REPORT ON
GROUND INVESTIGATION
AT
ST. ANDREWS PRIMARY
SCHOOL, NORTHAMPTON
REPORT STATUS SHEET

<table>
<thead>
<tr>
<th>Client</th>
<th>St. Andrews Primary School, Northampton</th>
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<tbody>
<tr>
<td>Report Title</td>
<td>Report on Ground Investigation at St. Andrews Primary School, Ecton Brook Road, Northampton</td>
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<tr>
<th>One Copy Issued</th>
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<th>Signed for and on behalf of Applied Geology Limited</th>
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<tbody>
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<td>23/01/2013</td>
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1.0 INTRODUCTION

An area of land at St. Andrews Primary School in Northampton is being considered for redevelopment by Northampton County Council, (the Client). The proposals for the site comprise a new classroom block, as shown on Drawing No 4012-01 Revision P4, dated June 2012 and produced by pHp Architects. This report presents the results of a combined Desk Study Phase I and Phase II Geotechnical & Geo-environmental Ground Investigation, undertaken on behalf of the Client.

The desk study / Phase I assessment and Phase II ground investigation were undertaken to:

- Permit formulation of an opinion, as to the potential for hazardous substances or conditions to exist on, at or near the site at levels or in a situation likely to warrant mitigation or consideration appropriate to the intended end use proposed by the Client and as stated above.

- Establish geological conditions and geotechnical parameters to permit safe and economic development design.

The terms of reference/brief for the works were mutually developed between Applied Geology and Lend Lease, Engineer to the client, and are outlined in our proposal AG12-3606let001 and estimate AG12-3606-01 of the 28\textsuperscript{th} of September 2012. Limitations and Exceptions of the report are presented in Section 11.

More specifically, the services provided are summarised below and detailed in the following Sections.

- A site inspection and walkover survey to identify indicators (as defined in later sections) of the existence of hazardous substances or conditions on and in the vicinity of the site.

- A review of the following sources to provide data on likely ground conditions, geohazards and features which may affect development and to obtain information about the potential for hazardous substances to exist at and in the vicinity of the site:
  - Groundsure - Environmental Database
  - BGS - Published Information & Borehole Database
  - Historical Ordnance Survey (OS) Maps
  - Environment Agency Web Site
  - MAGIC Web Site

- Ground investigation together with sampling, monitoring and a programme of laboratory testing.

- Assessment and reporting of the results of the works.

- Prior to arrival on site statutory service information was obtained by Applied Geology furthermore verbal enquiries as to the location of known services were made on site.
2.0 SITE LOCATION AND DESCRIPTION

2.1 General

The site comprises a portion of the existing school playground located adjacent to the entrance of St. Andrews Primary School located off Ecton Brook Road approximately 7km northeast of Northampton town centre. The National Grid reference for the centre of the site is SP 817 627 as shown on the Site Location Plan in Appendix A.

The site comprised the southern portion of a tarmacadam playground together with a small area of an adjacent grass landscaping area to the west all located in the northeast of the school grounds. The area under investigation is approximately 50m in length from north to south and 25m wide from east to west and covers an area of approximately 0.15 hectares. The site was surrounded to the north by a grass playing field, to the east by parking and the school entrance off Ecton Brook Road and to the west by the existing school buildings.

2.2 Walkover Survey

The site was essentially flat with ground levels falling gently from north to south. The site was currently occupied by a tarmacadam playground together with bike racks in the centre of the site whilst the south of the site was occupied by grassed landscaping located adjacent to the school entrance. The playground was separated from the surrounding car park and landscaping by a high chain link fence. The adjacent school buildings to the west comprised single storey classroom buildings.

No obvious visual or olfactory evidence of any significant contamination was observed during the site walkover.

2.3 Proposed Development

Proposals for the site comprise a new one and two storey classroom block extended from the existing buildings and containing three classrooms, a staff room, studio and group areas. Details of the proposed development is presented upon Drawing No’s 4012-01 Revision P4 and 4012-04 Revision P1, dated June 2012, produced by pHp Architects and reproduced within Appendix A.

