abstraction points within 250m of the site;
- There are no recorded surface water abstraction points within 250m of the site;
- There are no recorded potable water abstraction points within 250m of the site;
- There are no recorded Source Protection Zones (SPZ) within 250m of the site;
- The nearest recorded surface water features are located on-site: unnamed tertiary river, unnamed culvert and primary river (River Lodden, adjacent to the northwest of the site).



3.5 Radon

Site-specific radon information (Appendix D of this report) and British Geological Survey (BGS) data indicate that between 1% and 3% of homes are above the Radon Action Level and that no radon protective measures are necessary in the construction of new properties and extensions.

3.6 Conceptual Site Model

3.6.1 Geotechnical Conceptual Site Model

From the historical data, the site has comprised farmland from first edition (1886) maps until the present day. Therefore, no significant made ground would be anticipated.

From the published information, the expected underlying geology is Late Jurassic Kimmeridge Clay Formation, overlain across much of the site, particularly around the site's periphery, by Quaternary Head deposits and, adjacent to the stream (River Lodden) and drainage ditch, by Quaternary Alluvium.

The Kimmeridge Clay should provide sufficient bearing capacity for the adoption of traditional strip or trench-fill foundations. However, if significant depths of soft/ loose superficial Head and/ or Alluvium deposits are encountered, foundations may require deepening, or an alternative foundation solution may be required.

The geological information indicates that the permeability of the bedrock geology is typically low to very low, i.e. is unlikely to be suitable for soakaway drainage. The observation that much of the site was waterlogged in May 2014 also indicates low permeability soil conditions and/ or a near surface groundwater table exists. The stream and drainage channel crossing the site also suggest that groundwater may be present near to the surface.

3.6.2 Contamination Conceptual Site Model

Source

From the historical data, the site has comprised farmland from first edition (1886) maps until the present day. Therefore, no significant contamination would be expected as a result of past or present on-site land uses.

There are several recorded potentially contaminative land uses within 250m of the site. However, given the localised nature of any potential contamination from these potential sources, and the distance from the site, it is considered that no significant contamination of the ground beneath the site is likely to have occurred as a result of past or present off-site land uses.

Pathway

In accordance with the CLEA model, a residential with home grown produce land use is considered to be most appropriate for this development and has been used in this risk assessment. The following exposure pathways potentially linking contamination to humans have been considered:

- direct soil and indoor dust ingestion;
- consumption of home grown produce;
- consumption of soil adhering to home grown produce;



- skin contact with soils and indoor dust; and
- inhalation of indoor and outdoor dust and vapours.

If present, groundwater flow within the underlying bedrock is considered to be the main migration pathway linking any contamination to the water environment.

Receptor

As a residential land use, end users are considered as potential receptors of any contamination, with a young female child (aged zero to six years old), being the critical receptor.

As there are no abstraction points within 250m of the site, the nearest water course, located on-site, and groundwater beneath the site are considered to be the main potential controlled waters receptors.

3.7 Sampling and Analysis Plan

In order to confirm the above conceptual site models, an intrusive ground investigation was undertaken.

Trial pits were considered to be the most suitable exploratory technique, as these would enable a large volume of the ground to be inspected and tested in-situ. The trial pits were located so as to provide a reasonable spread of information and an accurate representation of subsurface ground conditions.

In-situ soakaway testing was undertaken to assess the permeability and suitability of the ground for soakaway drainage.

Plasticity index/ particle size distribution tests were undertaken to determine the volume change potential of the soil for foundation design and pH and soluble sulphate testing was undertaken to determine concrete class requirements. Samples were taken for geotechnical testing from twenty-two different locations, at different depths.

Representative samples were taken and tested for general inorganics, heavy metals/ metalloids, speciated polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH) and total phenols, which provides a broad and general range of contaminants that may be present. Should detectable levels of TPH be recorded, speciated TPH and monoaromatics testing would be undertaken, in line with current UK best practice (Environment Agency (2005): The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils).

Samples were selected for contamination testing from nineteen of the trial pits from a range of depths within the near surface deposits, as, in accordance with the CLEA model, contamination is assumed to be within the near surface deposits for most exposure pathways.

Samples were selected for testing to provide an accurate representation of ground conditions encountered.



4 FIELDWORK

4.1 General

All fieldwork was undertaken on 27 and 28 May 2014 and 09, 10 and 11 July 2014. The siting and setting out of all the trial pits was the responsibility of Ruddlesden geotechnical Ltd, who also determined the extent of testing and sampling.

The fieldwork was undertaken in two phases and much of the site was waterlogged during the winter months or contained uncut grass. No access was possible in a small field in the east of the site, off Shaftesbury Road, as this was padlocked at the time of the investigation.

All fieldwork was undertaken in accordance with BS5930 (1999): British Standard Code of Practice for Site Investigation, British Standard BS10175 (2011): Investigation of Potentially Contaminated Sites – Code of Practice and Eurocode 7 (2007): Part 2 Ground Investigation and Testing.

4.2 Trial Pits

Fifty-three trial pits were excavated to depths of between 2.00m and 3.80m using a JCB 3CX (seven-tonne wheeled excavator).

Samples and observations were made from inside the pit to a depth of up to 1.20m, where safe to do so, from the surface and from samples recovered from the excavator bucket. The supervising geologist provided a detailed description of the ground conditions, groundwater and stability and also obtained samples at representative locations, which were placed into suitable containers. The trial pits were not shored.

In-situ shear vane testing was undertaken within suitable cohesive soils to obtain an estimate of undrained shear strength.

Details of ground and groundwater conditions encountered can be found on the trial pit logs (Appendix A) and photographs (Appendix B). The trial pit locations are shown on the trial pit location plan (Dwg. No. 14114/04, Appendix E).

4.3 Soakaway Testing

Ten soakaway tests were undertaken in general accordance with BRE 365 'Soakaway Design'.

The trial pit was excavated to a depth deemed sufficient to represent a section of the design soakaway. The vertical sides were trimmed square. A 1500-gallon water bowser was used to supply the large volumes of water required at a quick rate.

The pit was filled with water and allowed to drain. The fall in water level was recorded with time.



5 LABORATORY TESTING

5.1 General

All laboratory testing was scheduled by Ruddlesden geotechnical Ltd and the results are presented in Appendix C of this report. Unless stated otherwise, the laboratory testing was UKAS accredited.

5.2 Geotechnical Testing

The programme of laboratory testing was carried out in accordance with BS 1377 (1990) 'Methods of Test for Soils for Civil Engineering Purposes'.

The following tests were carried out on twenty-two samples:

- water content;
- plasticity index/ particle size distribution;
- percentage passing 425µm sieve;
- pH value; and
- soluble sulphate content.

5.3 Contamination Testing

In order to test the conceptual site model (see section 3.6.2 of this report), nineteen soil samples were tested for the following suites of tests:

General Inorganics

pH, soluble sulphate, organic matter.

Heavy Metals/ Metalloids

Arsenic, boron, cadmium, chromium (VI), chromium (total), copper, lead, mercury, nickel, selenium, zinc.

Speciated Polyaromatic Hydrocarbons (PAH)

Acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h) anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene.

Total Phenols

Total Phenols (monohydric).

Petroleum Hydrocarbons

Total Petroleum Hydrocarbons (TPH).



6 RESULTS OF THE INVESTIGATION

6.1 General

The following sections provide a summary of ground conditions encountered, groundwater and laboratory testing. Further details are provided in the appendices of this report.

The results of this investigation broadly concur with the predicted conceptual site model.

6.2 Ground Conditions Encountered

6.2.1 Topsoil

Brown silty gravelly clay was typically encountered across the site to depths of between 0.20m and 0.60m below existing ground levels.

6.2.2 Made Ground

Beneath the topsoil in TP63, in the far south of the site, greyish brown slightly silty clay with rare ceramic fragments was encountered to a depth of 0.80m.

No other deposits of made ground were encountered across the site during the investigation.

6.2.3 Natural Geology

Beneath the topsoil and/ or made ground, firm to stiff yellowish brown/ grey silty clay and/ or firm to stiff bluish grey silty clay and/ or firm to stiff brown silty clay was generally encountered.

At fourteen locations across the site, (loose to medium dense) grey/ brown sandy clayey gravel was encountered below the yellowish brown/ grey silty clay and/ or above the bluish grey silty clay, to depths of between 0.50m and 2.70m.

At four locations across the site, soft to firm bluish grey silty very gravelly clay was encountered to depths of between 2.00m and 3.40m.

At eleven locations in the south of the site, stiff bluish grey/ very dark blue silty clay was encountered to depths of between 2.00m and to the base of trial pits.

Estimates of undrained shear strength obtained from in-situ shear vane testing typically ranged from 40kN/m² to 100kN/m² and from 60kN/m² to 120kN/m², at depths of 0.50m and 1.00m respectively.

The density of the granular deposits was estimated from a visual assessment only, i.e. ease of excavation and stability of trial pit sides.



6.3 Groundwater

Groundwater was encountered at the following depths during the course of the investigation:

Table 6.1: Occurrence of Groundwater

TP No.	Water Level (mBGL)	Rate of Inflow
TP08	2.60	Slight
TP13	0.90	Slight
TP19	2.10	Slight
TP20	1.90	Slight
TP27	1.80	Slight
TP30	2.50	Slight
TP39	2.20	Constant
TP44	2.50	Slight
TP49	2.60	Slight
TP54	2.00	Slight
TP62	2.50	Slight

6.4 Soakaway Testing

Full details of the soakaway testing results are provided in Appendix A of this report.

In summary, negligible rates of infiltration were recorded in all of the soakaway tests.



6.5 Geotechnical Laboratory Testing

All the geotechnical laboratory testing results are presented in Appendix C of this report. The results are summarised in the table below:

Table 6.2: Summary of Geotechnical Laboratory Testing Results (1 of 3)

	TP07 0.80m	TP08 2.00m	TP12 1.50m	TP15 2.00m	TP19 1.00m	TP22 1.00m	TP24 1.00m	TP26 1.00m	TP28 1.50m
Moisture content (%)	26.5	20.3	35.8	18.8	28.1	32.1	30.1	18.9	27.7
Liquid limit (%)	61	37	53	38	54	61	56	71	61
Plastic limit (%)	22	18	21	16	24	26	24	28	26
Plasticity index (%)	39	19	32	22	30	35	32	43	35
%passing 425µm sieve	100	99.6	100	100	100	100	100	24.6	100
Modified plasticity index (%)	39	19	32	22	30	29	32	11	35
Volume change potential	Medium	Low	Medium	Medium	Medium	Medium	Medium	Low	Medium
pH value	7.7	6.1	6.7	6.3	6.7	6.7	5.7	5.8	6.4
Soluble sulphate content (mg/kg)	50	70	47	100	440	6200	340	400	590



Table 6.2: Summary of Geotechnical Laboratory Testing Results (2 of 3)

	TP30 1.00m	TP33 1.50m	TP35 1.50m	TP40 1.80m	TP41 1.50m	TP44 2.00m	TP47 1.50m	TP49 2.00m	TP50 1.00m
Moisture content (%)	28.5	24.7	24.7	14.0	26	26.8	29.0	16.0	21.0
Liquid limit (%)	51	55	55	-	-	56	60	-	57
Plastic limit (%)	22	22	22	-	-	26	24	-	24
Plasticity index (%)	29	33	33	-	-	30	36	-	33
%passing 425µm sieve	100	100	100	-	-	100	91.2	-	25.9
Modified plasticity index (%)	29	33	33	-	-	30	33	-	9
Volume change potential	Medium	Medium	Medium	Non-shrinkable	Non-shrinkable	Medium	Medium	Non-shrinkable	Low
pH value	6.4	6.1	7.1	7.8	8.0	7.4	7.5	7.8	7.9
Soluble sulphate content (mg/kg)	82	4600	590	110	1100	4200	4300	20	110

Table 6.2: Summary of Geotechnical Laboratory Testing Results (3 of 3)

	TP53 1.50m	TP56 1.50m	TP58 1.00m	TP62 1.25m
Moisture content (%)	31.6	29.1	31.8	31.8
Liquid limit (%)	60	56	68	62
Plastic limit (%)	25	23	25	25
Plasticity index (%)	35	33	43	37
%passing 425µm sieve	100	100	100	100
Modified plasticity index (%)	35	33	43	37
Volume change potential	Medium	Medium	High	Medium
pH value	7.8	6.7	6.8	7.4
Soluble sulphate content (mg/kg)	230	350	3300	40



6.6 Contamination Laboratory Testing

All the laboratory testing results, together with the Generic Assessment Criteria to which they have been compared, are presented in Appendix C of this report and the implications are discussed in section 8 of this report.

In summary, no significantly elevated levels of contamination were recorded in any of the nineteen soil samples tested.



7 GEOTECHNICAL ASSESSMENT

7.1 Proposals

It is proposed to develop the site for primarily residential purposes with the construction of residential housing and associated local centre, public open spaces and infrastructure. The proposed site master plan is presented in Appendix E of this report.

7.2 Ground Profile

The ground conditions encountered have been summarised in section 6 of this report and the individual trial pit logs, photographs and laboratory testing results should be referred to for further details. Within this section of the report the general ground profile is reviewed and the engineering significance of individual layers is discussed.

Made ground was encountered in TP63, in the far south of the site, to a depth of 0.80m. This deposit does not provide a suitable founding stratum due to its low and variable bearing properties and all foundations must be built below it.

Beneath a surface covering of topsoil and/ or made ground, firm to stiff yellowish brown/ grey silty clay and/ or firm to stiff bluish grey silty clay and/ or firm to stiff brown silty clay was typically encountered. Estimated undrained shear strengths, obtained from in-situ shear vane testing, of between 40kN/m² and 120kN/m² indicate that this deposit has sufficient bearing capacity to provide a suitable founding stratum. Laboratory testing revealed this deposit to typically be of medium volume change potential in accordance with NHBC Standards, Chapter 4.2, though soils of low volume change potential and, at one location (TP58), high volume change potential were recorded.

In several locations across the site, (loose to medium dense) grey/ brown, sandy clayey gravel was encountered beneath the firm to stiff yellowish brown/ grey silty clay. It is considered that this deposit also has sufficient bearing capacity to provide a suitable founding stratum. Laboratory testing indicated this deposit to be non-shrinkable in accordance with NHBC Standards, Chapter 4.2.

In a few locations across the site, soft to firm silty gravelly clay was occasionally encountered to various depths. Foundations may need to be deepened beneath these deposits or, depending on location-specific strengths, bearing capacities may have to be limited.

7.3 Foundations

7.3.1 General

The results of this investigation indicate that strip or trench-fill foundations are generally suitable to support the proposed structures.

However, it is noted that the bearing capacity of the soils varies across the site. Similarly, the volume change potential of the soil varies across the site: although much of the site is underlain by clays of medium volume change potential, locally soils of high and low volume change potential exist.

Prior to development, further, more intensive, investigation is recommended to confirm the bearing capacity and volume change potential of the soils in a particular area (as well as the inaccessible field in the east of the site).



7.3.2 Strip or Trench-Fill Foundations

It is considered that an allowable bearing pressure of 100kN/m² may be placed on the firm to stiff silty clay and/ or (loose to medium dense) clayey sandy gravel by strip or trench-fill foundations of least width 600mm at a minimum depth of 0.90m (assuming medium volume change potential soils are proven to be present) below existing or proposed ground levels, whichever is deepest.

Where building near trees, foundations should be deepened in accordance with NHBC Standards, Chapter 4.2, for soils of medium volume change potential, subject to more intensive testing confirming that high volume change potential soils do not exist in a particular area.

Where foundations are stepped to take account of the influence of trees they should be stepped gradually with no step exceeding 0.50m.

Where foundation depths exceed 1.50m due to NHBC building near tree requirements, heave precautions are required to protect the foundations from lateral soil heave movements. Suitable heave precautions for trench-fill foundations would be compressible material against the inside faces of all external wall foundations.

Foundations must also be built at least 0.20m below any superficial soft deposits and made ground.

It should be endeavoured to build foundations on like material. Where this is not possible, the boundary between the changes in strata, e.g. clay/ gravel, should be suitably reinforced.

Any soft or loose material in the base of foundation excavations should be removed and replaced with compacted lean mix concrete prior to pouring the foundations.

7.3.3 Ground Floor Slabs

Where NHBC building near trees requirements mean that foundation depths are greater than 1.50m, or where the depth of made ground is more than 600mm, fully suspended ground floor slabs are required.

Where NHBC building near trees requirements mean that foundation depths are less than 1.50m and where the depth of made ground is less than 600mm, ground bearing slabs may be adopted.

As laboratory testing has indicated the soils to be of medium/ high volume change potential, suspended ground floors with a minimum void dimension of 150mm should be used where ground floor construction is undertaken when soils are seasonally desiccated (i.e. during summer months and autumn).

7.3.4 Sulphate and pH Aggressivity

Elevated levels of soluble sulphate have been recorded, with the mean of the highest 20% being 3,110mg/kg.

The results of the pH and soluble sulphate tests have been compared to Table C1 of BRE Special Digest 1 "Concrete in Aggressive Ground". This comparison indicates the Design Sulphate Class for the site to be DS-4. As the site is considered to be greenfield, groundwater can be treated as mobile and pH values greater than 5.5 were recorded, Aggressive Chemical Environment for Concrete (ACEC) class AC-4 is required for all buried concrete at this site, i.e. sulphate resistant concrete.



It is noted that the value of 3,110mg/kg only slightly exceeds the 3,000mg/kg limit for AC-3 design sulphate class. Therefore, it is considered that the above assessment may be able to be reassessed if additional testing were to be undertaken. This testing could be undertaken in conjunction with the additional volume change potential testing recommended previously in section 7.3.1.

7.3.5 Radon Protective Measures

BRE Report BR 211 'Radon: Guidance on Protective Measures for New Buildings' and British Geological Survey (BGS) information obtained as part of the desk study information (Appendix D of this report) indicate that no radon protection measures are required.

7.4 Groundwater and Excavations

Groundwater was encountered in eleven of the fifty-three trial pits, at depths of between 0.90m and 2.60m. Therefore, de-watering of temporary excavations is likely to be required.

It is noted that groundwater levels fluctuate according to the season and from year to year. In the weeks prior to the investigation the weather had been average for the time of year. Therefore, higher groundwater levels may be encountered during periods of wetter weather. Likewise though, lower groundwater levels may be encountered during the drier summer months.

Land drains were occasionally encountered during the trial pitting works. Land drains encountered during foundation construction should be intercepted and diverted to a suitable outfall to avoid potential softening of the strata beneath the foundations.

Slight collapse of trial pit sides was recorded in gravel strata during the investigation. Therefore, some shoring of temporary excavations may be required.

All slopes (temporary or permanent) should be designed in accordance with the recommendations provided in BS: 6031 (2009): Code of Practice for Earthworks. In particular, it should be noted that the stability of any cut slopes will be a function of both the shearing resistance of the soil and the angle of the slope.

No problems with excavatability are foreseen.

7.5 Roads

From an assessment of the trial pit logs and laboratory testing results, which classified the soils as being of high plasticity, it is recommended that a CBR value of 2% be used for road pavement design at this site.

Laboratory testing indicated that the soils are frost-susceptible.

If highways are to be adopted, additional in-situ CBR testing may need to be undertaken by the adopting authority along the line of the highway at and below road formation level to confirm the CBR value.



7.6 Soakaways

Ten in-situ soakaway tests were undertaken in accordance with BRE 365.

Water level falls of between 0.00m and 0.03m were recorded over the course of the day, indicating that the ground has a low permeability and is not suitable for the use of soakaway drainage.

The preferable drainage solution at this site would be to discharge into a sewer or suitable outfall.

If necessary, surface ponds and/ or underground storage tanks with a throttled outflow valve may be able to be installed to allow water to be discharged at an agreed rate with the relevant regulatory authority so that during storm periods discharge is not increased from the present situation.



8 CONTAMINATION ASSESSMENT

8.1 General

It is proposed to develop the site for primarily residential purposes with the construction of residential housing and associated local centre, public open spaces and infrastructure. The proposed site masterplan is presented in Appendix E of this report.

The contamination assessment has been carried out in accordance with the latest guidance using a source-pathway-receptor analysis method, to assess whether or not the recorded levels of contamination are safe and suitable for use and to determine the extent of any further assessment or remedial measures that might be necessary. In particular, reference has been made to the following documents:

- Defra (2014): SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report;
- Defra (2014): SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Policy Companion Document;
- Defra & Environment Agency (2004): CLR 11: Model Procedures for the Management of Land Contamination;
- Defra (2012): Environmental Protection Act 1990: Part 2A: Contaminated Land Statutory Guidance;
- Department for Communities and Local Government (2012): National Planning Policy Framework;
- Environment Agency (2005): The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils;
- Environment Agency (2006): Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination;
- Environment Agency (2009): Human Health Toxicological Assessment of Contaminants in Soil (SR2);
- Environment Agency (2009): Updated Technical Background to the CLEA Model (SR3); and
- LQM/ CIEH (2015): The LQM/ CIEH S4ULs for Human Health Risk Assessment. Publication No. S4UL3408.

8.2 Human Health Risk Assessment

8.2.1 Generic Assessment Criteria

A Generic Qualitative Risk Assessment (GQRA) has been undertaken to assess the level of risk posed to human health by soil contamination.

The results of the contamination laboratory testing have been compared to Generic Assessment Criteria (GAC) to aid the evaluation of the extent of contamination at the site. If any of the GAC are exceeded, this may be indicative of an unacceptable risk to the health of site users and that further investigation and/ or remediation is required.

The proposed end use of residential with home grown produce land use has been used in this risk assessment.



Suitable 4 Use Levels (S4ULs), published by Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH), have been used for comparison. The S4ULs have been derived in accordance with UK legislation and Environment Agency guidance using a modified version of the Environment Agency CLEA software. They are fully based on the concept of minimal or tolerable risk as described in SR2 (Environment Agency (2009): Human Health Toxicological Assessment of Contaminants in Soil). The S4ULs have adopted Defra's (2014) revised exposure assumptions and so are considered to be more applicable and up-to-date than the Soil Guideline Values (SGVs), published by Environment Agency (2009) and also derived from the CLEA model. The S4ULs are therefore considered to be applicable under the planning regime in demonstrating whether a site is safe and suitable for use.

In the absence of any other authoritative guidance for lead, the Category 4 Screening Levels (C4SL) for lead, published by Contaminated Land Applications in Real Environments (CL:AIRE), and supported by Defra, has been used for comparison. C4SLs are generic screening levels that are more pragmatic but still strongly precautionary compared to the existing SGVs and other similarly derived numbers. The C4SLs are cautious estimates of contaminant concentrations in soil that are still considered to present an acceptable level of risk, within the context of Part 2A, by combining latest information on human health toxicology, exposure assessment and normal ambient levels of contaminants in the environment.

8.2.2 Comparison of Testing Results to GAC

Of the nineteen soil samples tested, none of the Generic Assessment Criteria were exceeded for a residential with home grown produce land use.

8.3 Controlled Waters Risk Assessment

In order for land affected by contamination to cause harm, there must be a source of contamination, a receptor that can be harmed and a pathway by which the receptor can be exposed to the contamination.

As no significantly elevated levels of contamination were recorded (i.e. there is no source) and no groundwater was encountered (i.e. there is no pathway), it is considered that the levels of contamination recorded at this site are unlikely to cause significant pollution to the water environment.

8.4 Ground Gas Assessment

The desk study information indicates that no radon protective measures are required at this site.

In order to assess the risks posed by ground gas, the principles outlined in BS 8485 (2015) 'Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings' and NHBC Report No. 10627-RO1 (2007) 'Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present' have been followed.

The breakdown of organic material in made ground can produce ground gas, though it may also be produced by other, natural, sources (e.g. coal, peat). The principal components of ground gas are methane (potentially explosive) and carbon dioxide (potential asphyxiant).

There are no recorded landfill sites within 250m of the site and no significant depths biogenic made ground were encountered.



Therefore, ground gas protection measures are not considered to be required at this site.

From an assessment of the ground conditions encountered and laboratory testing results, significant levels of Volatile Organic Compounds (VOCs) are unlikely to be present. A hydrocarbon vapour proof membrane is therefore not considered to be necessary.

8.5 Revised Conceptual Site Model

Prior to the investigation, it was considered unlikely that any significant contamination would be present as a result of past or present on- or off-site land uses.

The results of this investigation have indicated that the levels of contamination present are unlikely to be harmful to human health given the proposed end use and are unlikely to cause significant pollution to the water environment.

Therefore, there is no source-pathway-receptor linkage.

8.6 Discussion and Recommendations

The contamination risk assessments indicate that, due to the absence of a contamination source, the levels of contamination recorded in this investigation are not potentially harmful to human health given the proposed end use or to the water environment. Therefore, no further action or specific remedial measures are required for the proposed end use.

However, if any unexpected discoveries are encountered during construction activities (i.e. anything substantially different from the findings of this investigation), Ruddlesden geotechnical Ltd should be contacted so that appropriate recommendations may be provided.

Also, in line with general good practice, comprehensive and accurate site records should be kept, including details of where soil has been moved to or from site and tip receipts.

If contamination aspects are a planning condition, these recommendations are subject to the approval of the local authority.

8.7 Water Pipe Selection Site Assessment

A site assessment has been undertaken in accordance with the UKWIR document 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites'. Based on the desk study, exploratory hole logs and laboratory testing information, upgraded water supply pipes are not considered to be necessary at this site.



9 REFERENCES

- Brinch Hansen (1978), cited in Tomlinson (1995).
- British Standards Institution (1990): BS 1377 Methods of Test for Soils for Civil Engineering Purposes.
- British Standards Institution (2011): BS 10175: Investigation of Potentially Contaminated Sites – Code of Practice.
- British Standards Institution (2015): BS 5930: Code of Practice for Ground Investigations.
- British Standards Institution (2015): BS 8485: Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings.
- Building Research Establishment (2005): Special Digest 1: Concrete in Aggressive Ground.
- Building Research Establishment (2015): Report BR 211: Radon: Guidance on Protective Measures for New Buildings.
- Building Research Establishment (2016): DG 365: Soakaway Design.
- Defra & Environment Agency (2004): CLR 11: Model Procedures for the Management of Land Contamination.
- Defra (2012): Environmental Protection Act 1990: Part 2A: Contaminated Land Statutory Guidance.
- Defra (2014): SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report.
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- Department for Communities and Local Government (2012): National Planning Policy Framework.
- Environment Agency (2005): The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils.
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- Environment Agency (2009): Human Health Toxicological Assessment of Contaminants in Soil (SR2).
- Environment Agency (2009): Updated Technical background to the CLEA Model (SR3).
- Eurocode 7 (2007): Part 2 Ground Investigation and Testing.
- Highways Agency (2006): Design Guidance for Road Pavement Foundations (Draft HD 25). Interim Advice Note IAN 73/06.
- LQM/ CIEH (2015): The LQM/ CIEH S4ULs for Human Health Risk Assessment. Publication No. S4UL3408.
- NHBC (2016): NHBC Standards.
- NHBC (2007): Report No 10627-RO1: Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present.



- Terzaghi and Peck (1979), cited in CIRIA Report 143 (2005).
- Tomlinson (1995): Foundation Design & Construction, 6th Edition.
- UKWIR (2011): Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites.



10 TERMS AND CONDITIONS

1. This report has been prepared for the sole use of the specified client in response to an agreed brief and for the stated purpose. The recommendations used in this report should not be used for any other schemes on or adjacent to this site without further reference to this company.
2. The copyright of this report is owned by Ruddlesden geotechnical Ltd. With the exception of the named client, who may copy and distribute the report to deal with matters directly relating to its commission, this report may not be reproduced, published or adapted without written consent of the company.
3. New information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances, this report should be referred to Ruddlesden geotechnical Ltd for reassessment and, if necessary, reappraisal.
4. The comments given in this report assume that ground conditions do not vary beyond the range revealed by the investigation. There may, however, be conditions at or adjacent to the site that have not been disclosed by the investigation and which, therefore, have not been considered in this report. Accordingly, a careful watch should be maintained during any future groundworks and the recommendations of this report reviewed as necessary.
5. Whilst confident in the findings of the report, the recommendations may not necessarily be accepted by other authorities without question. It is advisable that, where appropriate, the report be submitted to the relevant statutory authorities and approval obtained before detailed design, site works or other irrevocable action is undertaken.
6. All comments and recommendations are based on groundwater conditions encountered at the time of investigation. It should be noted that groundwater levels might fluctuate according to the season and from year to year. This may have implications on other recommendations, including foundations and excavations.
7. All third party data referred to in the report, e.g. environmental searches and laboratory testing, has been obtained in good faith from bona fide sources. Ruddlesden geotechnical Ltd cannot be held liable for any incorrect information supplied to us.



APPENDICES



APPENDIX A

EXPLORATORY HOLE RECORDS AND FIELD DATA



Key to Trial Pit and Borehole Logs (Common Symbols)

Strata legend



Made Ground

Topsoil

Clay

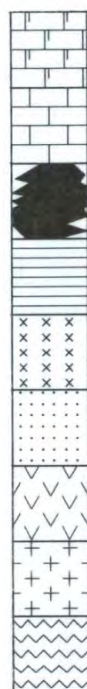
Silt

Sand

Gravel

Peat

Composite soil types will be signified by combined symbols, e.g. silty sand



Chalk

Limestone

Coal

Mudstone

Siltstone

Sandstone

Fine grained igneous rock (e.g. basalt)

Medium grained igneous rock (e.g. granite)

Fine grained metamorphic rock (e.g. slate)

Groundwater



Groundwater strike



Standing groundwater level

Installations



Cement seal

Bentonite seal

Filter pack (slotted pipe)

Samples

D	Small disturbed sample
J	Small disturbed sample (amber glass jar)
B	Disturbed bulk sample
U100	Undisturbed sample (100mm diameter)
W	Water sample

Rotary drilling

TCR	Total core recovery (%)
SCR	Solid core recovery (%)
RQD	Rock quality designation (%)
FI	Fracture index (fractures/m)
NI	Non-intact

In-situ testing

SPT	Standard Penetration Test (split spoon sampler)
SPT(C)	Standard Penetration Test (solid cone)
V	Shear vane test
CBR	California Bearing Ratio

SPT results (examples)

30	N-Value (blows recorded for 300mm penetration, following 150mm seating drive)
50/125	50 blows for 125mm penetration



Field Identification and Description of Soils (Based on Table 7 of BS 5930: 2015)

SOIL GROUP	Very coarse soils			Coarse soils						Fine soils					
PRINCIPAL SOIL TYPE	BOULDERS		COBBLES	GRAVEL			SAND			SILT			CLAY		
Particle size (mm)	Large boulder	Boulder	Cobble	Coarse	Medium	Fine	Coarse	Medium	Fine	Coarse	Medium	Fine			
	>630	630-200	200-63	63-20	20-6.3	6.3-2.0	2.0-0.63	0.63-0.2	0.2-0.063	0.063-0.02	0.02-0.0063	0.0063-0.002	<0.002		
Visual identification	Only seen complete in pits or exposures. Difficult to recover whole from boreholes.			Easily visible to naked eye; particle shape can be described; grading can be described.			Visible to naked eye; no cohesion when dry; grading can be described.			Only coarse silt visible with hand lens; exhibits little plasticity and marked dilatancy; slightly granular or silky to the touch; disintegrates in water; lumps dry quickly; possesses cohesion but can be powdered easily between fingers.			Dry lumps can be broken but not powdered between the fingers; dry lumps disintegrate under water but more slowly than silt; smooth to the touch; exhibits plasticity but no dilatancy; sticks to the fingers and dries slowly; shrinks appreciably on drying usually showing cracks.		
Density/ Consistency	No terms defined. Qualitative description of packing by inspection and ease of excavation.			Classification of relative density on the basis of N-value, or field assessment using hand tests may be made. SPT N-values = 0 – 4 = Very loose 4 – 10 = Loose 10 – 30 = Medium dense 30 – 50 = Dense >50 = Very dense					Term	Very soft	Soft	Firm	Stiff	Very stiff	
									Field test	Finger easily pushed in up to 25mm. Exudes between fingers.	Fingers pushed in up to 10mm. Moulded by light finger pressure.	Thumb makes impression easily. Cannot be moulded by fingers. Rolls to thread.	Can be indented slightly by thumb. Crumbles in rolling thread. Remoulds.	Can be indented by thumb nail. Cannot be moulded, crumbles.	
Discontinuities	Describe spacing of features such as fissures, shears, partings, isolated beds or laminae, desiccation cracks, rootlets, etc. Fissured: breaks into blocks along unpolished discontinuities. Sheared: breaks into blocks along polished discontinuities.					Scale of spacing of discontinuities	Term	very widely	widely	medium	closely	very closely	extremely closely		
							Mean spacing (mm)	>2000	2000-600	600-200	200-60	60-20	<20		
Bedding	Describe thickness of beds in accordance with geological definition. Alternating layers of materials are inter-bedded or inter-laminated and should be described by thickness term if in equal proportions, or by a thickness of and spacing between subordinate layers where unequal.					Scale of bedding thickness	Term	very thickly bedded	thickly bedded	medium bedded	thinly bedded	very thinly bedded	thickly laminated	thinly laminated	
							Mean thickness (mm)	>2000	2000-600	600-200	200-60	60-20	20-6	<6	
Colour	HUE can be preceded by LIGHTNESS and/ or CHROMA Red/ Pink/ Orange/ Yellow/ Cream/ Brown/ Green/ Blue/ White/ Grey/ Black Light/ -/ Dark Reddish/ Pinkish/ Orangish/ Yellowish/ Brownish/ Greenish/ Bluish/ Greyish Colours may be mottled More than 3 colours is multicoloured														
Secondary constituents	For mixtures including very coarse soils see section 33.4.4.2 of BS 5930 (2015).		Terms in coarse soils	slightly (sandy) ^{B)}	(sandy) ^{B)}	very (sandy) ^{B)}	SAND AND GRAVEL		Terms in fine soil	slightly sandy ^{D)}	(sandy) ^{D)}	very (sandy) ^{F)}	Silty CLAY Clayey SILT	Terms used to reflect secondary fine constituents where this is important	
			Proportion secondary ^{A)}	<5%	5-20% ^{C)}	>20% ^{C)}	About 50%		Proportion secondary ^{A)}	<35%	35-65% ^{E)}	>65% ^{E)}			
Mineralogy	Terms can include: glauconitic/ micaceous/ shelly/ organic/ calcareous. For example: slightly (glauconitic)/ (glauconitic)/ very (glauconitic). Carbonate Content: slightly calcareous – weak or sporadic effervescence from HCl/ calcareous – clear but not sustained effervescence from HCl/ highly calcareous – strong, sustained effervescence from HCl. Organic soils contain secondary finely divided or discrete particles of organic matter often with distinctive smell, might oxidise rapidly. For example: slightly organic-grey/ organic–dark grey/ very organic–black.														
Particle shape	Very angular/ Angular/ Sub-angular/ Sub-rounded/ Rounded/ Well-rounded A dominant shape can be described, for example: Cubic/ Flat/ Elongate														
PRINCIPAL SOIL TYPE	LARGE BOULDERS	BOULDERS	COBBLES	GRAVEL			SAND			SILT			CLAY		
Tertiary constituents	Example terms include: shell fragments/ pockets of peat/ gypsum crystals/ pyrite nodules/ calcareous concretions/ flint gravel/ brick fragments/ rootlets/ plastic bags. Qualitative proportions can be given: with rare/ with occasional/ with numerous/ frequent/ abundant. Proportions are defined on a site or material specific basis, or subjectively.														
Geological unit	Name in accordance with published geological maps, memoirs or sheet explanations. For example: River Terrace Deposits/ Glacial Sand And Gravel/ Made Ground/ Crackington Formation/ Weathered Heavitree Breccia Formation/ Meadfoot Group/ Upper Devonian Slates/ Alluvium/ Topsoil/ Laminated Beds/ Bude Formation/ Sherwood Sandstone Group.														

A) Percentage coarse or fine soil type assessed excluding cobbles and boulders.

B) Gravelly or sandy and/ or silty or clayey.

C) Can be described as fine soil depending on mass behaviour.

D) Gravelly and/ or sandy.

E) Can be described as coarse soil depending on mass behaviour.

F) Gravelly or sandy.