3.0 DESK STUDY INFORMATION

3.1 Site History

Historical maps were obtained in order to determine any significant past activity or land usage. Copies of these maps are presented in Appendix B of this report and are described below:
Table 1 – Site History Summary

<table>
<thead>
<tr>
<th>Map Date</th>
<th>On The Site</th>
<th>In The Vicinity Of The Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1885</td>
<td>The site comprises part of an unoccupied agricultural field.</td>
<td>The site is surrounded by agricultural fields in all directions surrounding the site. Ecton Brook is present located approximately 200m east of the site flowing from north to south.</td>
</tr>
<tr>
<td>1900</td>
<td>No significant changes.</td>
<td>No significant changes.</td>
</tr>
<tr>
<td>1926</td>
<td>No significant changes.</td>
<td>No significant changes.</td>
</tr>
<tr>
<td>1967</td>
<td>No Significant changes.</td>
<td>Electricity pylons are now shown running from northeast to southwest and at their closest run approximately 75m to the northwest</td>
</tr>
<tr>
<td>1981 &amp; 1983 – 1986</td>
<td>The site now resembles its present configuration with the playground occupying the site.</td>
<td>St. Andrews Primary School (labelled as Ecton Brook Lower School) is now located adjacent to the west and south of the site. The southern portion of the school buildings are labelled as a community centre. The area surrounding the school has been significantly developed with housing now located along a series of new roads including Ecton Brook Road which is located directly east of the site and runs from north to south. Ecton Brook Old Peoples Home together with the Ecton Brook public house have been built approximately 50m south of the site. A subway together with associated slopes / banks has been built beneath Ecton Brook Road located approximately 30m southeast of the site.</td>
</tr>
<tr>
<td>1985 – 1989</td>
<td>No significant changes.</td>
<td>No significant changes.</td>
</tr>
<tr>
<td>1992</td>
<td>No significant changes.</td>
<td>The school has been extended to the west of the site.</td>
</tr>
<tr>
<td>2012</td>
<td>No significant changes.</td>
<td>No significant changes.</td>
</tr>
</tbody>
</table>

3.2 Anticipated Geology

Reference to the published 1:50,000 scale British Geological Survey (BGS) map, Sheet 185 solid / solid and drift edition, indicates the site to be underlain by Glacial Lake Deposits which form a drift channel overlying the Upper Lias strata of the Jurassic Period. The Upper Lias strata is described as ‘mainly mudstone with thin limestones and shales at base’.

The BGS was requested to provide records of any relevant archived boreholes within the vicinity of the site. Copies of relevant boreholes are presented in Appendix B. A summary of selected relevant boreholes is presented below:

Table 2 – Summary of Selected BGS Borehole

<table>
<thead>
<tr>
<th>Borehole Ref</th>
<th>Location</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP86SW569 – Ecton Brook BH37 Vol2</td>
<td>Approximately 5m to north (481700, 262800)</td>
<td>GI – 0.25m bgl: Brown silty TOPSOIL. 0.25 – 1.35m bgl: Yellow brown silty CLAY with red brown mottling. (Glacial Deposits) 1.35 – 1.40m bgl: Yellow CLAY and grey SAND. (Glacial Deposits) 1.40 – 2.60m bgl: Red-orange brown ferruginous SILT. (Glacial Deposits) 2.60 – 3.10m bgl: Red brown / blue grey mottled SILT. (Glacial Deposits)</td>
</tr>
</tbody>
</table>
SP86SW597 – Ecton Brook BH65 Vol2
Approximately 30m to east (481750, 262770)
GI – 0.25m bgl: Brown TOPSOIL.
0.25 – 1.80m bgl: Yellow brown silty CLAY with grey brown silty laminae. (Glacial Deposits)
1.80 – 2.45m bgl: Interlaminated yellow and pale grey brown SILT. (Glacial Deposits)
2.45 – 8.10m bgl: Yellow brown laminated and fissured SILT. (Glacial Deposits)
8.10 – 8.60m bgl: Interlaminated grey / yellow / brown SILT with layers of light grey clay. (Glacial Deposits)
8.60 – 9.10m bgl: Laminated yellow brown silty fine SAND. (Glacial Deposits)

SP86SW630 – Ecton Brook BH95 Vol2
Approximately 15m east (481760, 262730)
GI – 0.15m bgl: TOPSOIL.
0.15 – 2.00m bgl: Yellow brown / brown mottled silty sandy CLAY. (Glacial Deposits)
2.00 – 4.30m bgl: Dark grey / brown mottled CLAY with fissures and silty laminae. (Upper Lias)
4.30 – 6.00m bgl: Dark blue grey laminated and fissured CLAY. (Upper Lias)

SP86SW576 – Ecton Brook BH44 Vol2
Approximately 10m to south (481700, 262700)
GI – 0.30m bgl: Brown silty TOPSOIL.
0.30 – 0.70m bgl: Brown friable clayey SILT. (Glacial Deposits)
0.70 – 1.70m bgl: Yellow brown sandy laminated SILT. (Glacial Deposits)
1.70 – 2.50m bgl: Yellow brown / red brown slightly clayey SILT. (Glacial Deposits)
2.50 – 3.10m bgl: Yellow brown / pale grey interbanded CLAY and coarse SILT with fine sand. (Glacial Deposits)

These boreholes confirm the anticipated geology of the site, based on published data.