TRIAL PIT LOGS

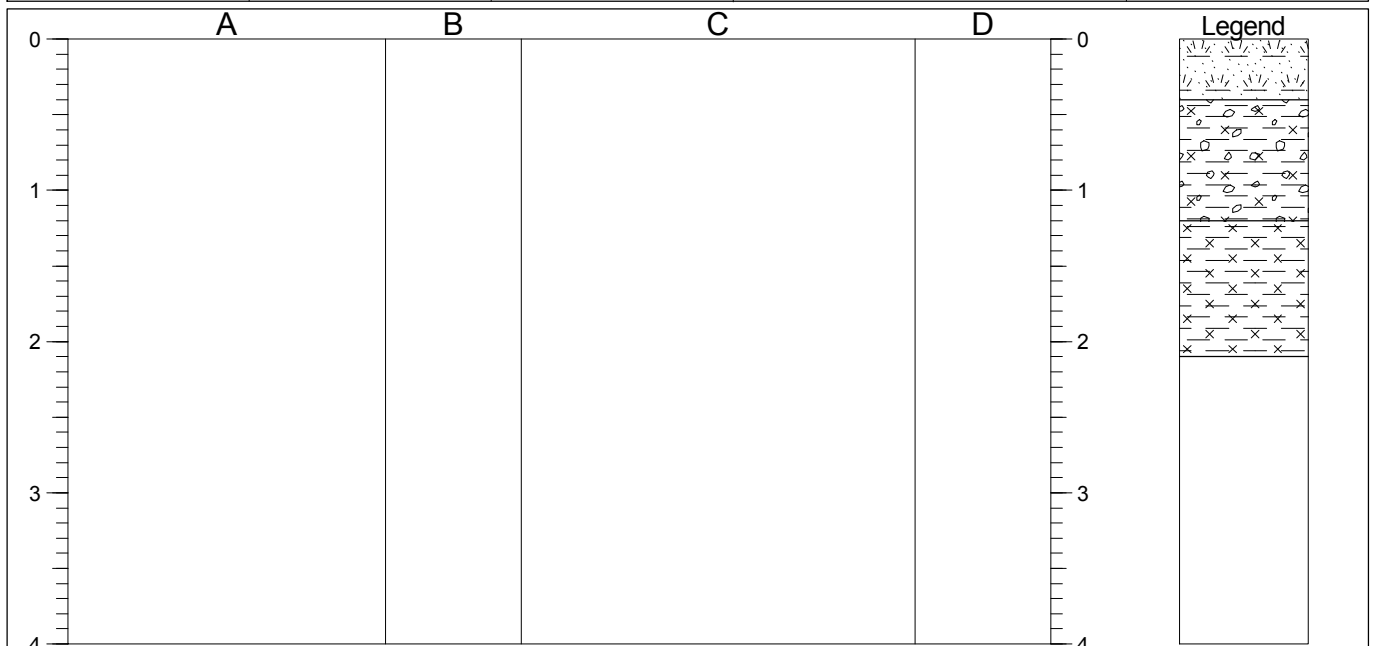




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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP07
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.40		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.40-1.20		Firm yellowish brown/ grey gravelly silty CLAY. Gravel is fine to coarse subrounded to subangular of mixed lithologies.	0.50	VANE	60
		0.90 ...very gravelly	0.80	D	
			1.00	VANE	80
1.20-2.10		Firm bluish grey mottled brown silty CLAY with some mudstone lithorelic structures and rare shells.			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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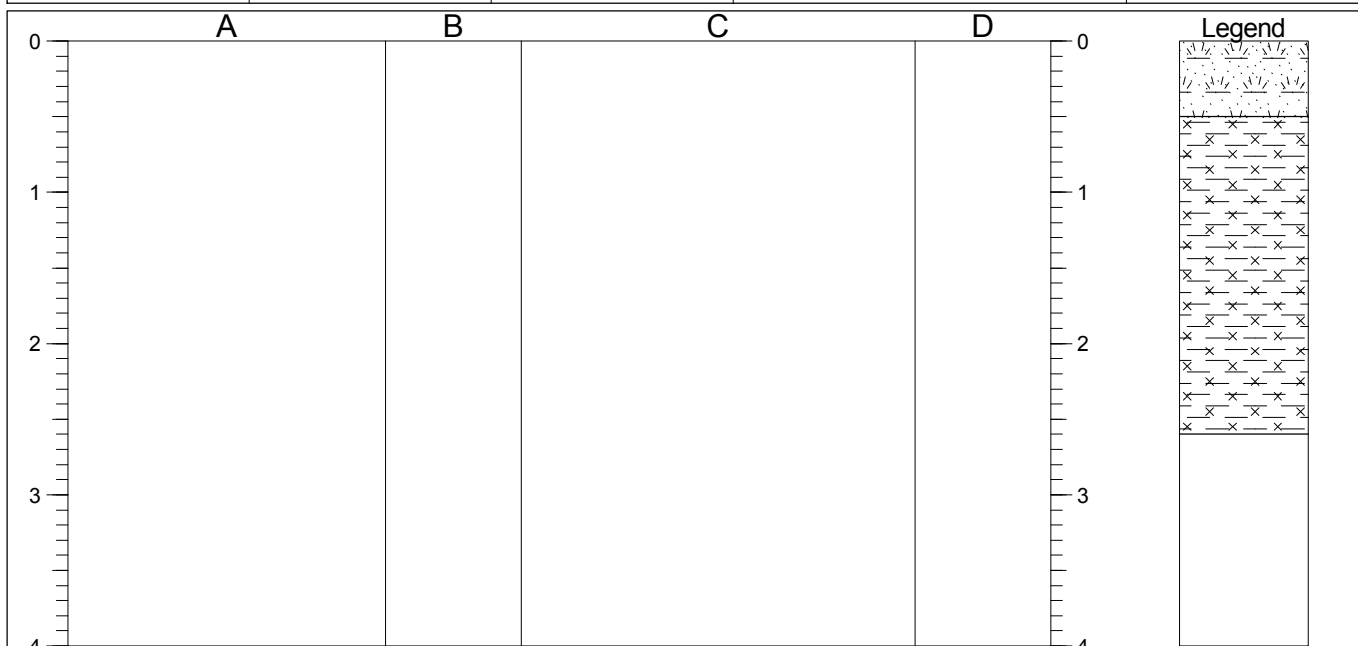
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



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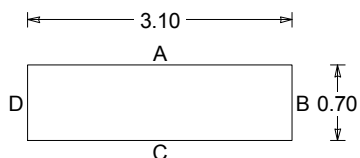
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP08
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.50		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets. Gravel is fine to coarse subangular to subrounded of mixed lithologies.			
0.50-2.60		Firm yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	80
			1.00	VANE	80
			2.00	D	
		2.30 ...very gravelly very moist			

Shoring/Support: None.
Stability: Stable.
Groundwater: Slight seepage at base (2.60m).



GENERAL REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

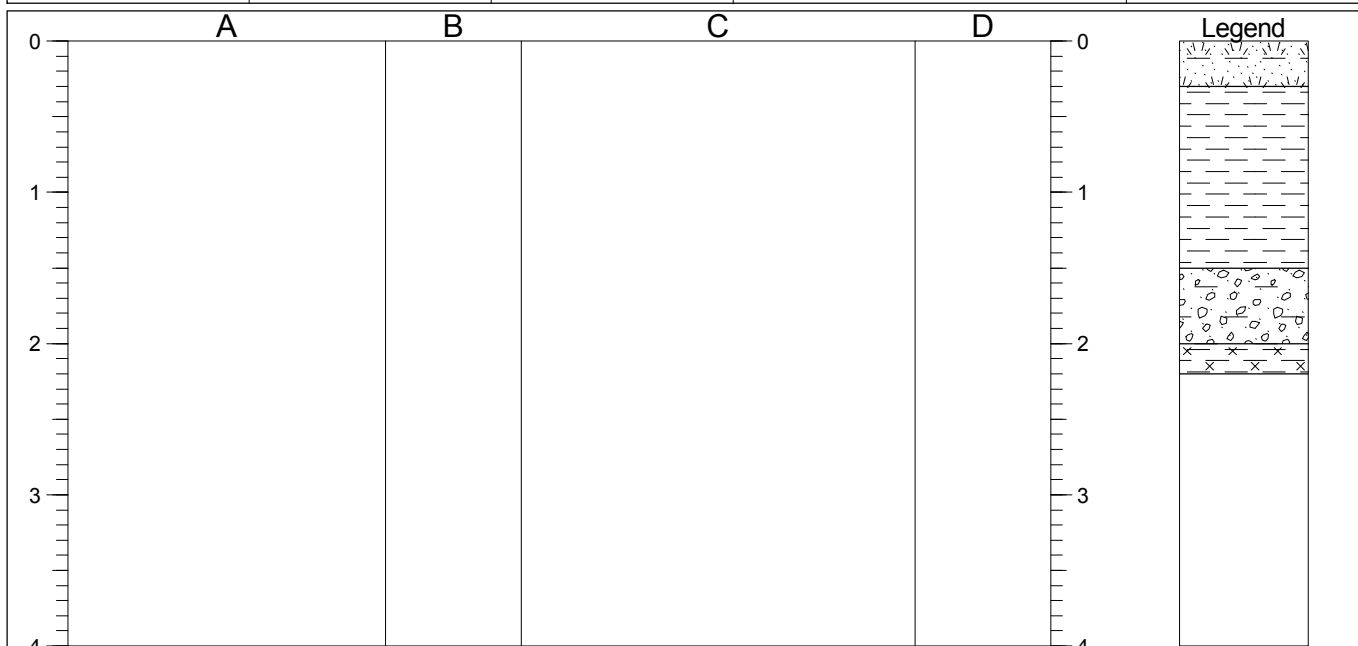
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



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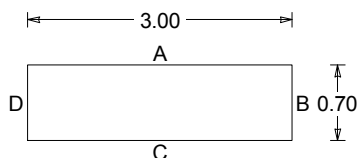
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP09
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.50		Firm to stiff yellowish brown/ grey slightly sandy silty CLAY with rare fine to medium subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	J	
			0.50	VANE	65
			1.00	VANE	80
1.50-2.00		(Medium dense) yellowish brown/ grey sandy very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly mudstone and flint.			
2.00-2.20		Stiff bluish grey silty CLAY.			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

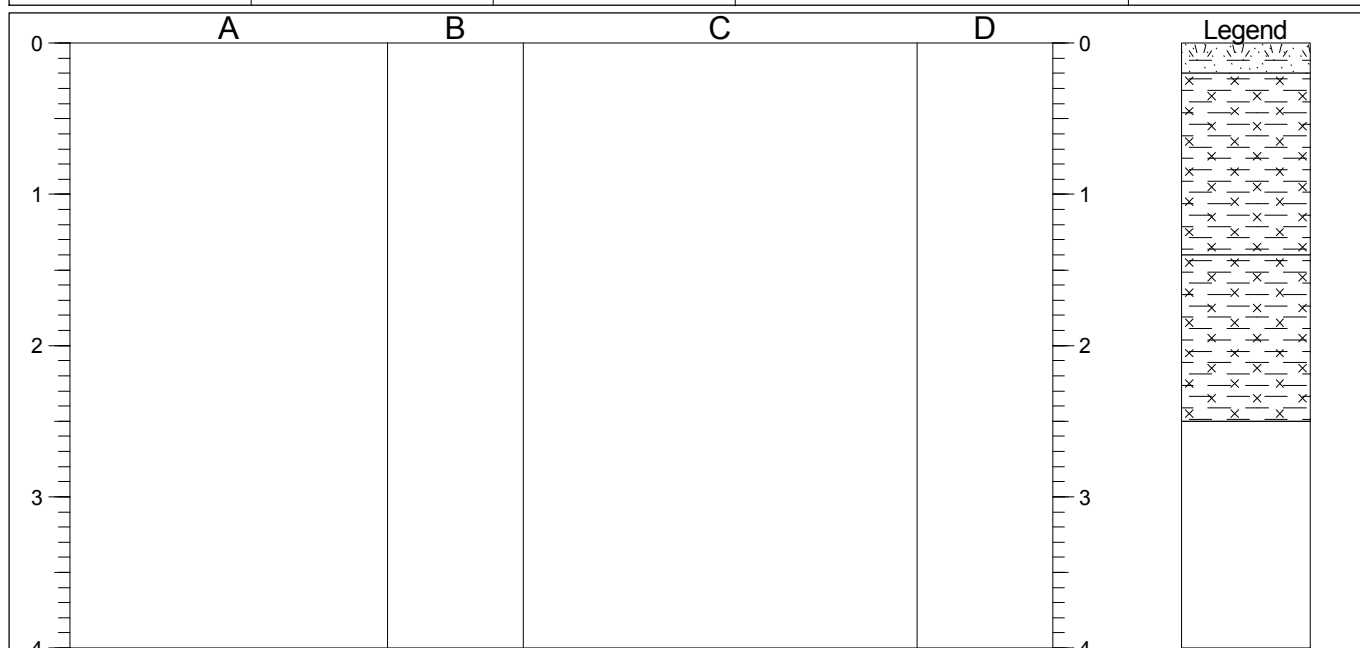
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP12
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.20-1.40		Firm brown silty CLAY with occasional roots and rootlets.	0.50	J	
			0.50	VANE	100
			1.00	VANE	100
1.40-2.50		Firm yellowish brown/ grey silty CLAY with rare rootlets.	1.50	D	

Shoring/Support: None. Stability: Stable. Groundwater: None encountered. 	GENERAL REMARKS	

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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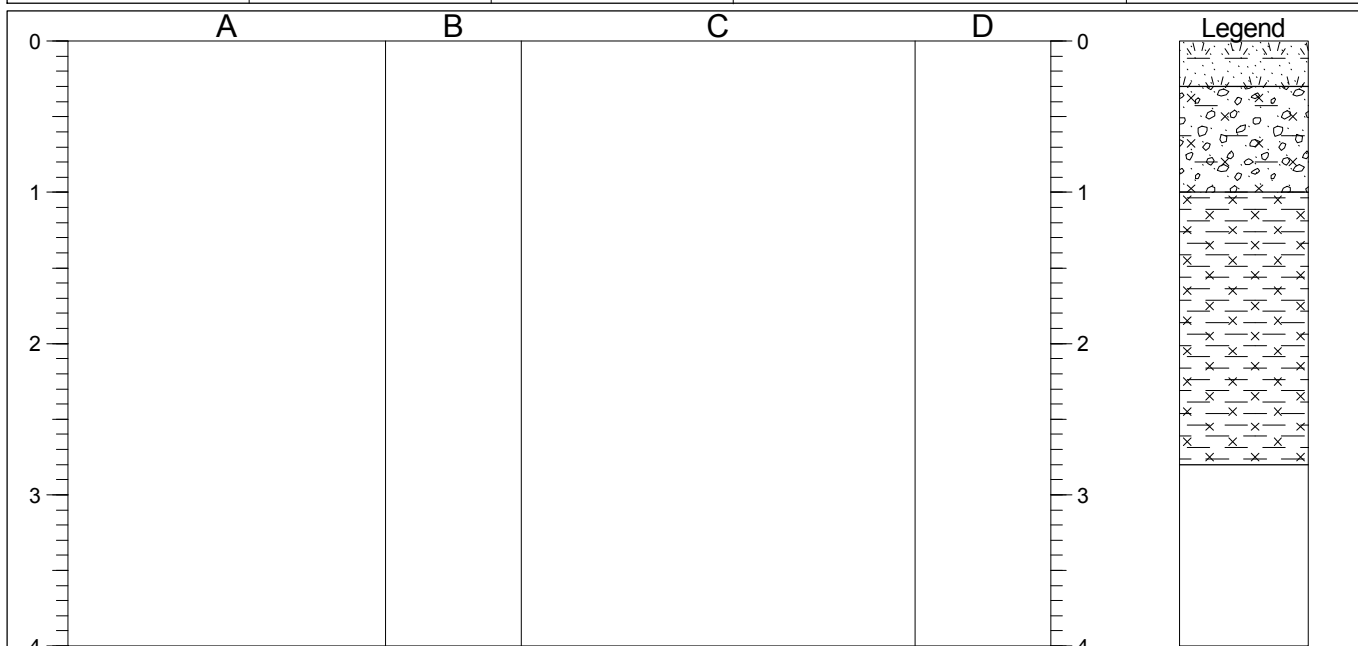
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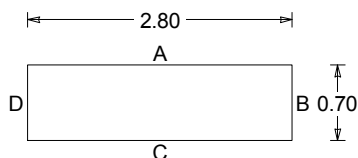
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP13
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.00		(Medium dense) light grey/ brown slightly sandy silty very clayey GRAVEL. Gravel is medium to coarse subrounded to subangular of mixed lithology.	0.50	VANE	too gravelly
1.00-2.80		Firm to stiff bluish grey mottled brown silty CLAY with rare organics and occasional gypsum crystals. 2.00 ...some mudstone lithorelic structures	1.00	VANE	too gravelly

Shoring/Support: None.
Stability: Some collapse of gravel stratum.
Groundwater: Slight seepage at 0.90m.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

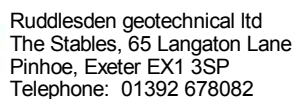
All dimensions in metres
Scale 1:50

Client:

Welbeck Land

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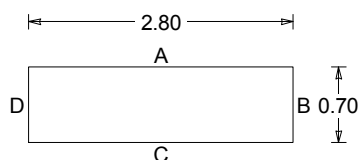


TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP14
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown silty clay with frequent roots and rootlets.	0.30 0.50 1.00	J VANE VANE	60 60
0.20-0.70		Firm yellowish brown/ grey gravelly silty CLAY with occasional rootlets. Gravel is fine to coarse subangular to subrounded of mixed lithologies.			
0.70-2.20		Firm bluish grey mottled brown silty CLAY with occasional crystals of gypsum and organics. ...with shells and mudstone lithorelic structures			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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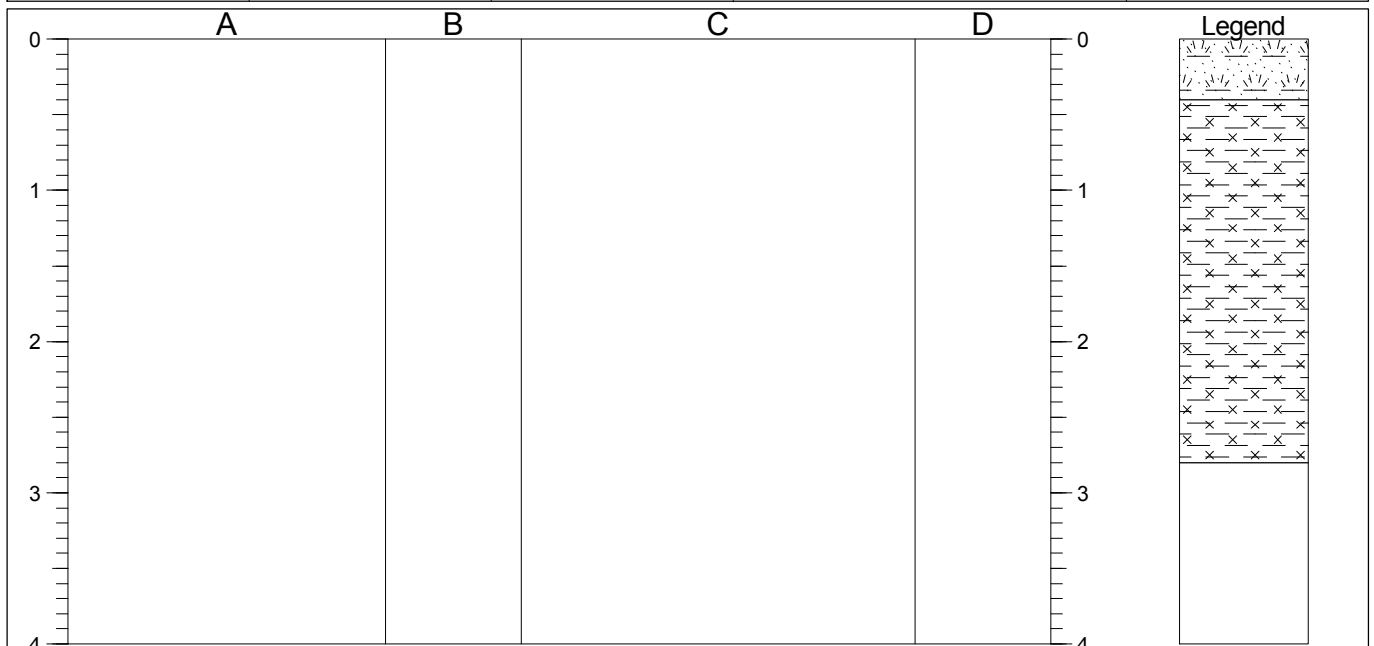
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP15
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

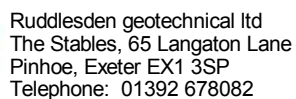


STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.40		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.40-2.80		Firm yellowish brown/ grey silty CLAY with occasional roots and rootlets. 0.60 ...land drain	0.50	VANE	65
			1.00	VANE	95
			2.00	D	
		2.50 ...sandy			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS
<p>A diagram of a rectangular pit. The length is labeled 'A' with a dimension line showing 2.60. The width is labeled 'B' with a dimension line showing 0.70. The depth is labeled 'D'.</p>	

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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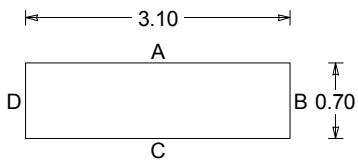


TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP16
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-2.00		Firm to stiff bluish grey mottled yellowish brown silty CLAY with rare fine to medium subangular to subrounded gravel of mixed lithology and organics (rootlets). 0.50 ...land drain	0.50	VANE	60
			0.75	J	
			1.00	VANE	60

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

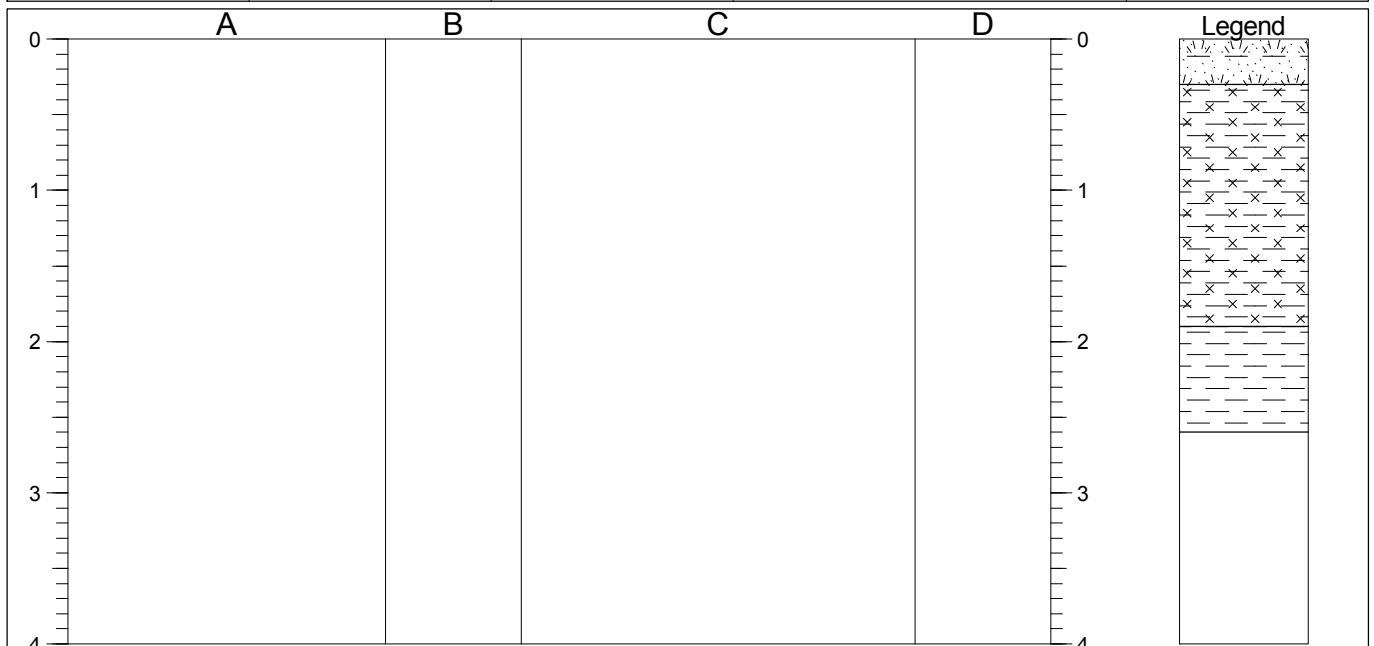
All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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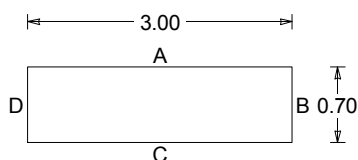
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP19
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.30-1.90		Firm to stiff brown silty CLAY.	0.50	VANE	90
			1.00	D	
			1.00	VANE	120
1.90-2.60		Stiff bluish grey mottled brown CLAY. 2.00 - 2.10 ...very gravelly. Gravel is fine to coarse subrounded to subangular of mixed lithologies (moist).			

Shoring/Support: None.
Stability: Stable.
Groundwater: Slight seepage at 2.10m.



GENERAL REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

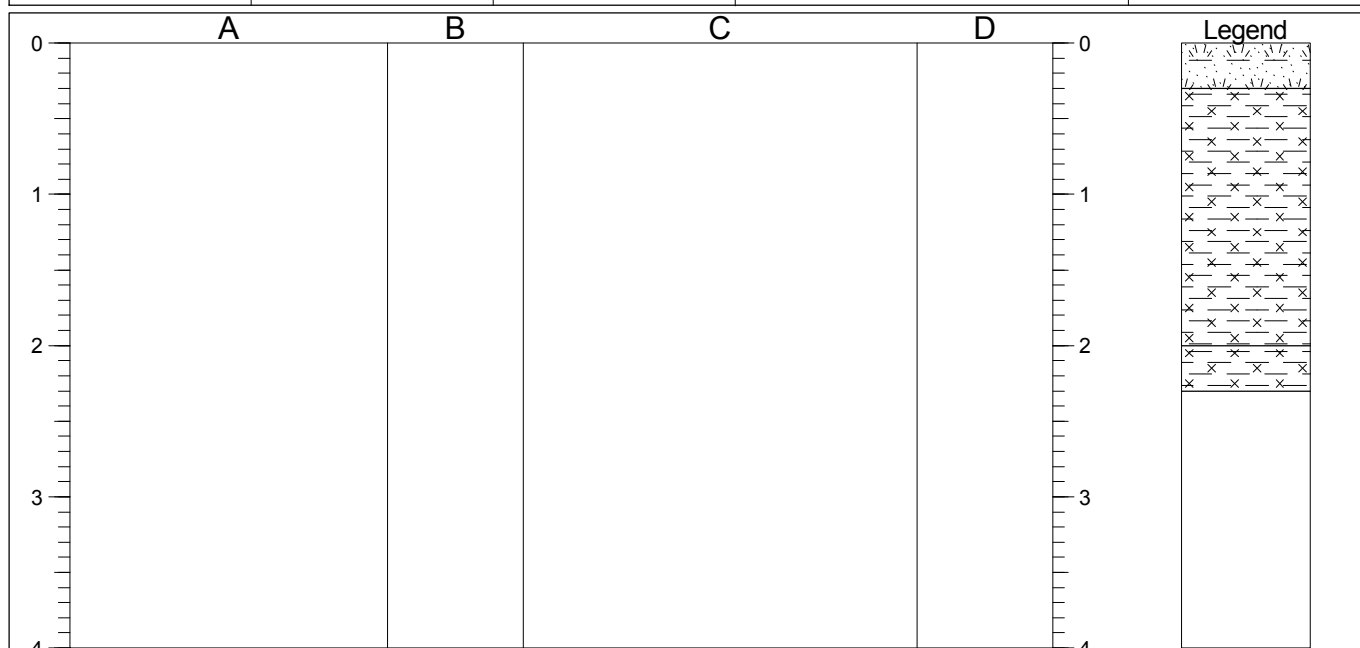
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP20
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



4

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.30-2.00		Firm yellowish brown/ grey silty CLAY with occasional rootlets.	0.50	J	
			0.50	VANE	70
			1.00	VANE	90
		1.50 ...very gravelly. Gravel is fine to coarse subangular to subrounded of mixed lithologies (moist)			
2.00-2.30		Firm to stiff bluish grey silty CLAY with rare gypsum crystals and some mudstone lithorelic structures and occasional shells.			

4

100

Shoring/Support: None. Stability: Stable. Groundwater: Slight seepage at 1.90m.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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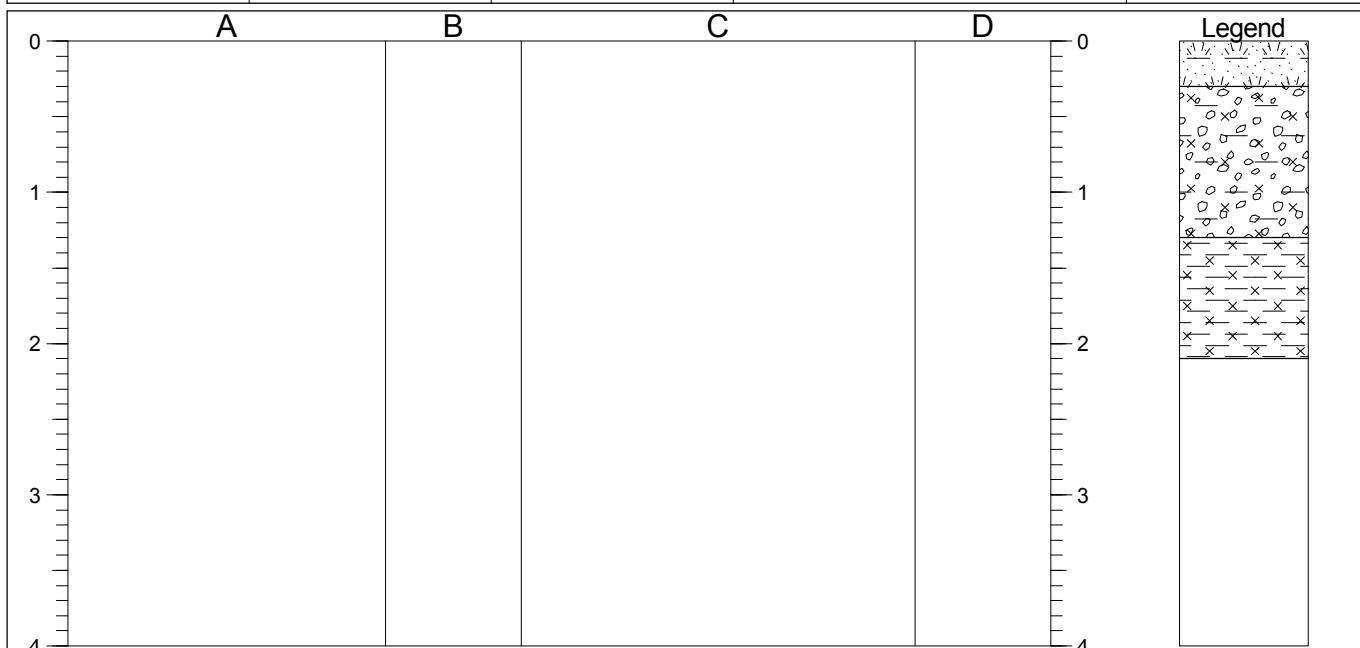
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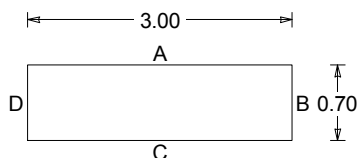
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP21
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.30-1.30		(Medium dense) grey/ yellowish brown silty very clayey GRAVEL occasionally very gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint.	0.50 0.50	J VANE	too granular
1.30-2.10		Stiff bluish grey very silty CLAY with rare shell fragments and organics.	1.00	VANE	too granular

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.		GENERAL REMARKS 1. Density of granular deposits estimated from visual assessment only.	
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All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

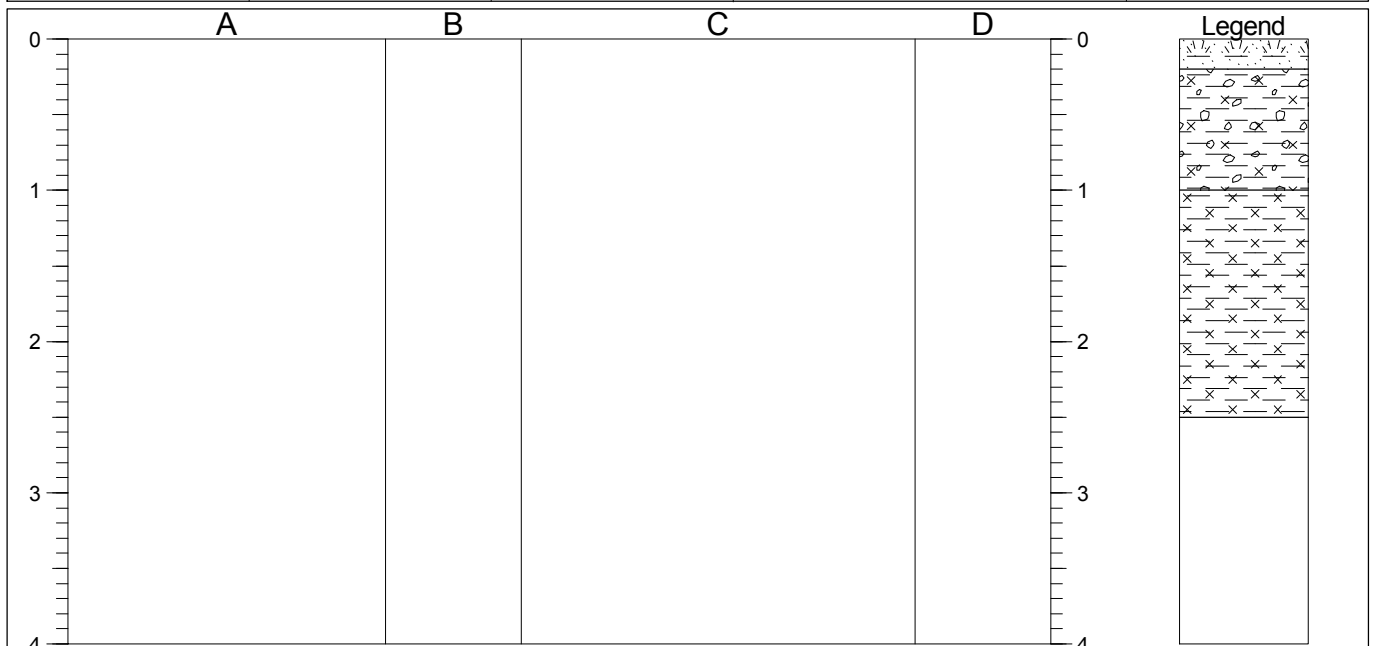
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP22
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.20-1.00		Firm yellowish brown/ grey gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies.	0.30	VANE	60
1.00-2.50		Firm bluish grey mottled brown silty CLAY with occasional gypsum crystals. 1.20 ...with some shells and mudstone lithorelic structures	1.00 1.00	D VANE	75

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

A diagram of a rectangular pit. The top horizontal edge is labeled 'A' and has a dimension line above it indicating a length of 2.80. The bottom horizontal edge is labeled 'C'. The left vertical edge is labeled 'D'. The right vertical edge is labeled 'B' and has a dimension line to its right indicating a width of 0.70.

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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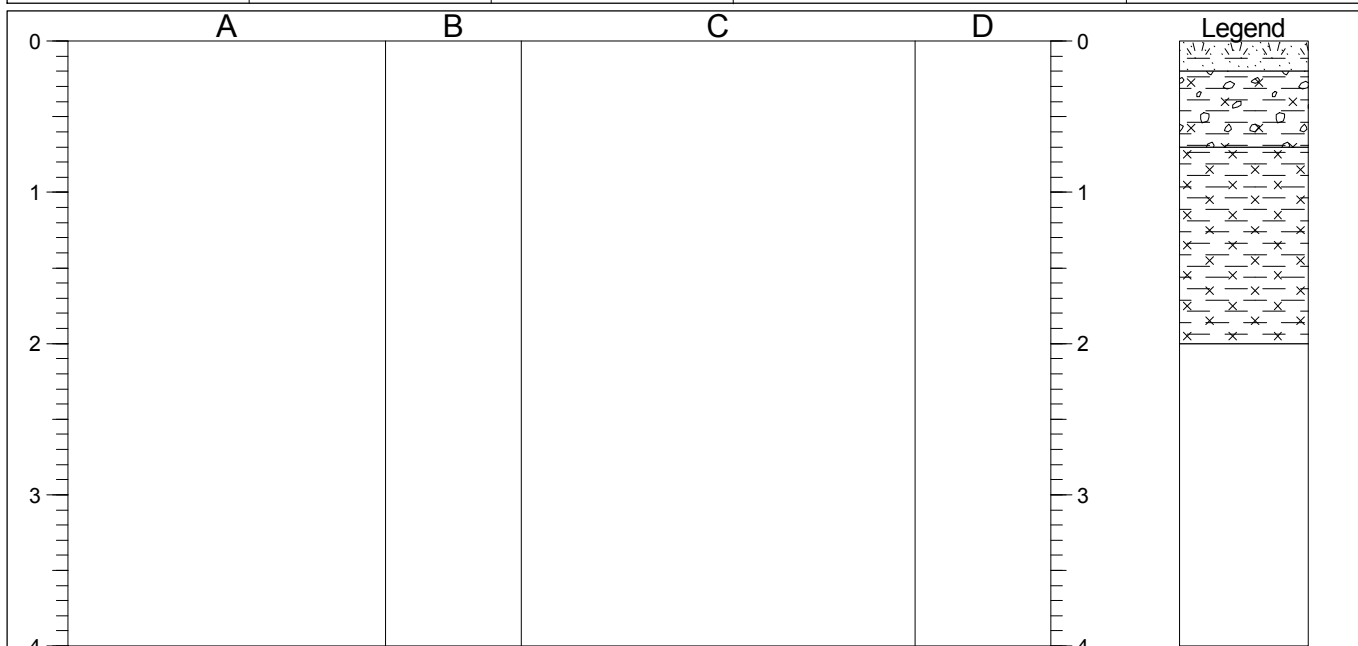
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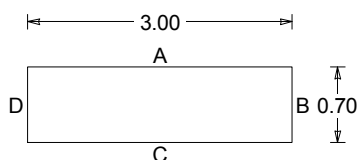
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP23
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-0.70		Firm to stiff yellowish brown/ grey silty gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint.	0.50	VANE	75
0.70-2.00		Stiff bluish grey very silty CLAY with occasional shell fragments and organics.	0.60	J	
		0.70 ...land drain	1.00	VANE	75
		1.30 ...boulder of mudstone with calcite veins			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL
REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

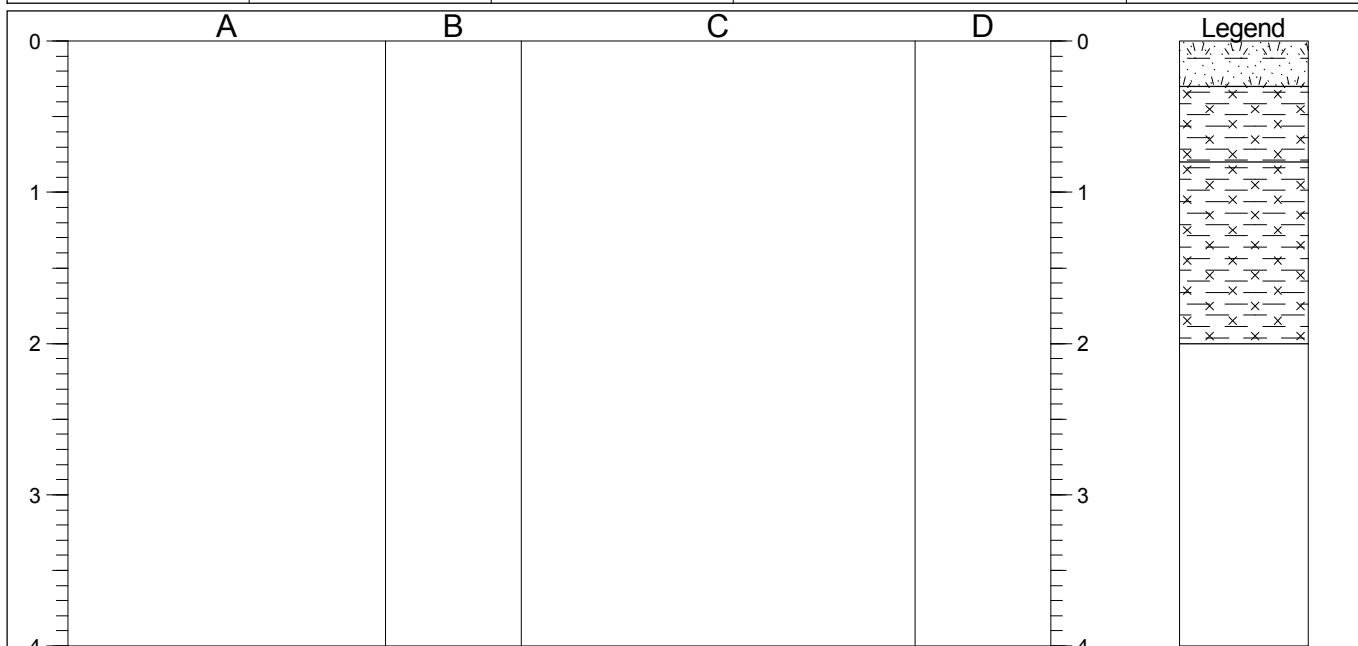
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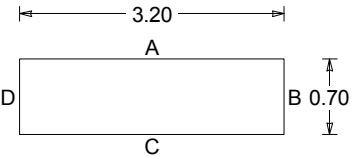
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP24
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-0.80		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint and sandstone.	0.50	VANE	80
0.80-2.00		Stiff bluish grey mottled yellowish brown very silty CLAY with occasional shell fragments and organics (rootlets).	1.00 1.00	J VANE	90

Shoring/Support: None. Stability: Stable. Groundwater: None encountered. 	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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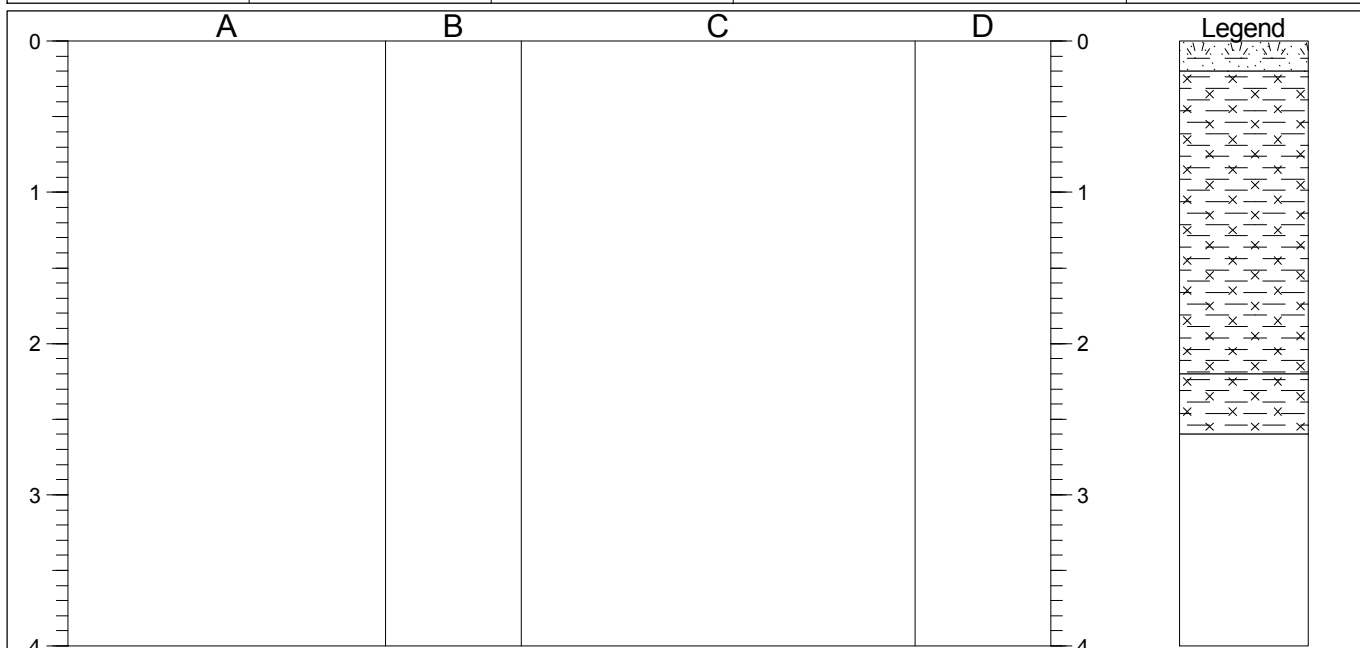
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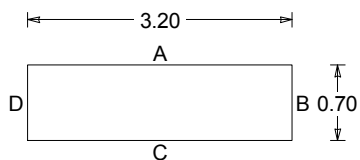
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP25
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.20-2.20		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to medium subangular to subrounded gravel of mixed lithologies predominantly mudstone and flint. 0.50 ...land drain 1.50 ...rare gypsum crystals	0.50	VANE	40
			1.00	VANE	50
2.20-2.60		Firm/ stiff very dark blue mottled brown slightly silty CLAY.	2.20	D	

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL
REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

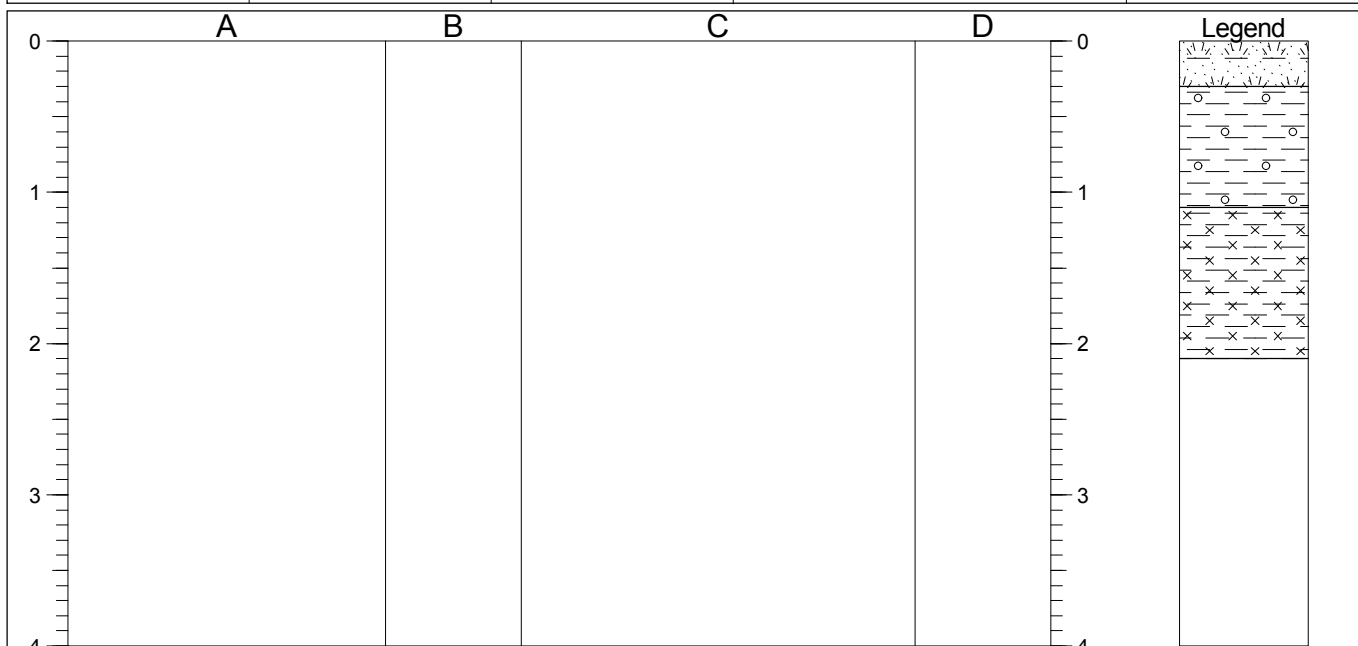
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



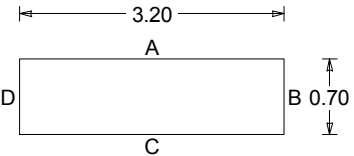
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP26
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.10		Firm yellowish brown/ grey silty gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint.	0.50	VANE	too granular
1.10-2.10		Stiff bluish grey/ very dark blue silty CLAY with occasional organics (rootlets).	1.00	D	
			1.00	VANE	too granular

Shoring/Support: None. Stability: Stable. Groundwater: None encountered. 	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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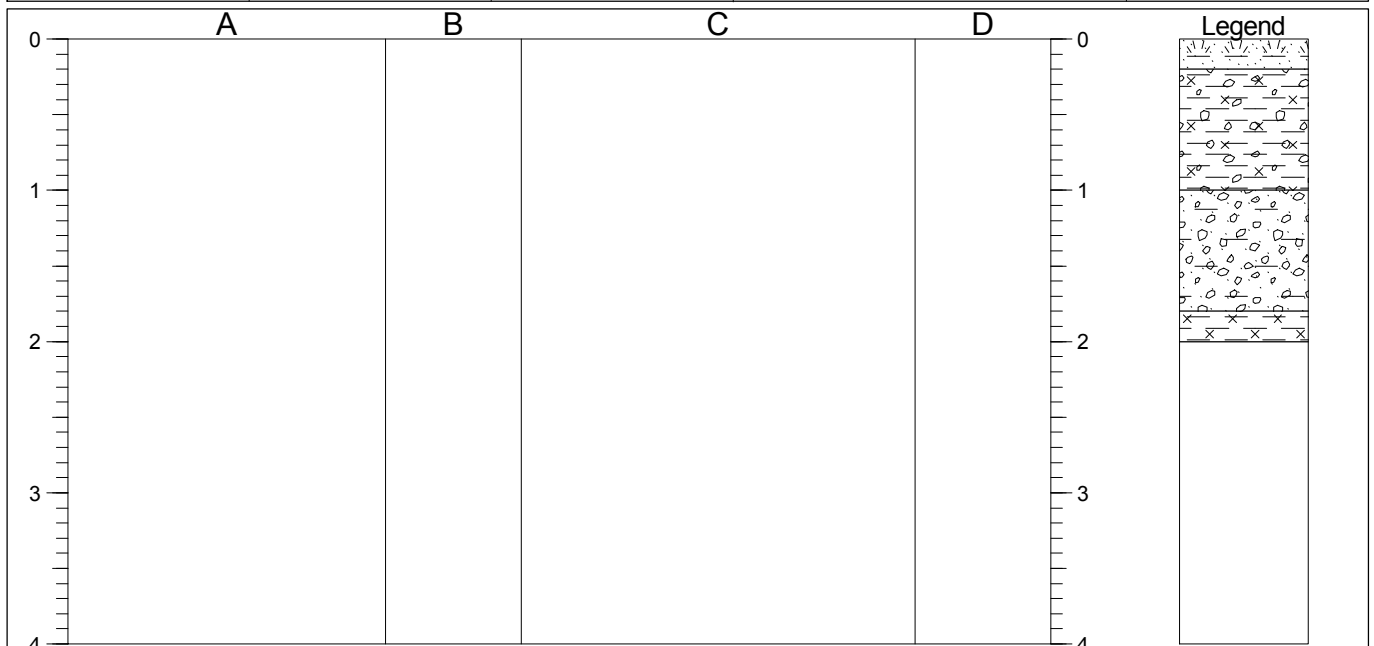
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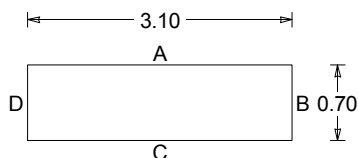
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP27
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.	0.30 0.50	J	65
0.20-1.00		Firm to stiff yellowish brown/ grey slightly gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint. 0.40 ...land drain		VANE	
1.00-1.80		(Medium dense) yellowish brown/ grey sandy very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint and sandstone.	1.00	VANE	65
1.80-2.00		Stiff bluish grey silty CLAY with occasional shell fragments.			

Shoring/Support: None. Stability: Slight collapse in gravel. Groundwater: Slight seepage at 1.80m.		GENERAL REMARKS 1. Density of granular deposits estimated from visual assessment only.	
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All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

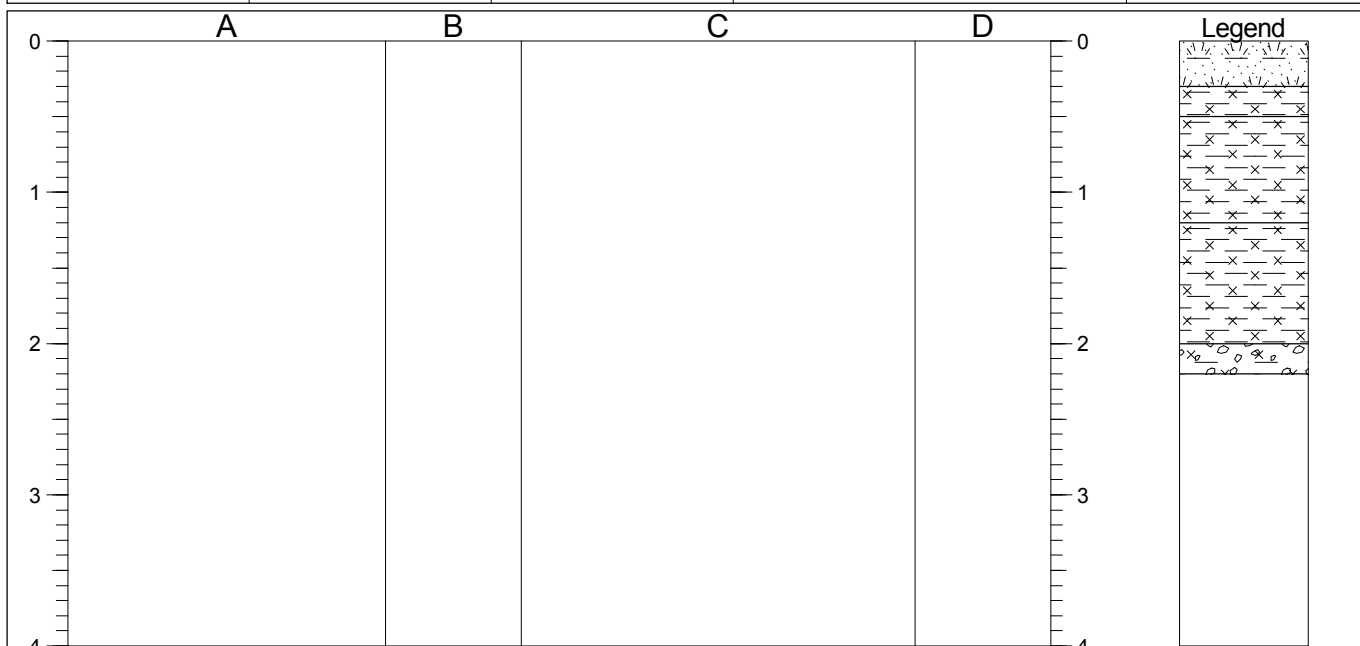
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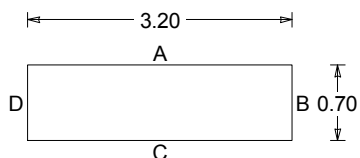
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP28
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.	1.00	VANE	75
0.30-0.50		Firm brown silty CLAY with occasional roots (subsoil).			
0.50-1.20		Stiff brown very silty CLAY.			
1.20-2.00		Firm to stiff yellowish brown/ grey silty CLAY.			
2.00-2.20		(Medium dense) yellowish brown/ grey silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded flint (moist).			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

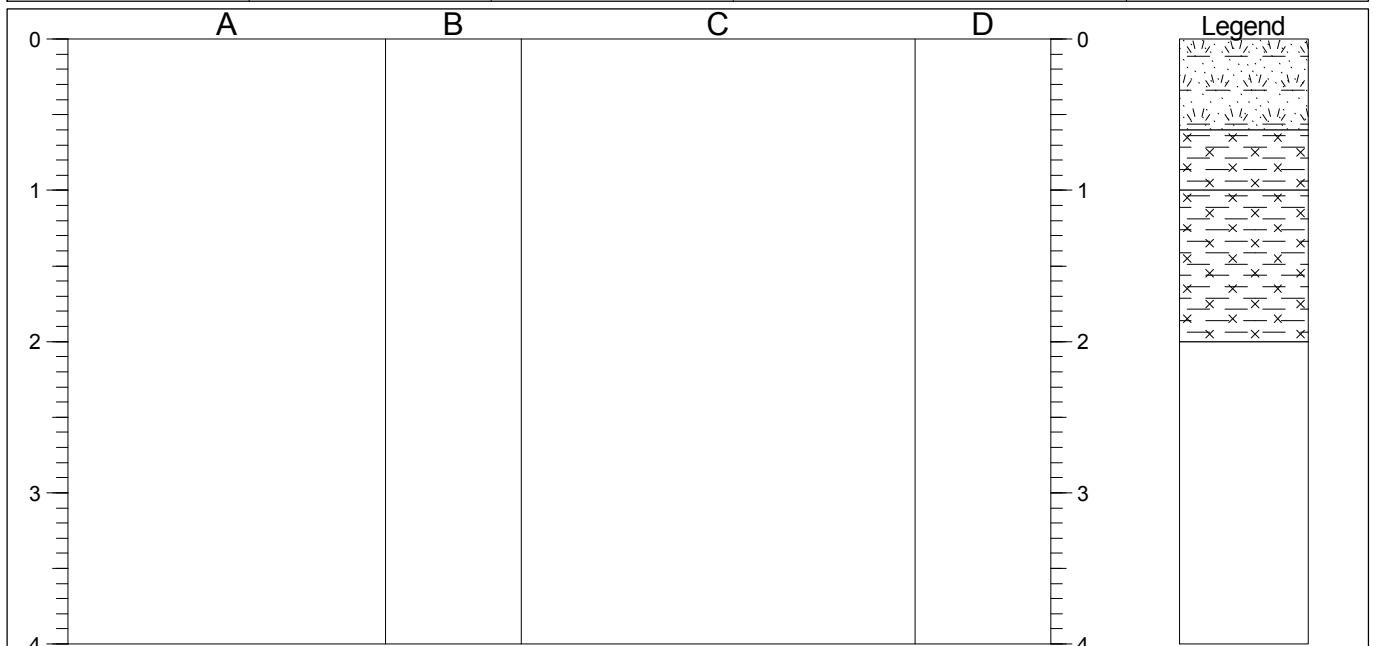
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP29
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.60		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.60-1.00		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of flint.	0.70	J	
1.00-2.00		Stiff bluish grey mottled yellowish brown silty CLAY with occasional shell fragments and gypsum crystals.	1.00	VANE	65

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.		GENERAL REMARKS	
<p>Diagram showing a rectangular pit with dimensions: length 3.10, width 0.70. The pit is labeled with A, B, C, and D at the corners.</p>			

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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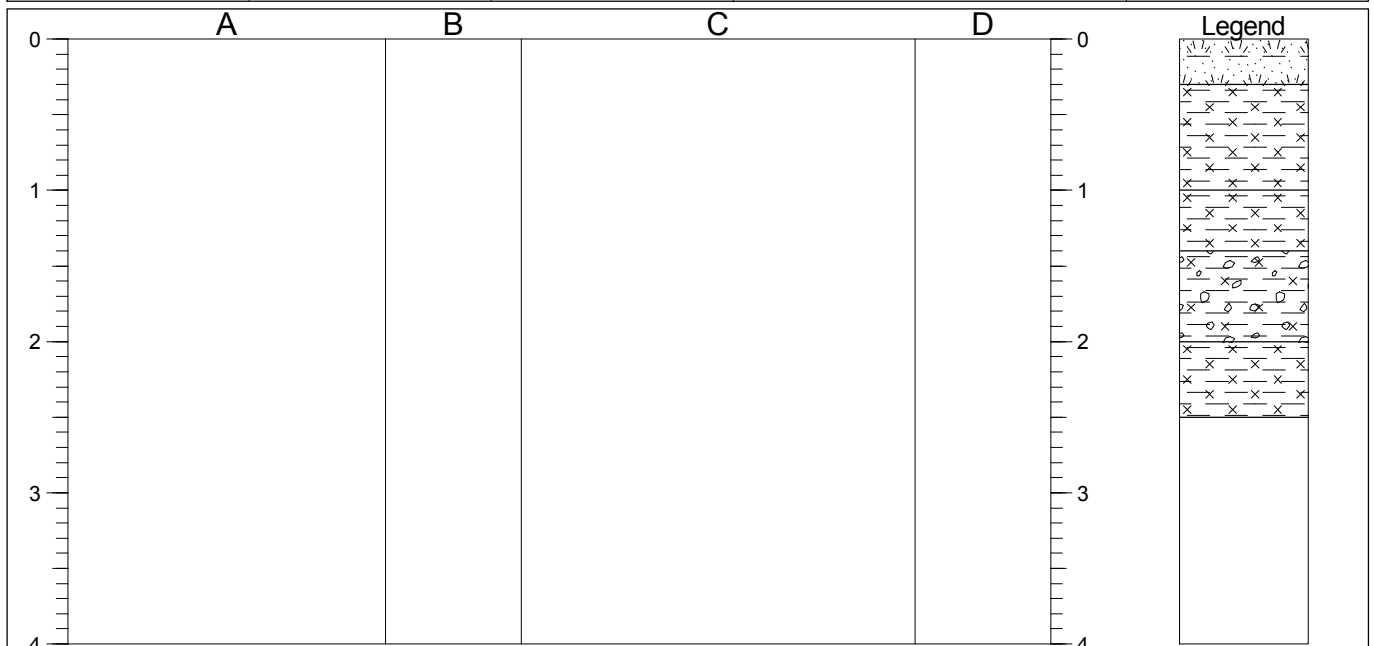
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP30
Job No 14114	Date 27-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.00		Firm brown silty CLAY with occasional rootlets.	0.50	VANE	90
1.00-1.40		Firm yellowish brown/ grey silty CLAY.	1.00	D	
1.40-2.00		Firm grey/ dark brown silty very gravelly CLAY. Gravel is fine to coarse subangular of mixed lithologies.	1.00	VANE	50
2.00-2.50		Firm bluish grey mottled brown silty CLAY with some mudstone lithorelic structures.			

Shoring/Support: None. Stability: Stable. Groundwater: Slight groundwater at base of pit (2.50m). 		GENERAL REMARKS	

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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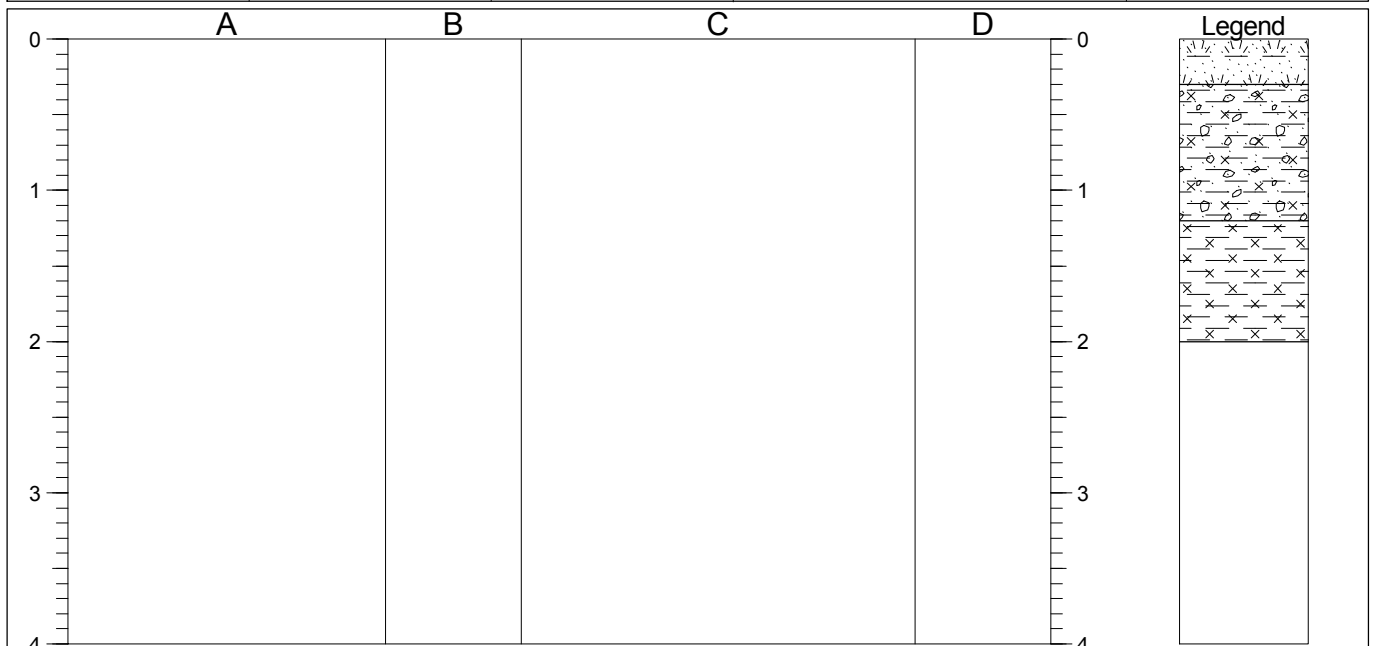
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP31
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.30-1.20		Soft to firm brown slightly sandy silty very gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies.	0.50	VANE	too granular
1.20-2.00		Firm to stiff bluish grey mottled brown silty CLAY.	1.00	VANE	too granular

Shoring/Support: None. Stability: Slight collapse of gravelly clay stratum. Groundwater: None encountered.	GENERAL REMARKS

2.40

A

D

B

0.70

C

Diagram showing a rectangular pit with dimensions: length 2.40, width 0.70. The pit is labeled with A (top), B (right), C (bottom), and D (left).

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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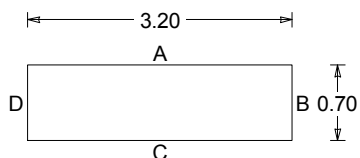
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP32
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

A	B	C	D	Legend
0				
1				
2				
3				
4				

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-2.10		Firm to stiff grey mottled yellowish brown silty gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint. 0.60 - 0.90 ...bed of medium dense grey/ yellowish brown sandy silty very clayey fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint 1.10 ...occasional organics (rootlets) and gypsum crystals	0.50 0.60 1.00	VANE J VANE	too gravelly too gravelly

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

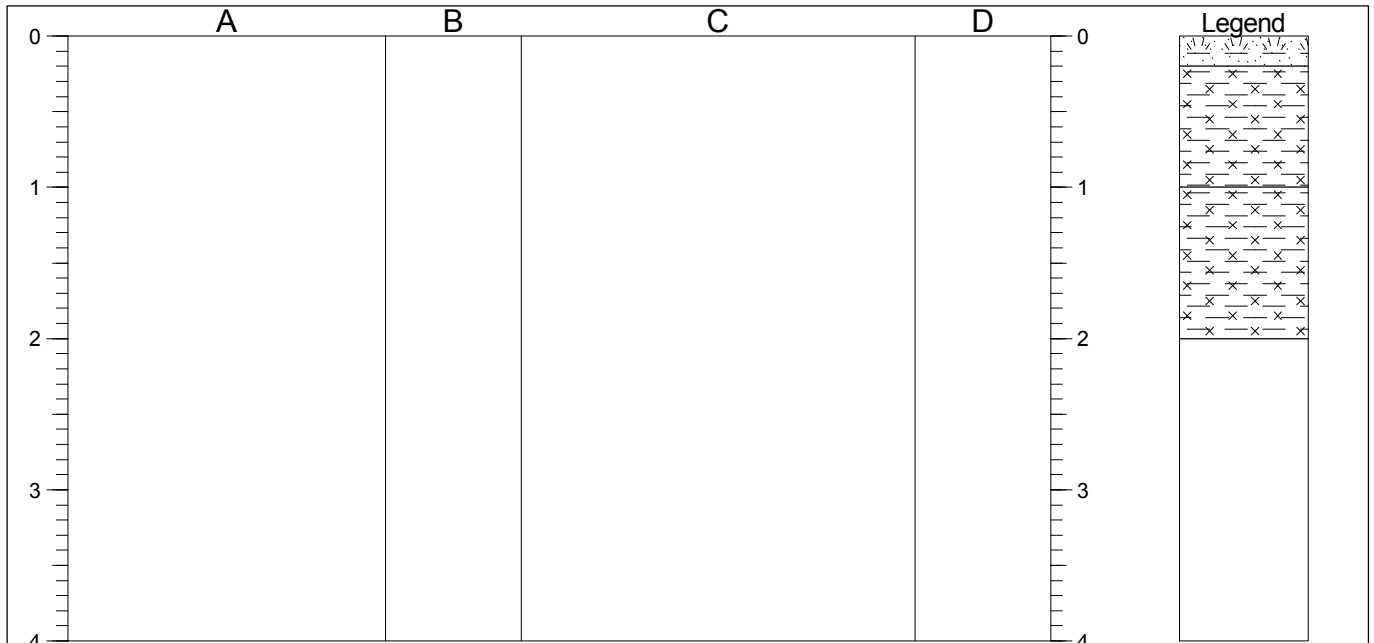
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP33
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-1.00		Firm to stiff grey/ yellowish brown silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	55
1.00-2.00		Stiff bluish grey very silty CLAY with occasional shell fragments and gypsum crystals.	1.00	VANE	60
			1.50	D	

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

3.00

A

D

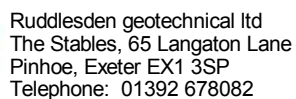
B

0.70

C

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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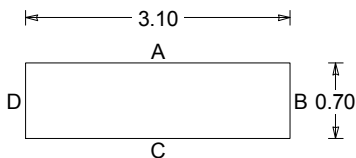


TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP34
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-2.00		Stiff bluish grey mottled yellowish brown very silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies and roots.	0.30	J	
			0.50	VANE	80
		1.20 ...with occasional shell fragments and gypsum crystals	1.00	VANE	90
		1.60 ...very stiff			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP35
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

A	B	C	D	Legend
0				
1				
2				
3				
4				

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-2.20		Firm to stiff grey/ yellowish brown gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint.	0.50	VANE	too granular
		0.80 ...grey mottled yellowish brown with frequent shell fragments and rare organics (rootlets)	1.00	VANE	70
			1.50	D	

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

3.20

A

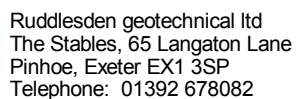
D

B 0.70

C

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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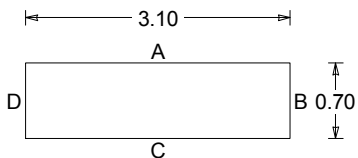


TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP36
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-2.10		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to medium subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	50
		1.00 ...shell fragments	1.00	VANE	70

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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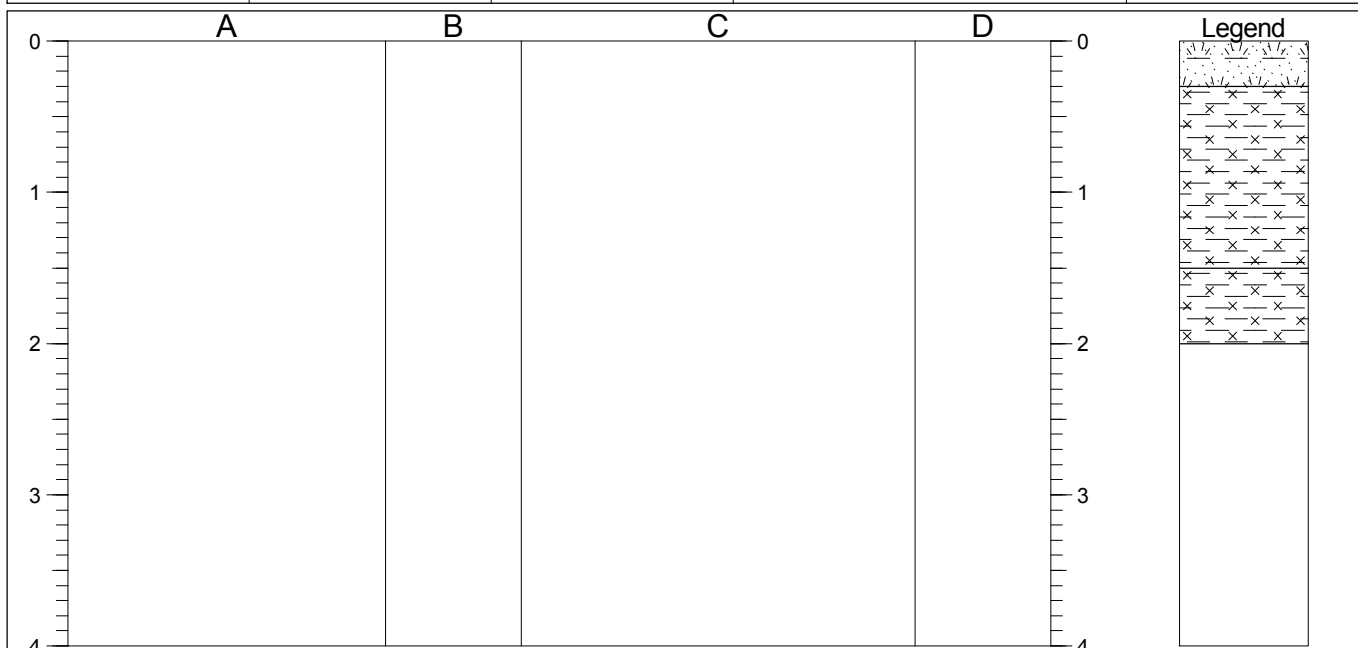
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP37
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.50		Firm to stiff grey mottled yellowish brown silty CLAY.	0.50	VANE	60
			1.00	VANE	60
1.50-2.00		Stiff dark blue silty CLAY. 1.70 ...frequent shell fragments			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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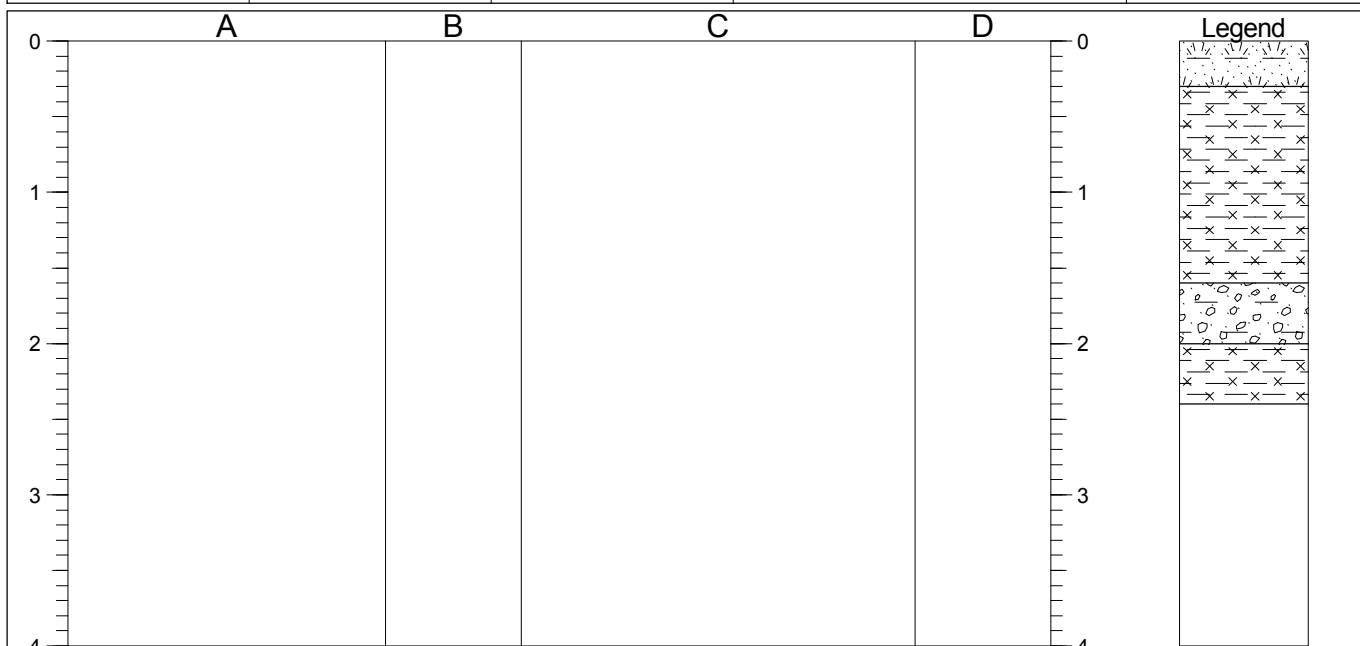
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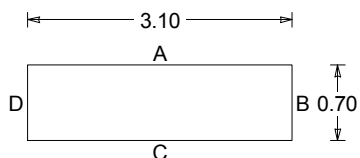
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP38
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.60		Firm to stiff yellowish brown/ grey silty CLAY with fine to medium subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	J	
			0.50	VANE	65
		1.30 ...gravelly	1.00	VANE	75
1.60-2.00		(Medium dense) yellowish brown/ grey slightly sandy clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint and mudstone.			
2.00-2.40		Stiff dark blue silty CLAY with occasional shell fragments.			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

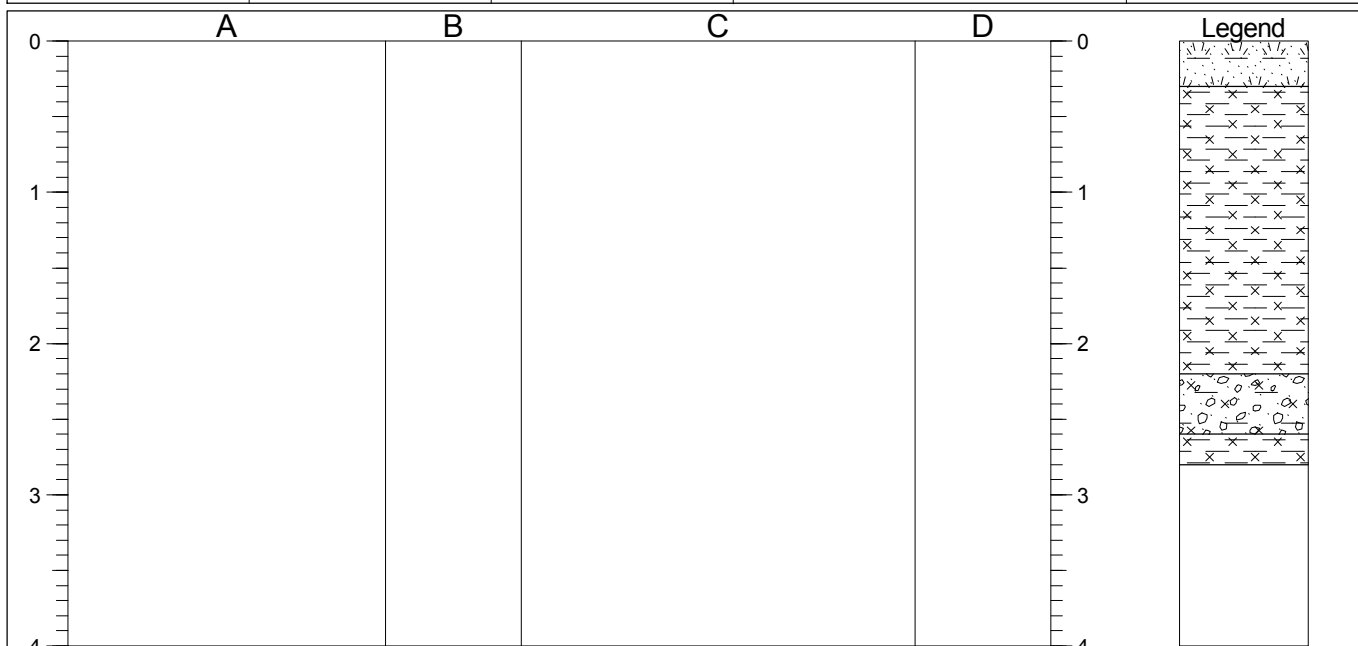
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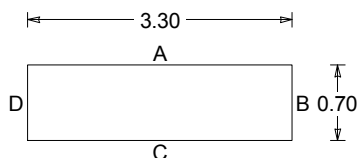
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP39
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.30-2.20		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of flint.	0.40 0.50	J VANE	80
			1.00	VANE	90
2.20-2.60		(Medium dense) yellowish brown slightly sandy silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of flint (very moist).			
2.60-2.80		Stiff bluish grey silty CLAY.			