3.3 Mining History/Geological Cavities

Reference to the Department of the Environment (now DEFRA) “Review of Mining Instability in Great Britain” indicates the site is not located in an area of recorded non-coal mining activities.

Consultation of the Coal Authority’s/Law Society’s Coal Mining Searches Directory indicates that the site lies in an area for which a standard mining report is not required for new development.

A review of the DoE regional reports for Natural Underground Cavities in Great Britain (1993) indicates the site is not located in an area of recorded natural cavity formation.

3.4 Radon

Reference to the BRE document 211:2007, (Radon: guidance on protective measures for new buildings), indicates that the site does not lie in an area where the geological strata may be susceptible to radon emissions. Hence, no precautions against ingress of radon into buildings are necessary.

3.5 Hydrology

The nearest surface watercourse is the Ecton Brook located approximately 200m to the east of the site and which flows to the south. There are no surface water abstractions within 2000m of the centre of the site. There are no licenced discharge consents located within 500m of the site.
The Environment Agency Web site indicates that the site does not lie within an indicative flood plain. However this report is not intended to be a full hydrological study and if a flood risk assessment is needed, additional analysis by others is recommended to confirm this aspect of the development.

3.6 Hydrogeology

According to the Groundsure Report the Glacial Lake Deposits overlying the site together with the underlying Upper Lias strata are both classified as Unproductive by the Environment Agency. Unproductive strata is described as ‘rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow’.

There are no groundwater or potable water abstraction licences located within 1000m of the site and the site does not lie within a source protection zone.

3.7 Ecology

Information from environmental and ecological datasets was obtained from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website undertaken on 18th December 2012.

There are no recorded protected species or habitats present on the site. In addition, there are no statutory rural designations associated with the site. However, the site is located within an area of Catchment Sensitive Farming Delivery Initiative 2011 – 2014.

If a full assessment of Environmental or Ecological aspects is required, it is recommended that other specialists are consulted.

3.8 Environmental Searches

Information pertaining to environmental issues was obtained from a Groundsure report, commissioned by Applied Geology Limited, dated 31st October 2012. This database contains sets of data corresponding to the databases held by a number of sources including the Environment Agency (EA), British Geological Survey (BGS), Health Protection Agency (HPA), Coal Authority (CA), Department for the Environment, Farming and Rural Affairs (DEFRA) and the Local Authorities (LAs). A copy of the report is included in Appendix B.

A summary of the findings of these searches is presented below and copies of the responses from the various authorities are included in Appendix B.

There are no records of any current or historic landfill sites within 250m of the site.

There are no IPC or IPPC authorised activities within 500m of the site. There are no records of any List 1 or List 2 Dangerous Substances Inventory sites within 500m of the site. There are no records of any COMAH and NIHHS sites within 500m of the site. There is one Environment Agency recorded pollution incident within 250m of the site boundary relating to an incident on the 23rd of September 2002 213m northeast of the site involving oils and fuel. The incident was classified as Category 3 (minor Impact) for water and Category 4 (no Impact) for land and air.
There are no records of any Part A(2) and Part B activity within 500m of the site. There are no records of any Category 3 or 4 Radioactive Substance Licences within 500m of the site.

There are no sites within 500m of the site determined as contaminated under Part IIA of the Environmental Protection Act (EPA) 1990.

There are no records of environmentally sensitive sites such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA) or National Nature Reserves (NNR) within 1km of the site. However, the site does lie within a nitrate vulnerable zone.

3.9 Contemporary Trade Directories

The Groundsure report gives details of potentially contaminative industries / businesses within 250m of the site. On review of the current land uses surrounding the site there are a number of records for infrastructure such as a gas governor located 54m to the northeast and electricity substations >100m from the site. None of the current industries recorded are considered to have any potential to impact upon the site.