Shoring/Support: None.
Stability: Slight collapse in very gravelly bed.
Groundwater: Encountered at 2.20m constant flow.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

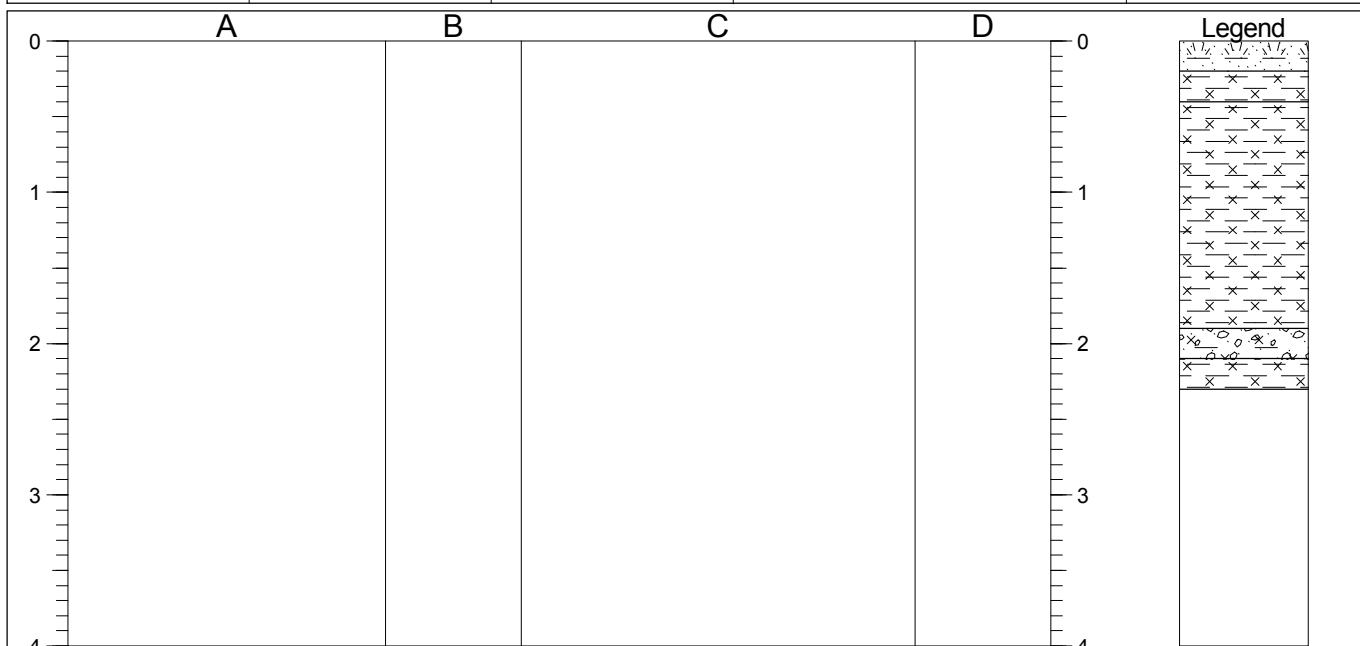
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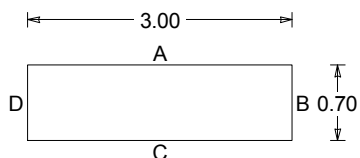
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP40
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-0.40		Firm brown silty CLAY with occasional roots and rootlets (subsoil).			
0.40-1.90		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of flint.	0.50	VANE	80
			1.00	VANE	80
1.90-2.10		(Medium dense) yellowish brown/ grey slightly sandy silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of flint.	1.80	B	
2.10-2.30		Stiff bluish grey silty CLAY.			

Shoring/Support: None.
Stability: Slight collapse in gravel.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

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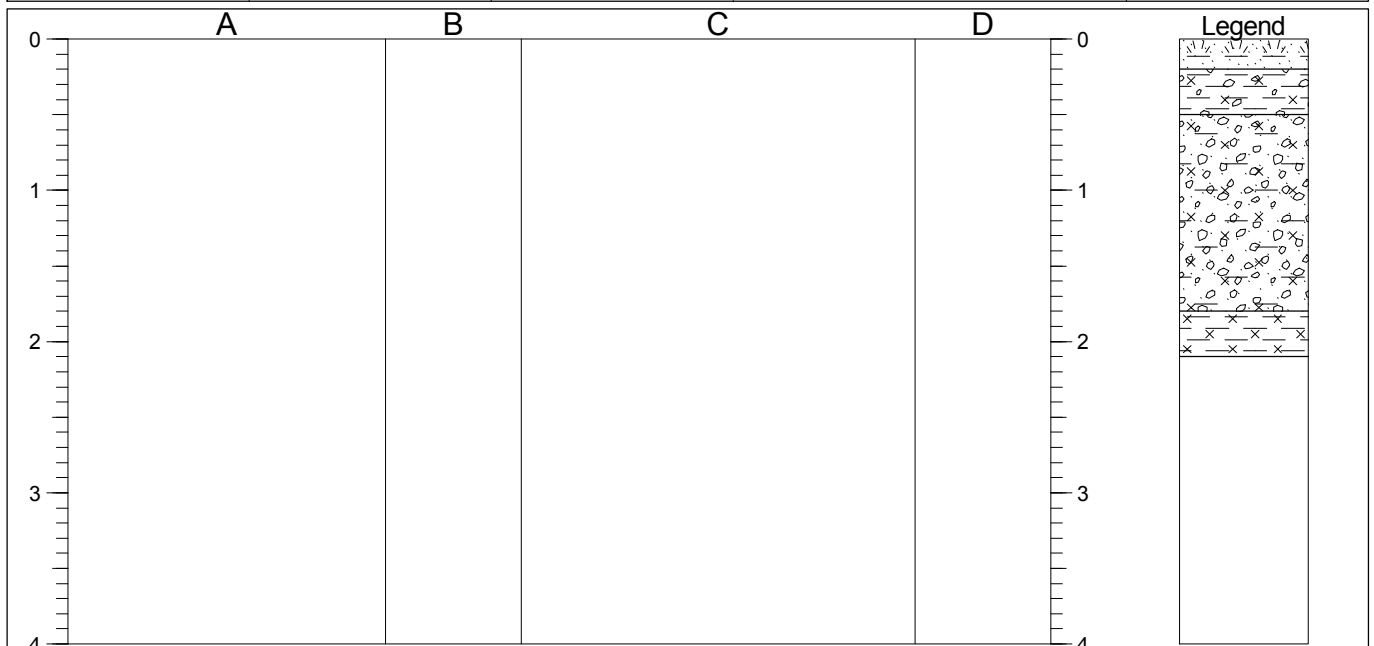
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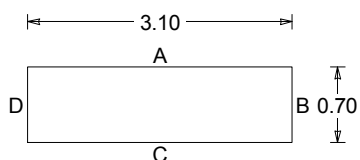
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP41
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-0.50		Firm to stiff yellowish brown/ grey silty gravelly CLAY.			
0.50-1.80		(Medium dense) yellowish brown/ grey slightly sandy silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint (moist).	0.50	VANE	85
		1.50 ...bluish grey	1.00	B	
			1.00	VANE	too granular
1.80-2.10		Stiff bluish grey very silty CLAY with frequent shell fragments and occasional organics (rootlets).			

Shoring/Support: None.
Stability: Slight collapse in gravel.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

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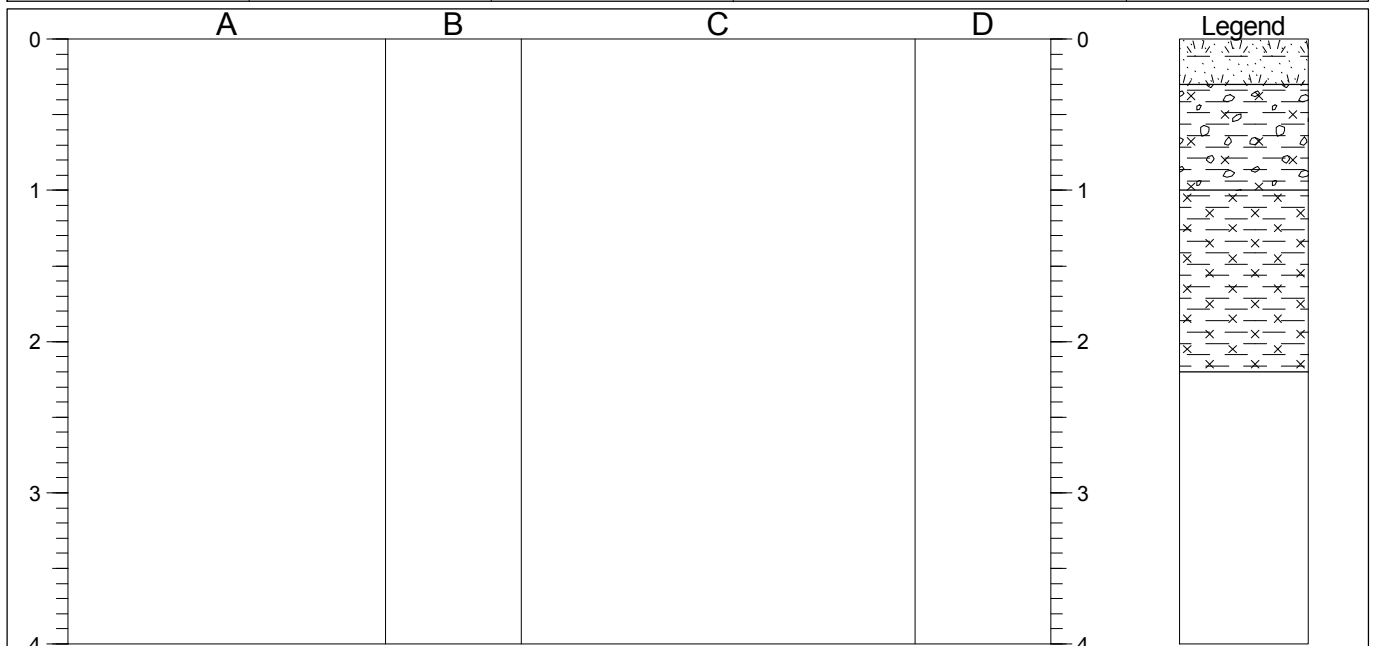
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP42
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.30-1.00		Firm yellowish brown/ grey gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies.	0.50	VANE	too gravelly
1.00-2.20		Firm bluish grey mottled brown silty CLAY.	1.00	VANE	too gravelly
		1.70 ...with occasional shells and mudstone lithorelic structures			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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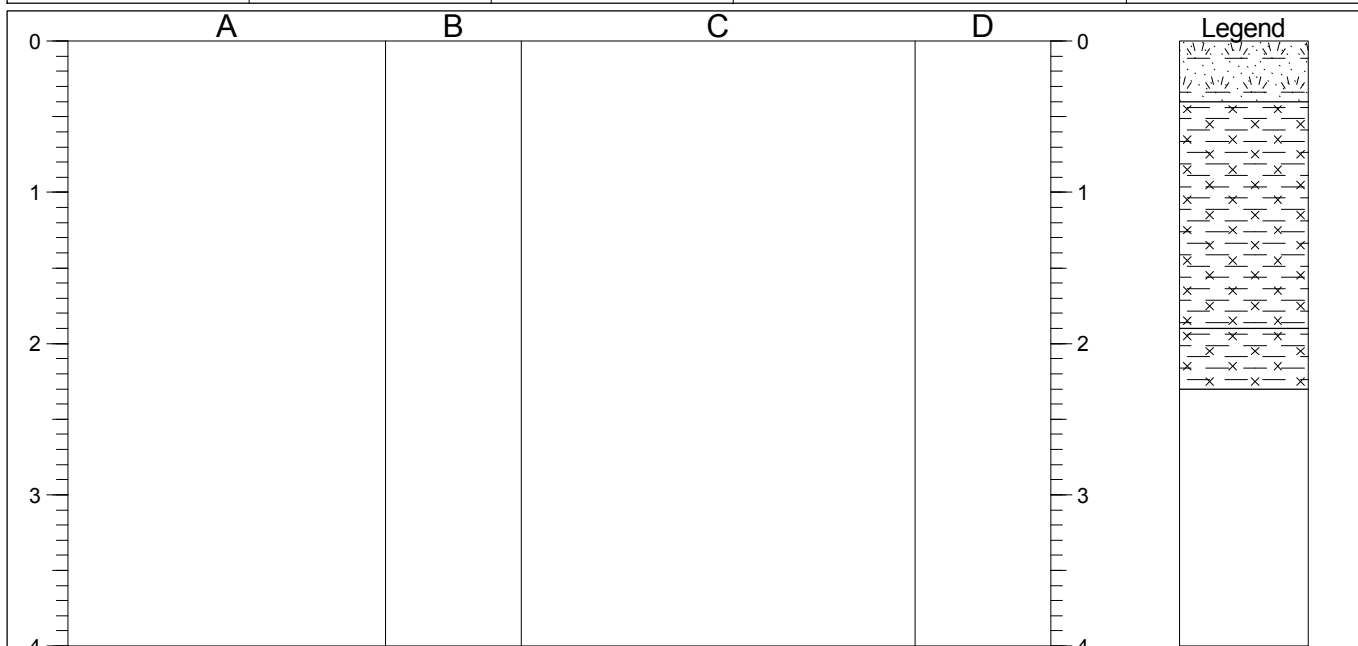
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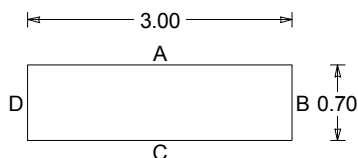
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP43
Job No 14114	Date 28-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.40		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.40-1.90		Firm yellowish brown/ grey silty CLAY with occasional rootlets and rare gravel.	0.50	VANE	60
			0.70	J	
			1.00	VANE	80
1.90-2.30		Firm to stiff bluish grey mottled brown silty CLAY with frequent shells and mudstone lithorelic structures.			
		1.90 - 2.10 ...frequent cobbles and boulders of mudstone			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

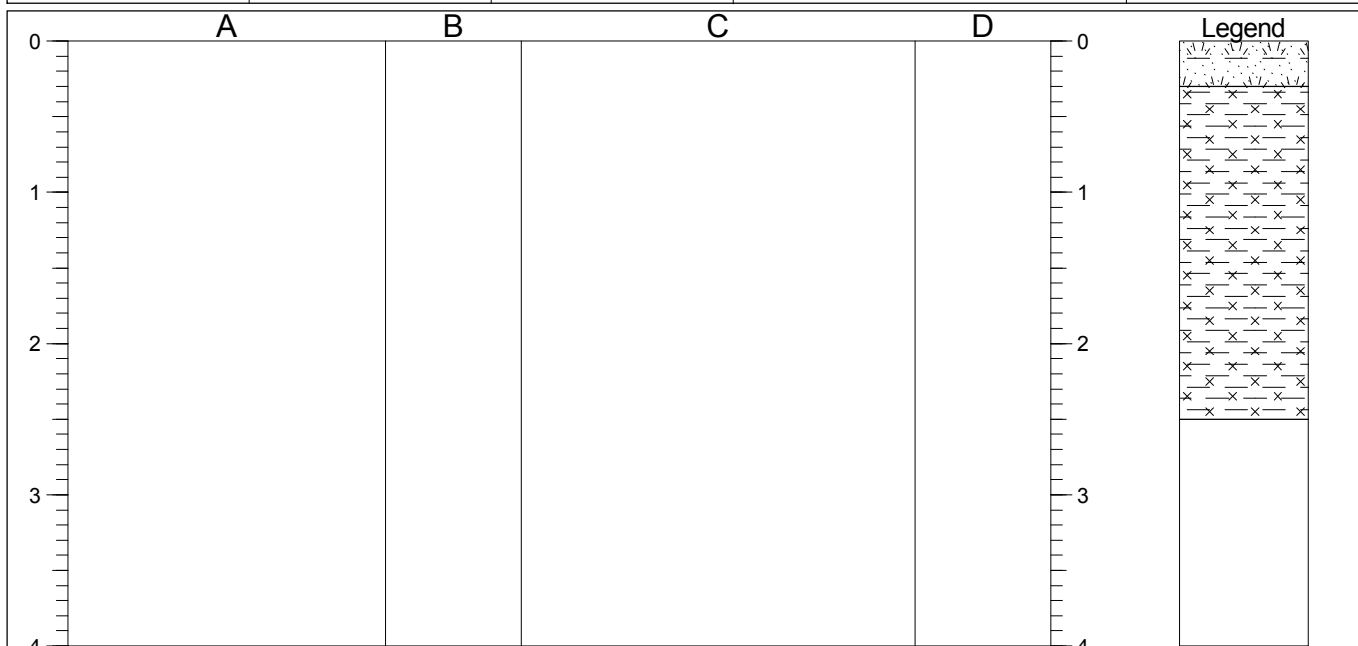
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



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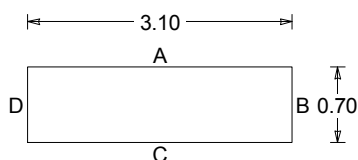
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP44
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-2.50		Firm to stiff grey mottled yellowish brown silty CLAY with rare fine to medium subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	75
		1.10 ...frequent gypsum crystals	1.00	VANE	50
		1.60 ...stiff	2.00	D	

Shoring/Support: None.
Stability: Stable.
Groundwater: Slight seepage in base (2.50m).



GENERAL
REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

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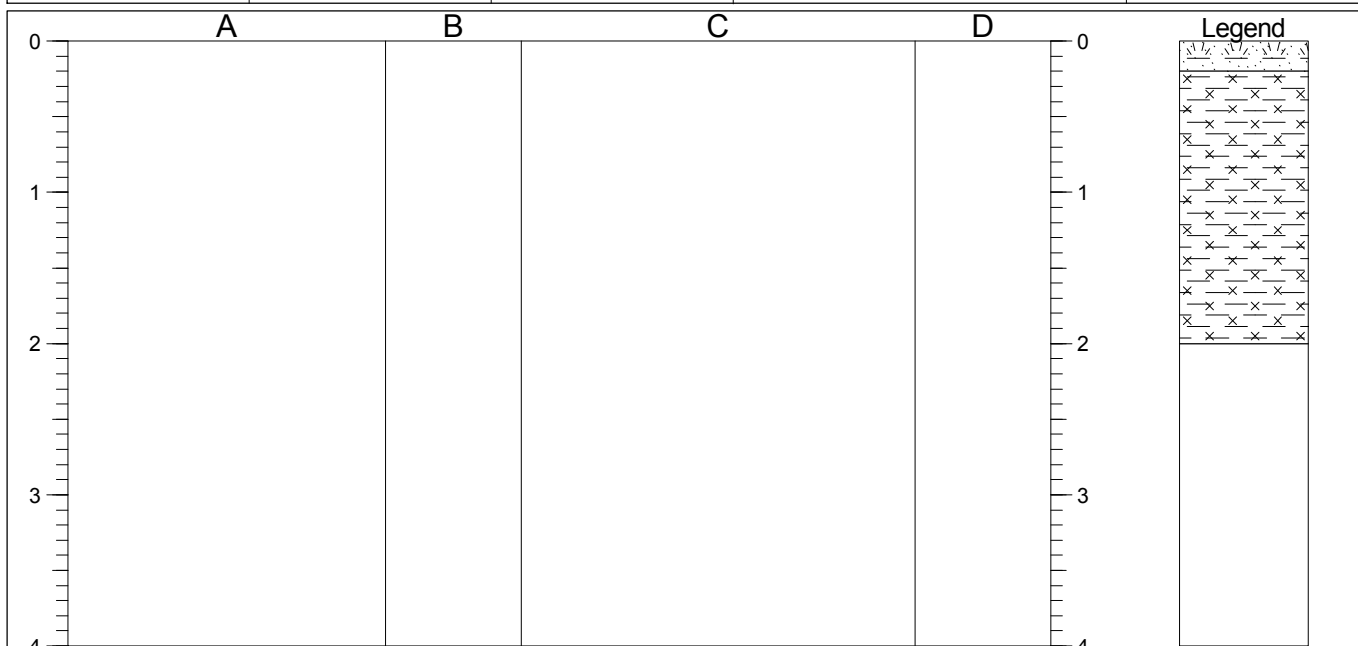
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP45
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-2.00		Firm to stiff grey mottled yellowish brown silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	70
		0.70 ...lense of gravel. Gravel is fine to coarse subrounded flint (~0.10m thick)	1.00	VANE	60
		1.60 ...occasionally sandy			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

3.10

A

D

B

0.70

C

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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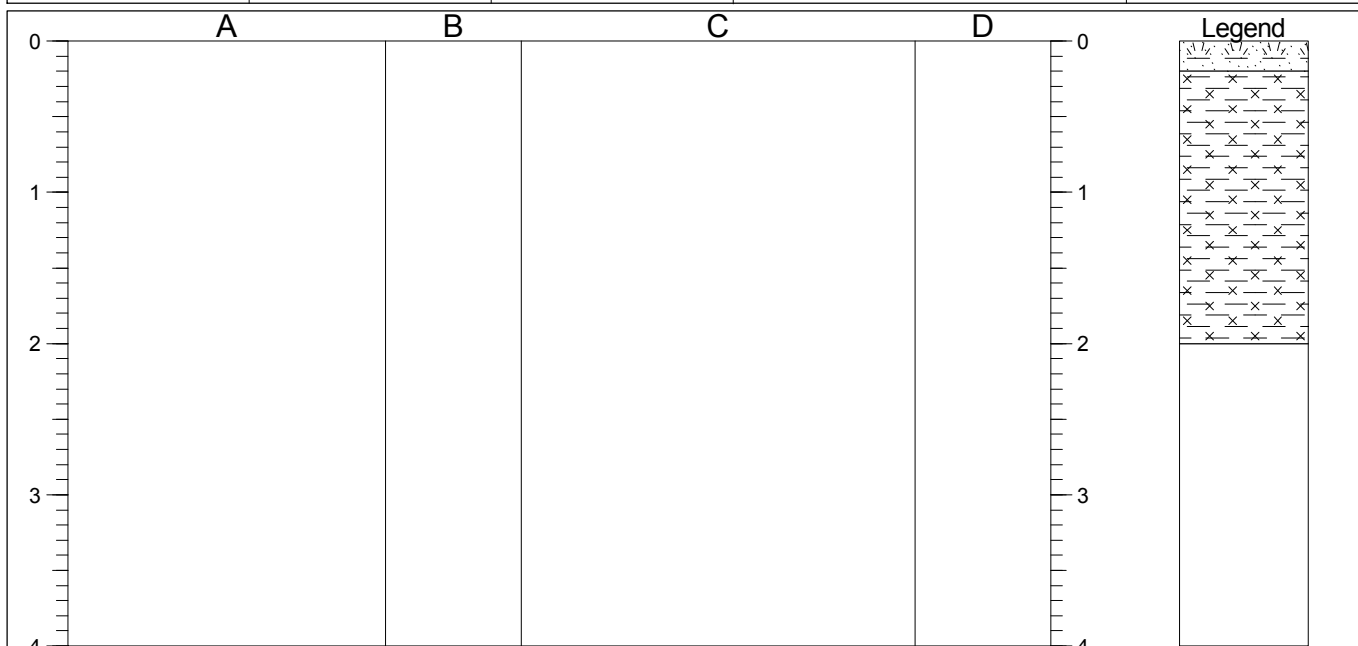
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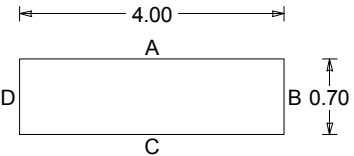
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP46
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

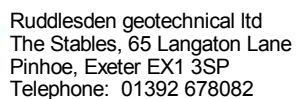


STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-2.00		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	60
		1.00 ...with occasional organics (rootlets) and gypsum crystals	0.75	J	
			1.00	VANE	80

Shoring/Support: None. Stability: Stable. Groundwater: None encountered. 	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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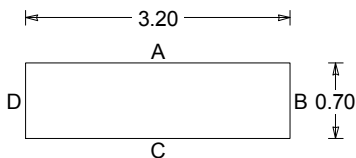


TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP47
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

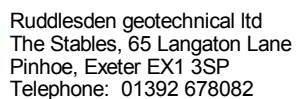
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.	0.50	VANE	55
0.20-2.10		Firm yellowish brown/ grey silty CLAY with rare shell fragments.			
		0.80 ...lenses of calcite gravel/ cobbles			
		1.10 ...frequent shell fragments	1.00	VANE	70

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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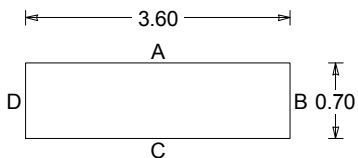


TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP48
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-2.00		Firm to stiff yellowish brown/ grey silty CLAY.	0.50	VANE	60
			1.00	VANE	55
		1.60 ...grey with frequent shell fragments			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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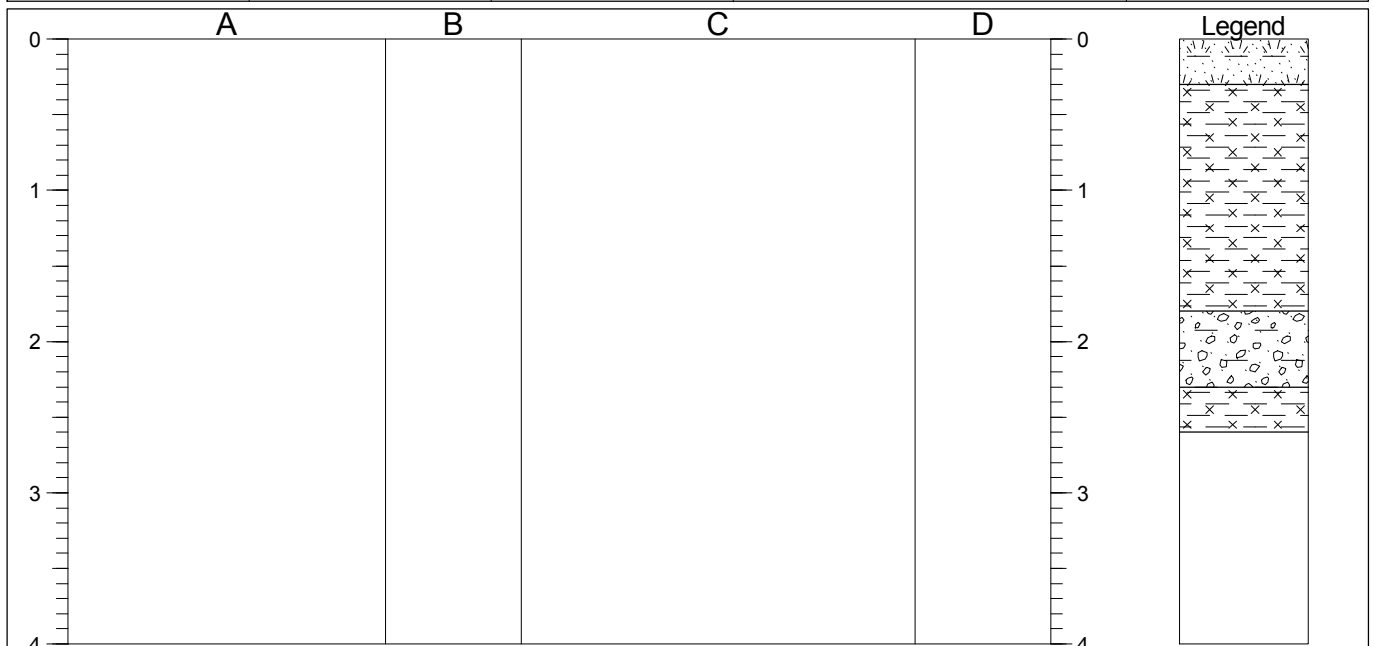
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP49
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.80		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint. 1.20 ...rare lenses of black silty clay	0.50	VANE	70
			1.00	VANE	85
1.80-2.30		(Medium dense) yellowish brown/ grey slightly clayey sandy GRAVEL. Gravel is fine to coarse subangular to subrounded of mixed lithologies, predominantly flint, mudstone and sandstone (moist).	2.00	B	
2.30-2.60		Stiff dark blue silty CLAY with rare shell fragments. 2.40 ...occasional mudstone lithorelic structures			

Shoring/Support: None. Stability: Slight collapse. Groundwater: Slight seepage in base (2.60m). 		GENERAL REMARKS 1. Density of granular deposits estimated from visual assessment only.	
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All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP50
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

A	B	C	D	Legend
0				
1				
2				
3				
4				

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-0.60		Firm brown silty CLAY (subsoil).			
0.60-2.10		Firm to stiff yellowish brown/ grey silty gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint.			
		1.20 - 1.80 ...bed of slightly sandy silty very gravelly clay. Gravel is fine to coarse subangular to subrounded flint	1.00	D	
		1.80 ...stiff	1.00	VANE	80

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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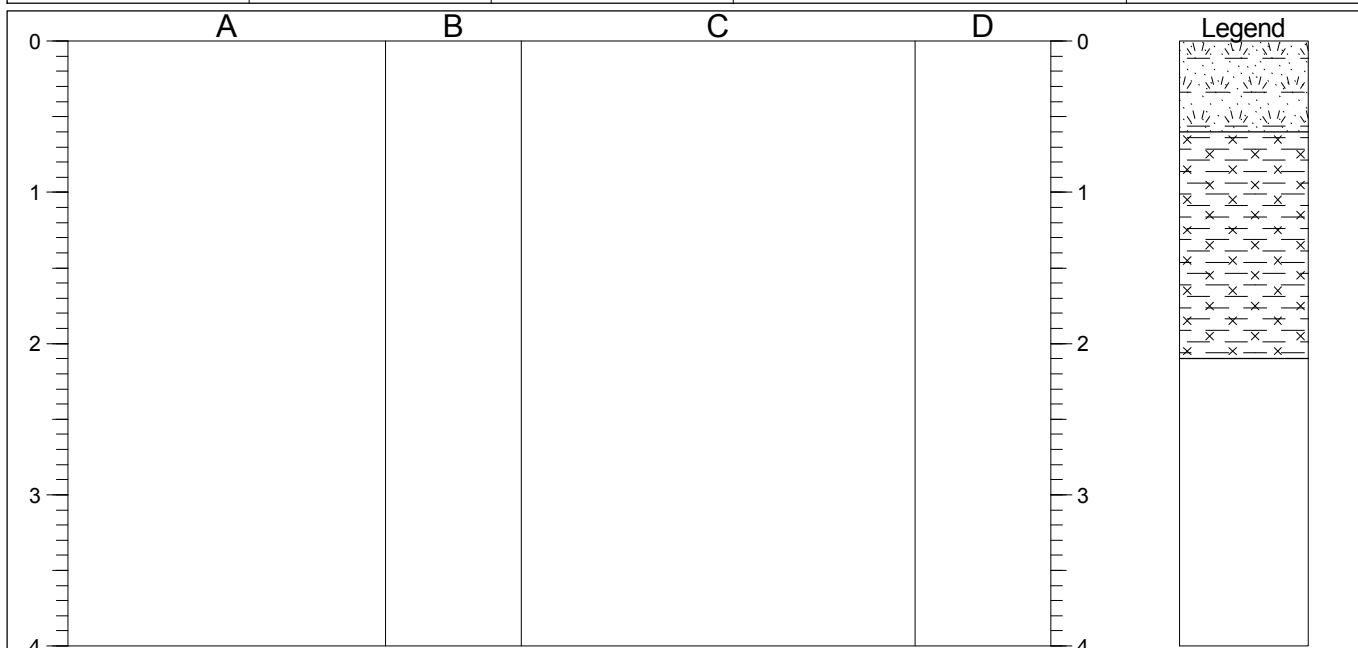
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP51
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.60		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets and occasional cobbles/ boulders.			
0.60-2.10		Firm to stiff grey/ yellowish brown silty CLAY.	1.00	VANE	80
		1.80 ...slightly sandy silty gravelly clay. Gravel is fine to coarse subangular to subrounded flint			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.		GENERAL REMARKS	

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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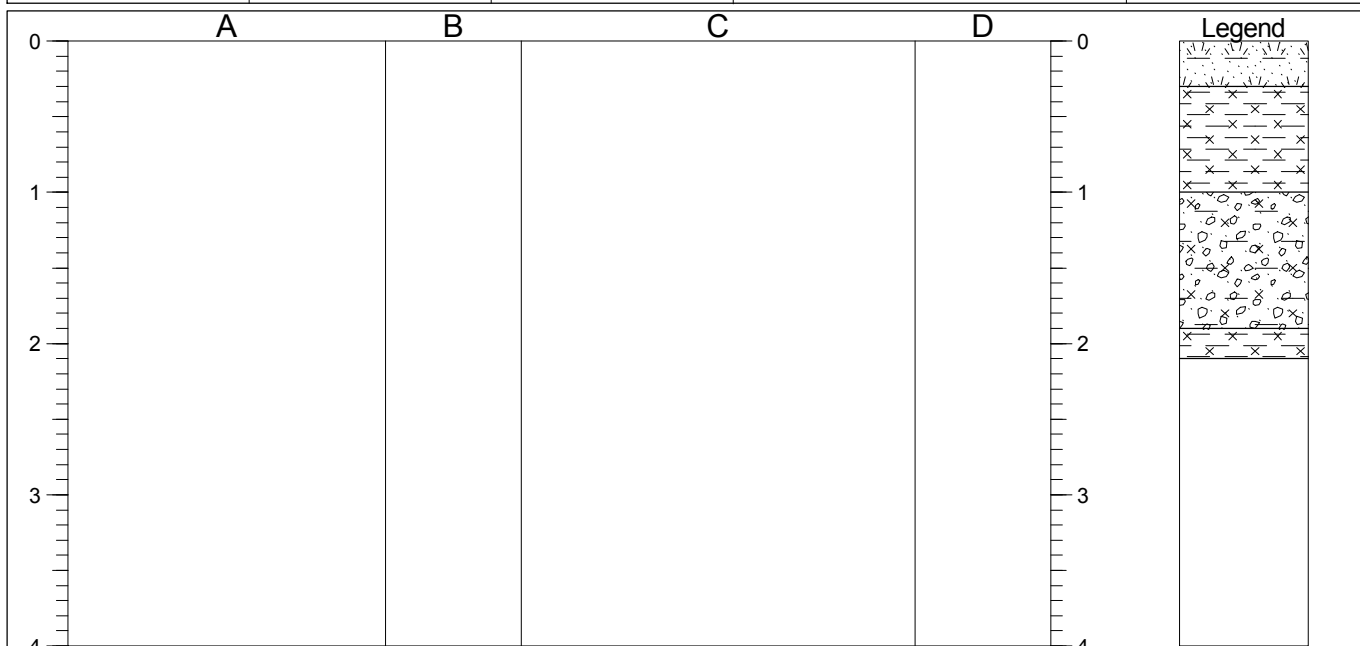
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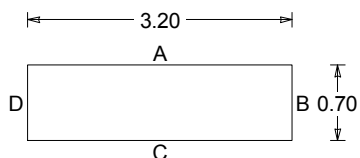
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP52
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.00		Stiff yellowish brown/ grey very silty CLAY with rare shell fragments and fine to coarse subangular to subrounded gravel of flint.	0.30 0.50	J VANE	100
1.00-1.90		(Medium dense) yellow brown/ grey slightly sandy silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of flint (moist).	1.00	VANE	90
1.90-2.10		Stiff bluish grey very silty CLAY with rare shell fragments and fine to medium subangular to subrounded gravel of flint.			

Shoring/Support: None.
Stability: Slight collapse of gravel.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

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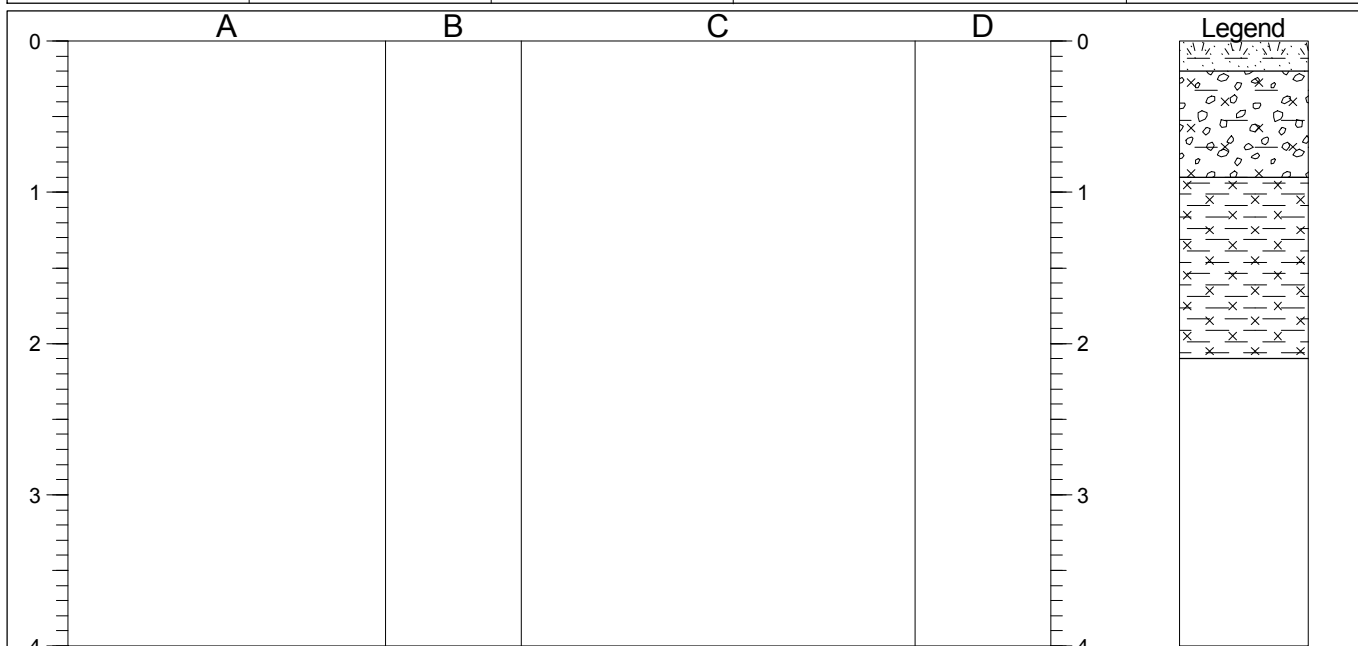
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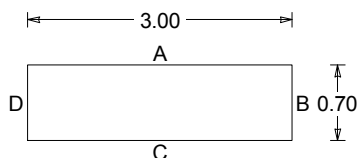
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP53
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.20-0.90		(Medium dense) yellowish brown/ grey silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded flint.	0.50	VANE	too granular
0.90-2.10		Firm to stiff bluish grey mottled yellowish brown silty CLAY with rare fine to medium subangular to subrounded gravel of flint.	1.00	VANE	too granular
			1.50	D	

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.		GENERAL REMARKS 1. Density of granular deposits estimated from visual assessment only.	
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All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

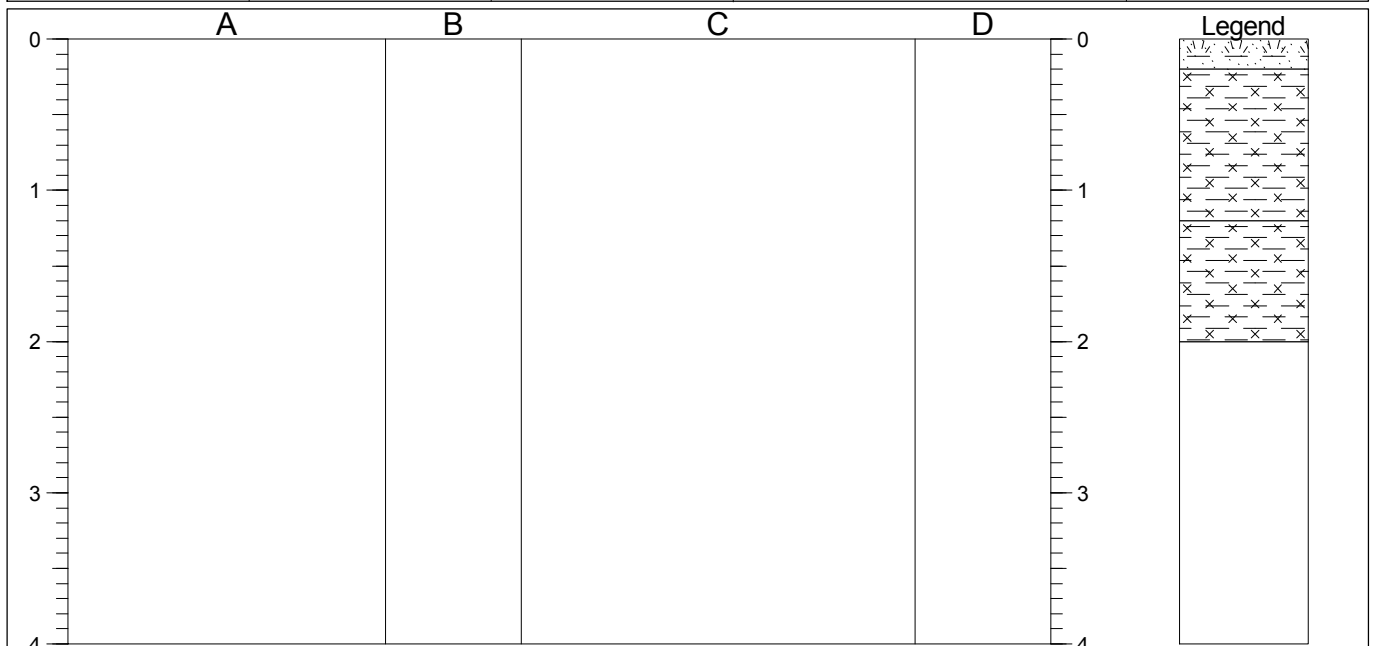
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP54
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

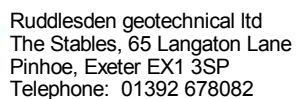


STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.	0.30 0.50 1.00	J VANE VANE	90 80
0.20-1.20		Stiff yellowish brown/ grey silty CLAY with rare black carbonaceous material.			
1.20-2.00		Stiff bluish grey mottled yellowish brown very silty CLAY with occasional shell fragments. 1.20 - 1.40 ...gravelly (moist)			

<p>Shoring/Support: None. Stability: Stable. Groundwater: Slight groundwater at base (2.00m).</p>	GENERAL REMARKS	

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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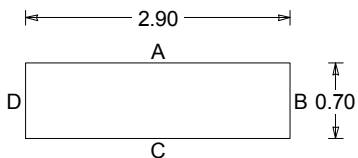
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP55
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

Figure 1 displays a 4x4 grid of panels (A, B, C, D) showing the spatial distribution of four variables (X, Y, Z, W) across a 4x4 grid. The Y-axis is labeled 0, 1, 2, 3, 4. The X-axis is labeled A, B, C, D. A legend on the right shows the patterns for each variable: X (dots), Y (crosses), Z (asterisks), and W (plus signs).

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.	0.50 1.00	VANE	too granular 65
0.20-0.50		(Medium dense) yellowish brown/ grey slightly sandy silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded mixed lithologies predominantly flint.			
0.50-2.10		Firm to stiff bluish grey mottled yellowish brown very silty CLAY with occasional shell fragments and fine to coarse subangular to subrounded gravel of flint.			
		1.20 ...land drain			

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.

GENERAL
REMARKS

1. Density of granular deposits estimated from visual assessment only.



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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP56
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1

A	B	C	D	Legend
0				
1				
2				
3				
4				

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-1.40		Firm to stiff grey mottled yellowish brown silty gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint. 0.50 - 0.80 ...bed of grey/ yellowish brown sandy silty very clayey gravel (moist)	1.00	VANE	100
1.40-2.20		Stiff very dark bluish grey mottled yellowish brown silty CLAY with frequent organics (rootlets) and frequent gypsum crystals (2mm to 60mm).	1.50	D	

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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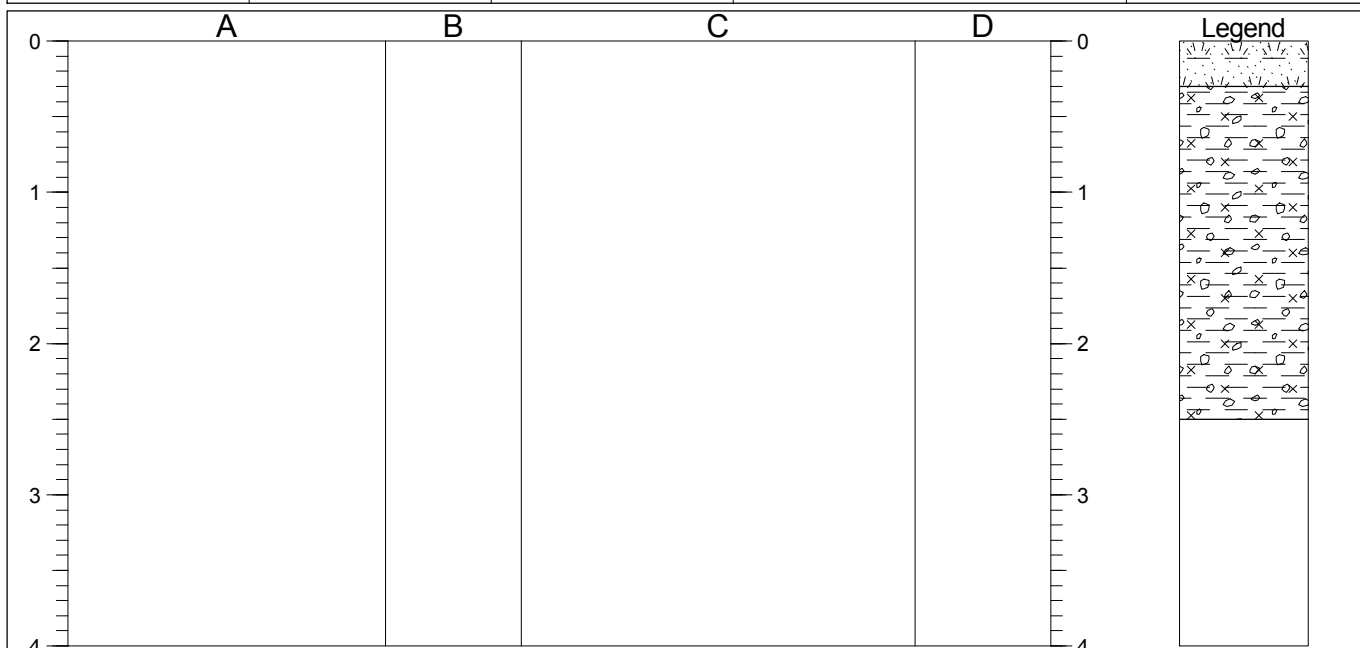
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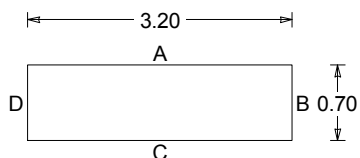
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP57
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-2.50		Firm to stiff grey/ yellowish brown gravelly silty CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint and mudstone. 0.50 - 0.70 ...bed of sandy silty very clayey gravel. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint and mudstone 1.90 ...with occasional organics (rootlets) and rare gypsum crystals	0.50	VANE	70
			1.00	VANE	70

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL
REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

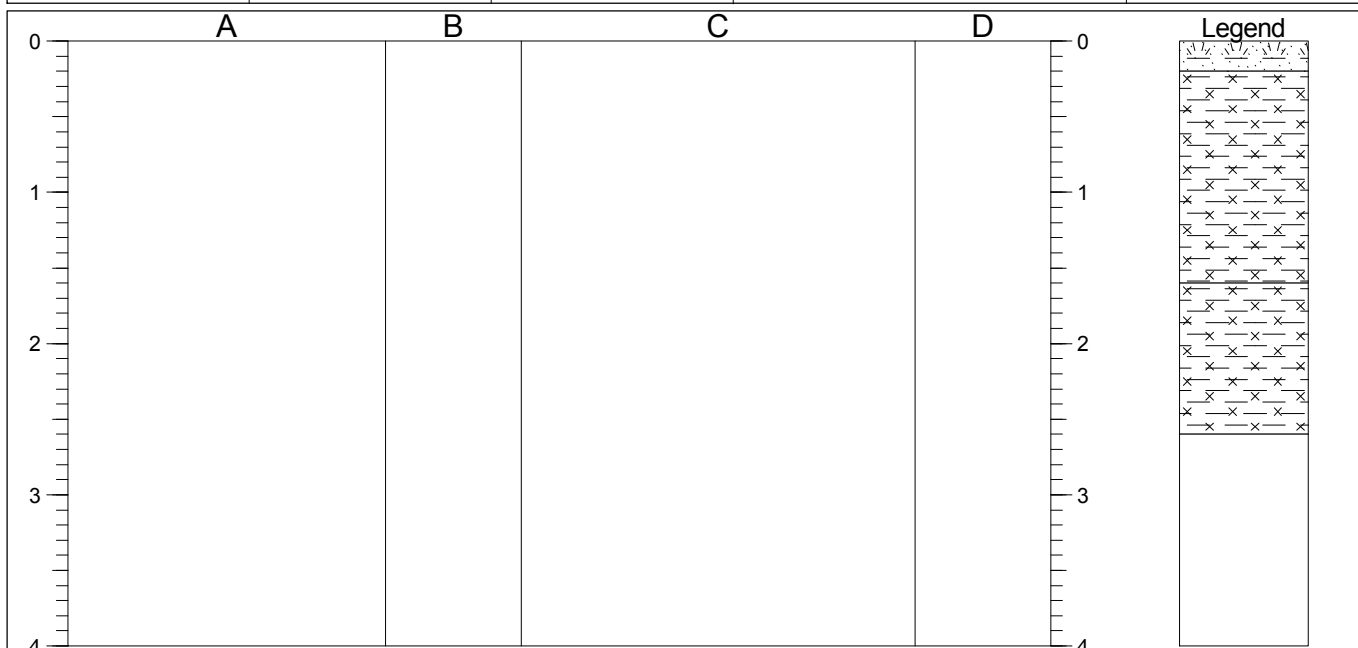
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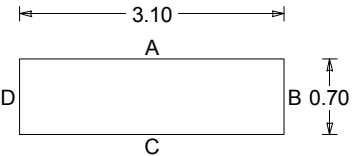
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TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP58
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.20-1.60		Firm to stiff yellowish brown/ grey silty CLAY. 0.50 ...land drain	0.30 0.50	J VANE	55
1.60-2.60		Stiff dark blue silty CLAY with occasional shell fragments. ...occasional mudstone lithorelic structures	1.00 1.00	D VANE	65

Shoring/Support: None. Stability: Stable. Groundwater: None encountered. 	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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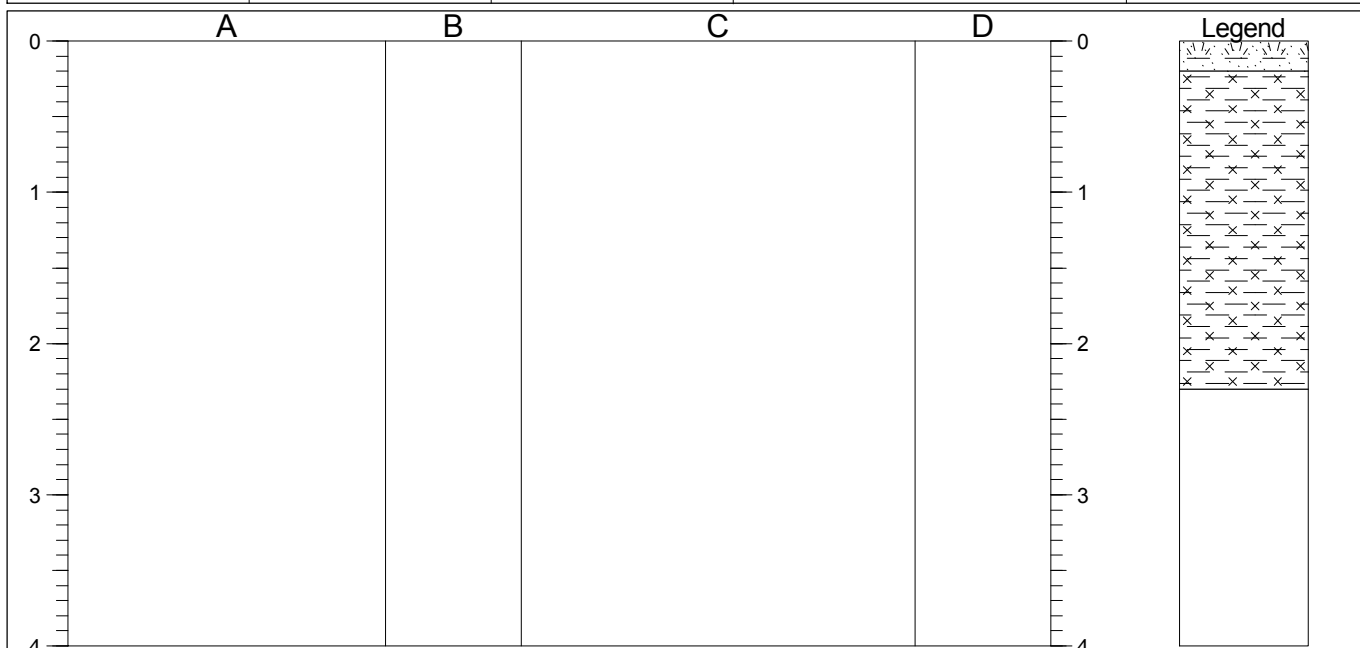
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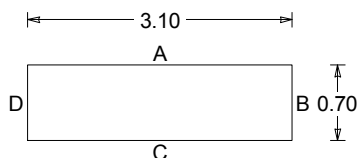
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP59
Job No 14114	Date 09-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.20-2.30		Firm yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	50
		1.60 ...grey with frequent shell fragments and occasional lithorelic structures	1.00	VANE	65

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL
REMARKS

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

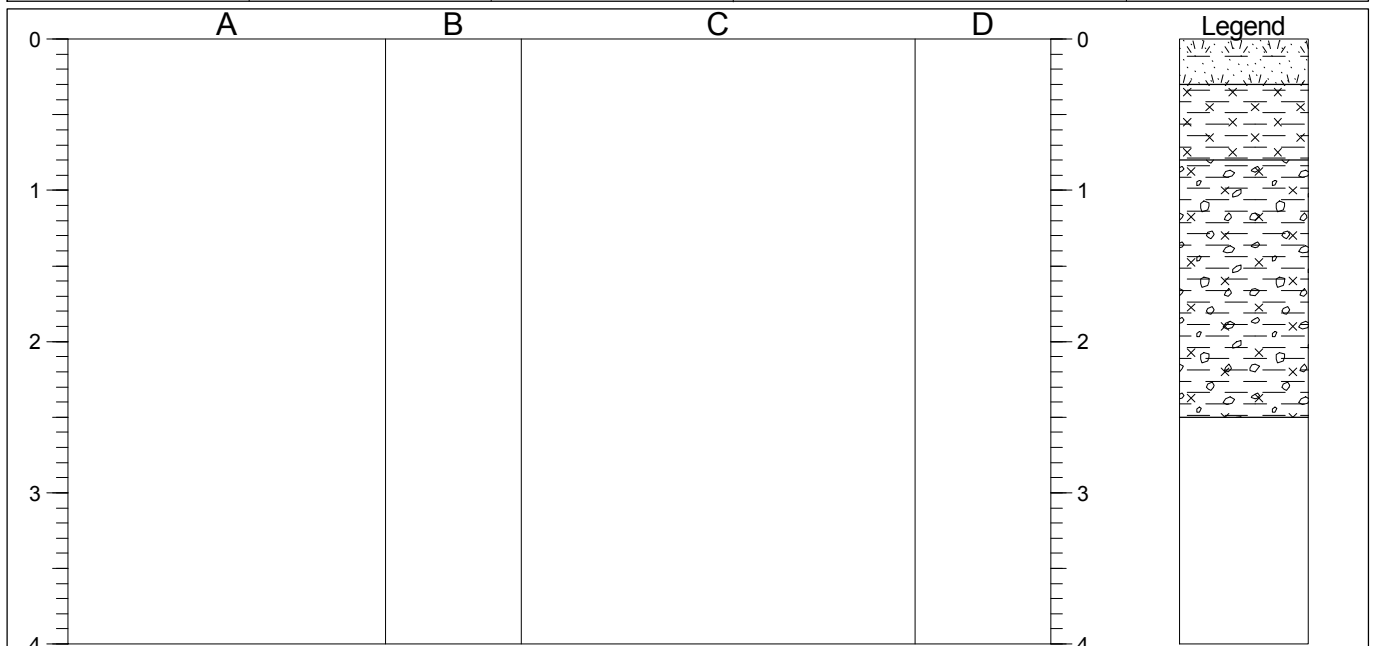
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



Ruddlesden geotechnical Ltd
The Stables, 65 Langaton Lane
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Telephone: 01392 678082

TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP60
Job No 14114	Date 27-05-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown silty clay with frequent roots and rootlets.			
0.30-0.80		Firm yellowish brown/ grey silty CLAY. 0.60 ...land drain	0.50	VANE	70
0.80-2.50		Stiff grey mottled brown slightly gravelly silty CLAY with some shells. Gravel is fine to coarse subangular of mixed lithologies. 1.20 - 1.30 ...gravelly 1.90 ...with some mudstone lithorelic structures	1.00	VANE	125

Shoring/Support: None. Stability: Stable. Groundwater: None encountered.	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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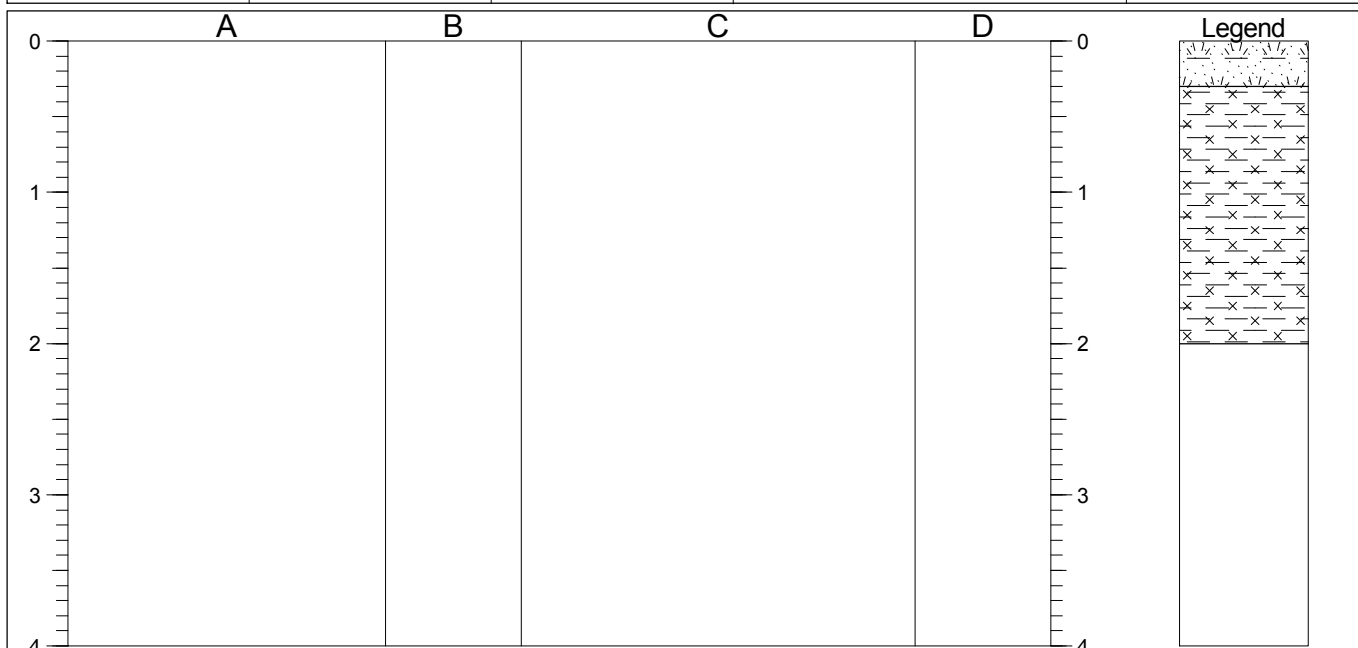
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



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The Stables, 65 Langaton Lane
Pinhoe, Exeter EX1 3SP
Telephone: 01392 678082

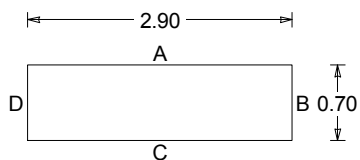
TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP61
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.30-2.00		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of mixed lithologies predominantly flint.	0.50	VANE	70
		1.60 - 1.80 ...bed of (medium dense) sandy silty very clayey gravel. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint (moist)	1.00	VANE	70

Shoring/Support: None.
Stability: Stable.
Groundwater: None encountered.



GENERAL REMARKS

1. Density of granular deposits estimated from visual assessment only.

All dimensions in metres
Scale 1:50

Client:

Welbeck Land

Logged By TB

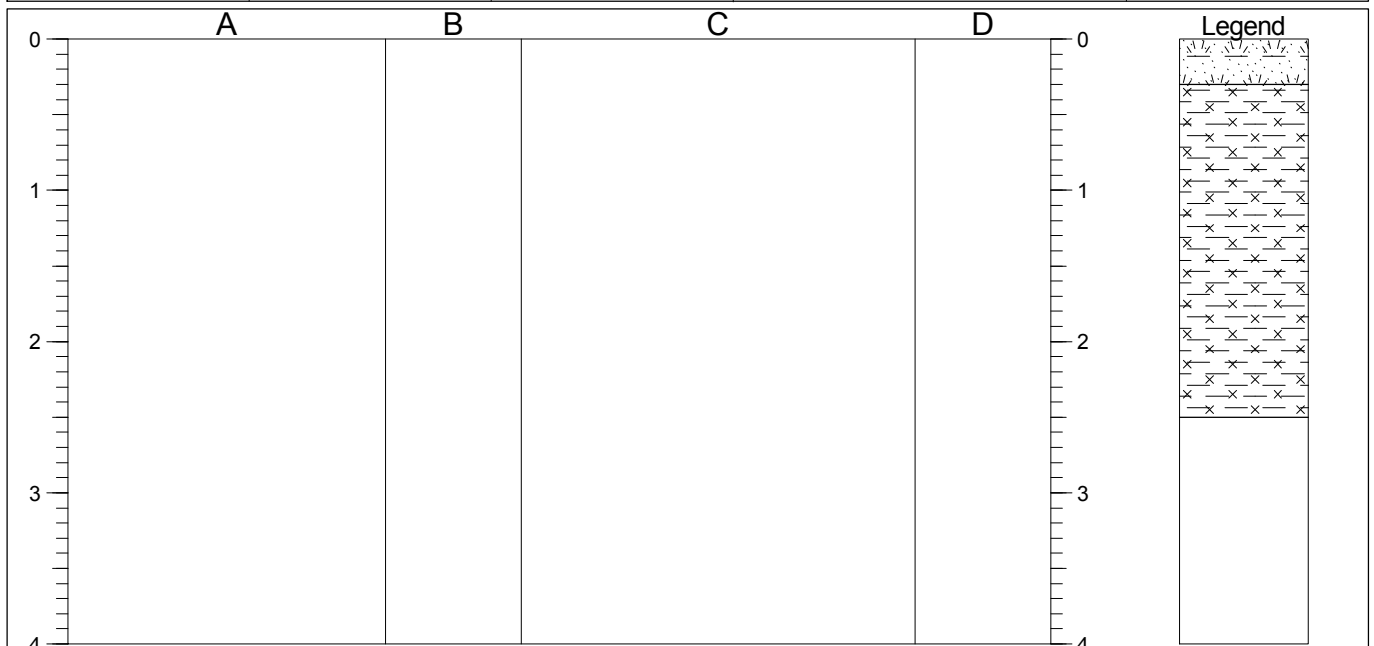
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



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Telephone: 01392 678082

TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP62
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown slightly gravelly silty clay with frequent roots and rootlets.			
0.30-2.50		Firm to stiff grey mottled yellowish brown silty CLAY.	0.50	VANE	100
		1.30 - 1.50 ...bed of sandy silty very clayey GRAVEL. Gravel is fine to coarse subangular to subrounded of mixed lithologies predominantly flint and mudstone	1.00	VANE	70
		1.70 - 1.90 ...with occasional organics (rootlets)	1.25	J	
		2.10 ...with occasional shell fragments and gypsum crystals.			

Shoring/Support: None. Stability: Stable. Groundwater: Slight seepage at base (2.50m). 		GENERAL REMARKS	
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All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
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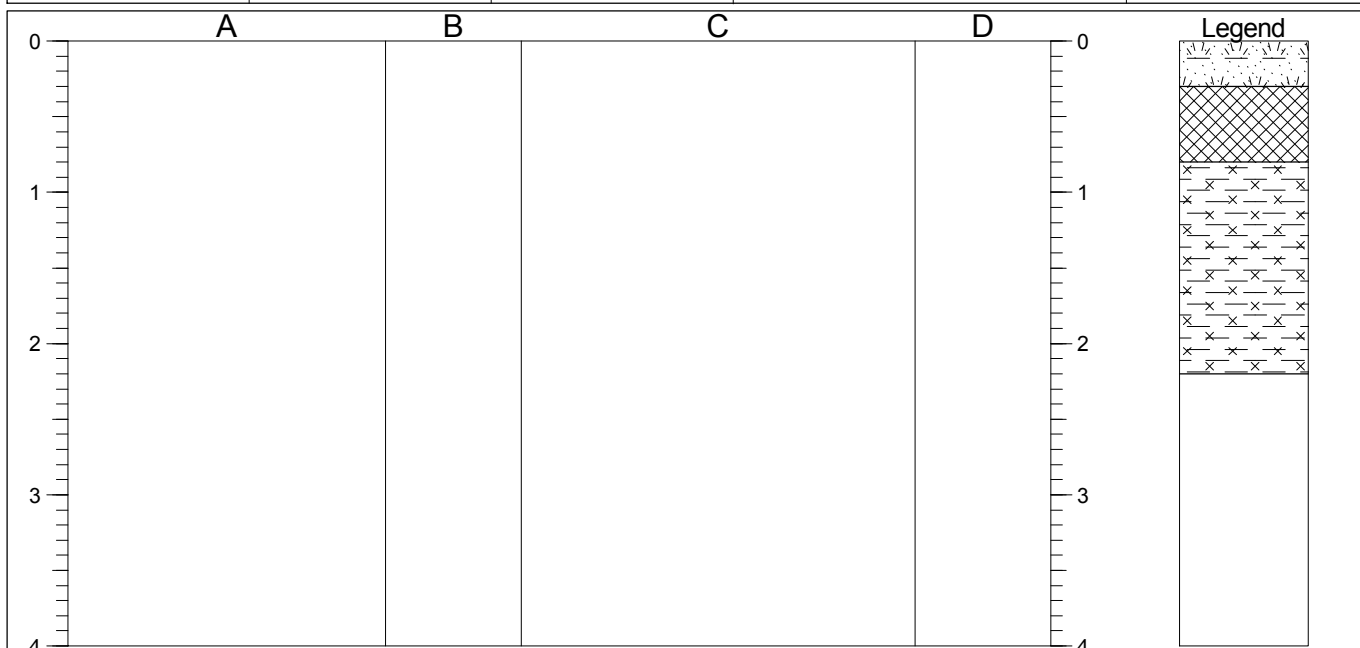
AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17



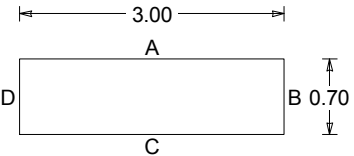
Ruddlesden geotechnical Ltd
The Stables, 65 Langaton Lane
Pinhoe, Exeter EX1 3SP
Telephone: 01392 678082

TRIAL PIT LOG

Project Land South of Gillingham, Dorset				TRIAL PIT No TP63
Job No 14114	Date 10-07-14	Ground Level (m)	Co-Ordinates (BNG)	
Contractor	Method/ Plant JCB 3CX	Energy Ratio		Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.30		TOPSOIL: Brown gravelly silty clay with frequent roots and rootlets.			
0.30-0.80		MADE GROUND: Greyish brown slightly silty clay with rare ceramic fragments.	0.50	J	
0.80-2.20		Firm to stiff yellowish brown/ grey silty CLAY with rare fine to coarse subangular to subrounded gravel of flint.	1.00	VANE	90
		2.00 ...stiff grey mottled yellowish brown			

Shoring/Support: None. Stability: Stable. Groundwater: None encountered. 	GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: Welbeck Land	Logged By TB
--	-------------------------	-----------------

AGS3 UK TP 14114 - LAND TO THE SOUTH OF GILLINGHAM, DORSET.GPJ AGS 3_1.GDT 20/11/17

SOAKAWAY TEST RESULTS



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: Jul-14

Test No. TP08

Length (m):	3.10
Width (m):	0.70
Depth (m):	2.60
Start Water Level (m):	1.00
Total Depth of Test	1.60

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

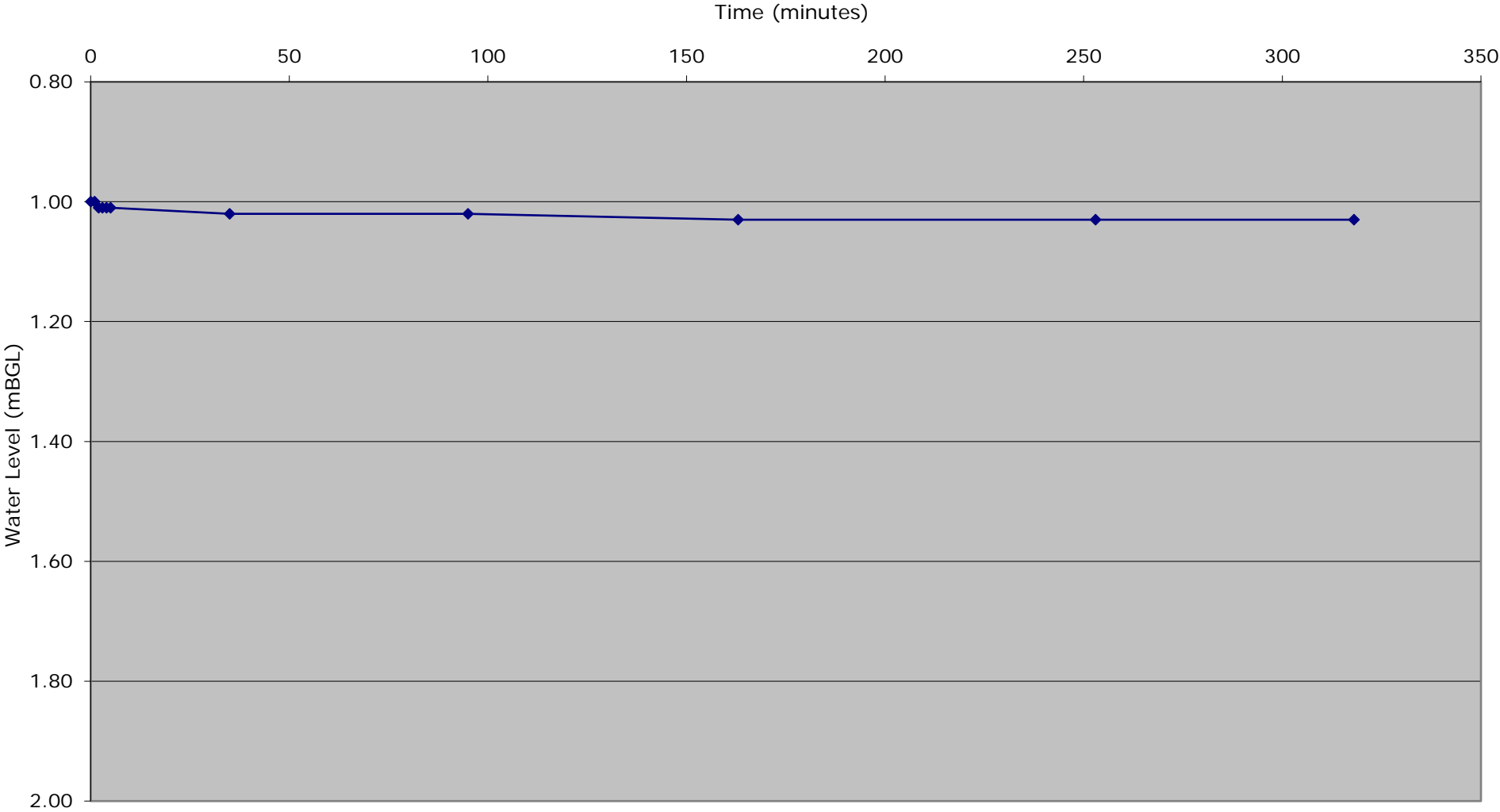
Calculations

Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
Where		
V_{p75-25}	=	effective storage volume of water in the trial pit between 75% and 25% effective depth
	=	$3.10 \times 0.70 \times 0.80$
	=	<u>1.736 m³</u>
a_{p50}	=	internal surface area of the trial pit up to 50% effective depth and including the base area
	=	$1.12 + 4.96 + 2.17$
	=	<u>8.25 m²</u>
t_{p75-25}	=	time for the water level to fall from 75% to 25% effective depth
		25% effective depth = 1.4
		75% effective depth = 2.2
	=	 - mins
	=	0 mins
	=	<u>0 secs</u>
Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
	=	$1.736 / 8.25 \times 0$
	=	<u>#DIV/0!</u> m/s

OTHER NOTES:



Soakaway Test Results - TP08



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: May-14

Test No. TP12

Length (m):	2.90
Width (m):	0.70
Depth (m):	2.50
Start Water Level (m):	0.98
Total Depth of Test	1.52