4.0 CONCEPTUAL MODEL

In developing a Conceptual Model for the site, pollutant linkages are determined by identifying likely sources of contamination from previous and current site uses, possible targets such as site users, neighbouring site users and Controlled Waters and linkages between them. These are discussed below together with a tabulated representation of the potential pollutant linkages for this site.

4.1 Summary of Site History

The site comprised part of an agricultural field from the earliest edition map until the 1981 edition map, by which time St. Andrews Primary School has been built with the subject site forming part of the playground. The surrounding areas are shown to have comprised fields up until the 1981 edition map by which time extensive development has taken place including widespread housing and new roads.

4.2 Summary of Anticipated Geology

It is anticipated there will be some Made Ground associated with the development of the site underlain by potentially very thick Glacial Lake Deposits forming part of a drift channel overlying Upper Lias strata.
4.3 Potential Source - Pathway – Receptor Pollutant Linkages

4.3.1 Sources

On-site

Any Made Ground on site will be a potential source of contamination. Elevated sulphates may be present within the Upper Lias strata beneath the site which may constitute aggressive ground conditions for buried concrete.

Off-site

There are no obvious off-site sources of contamination.

4.3.2 Pathways

On-site

Future users / pupils of the proposed classroom block may come into direct contact with contaminants within the Made Ground via dermal contact, ingestion or inhalation of dust.

Any granular Made Ground may provide a permeable pathway for migration of mobile contaminants.

Future buried concrete associated with the proposed development will be in direct contact with the near surface soils which may contain elevated sulphates. This is of particular relevance with the Upper Lias strata which can be potentially pyritic.

4.3.3 Receptors

Human Health

End users of the proposed classroom block development together with construction workers are potential receptors to any contamination present on or off site. In the case of construction workers, risks will be significantly reduced by the use of standard Personal Protective equipment such as gloves, adopting good hygiene practices and following standard procedures before entering confined spaces such as trenches.

Controlled Waters

The Glacial Lake Deposits and Upper Lias strata beneath are both classified as Unproductive by the Environment Agency and are therefore not considered to be a controlled waters receptor. The nearest surface water feature is Ecton Brook located approximately 200m east of the site however, it is not considered contamination from the site could migrate this far given the unproductive nature of the strata beneath the site. Hence there are no Controlled Water Receptors relevant to the site.
Buildings

Any buried concrete associated with the proposed commercial development may be susceptible to sulphate attack should elevated concentrations be present in the soils beneath the site.

4.3.4 Diagrammatic Representation:

The tabulated representation of the Conceptual Model described above is presented below (not to scale).

Table 3 – Initial Conceptual Site Model

<table>
<thead>
<tr>
<th>Source</th>
<th>Pathway</th>
<th>Receptor</th>
<th>Risk*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential contaminants within Made Ground.</td>
<td>Inhalation, ingestion, dermal contact.</td>
<td>End users</td>
<td>Low to medium</td>
</tr>
<tr>
<td>Elevated Sulphates</td>
<td>Direct Contact</td>
<td>Buried Concrete</td>
<td>Low to medium</td>
</tr>
</tbody>
</table>

* Definition of Risk Categories

Low Risk: Contaminants may be present but are unlikely to be at levels to have unacceptable impact on key receptors, or pathways are likely to be minimal.

Medium Risk: Contaminants are probably present and might have an unacceptable impact on key receptors. Pathways may also be present therefore remedial measures may be necessary to reduce the risks.

5.0 SITE WORK

5.1 General

Fieldwork was generally carried out, where relevant, in accordance with BS5930 (1999) “Code of Practice for Site Investigations”, BS10175 Investigation of Potentially Contaminated Sites, the Association of Geotechnical and Geoenvironmental Specialist Guidelines for Good Practice in Site Investigations (August 1998) and supervised by an experienced Engineering Geologist.

The locations of the exploratory holes were agreed between Lend Lease and Applied Geology Limited to the satisfaction of St. Andrews School. The sampling strategy for the exploratory hole locations was to best investigate the ground and contamination conditions across the site. The locations were constrained by the available access and known locations of underground services.

The exploratory holes were all positioned adjacent to the footprint of the proposed classroom block in order to provide information to support design. In addition FEP101 was excavated next the wall of the existing classroom buildings adjacent to the proposed development in order to view the existing foundations.