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

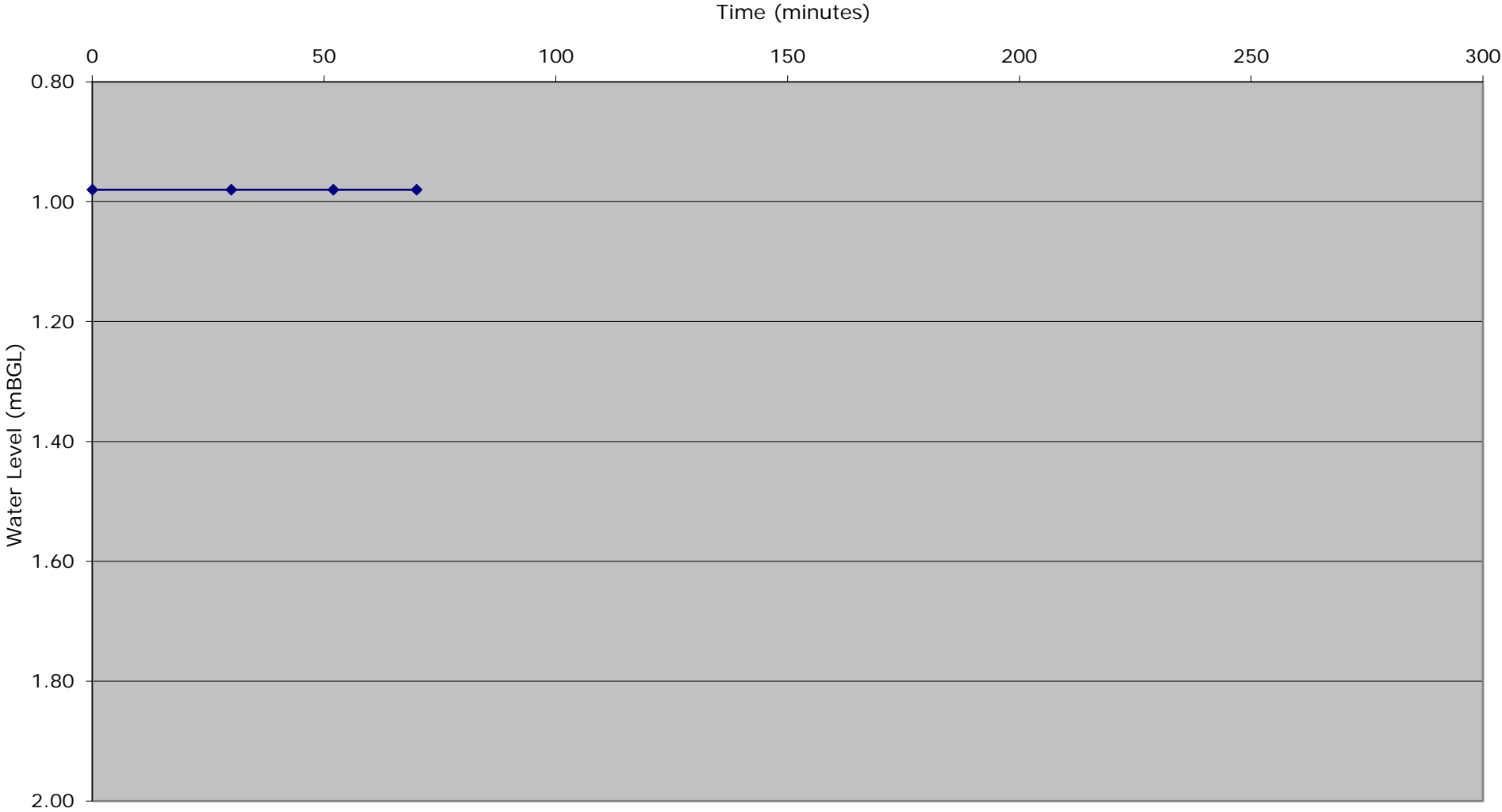
Calculations

$$\begin{aligned} \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\ \\ \text{Where} \\ V_{p75-25} &= \text{effective storage volume of water in the trial pit between 75\% and 25\% effective depth} \\ &= 2.90 \times 0.70 \times 0.76 \\ &= \underline{1.5428 \text{ m}^3} \\ a_{p50} &= \text{internal surface area of the trial pit up to 50\% effective depth and including the base area} \\ &= 1.06 + 4.41 + 2.03 \\ &= \underline{7.502 \text{ m}^2} \\ t_{p75-25} &= \text{time for the water level to fall from 75\% to 25\% effective depth} \\ &\quad \begin{array}{l} 25\% \text{ effective depth} = 1.36 \\ 75\% \text{ effective depth} = 2.12 \end{array} \\ &= \text{ } - \text{ } \text{ mins} \\ &= 0 \text{ mins} \\ &= \underline{0 \text{ secs}} \\ \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\ &= 1.5428 / 7.502 \times 0 \\ &= \underline{\#DIV/0! \text{ m/s}} \end{aligned}$$

OTHER NOTES:



Soakaway Test Results - TP12



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: May-14

Test No. TP22

Length (m):	2.80
Width (m):	0.70
Depth (m):	2.50
Start Water Level (m):	0.95
Total Depth of Test	1.55

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

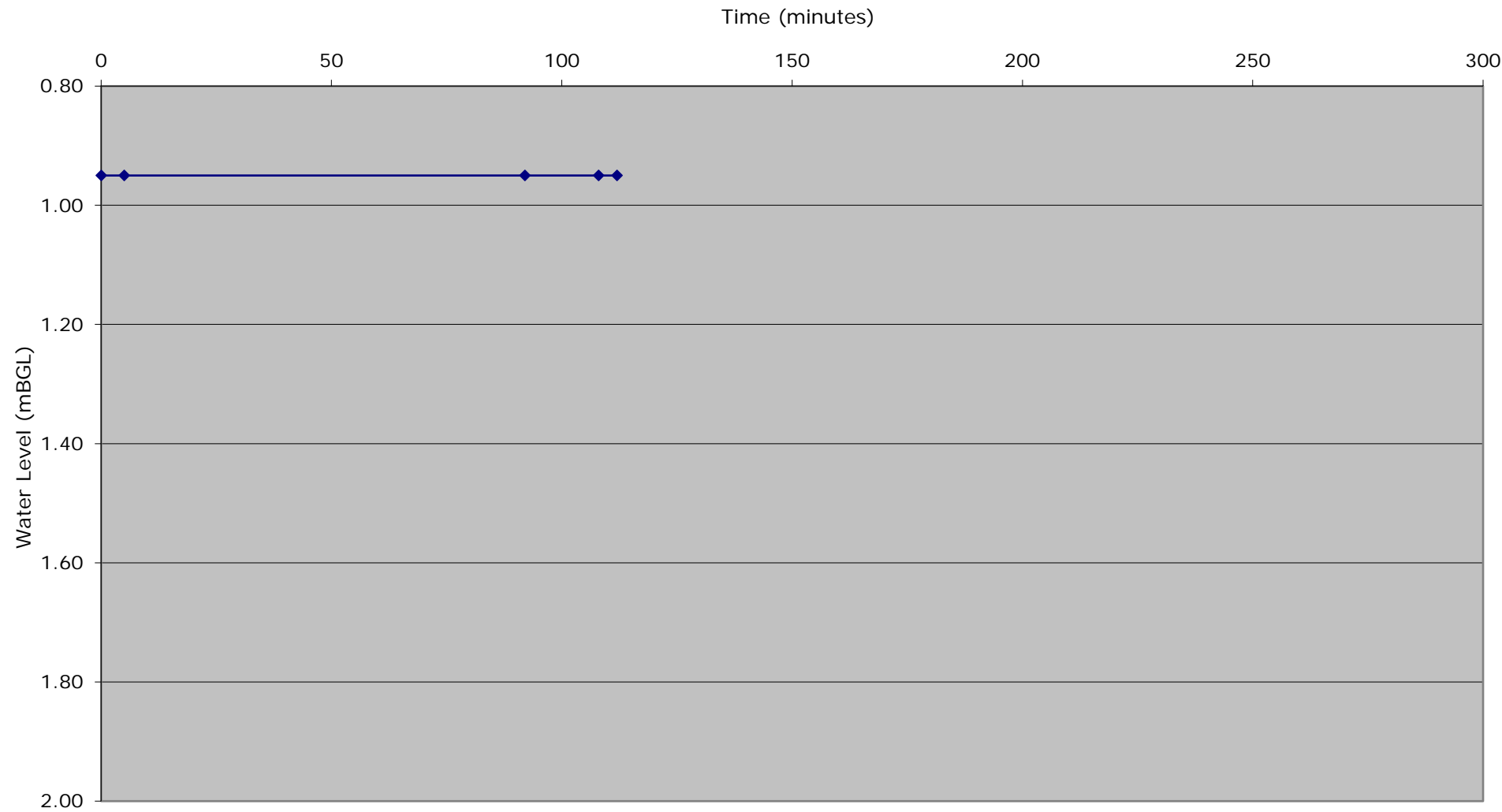
Calculations

$$\begin{aligned} \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\ \\ \text{Where} \\ V_{p75-25} &= \text{effective storage volume of water in the trial pit between 75\% and 25\% effective depth} \\ &= 2.80 \times 0.70 \times 0.78 \\ &= \underline{1.519 \text{ m}^3} \\ a_{p50} &= \text{internal surface area of the trial pit up to 50\% effective depth and including the base area} \\ &= 1.09 + 4.34 + 1.96 \\ &= \underline{7.385 \text{ m}^2} \\ t_{p75-25} &= \text{time for the water level to fall from 75\% to 25\% effective depth} \\ &\quad \begin{array}{l} 25\% \text{ effective depth} = 1.3375 \\ 75\% \text{ effective depth} = 2.1125 \end{array} \\ &= \text{ } - \text{ } \text{ mins} \\ &= 0 \text{ mins} \\ &= \underline{0 \text{ secs}} \\ \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\ &= 1.519 / 7.385 \times 0 \\ &= \underline{\underline{\#DIV/0! \text{ m/s}}} \end{aligned}$$

OTHER NOTES:



Soakaway Test Results - TP22



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: Jul-14

Test No. TP25

Length (m):	3.20
Width (m):	0.70
Depth (m):	2.60
Start Water Level (m):	0.93
Total Depth of Test	1.67

[illegible]

Soakaway Test Results

In Accordance with BRE 365 "Soakaway Design"

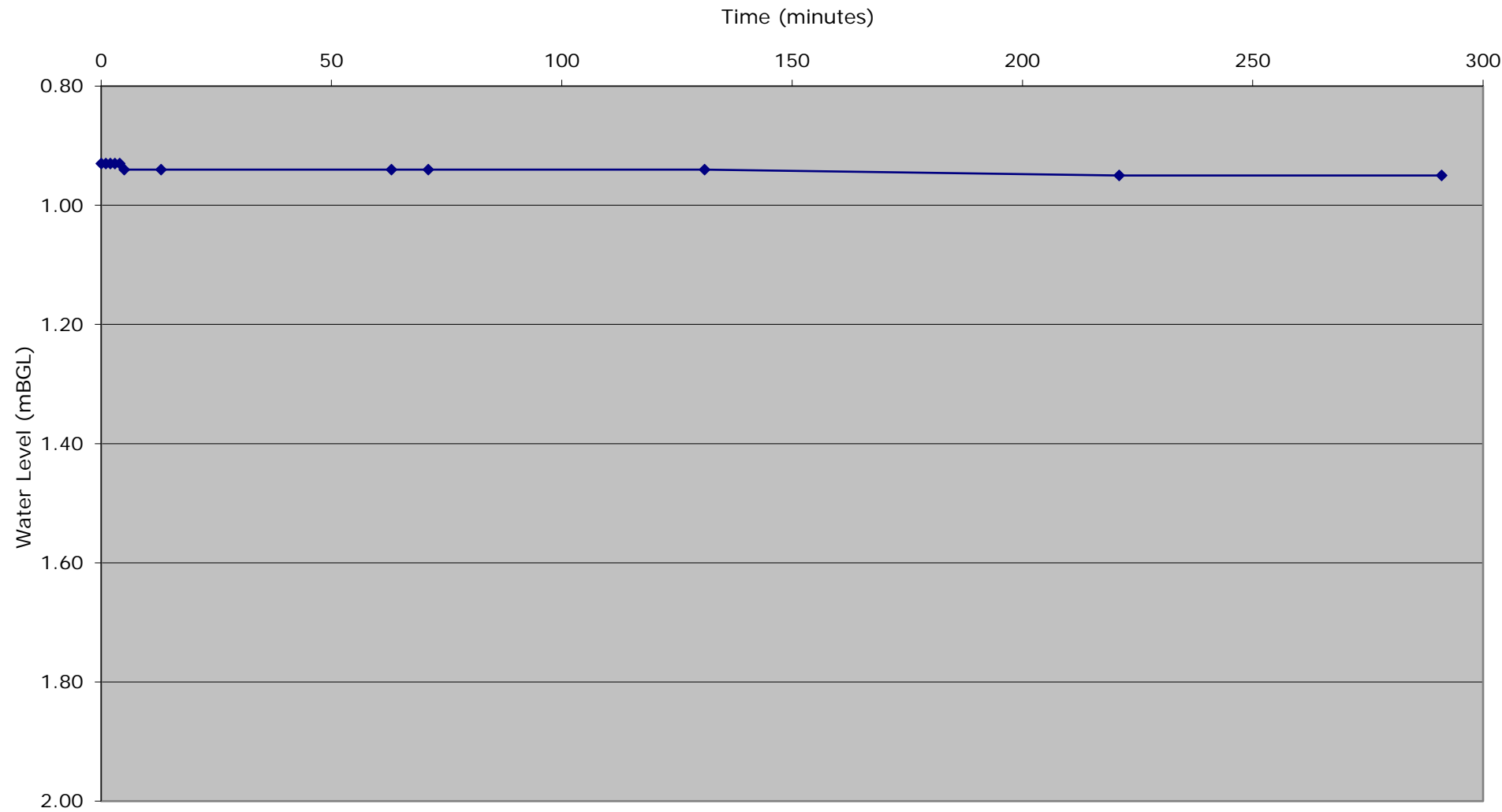
Calculations

$$\begin{aligned} \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\ \\ \text{Where} \\ V_{p75-25} &= \text{effective storage volume of water in the trial pit between 75\% and 25\% effective depth} \\ &= 3.20 \times 0.70 \times 0.84 \\ &= \underline{1.8704 \text{ m}^3} \\ a_{p50} &= \text{internal surface area of the trial pit up to 50\% effective depth and including the base area} \\ &= 1.17 + 5.34 + 2.24 \\ &= \underline{8.753 \text{ m}^2} \\ t_{p75-25} &= \text{time for the water level to fall from 75\% to 25\% effective depth} \\ &\quad \begin{array}{l} 25\% \text{ effective depth} = 1.3475 \\ 75\% \text{ effective depth} = 2.1825 \end{array} \\ &= \text{ } - \text{ } \text{ mins} \\ &= 0 \text{ mins} \\ &= \underline{0 \text{ secs}} \\ \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\ &= 1.8704 / 8.753 \times 0 \\ &= \underline{\underline{\#DIV/0! \text{ m/s}}} \end{aligned}$$

OTHER NOTES:



Soakaway Test Results - TP25



In Accordance with BRE 365 "Soakaway Design"

Test No. TP30

Length (m):	2.60
Width (m):	0.70
Depth (m):	2.50
Start Water Level (m):	1.02
Total Depth of Test	1.48

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

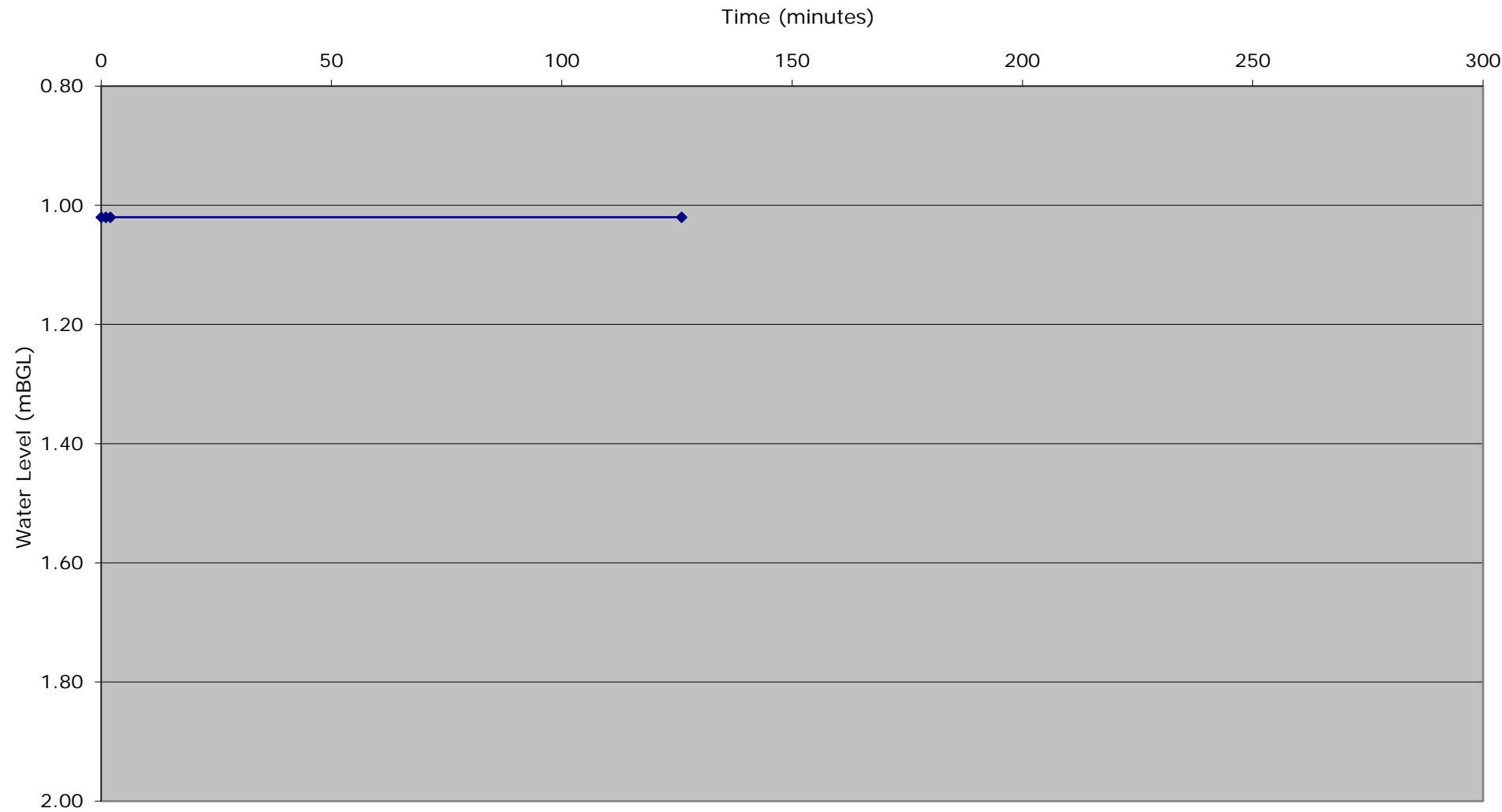
Calculations

Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
Where		
V_{p75-25}	=	effective storage volume of water in the trial pit between 75% and 25% effective depth
	=	$2.60 \times 0.70 \times 0.74$
	=	<u>1.3468 m³</u>
a_{p50}	=	internal surface area of the trial pit up to 50% effective depth and including the base area
	=	$1.04 + 3.85 + 1.82$
	=	<u>6.704 m²</u>
t_{p75-25}	=	time for the water level to fall from 75% to 25% effective depth
		25% effective depth = 1.39
		75% effective depth = 2.13
	=	 - mins
	=	0 mins
	=	<u>0 secs</u>
Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
	=	$1.3468 / 6.704 \times 0$
	=	<u>#DIV/0!</u> m/s

OTHER NOTES:



Soakaway Test Results - TP30



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: Jul-14

Test No. TP44

Length (m):	3.10
Width (m):	0.70
Depth (m):	2.50
Start Water Level (m):	0.90
Total Depth of Test	1.60

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

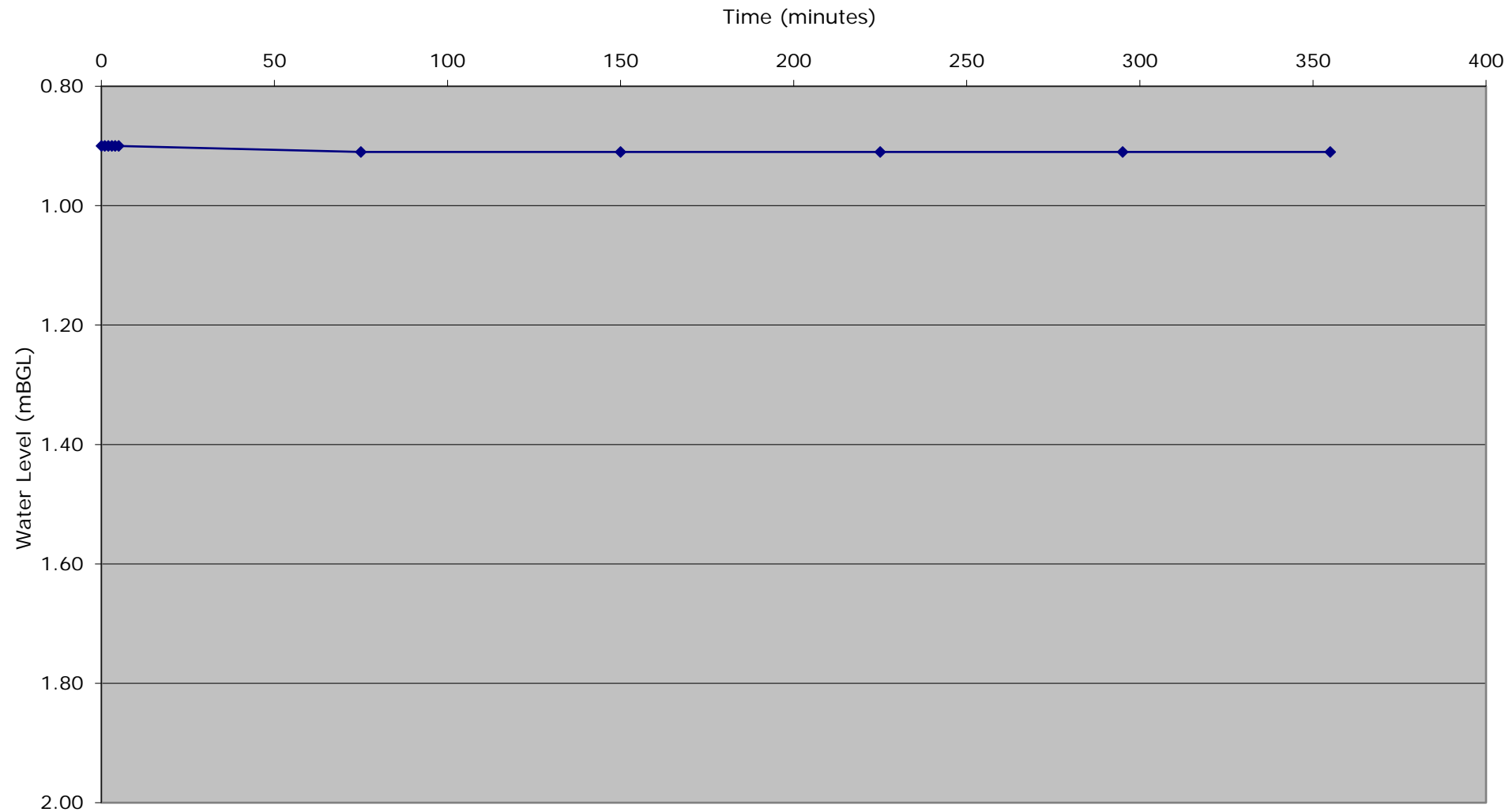
Calculations

Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
Where		
V_{p75-25}	=	effective storage volume of water in the trial pit between 75% and 25% effective depth
	=	$3.10 \times 0.70 \times 0.80$
	=	<u>1.736 m³</u>
a_{p50}	=	internal surface area of the trial pit up to 50% effective depth and including the base area
	=	$1.12 + 4.96 + 2.17$
	=	<u>8.25 m²</u>
t_{p75-25}	=	time for the water level to fall from 75% to 25% effective depth
		25% effective depth = 1.3
		75% effective depth = 2.1
	=	 - mins
	=	0 mins
	=	<u>0 secs</u>
Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
	=	$1.736 / 8.25 \times 0$
	=	<u>#DIV/0!</u> m/s

OTHER NOTES:



Soakaway Test Results - TP44



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: Jul-14

Test No. TP49

Length (m):	3.00
Width (m):	0.70
Depth (m):	2.60
Start Water Level (m):	0.99
Total Depth of Test	1.61

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

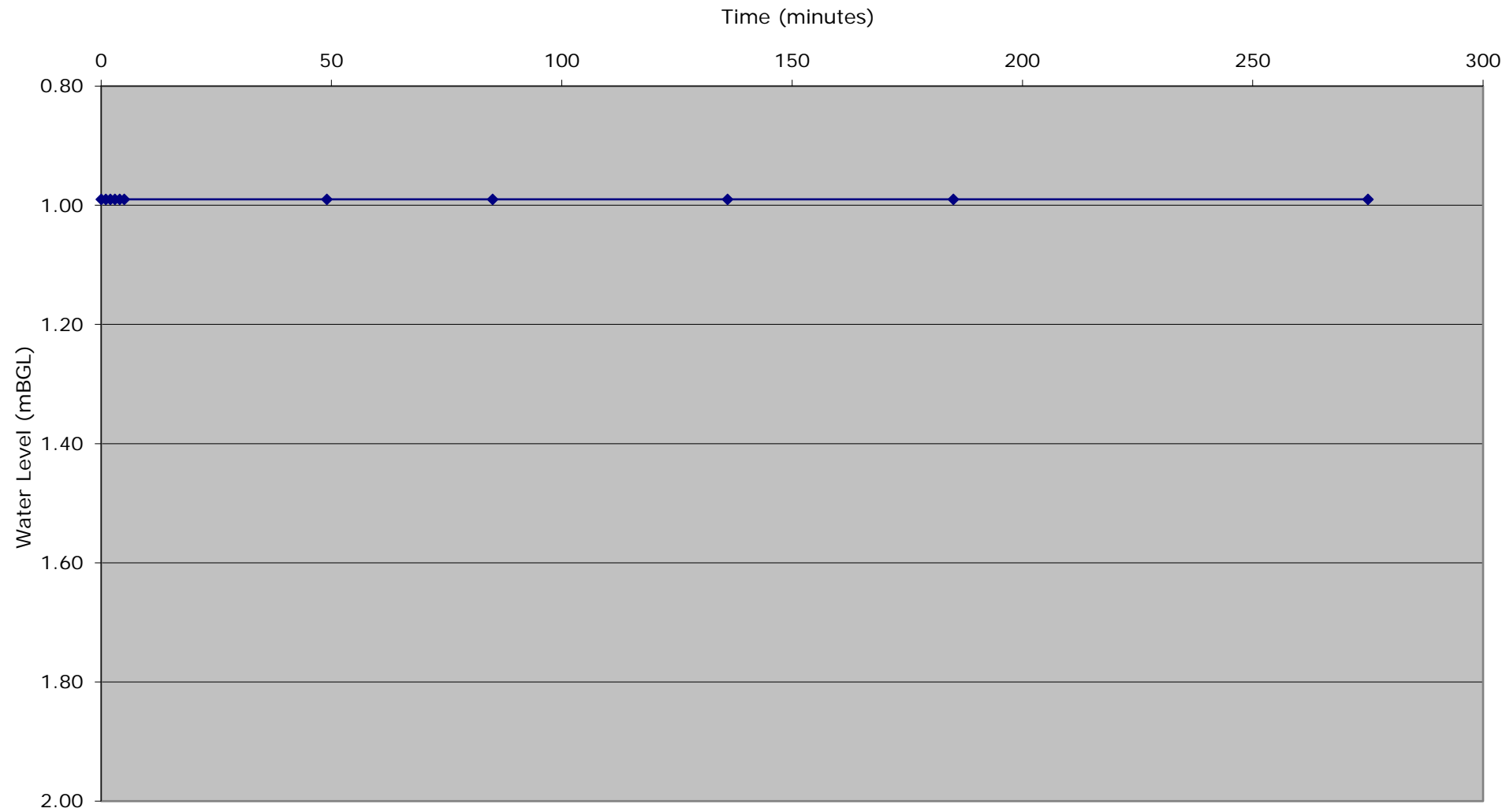
Calculations

Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
Where		
V_{p75-25}	=	effective storage volume of water in the trial pit between 75% and 25% effective depth
	=	$3.00 \times 0.70 \times 0.81$
	=	<u>1.6905 m³</u>
a_{p50}	=	internal surface area of the trial pit up to 50% effective depth and including the base area
	=	$1.13 + 4.83 + 2.10$
	=	<u>8.057 m²</u>
t_{p75-25}	=	time for the water level to fall from 75% to 25% effective depth
		25% effective depth = 1.3925
		75% effective depth = 2.1975
	=	 - mins
	=	0 mins
	=	<u>0 secs</u>
Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
	=	$1.6905 / 8.057 \times 0$
	=	<u>#DIV/0!</u> m/s

OTHER NOTES:



Soakaway Test Results - TP49



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: Jul-14

Test No. TP58

Length (m):	3.10
Width (m):	0.70
Depth (m):	2.60
Start Water Level (m):	1.00
Total Depth of Test	1.60

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

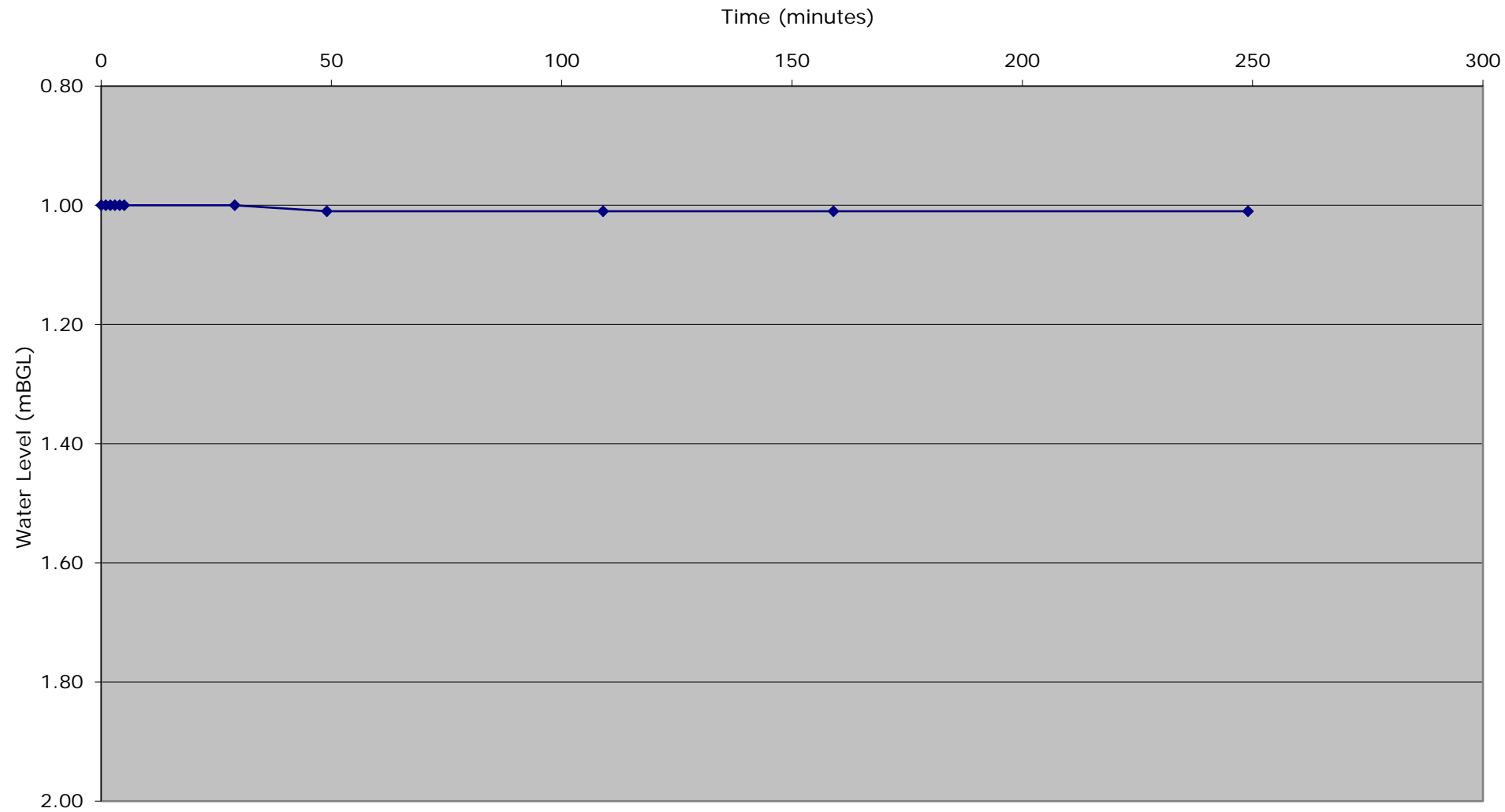
Calculations

Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
Where		
V_{p75-25}	=	effective storage volume of water in the trial pit between 75% and 25% effective depth
	=	$3.10 \times 0.70 \times 0.80$
	=	<u>1.736 m³</u>
a_{p50}	=	internal surface area of the trial pit up to 50% effective depth and including the base area
	=	$1.12 + 4.96 + 2.17$
	=	<u>8.25 m²</u>
t_{p75-25}	=	time for the water level to fall from 75% to 25% effective depth
		25% effective depth = 1.4
		75% effective depth = 2.2
	=	 - mins
	=	0 mins
	=	<u>0 secs</u>
Soil Infiltration Rate (f)	=	$(V_{p75-25}) / (a_{p50} \times t_{p75-25})$
	=	$1.736 / 8.25 \times 0$
	=	<u>#DIV/0!</u> m/s

OTHER NOTES:



Soakaway Test Results - TP49



In Accordance with BRE 365 "Soakaway Design"

Test No. TP60

Length (m):	2.40
Width (m):	0.70
Depth (m):	2.50
Start Water Level (m):	1.21
Total Depth of Test	1.29

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

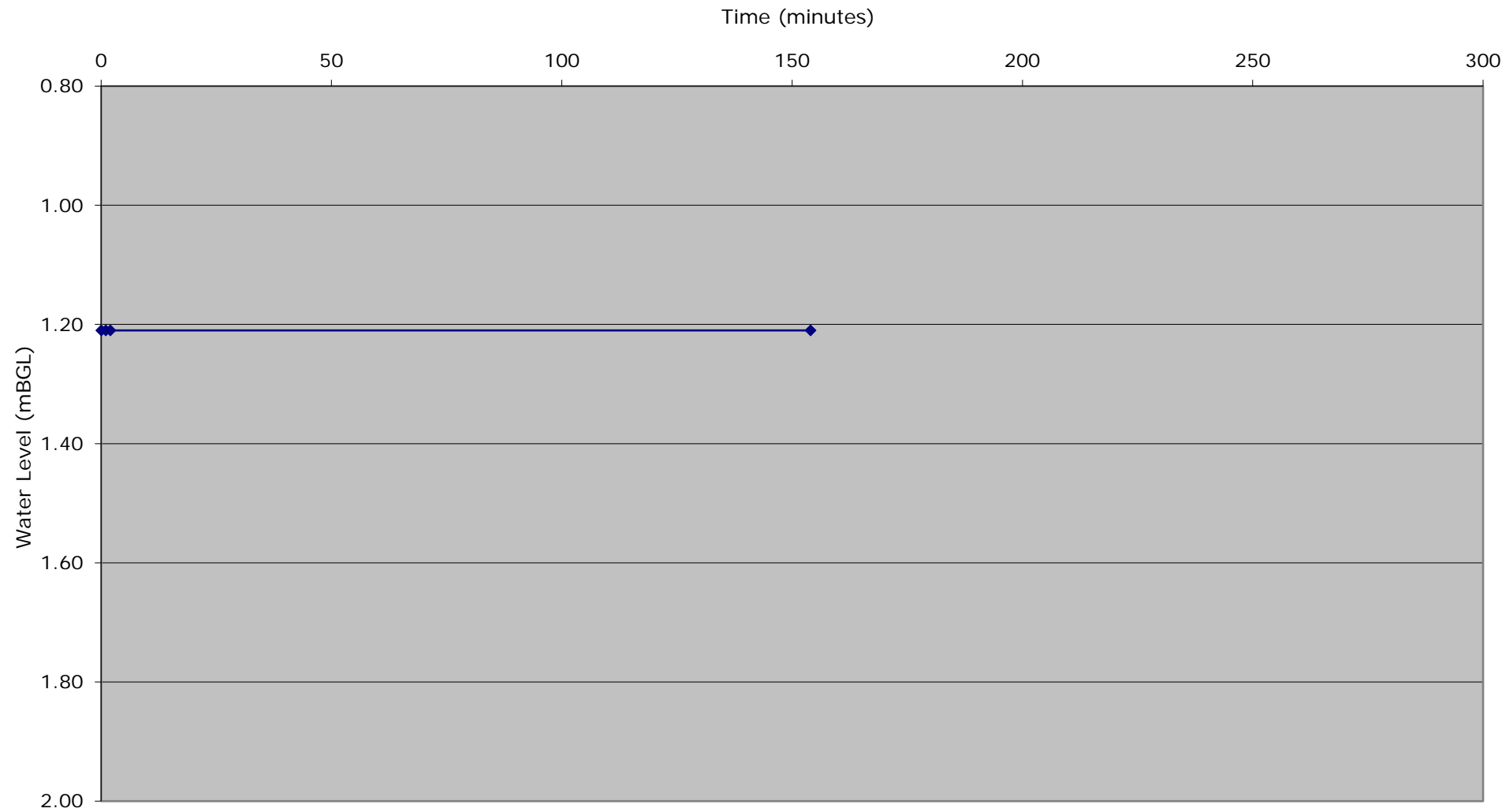
Calculations

$$\begin{aligned}
 \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\
 \\
 \text{Where} \\
 V_{p75-25} &= \text{effective storage volume of water in the trial pit between 75\% and 25\% effective depth} \\
 &= 2.40 \times 0.70 \times 0.65 \\
 &= \underline{1.0836 \text{ m}^3} \\
 a_{p50} &= \text{internal surface area of the trial pit up to 50\% effective depth and including the base area} \\
 &= 0.90 + 3.10 + 1.68 \\
 &= \underline{5.679 \text{ m}^2} \\
 t_{p75-25} &= \text{time for the water level to fall from 75\% to 25\% effective depth} \\
 &\quad \begin{array}{l} 25\% \text{ effective depth} = 1.5325 \\ 75\% \text{ effective depth} = 2.1775 \end{array} \\
 &= \text{ } - \text{ } \text{ mins} \\
 &= 0 \text{ mins} \\
 &= \underline{0 \text{ secs}} \\
 \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\
 &= 1.0836 / 5.679 \times 0 \\
 &= \underline{\underline{\#DIV/0! \text{ m/s}}}
 \end{aligned}$$

OTHER NOTES:



Soakaway Test Results - TP60



In Accordance with BRE 365 "Soakaway Design"

Job Title: South Gillingham Urban Expansion
Job No.: 14114
Client: South Gillingham Consortium
Date: Jul-14

Test No. TP62

Length (m):	3.30
Width (m):	0.70
Depth (m):	2.50
Start Water Level (m):	0.94
Total Depth of Test	1.56

[illegible]

Soakaway Test Results In Accordance with BRE 365 "Soakaway Design"

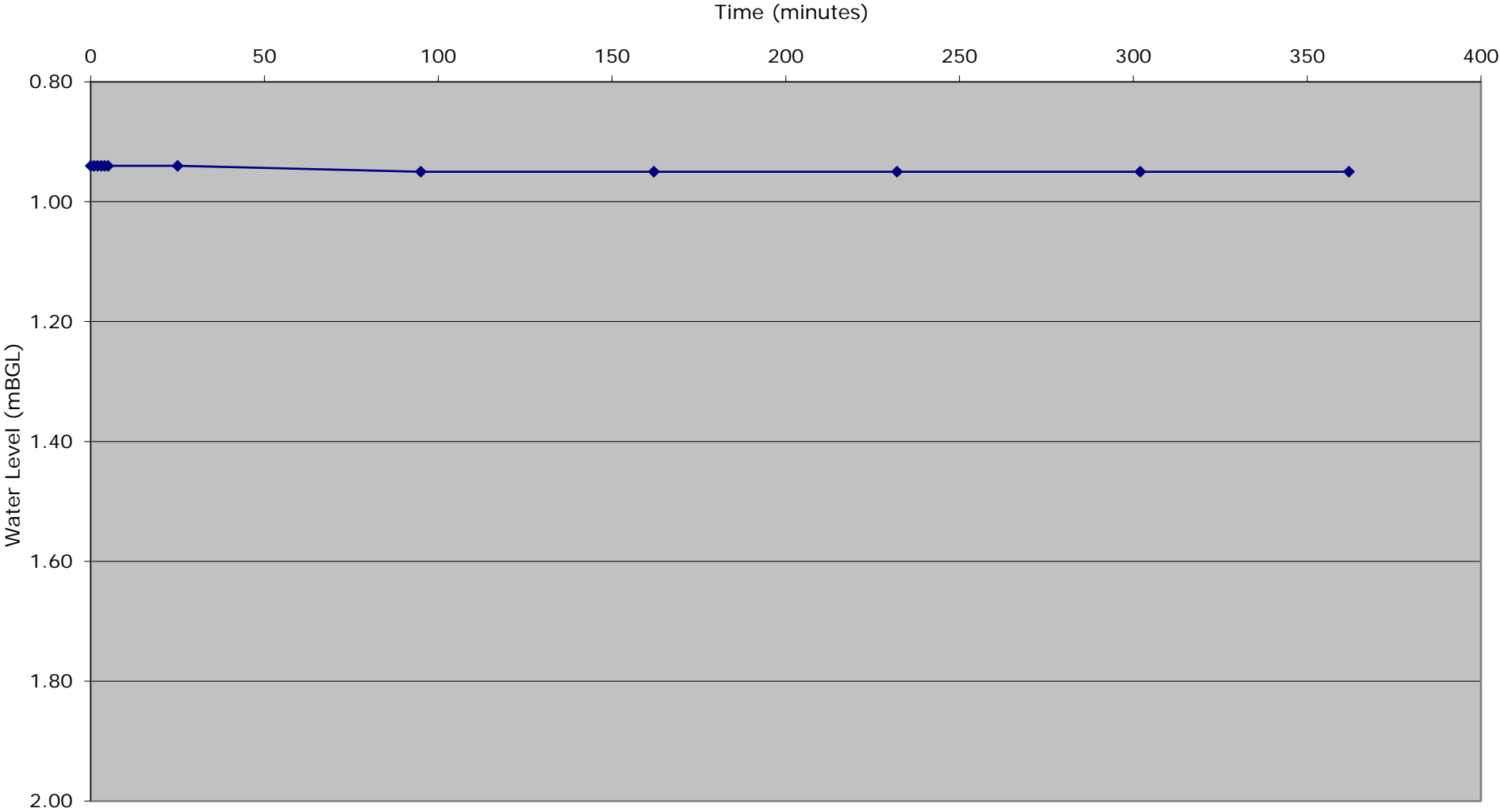
Calculations

$$\begin{aligned}
 \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\
 \\
 \text{Where} \\
 V_{p75-25} &= \text{effective storage volume of water in the trial pit between 75\% and 25\% effective depth} \\
 &= 3.30 \times 0.70 \times 0.78 \\
 &= \underline{1.8018 \text{ m}^3} \\
 a_{p50} &= \text{internal surface area of the trial pit up to 50\% effective depth and including the base area} \\
 &= 1.09 + 5.15 + 2.31 \\
 &= \underline{8.55 \text{ m}^2} \\
 t_{p75-25} &= \text{time for the water level to fall from 75\% to 25\% effective depth} \\
 &\quad \begin{array}{l} 25\% \text{ effective depth} = 1.33 \\ 75\% \text{ effective depth} = 2.11 \end{array} \\
 &= \text{ } - \text{ } \text{ mins} \\
 &= 0 \text{ mins} \\
 &= \underline{0 \text{ secs}} \\
 \text{Soil Infiltration Rate (f)} &= (V_{p75-25}) / (a_{p50} \times t_{p75-25}) \\
 &= 1.8018 / 8.55 \times 0 \\
 &= \underline{\underline{\#DIV/0! \text{ m/s}}}
 \end{aligned}$$

OTHER NOTES:



Soakaway Test Results - TP62



APPENDIX B

PHOTOGRAPHS



**Plate 1**

The large field in the southeast of the site, viewed from the southeast.

**Plate 2**

The lane in the east of the site, used to access fields in the east and southeast of the site, viewed from the north.

**Plate 3**

The fields in the centre of the site, viewed from the northeast.

**Plate 4**

The fields in the south of the site, viewed from the north.

**Plate 5**

The fields in the southwest of the site, viewed from the south.

**Plate 6**

The fields in the west of the site, viewed from the south.

**Plate 7**

The fields in the north of the site, viewed from the west.

**Plate 8**

Ground conditions encountered in TP49, typical of the ground conditions encountered across the site.

APPENDIX C

LABORATORY TESTING RESULTS



GEOTECHNICAL LABORATORY TESTING



Summary of Index Property Test Results

Job: South Gillingham Urban Expansion
Client: Ruddlesden geotechnical Ltd

Job No: 6345
Client Job No: 14114

Sample Reference	Natural MC (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing .425mm	Modified Plasticity Index (%)	Preparation Method	Description/ Remarks
TP02 1.00m (B)	28.8	56	23	33	100.0	33	Natural	Grey silty/sandy CLAY
TP06 2.00m (D)	27.9	56	23	33	100.0	33	Natural	Grey silty/sandy CLAY
TP07 1.00m (D)	26.5	61	22	39	100.0	39	Natural	Grey silty/sandy CLAY
TP12 1.50m (D)	35.8	53	21	32	100.0	32	Natural	Grey silty/sandy CLAY
TP15 2.00m (D)	18.8	38	16	22	100.0	22	Natural	Brown silty/sandy CLAY
TP17 1.50m (D)	30.7	61	26	35	100.0	35	Natural	Grey silty/sandy CLAY
TP19 1.00m (D)	28.1	54	24	30	100.0	30	Natural	Brown silty/sandy CLAY
TP22 1.00m (D)	32.1	61	26	35	100.0	35	Natural	Grey silty/sandy CLAY
TP30 1.00m (D)	28.5	51	22	29	100.0	29	Natural	Brown silty/sandy CLAY

Tests carried out in accordance with Clauses 3.2, 4.3, 5.3 and 5.4 of BS1377: Part 2: 1990

Modified Plasticity Index is defined in NHBC Chapter 4.2 as the PI multiplied by the percentage of particles passing the .425mm sieve.

Non-Modified Plasticity Indices plotted on the attached Casagrande Classification chart.

Prepared By: AS

Date: 16/06/2014

Processed By: AS

Date: 20/06/2014

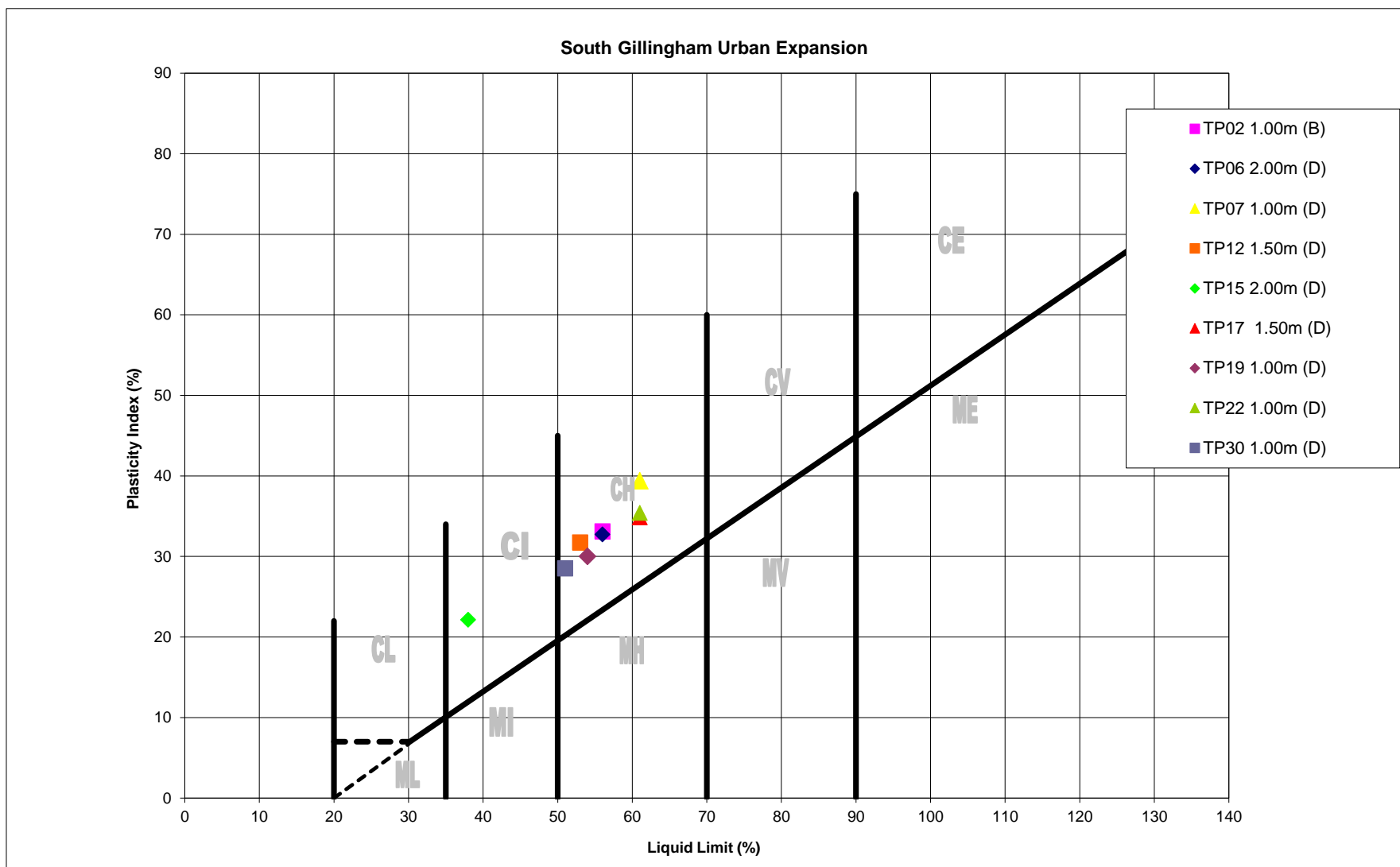
Tested By LC

Date: 17/06/2014

Checked By: EB

Date: 23/06/2014

Summary of Index Property Test Results



CONTAMINATION LABORATORY TESTING



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Analytical Report Number : 14-55504

Project / Site name:	South Gillingham Urban Expansion	Samples received on:	09/06/2014
Your job number:	14114	Samples instructed on:	09/06/2014
Your order number:	14114	Analysis completed by:	17/06/2014
Report Issue Number:	1	Report issued on:	17/06/2014
Samples Analysed:	19 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345020	345021	345022	345023	345024
Sample Reference				TP02	TP04	TP06	TP07	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	2.00	2.00	0.80	1.50
Date Sampled				27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	13	16	16	15
Total mass of sample received	kg	0.001	NONE	0.20	0.18	0.19	0.18	0.18

General Inorganics

pH	pH Units	N/A	MCERTS	7.5	7.9	7.4	7.7	6.7
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	5.0	0.66	4.8	0.050	0.047
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	5000	660	4800	50	47
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.5	0.33	2.4	0.025	0.024
Organic Matter	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	2	MCERTS	-	-	-	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.1	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.1	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.1	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	-	-	-	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345020	345021	345022	345023	345024
Sample Reference				TP02	TP04	TP06	TP07	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	2.00	2.00	0.80	1.50
Date Sampled				27/05/2014	27/05/2014	27/05/2014	27/05/2014	27/05/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH1 (C10 - C40)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345025	345026	345027	345028	345029
Sample Reference				TP15	TP17	TP19	TP22	TP30
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.00	1.50	1.00	1.00	1.00
Date Sampled				28/05/2014	27/05/2014	28/05/2014	28/05/2014	27/05/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	15	20	17	19	19
Total mass of sample received	kg	0.001	NONE	0.17	0.20	0.19	0.18	0.20

General Inorganics

pH	pH Units	N/A	MCERTS	6.3	7.3	6.7	6.7	6.4
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.10	0.66	0.44	6.2	0.082
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	100	660	440	6200	82
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.052	0.33	0.22	3.1	0.041
Organic Matter	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	2	MCERTS	-	-	-	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.1	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.1	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.1	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	-	-	-	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345025	345026	345027	345028	345029
Sample Reference				TP15	TP17	TP19	TP22	TP30
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.00	1.50	1.00	1.00	1.00
Date Sampled				28/05/2014	27/05/2014	28/05/2014	28/05/2014	27/05/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH1 (C10 - C40)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC5 - EC6								
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7								
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345030	345031	345032	345033	345034
Sample Reference				TP01	TP03	TP05	TP10	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.60	0.50	0.40	0.50
Date Sampled				27/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	12	13	19	23	20
Total mass of sample received	kg	0.001	NONE	0.48	0.46	0.52	0.46	0.47

General Inorganics

pH	pH Units	N/A	MCERTS	7.1	7.7	7.7	6.9	6.5
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.046	0.028	0.14	0.15	0.018
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	46	28	140	150	18
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.023	0.014	0.068	0.076	0.0089
Organic Matter	%	0.1	MCERTS	2.3	0.3	0.2	1.2	1.8

Total Phenols

Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.4	11	11	13	7.4
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	1.2	1.7	1.4	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	37	49	29	33
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	28	20	14	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	46	11	9.7	13	15
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	38	21	13	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.3	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	49	61	47	47	64

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345030	345031	345032	345033	345034
Sample Reference				TP01	TP03	TP05	TP10	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.60	0.50	0.40	0.50
Date Sampled				27/05/2014	27/05/2014	27/05/2014	27/05/2014	28/05/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH1 (C10 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345035	345036	345037	345038	
Sample Reference				TP14	TP17	TP20	TP43	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.30	0.20	0.50	0.70	
Date Sampled				28/05/2014	27/05/2014	28/05/2014	28/05/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	20	19	16	15	
Total mass of sample received	kg	0.001	NONE	0.44	0.45	0.46	0.50	

General Inorganics

pH	pH Units	N/A	MCERTS	6.2	6.7	6.7	6.8	
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.074	0.031	0.15	0.11	
Water Soluble Sulphate as SO ₄ (2:1)	mg/kg	2.5	MCERTS	74	31	150	110	
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.037	0.016	0.075	0.055	
Organic Matter	%	0.1	MCERTS	1.6	2.9	1.0	1.0	

Total Phenols

Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.28	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	0.88	< 0.10	< 0.10	
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	0.10	< 0.10	< 0.10	
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	2.2	< 0.10	< 0.10	
Anthracene	mg/kg	0.1	MCERTS	< 0.10	0.97	< 0.10	< 0.10	
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	11	< 0.10	< 0.10	
Pyrene	mg/kg	0.1	MCERTS	< 0.10	10	< 0.10	< 0.10	
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	7.1	< 0.10	< 0.10	
Chrysene	mg/kg	0.05	MCERTS	< 0.05	7.9	< 0.05	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	12	< 0.10	< 0.10	
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	4.1	< 0.10	< 0.10	
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	8.9	< 0.10	< 0.10	
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	5.9	< 0.10	< 0.10	
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	1.3	< 0.10	< 0.10	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	6.1	< 0.05	< 0.05	

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.6	79	< 1.6	< 1.6	
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	13	18	9.5	
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	1.3	0.9	0.3	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.2	0.4	0.4	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	26	42	31	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	16	16	32	25	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	21	15	12	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	33	69	41	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	77	79	64	

Analytical Report Number: 14-55504

Project / Site name: South Gillingham Urban Expansion

Your Order No: 14114

Lab Sample Number				345035	345036	345037	345038	
Sample Reference				TP14	TP17	TP20	TP43	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.30	0.20	0.50	0.70	
Date Sampled				28/05/2014	27/05/2014	28/05/2014	28/05/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	-	< 1.0	-	-	
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	-	

Petroleum Hydrocarbons

TPH1 (C10 - C40)	mg/kg	10	MCERTS	< 10	230	< 10	< 10	
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	-	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	-	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	-	-	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	8.1	-	-	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	-	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	-	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	2.4	-	-	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	41	-	-	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	160	-	-	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	210	-	-	



Analytical Report Number : 14-55504

Project / Site name: South Gillingham Urban Expansion

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content

of a sample is calculated as the % weight of the stones not passing a 2 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
345020	TP02	None Supplied	1.00	Grey clay and sand.
345021	TP04	None Supplied	2.00	Brown clay and sand.
345022	TP06	None Supplied	2.00	Grey clay and sand.
345023	TP07	None Supplied	0.80	Light brown clay and sand.
345024	TP12	None Supplied	1.50	Light brown clay and sand.
345025	TP15	None Supplied	2.00	Brown clay and sand.
345026	TP17	None Supplied	1.50	Brown clay and sand.
345027	TP19	None Supplied	1.00	Light brown clay and sand.
345028	TP22	None Supplied	1.00	Grey clay and sand.
345029	TP30	None Supplied	1.00	Light brown clay and sand.
345030	TP01	None Supplied	0.30	Brown clay and topsoil with gravel and vegetation.
345031	TP03	None Supplied	0.60	Light brown clay and sand.
345032	TP05	None Supplied	0.50	Light brown clay and sand.
345033	TP10	None Supplied	0.40	Light brown clay and sand.
345034	TP12	None Supplied	0.50	Light brown clay and sand.
345035	TP14	None Supplied	0.30	Light brown clay and sand.
345036	TP17	None Supplied	0.20	Brown clay and topsoil with gravel and vegetation.
345037	TP20	None Supplied	0.50	Light brown clay and sand.
345038	TP43	None Supplied	0.70	Light brown clay and sand.

Analytical Report Number : 14-55504

Project / Site name: South Gillingham Urban Expansion

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH1 (Soil)	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method	L064-PL	D	MCERTS
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

GENERIC ASSESSMENT CRITERIA



Residential with Home Grown Produce Land Use Generic Assessment Criteria (GAC)

Determinand	Unit	GAC			Highest Recorded Value	Location of Highest Recorded Value	No. of values exceeding GAC	Source of GAC
Phenols (total)	mg/kg	1% SOM 120	2.5% SOM 200	6% SOM 380	<2.0	ALL	0 of 19	S4UL
Naphthalene	mg/kg	1% SOM 2.3	2.5% SOM 5.6	6% SOM 13	<0.05	ALL	0 of 19	S4UL
Acenaphthylene	mg/kg	1% SOM 170	2.5% SOM 420	6% SOM 920	<0.10	ALL	0 of 19	S4UL
Acenaphthene	mg/kg	1% SOM 210	2.5% SOM 510	6% SOM 1100	<0.10	ALL	0 of 19	S4UL
Fluorene	mg/kg	1% SOM 170	2.5% SOM 400	6% SOM 860	<0.10	ALL	0 of 19	S4UL
Phenanthrene	mg/kg	1% SOM 95	2.5% SOM 220	6% SOM 440	<0.10	ALL	0 of 19	S4UL
Anthracene	mg/kg	1% SOM 2400	2.5% SOM 5400	6% SOM 11000	<0.10	ALL	0 of 19	S4UL
Fluoranthene	mg/kg	1% SOM 280	2.5% SOM 560	6% SOM 890	<0.10	ALL	0 of 19	S4UL
Pyrene	mg/kg	1% SOM 620	2.5% SOM 1200	6% SOM 2000	<0.10	ALL	0 of 19	S4UL
Benzo(a)anthracene	mg/kg	1% SOM 7.2	2.5% SOM 11	6% SOM 13	<0.10	ALL	0 of 19	S4UL
Chrysene	mg/kg	1% SOM 15	2.5% SOM 22	6% SOM 27	<0.05	ALL	0 of 19	S4UL
Benzo(b)fluoranthene	mg/kg	1% SOM 2.6	2.5% SOM 3.3	6% SOM 3.7	<0.10	ALL	0 of 19	S4UL
Benzo(k)fluoranthene	mg/kg	1% SOM 77	2.5% SOM 93	6% SOM 100	<0.10	ALL	0 of 19	S4UL
Benzo(a)pyrene	mg/kg	1% SOM 2.2	2.5% SOM 2.7	6% SOM 3.0	<0.10	ALL	0 of 19	S4UL
Indeno(1,2,3-cd)pyrene	mg/kg	1% SOM 27	2.5% SOM 36	6% SOM 41	<0.10	ALL	0 of 19	S4UL
Dibenzo(a,h)anthracene	mg/kg	1% SOM 0.24	2.5% SOM 0.28	6% SOM 0.30	<0.10	ALL	0 of 19	S4UL
Benzo(g,h,i)perylene	mg/kg	1% SOM 320	2.5% SOM 340	6% SOM 350	<0.05	ALL	0 of 19	S4UL
Arsenic	mg/kg	37			22	TP21	0 of 19	S4UL
Boron (water soluble)	mg/kg	290			2.2	TP58	0 of 19	S4UL
Cadmium	mg/kg	11			0.5	TP21	0 of 19	S4UL
Chromium (total)	mg/kg	910			50	TP21	0 of 19	S4UL
Copper	mg/kg	2400			35	TP16	0 of 19	S4UL
Lead	mg/kg	200			31	TP63	0 of 19	C4SL
Elemental Mercury	mg/kg	1.2			<0.3	ALL	0 of 19	S4UL
Nickel	mg/kg	130			69	TP20	0 of 19	S4UL
Selenium	mg/kg	250			<1.0	ALL	0 of 19	S4UL
Zinc	mg/kg	3700			84	TP16	0 of 19	S4UL
Total TPH	mg/kg	10			<10	ALL	0 of 19	Screening Value



Key:

1. S4UL = Suitable for Use Level
2. C4SL = Category 4 Screening Level
3. Screening Value = Laboratory detectable level of Total TPH. If detectable levels of TPH are recorded, speciated TPH analysis is undertaken.

Notes:

1. *Italic* entries indicate GAC exceeded.
2. Based on a sandy loam soil, as defined in SR3 (Environment Agency (2009): Updated Technical background to the CLEA Model) and 6% SOM (unless otherwise stated).
3. S4ULs for phenols, polyaromatic hydrocarbons and total petroleum hydrocarbons will vary according to SOM for all land uses.
4. Values are rounded to two significant figures.
5. S4ULs assume that free phase contamination is not present.
6. S4ULs are based on a sub-surface soil to indoor air correction factor of 1.
7. For naphthalene, the S4UL is based on a comparison of inhalation exposure with the TDI_{inhal} for localised effects.
8. For chromium (VI), the S4UL is based on comparison of inhalation exposure with inhalation ID.
9. Exposure to all xylene isomers should be considered together, because the HCV is based on the intake of total xylene and not an individual isomer in isolation.



APPENDIX D

DESK STUDY INFORMATION



HISTORICAL ORDNANCE SURVEY MAPS



Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

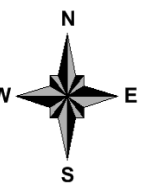
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Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: National Grid

Map date: 2012

Scale: 1:10,000

Printed at: 1:10,000

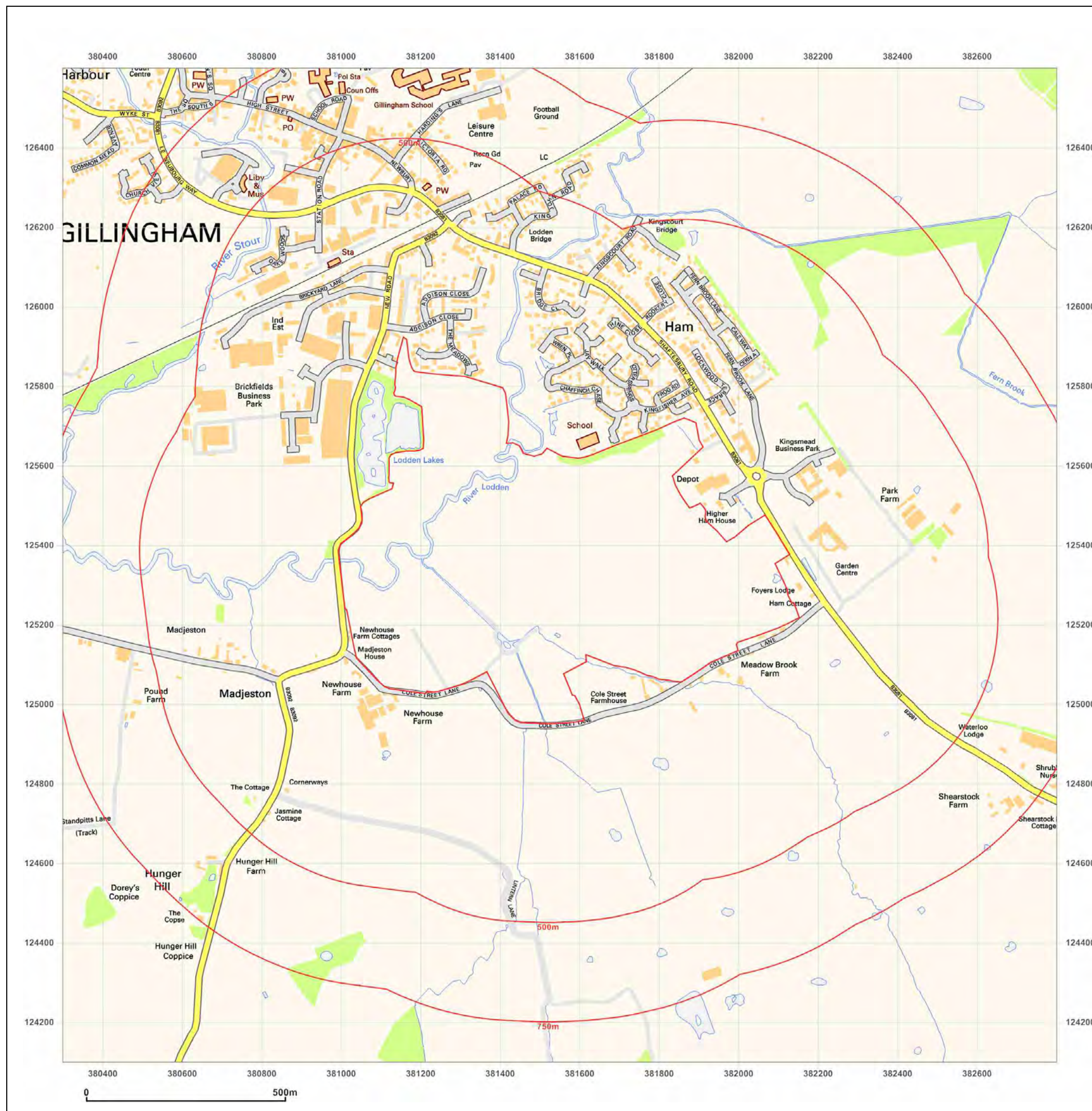


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Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000

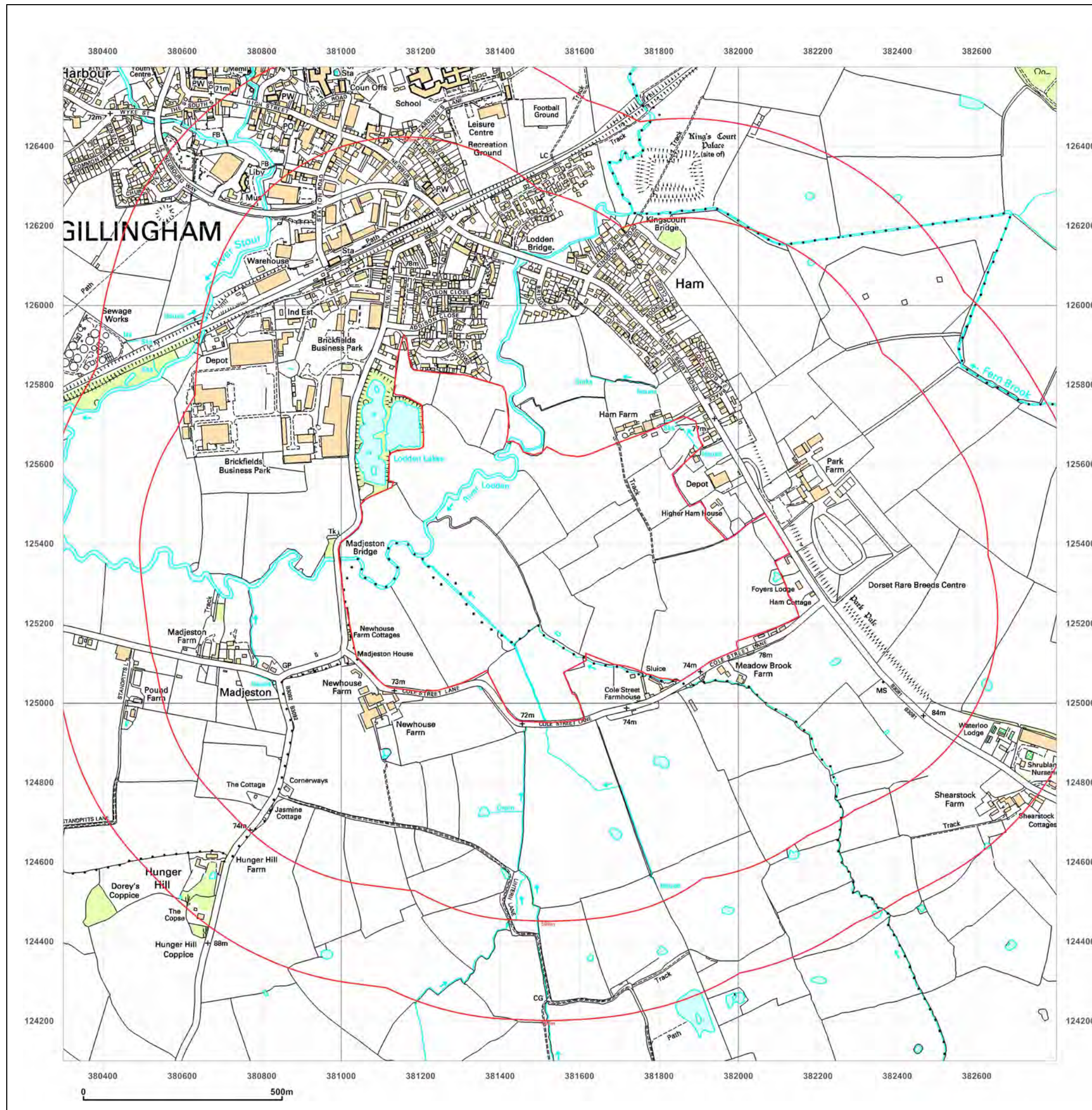


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Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: National Grid

Map date: 1992

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1981
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

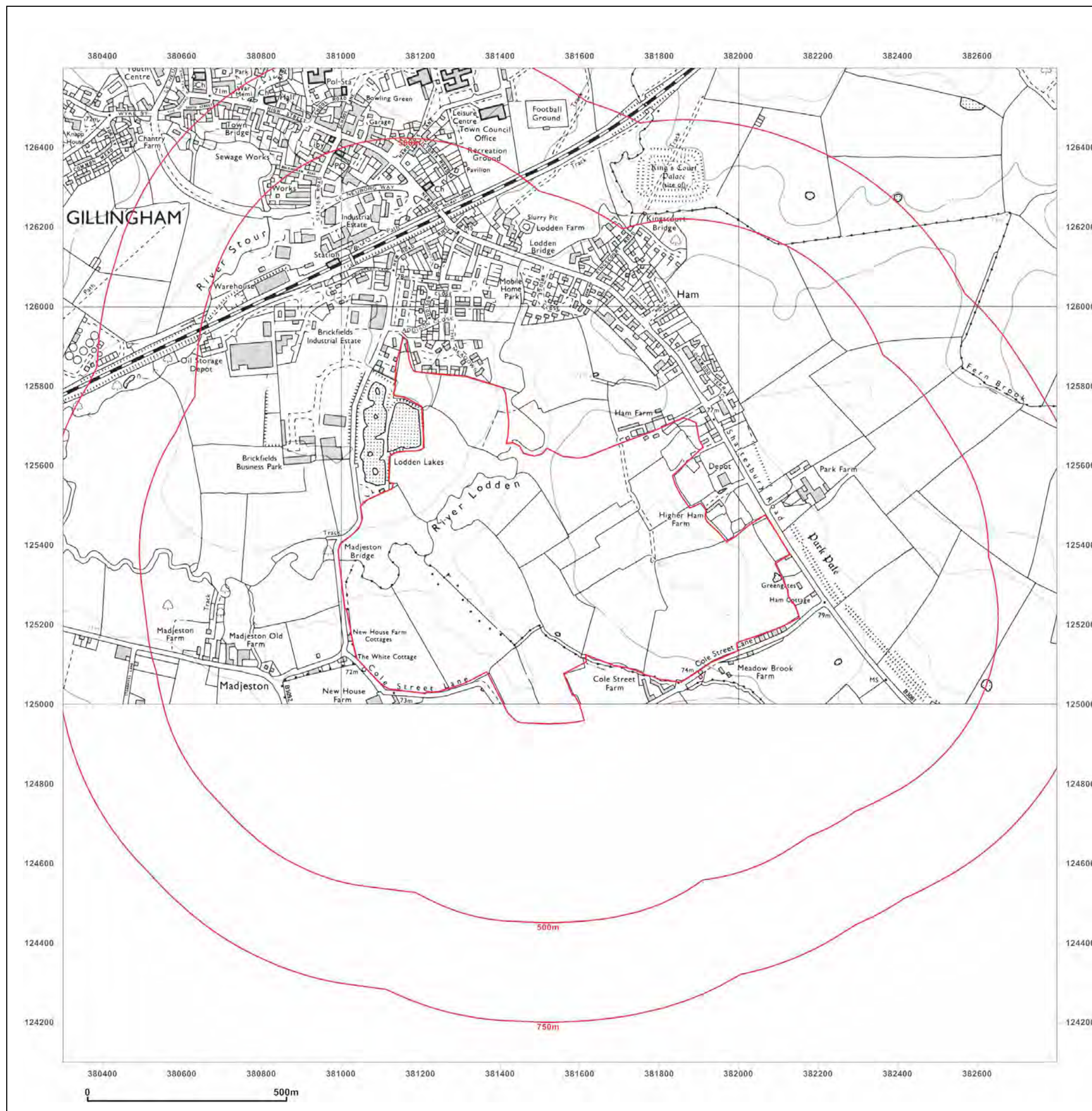


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Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: National Grid

Map date: 1983-1988

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1981
Revised 1983
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1985
Revised 1988
Edition N/A
Copyright N/A
Levelled N/A

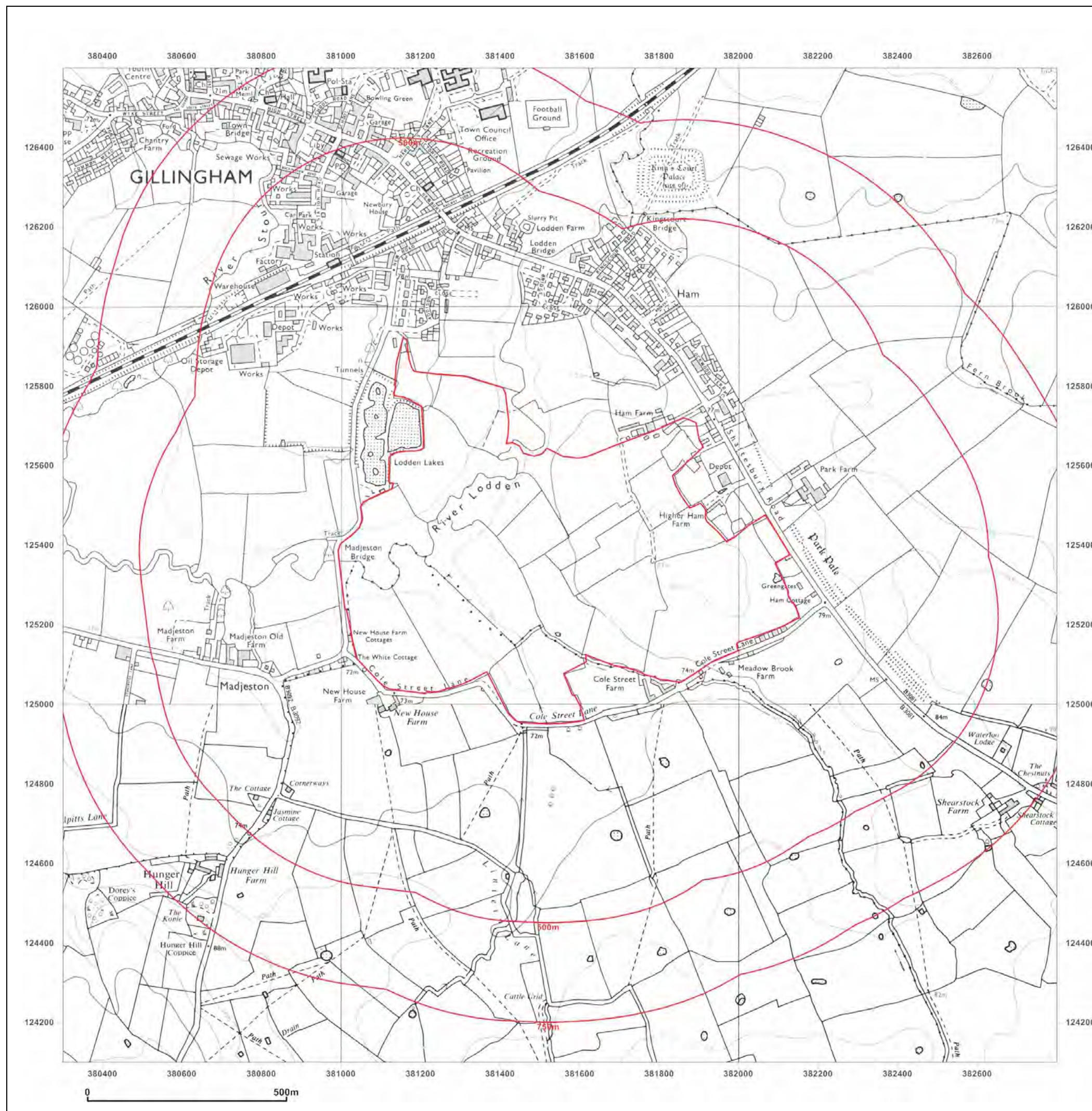


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Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: Provisional

Map date: 1968

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1968
Revised 1968
Edition N/A
Copyright N/A
Levelled N/A

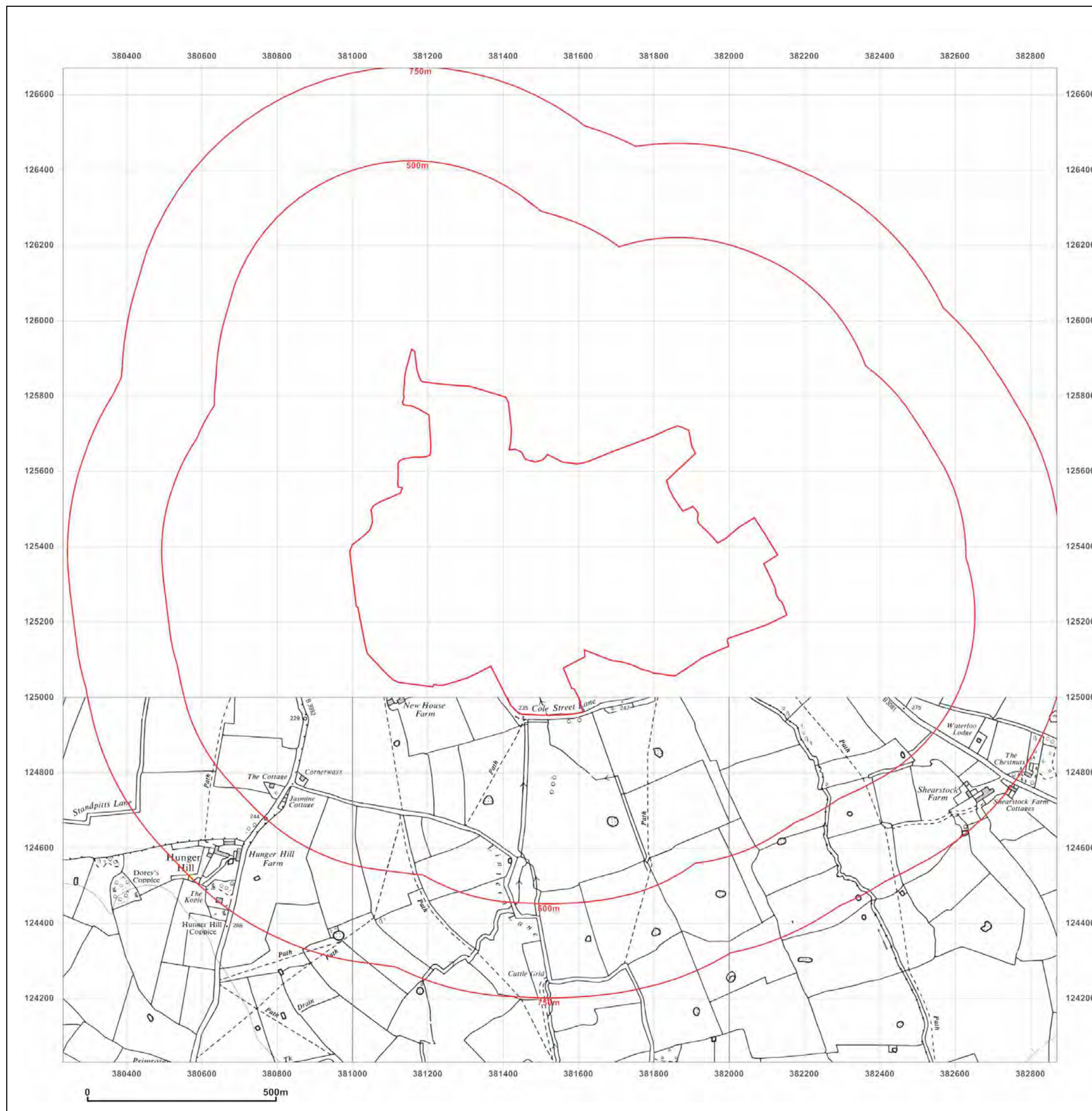


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Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: Provisional

Map date: 1956

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1956
Revised 1956
Edition N/A
Copyright N/A
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Surveyed 1956
Revised 1956
Edition N/A
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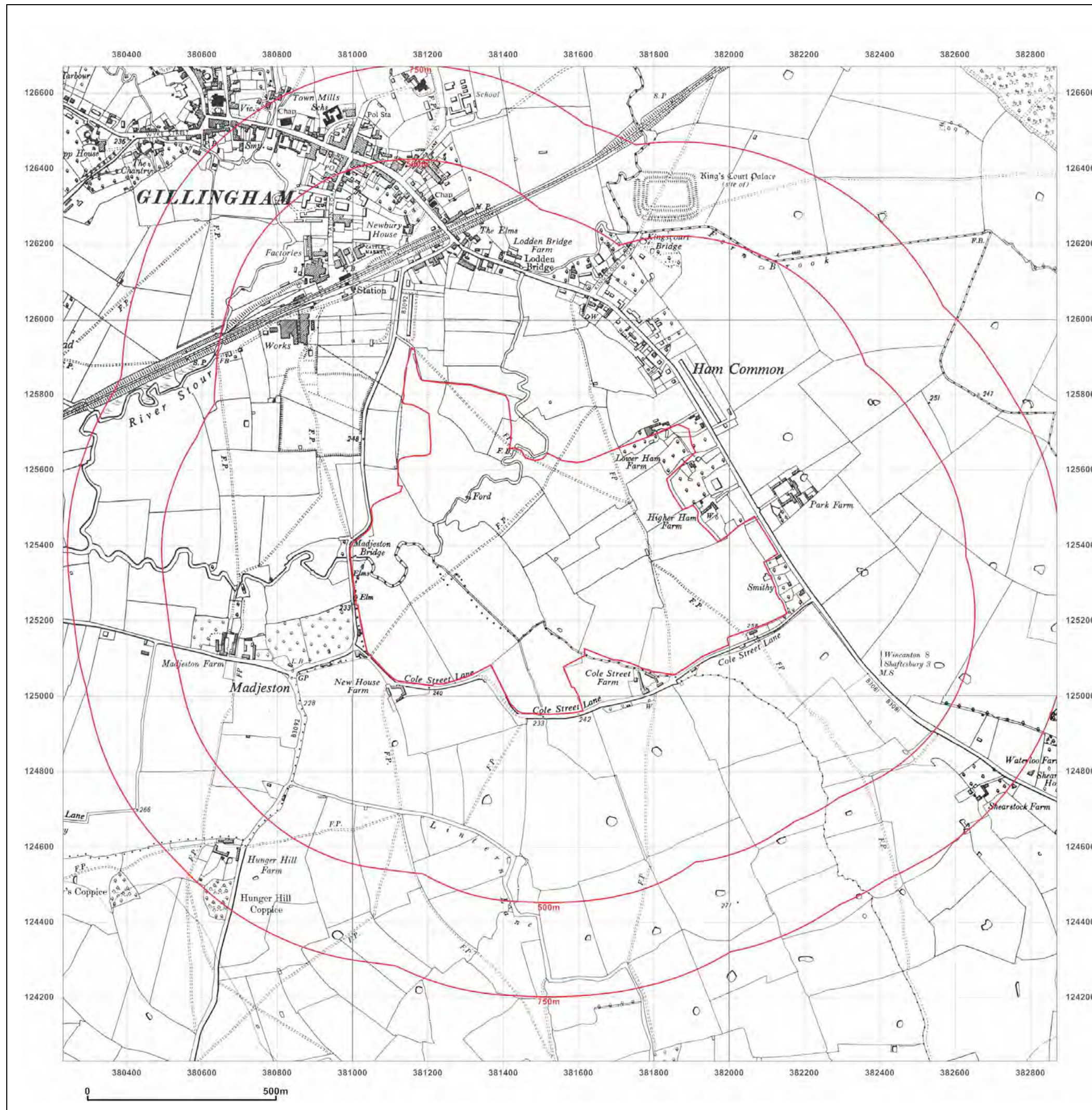


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Site Details:

SHAFTESBURY
ROAD, GILLINGHAM, DORSET,
SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: County Series

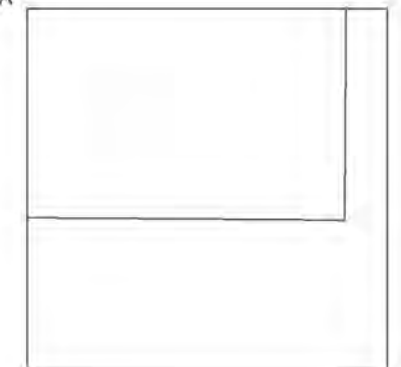
Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1938
Edition N/A
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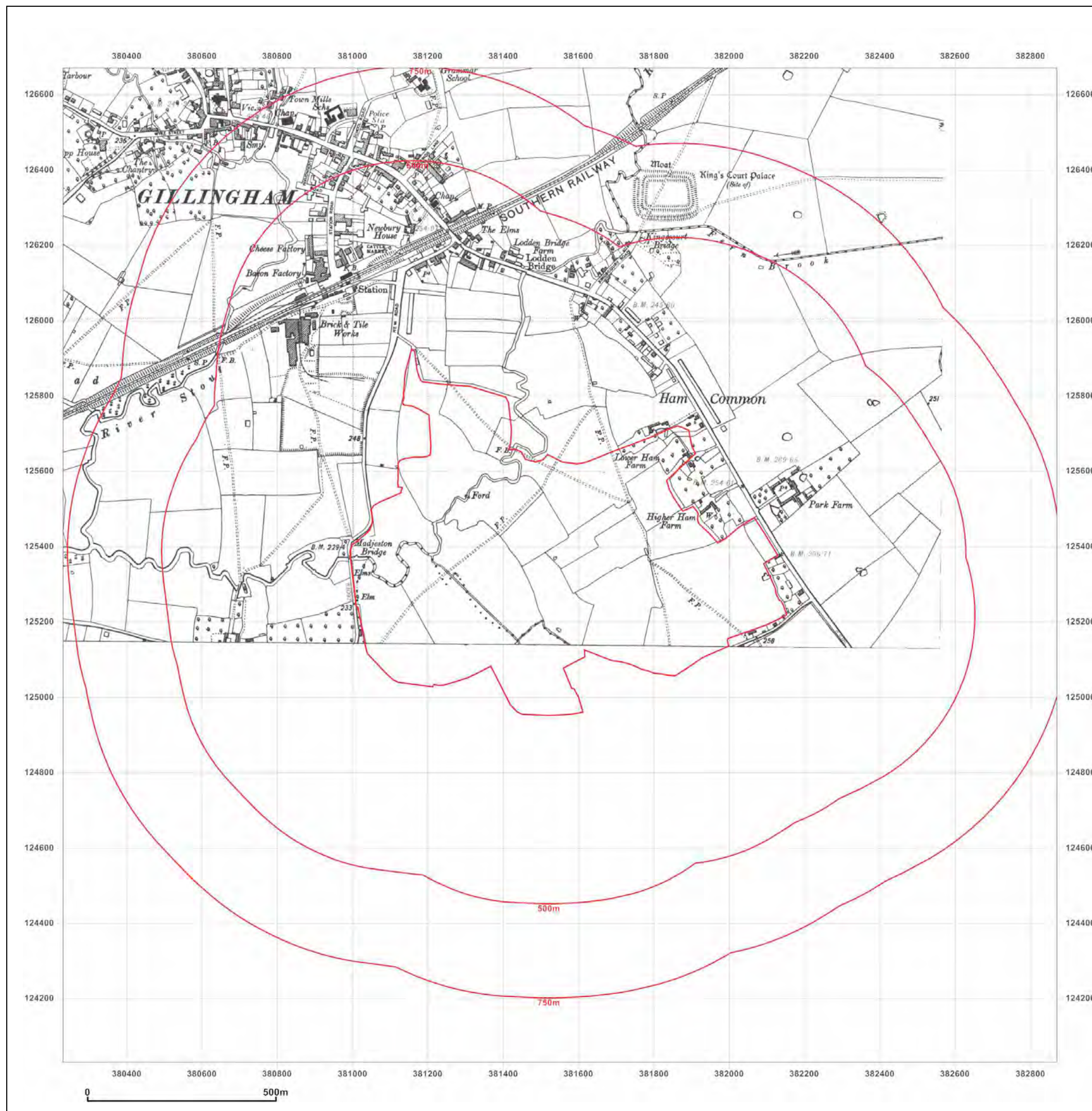


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SP8 4LL

Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: County Series

Map date: 1930-1931

Scale: 1:10,560

Printed at: 1:10,560



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Edition 1930
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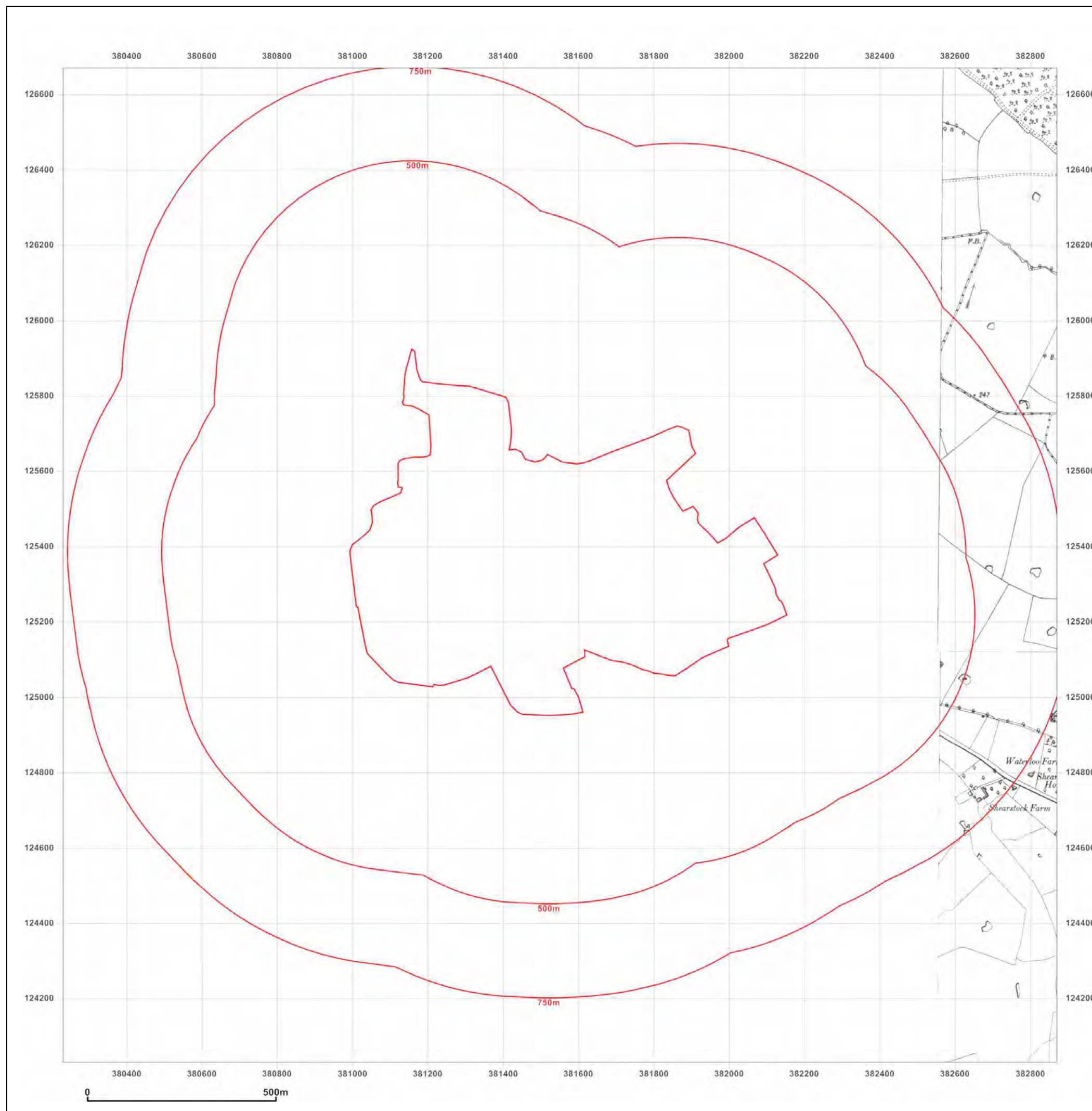


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Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: County Series

Map date: 1900-1902

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1900
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Surveyed 1885
Revised 1902
Edition N/A
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Surveyed 1885
Revised 1900
Edition N/A
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Levelled N/A

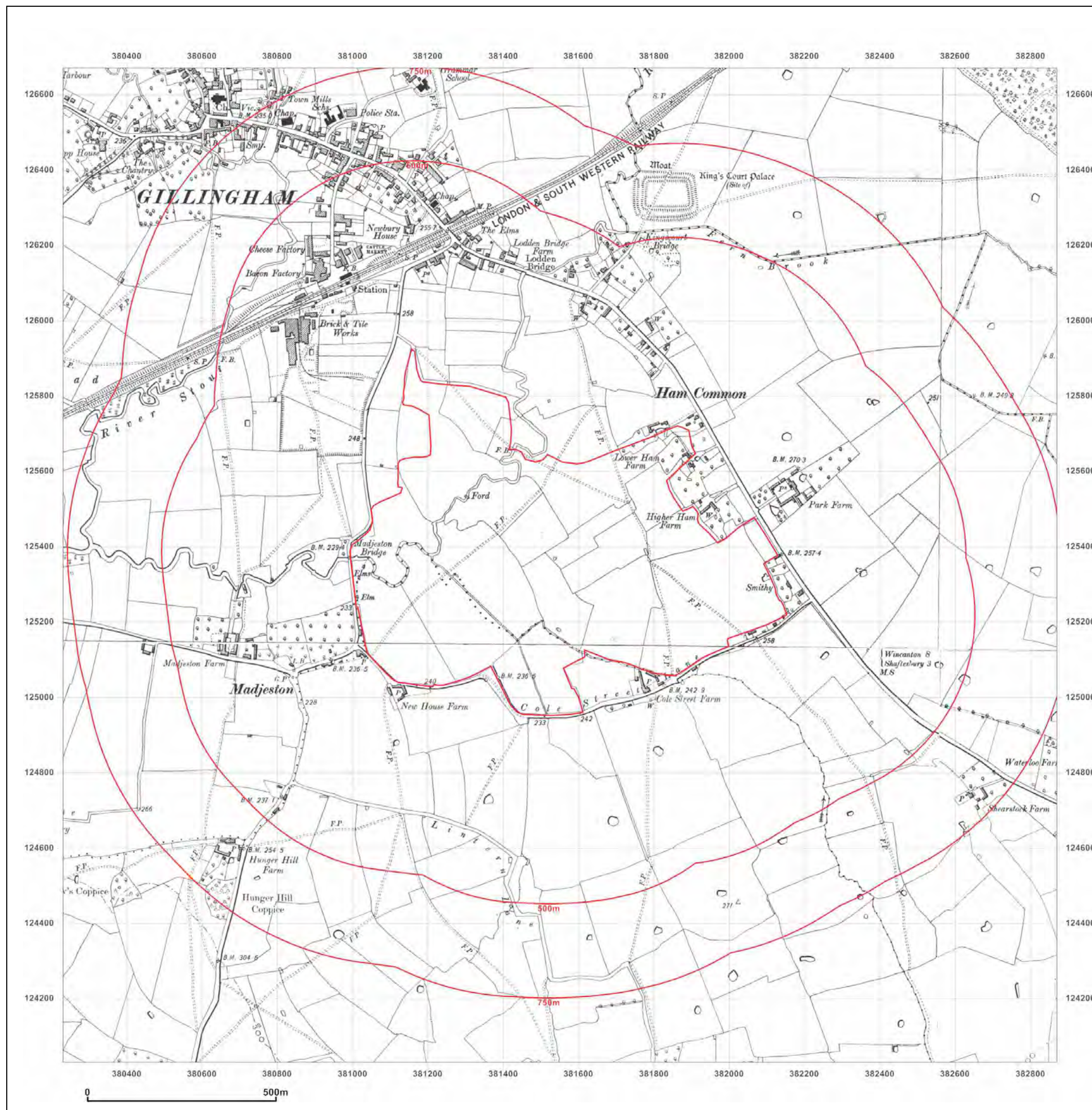


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Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: County Series

Map date: 1890

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1886
Edition 1890
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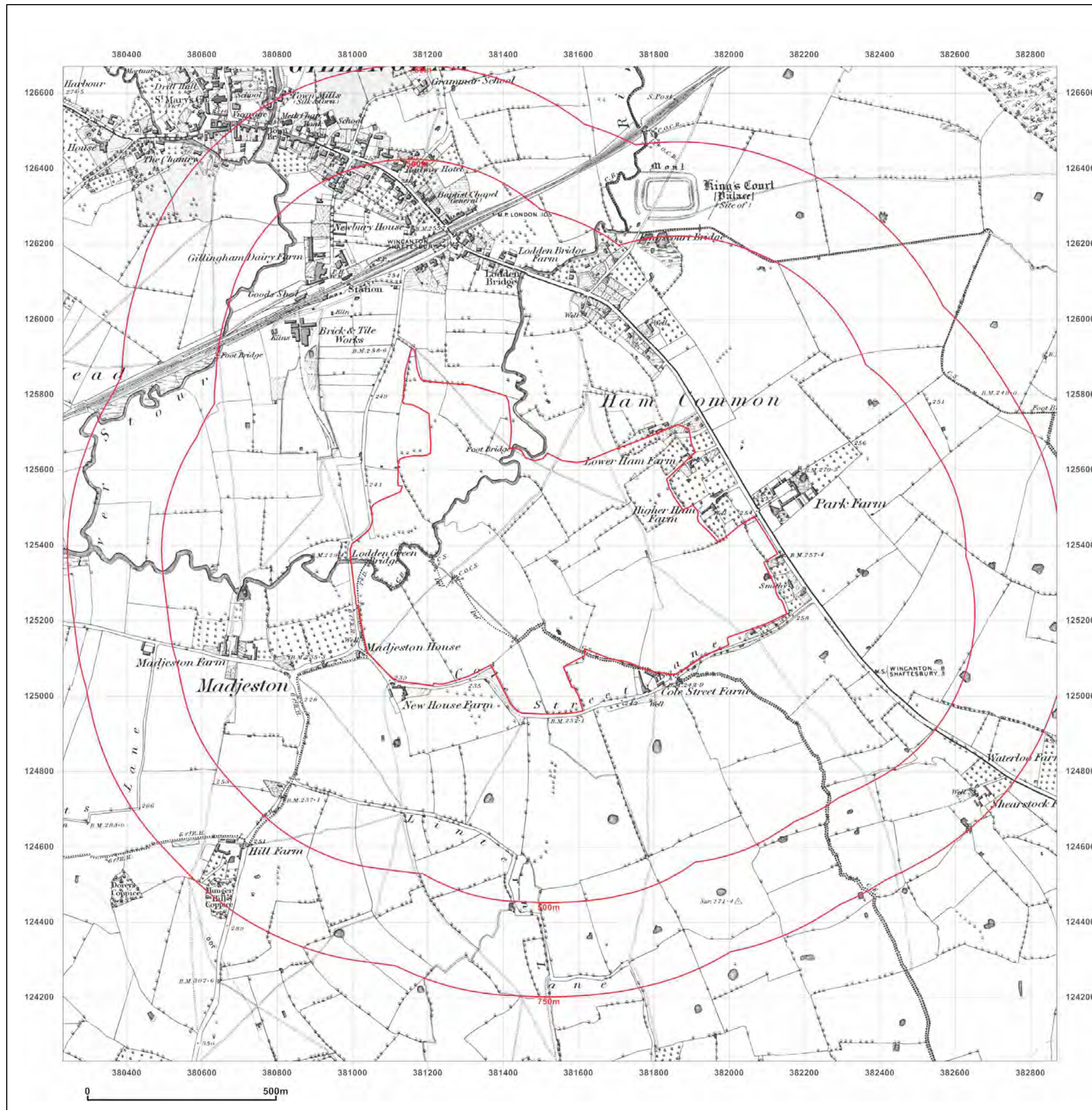


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Client Ref: 14114
Report Ref: HMD-411-1324029
Grid Ref: 381550, 125350

Map Name: County Series

Map date: 1886

Scale: 1:10,560

Printed at: 1:10,560



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Edition N/A
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Revised 1886
Edition N/A
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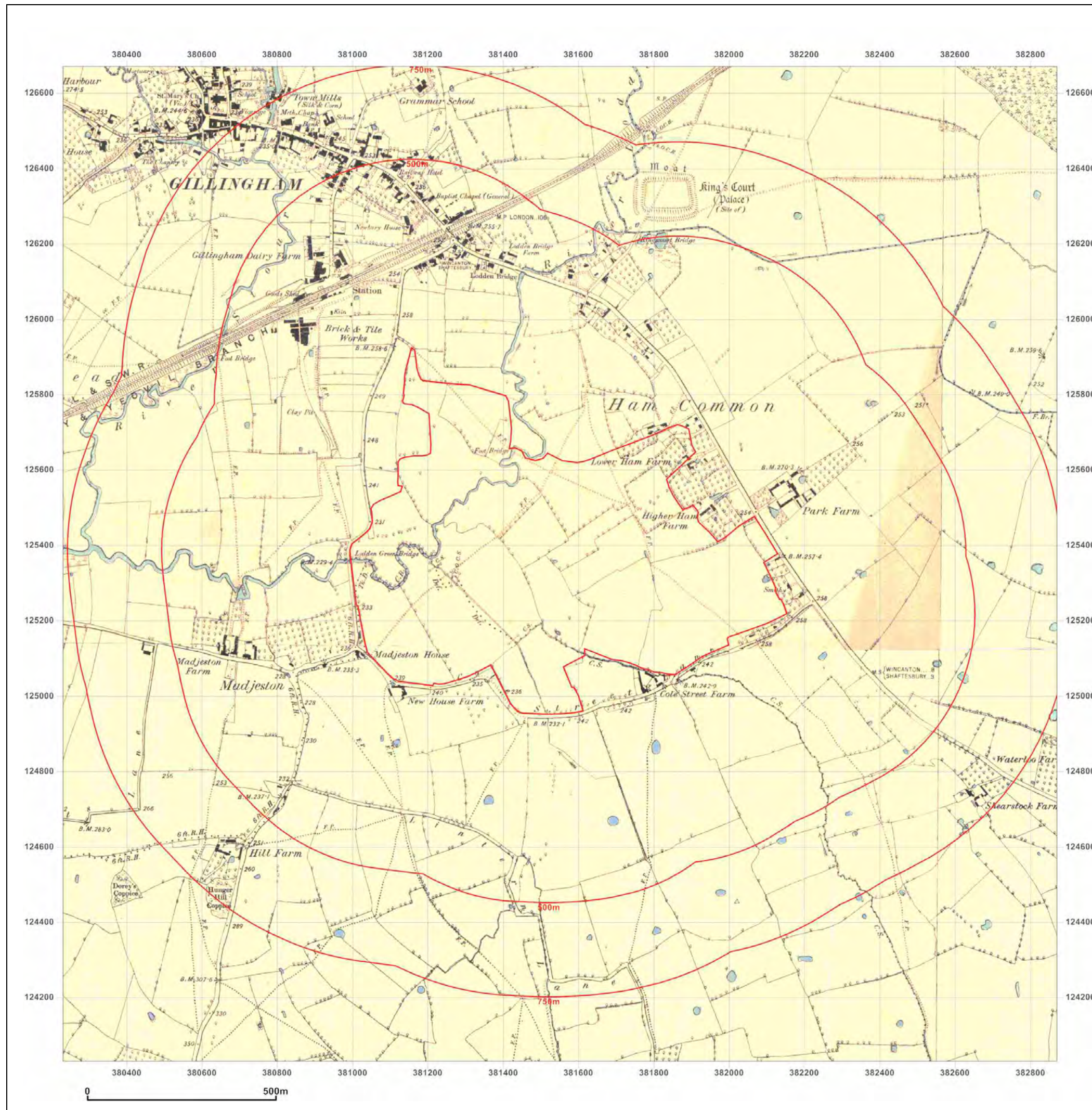


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GEOLOGICAL INFORMATION





Ruddlesden Geotechnical
65, Langaton Lane,
Exeter, EX1 3SP

GroundSure Reference: HMD-411-1324031

Your Reference: 14114

Report Date 4 Mar 2014

Report Delivery Method: Email - pdf

GroundSure Geoinsight

Address: SHAFTESBURY ROAD,GILLINGHAM,DORSET, SP8 4LL

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,

A handwritten signature in black ink, appearing to be "J. O.", followed by a comma.

Managing Director
Groundsure Limited

Enc.
GroundSure GeoInsight



GroundSure GeoInsight

Address: SHAFTESBURY ROAD,GILLINGHAM,DORSET, SP8 4LL

Date: 4 Mar 2014

Reference: HMD-411-1324031

Client: Ruddlesden Geotechnical



Aerial Photograph Capture date: 08-Oct-2009
Grid Reference: 381745,125252
Site Size: 62.50ha

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Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1:Geology

1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

Section 2:Ground Workings

	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	2	4	17	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	1	0	0
2.3 Current Ground Workings	0	0	0	1	2

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	0	0	0	0	0
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

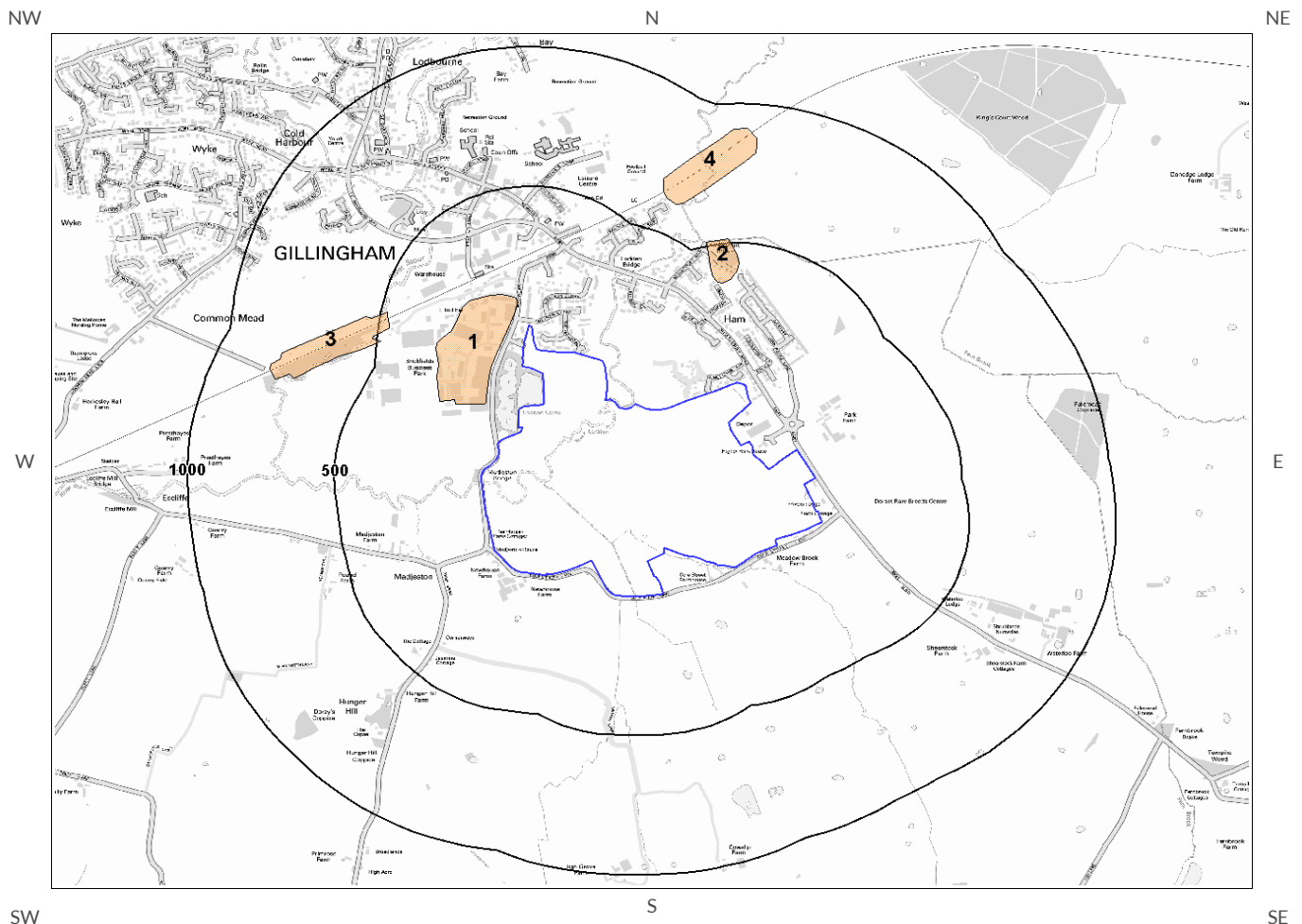
Section 4: Natural Ground Subsidence	On-site
4.1 Shrink Swell Clay	Low
4.2 Landslides	Very Low
4.3 Ground Dissolution of Soluble Rocks	Null
4.4 Compressible Deposits	Moderate
4.5 Collapsible Deposits	Very Low
4.6 Running Sand	Low

Section 5: Borehole Records	On-site	0-50m	51-250
5 BGS Recorded Boreholes	0	0	2

Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250
6 Records of Background Soil Chemistry	21	4	24

1 Geology

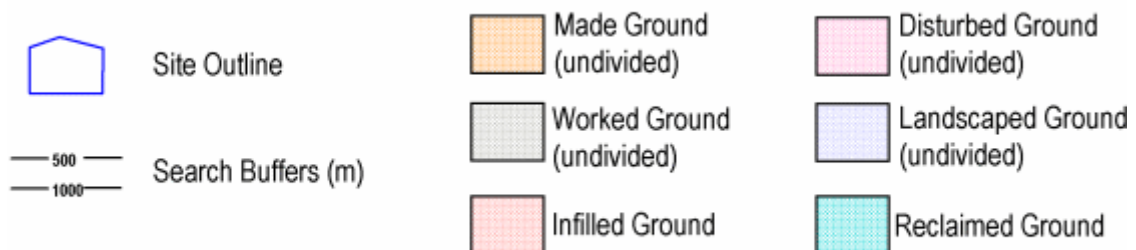
1.1 Artificial Ground Map



Artificial Ground Legend



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1 Geology

1.1 Artificial Ground

1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:297

Are there any records of Artificial/Made Ground within 500m of the study site boundary? Yes

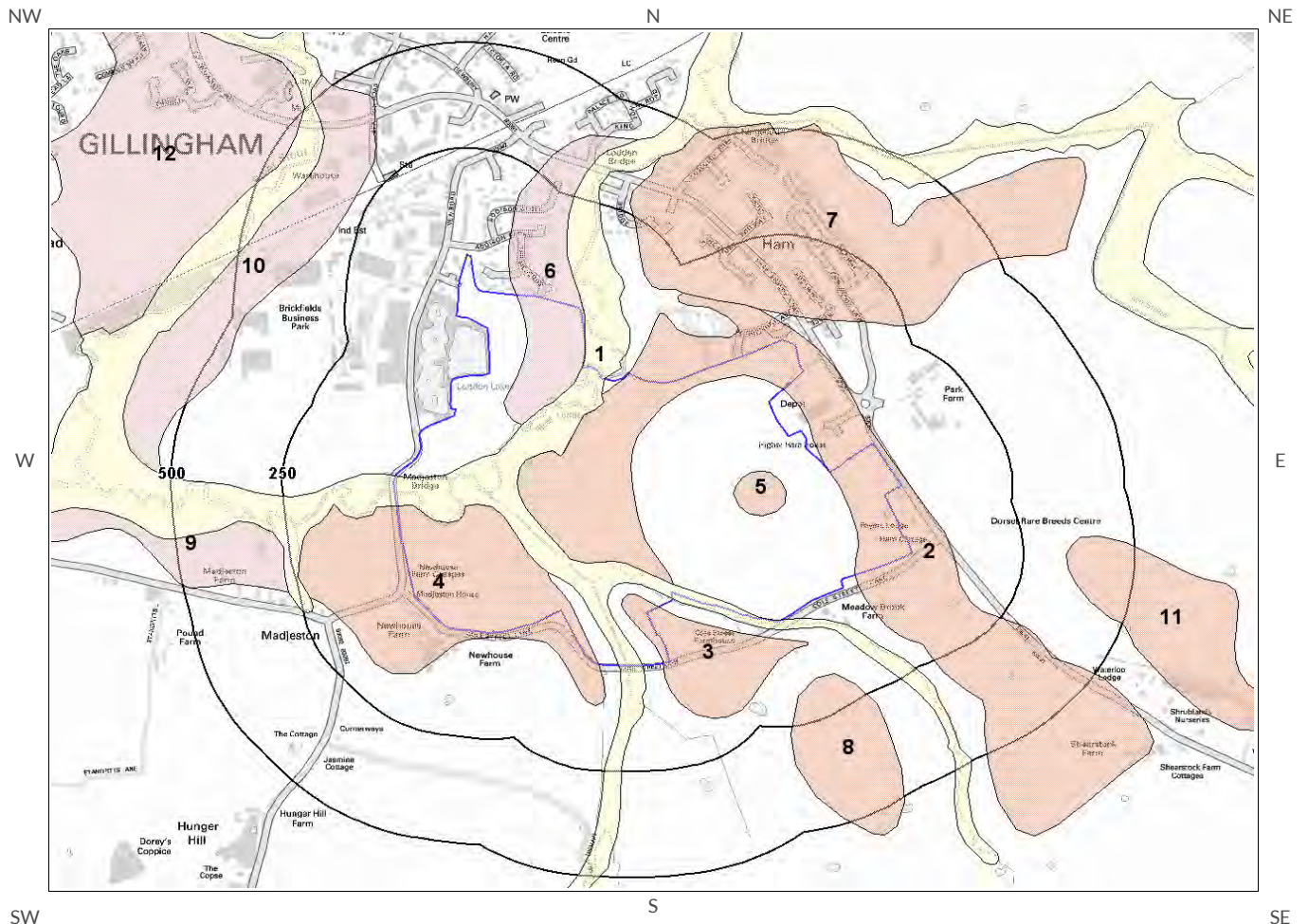
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	64.0	W	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	359.0	N	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	464.0	W	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

1.2 Superficial Deposits and Landslips Map



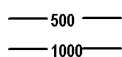
Superficial Deposits and Landslips
Legend



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Site Outline



Search Buffers (m)

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	ALV-CSSG	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
2	0.0	On Site	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
3	0.0	On Site	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
4	0.0	On Site	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
5	0.0	On Site	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
6	0.0	On Site	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL
7	62.0	N	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
8	157.0	SE	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
9	262.0	W	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL
10	284.0	NW	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL
11	345.0	E	HEAD1-CSSG	HEAD, 1	CLAY, SILT, SAND AND GRAVEL
12	467.0	NW	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Mixed	High	Very Low
0.0	On Site	Intergranular	High	Very Low
0.0	On Site	Intergranular	High	Very Low
0.0	On Site	Mixed	High	Very Low
39.0	S	Mixed	High	Very Low

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary?

No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site** boundary?

No

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site