Prior to commencement on site, statutory services plans were obtained by Applied Geology Limited. Verbal enquiries were also made regarding the positions of private or statutory services on site. The exploratory holes were set out to avoid the locations of known services. Prior to excavation or drilling, locations were scanned with a cable avoidance tool (CAT) and service pits excavated at borehole positions, where possible.
The positions of the exploratory holes were defined by taping from identifiable features on the topographic survey drawing. The locations are presented on Drawing No. AG1750-12-01 in Appendix A.

Descriptions and depths of the various strata recovered are presented on the exploratory hole records, reproduced in Appendix C, together with sample depths, the results of in-situ testing, comments on groundwater inflows, pit stability and any other pertinent information. The strata descriptions are in accordance with BS5930:1999 incorporating Amendment No 2 (2010). Disturbed plastic pot and glass amber jar samples were recovered from the various strata and stored and transported in cool boxes, where relevant, for possible future chemical laboratory testing.

5.2 **Driven Continuous Sampling Boreholes**

Three Driven Continuous Sampling (DCS101 – DCS103) boreholes were drilled at the site on the 1st of November 2012 to depths of between 6.45m (DCS101 and DCS103) and 8.45m (DCS102) below ground level (bgl), using a track mounted Archway Competitor 130 sampling rig.

Prior to drilling surface tarmacadam was broken out using a hydraulic breaker.

Samples of the deposits encountered were recovered in 1.00m long clear plastic liners, which were logged and sub-sampled on site by an Engineering Geologist.

The undrained shear strength of cohesive materials was determined where practical at selected intervals using a hand held penetrometer or hand shear vane.

During the drilling process, in-situ Standard Penetration Tests (SPTs) were undertaken at selected depths to determine the relative density of coarse grained deposits encountered or the in-situ strength of fine grained deposits by comparing the SPT "N" value results with published empirical data. Groundwater seepages were noted during drilling if encountered.

Details of the strata encountered, groundwater strikes, hand penetrometer/hand vane tests, samples taken and the SPT "N" values, (uncorrected for overburden pressure), together with any installation details, are presented on the individual exploratory hole records presented in Appendix C of this report.

5.3 **Hand Excavated Foundation Inspection Pit**

One hand excavated foundation inspection pit (FEP101) was excavated on the 1st of November 2012 to a depth of 1.16m bgl at which depth the full depth of existing foundations was exposed.

Details of the strata encountered are presented upon the individual exploratory hole record whilst the foundation dimensions are presented upon Drawing No. AG1750-12-02 in Appendix C of this report.
5.4 Falling Head Permeability Tests

Two falling head permeability tests were undertaken within the standpipes installed in DCS101 and DCS103. The standpipes were filled to ground level with water and the drop in water level recorded against time and the results are included within Appendix E.

5.5 Instrumentation

Standpipes were installed in selected boreholes as detailed in Table 4. Due to the active use of the tennis court the standpipes could only be installed within the grass landscaping in the north of the site. A visual representation of the standpipes is presented on the relevant borehole logs.

<table>
<thead>
<tr>
<th>Borehole No</th>
<th>Depth To Base of borehole (m)</th>
<th>Response Zone (m bgl)</th>
<th>Nominal Pipe Diameter (mm)</th>
<th>Gas Valve/Lockable Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCS101</td>
<td>6.45</td>
<td>1.00 – 4.00</td>
<td>50</td>
<td>Yes</td>
</tr>
<tr>
<td>DCS102</td>
<td>8.45</td>
<td>1.00 – 4.00</td>
<td>50</td>
<td>Yes</td>
</tr>
<tr>
<td>DCS103</td>
<td>6.45</td>
<td>1.00 – 4.00</td>
<td>50</td>
<td>Yes</td>
</tr>
</tbody>
</table>

5.6 Groundwater Monitoring

Two return groundwater monitoring visits to the site were undertaken on the 14th and 21st of November 2012. Ground gas monitoring was not considered necessary given the lack of any potential ground gas sources, such as landfill sites, within influencing distance of the site (i.e. 250m).

The results of the groundwater monitoring works and falling head permeability tests are presented in Appendix E.

6.0 LABORATORY TESTING

6.1 Geotechnical Testing

A programme of geotechnical laboratory testing was undertaken on samples selected from the Glacial Lake Deposits.

The geotechnical testing was carried out in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes and was undertaken by specialist laboratory (Enverity, UKAS Lab No 2304) and comprised three Atterberg Limit and Moisture Content Tests.

Additional analysis was carried out in accordance with BRE “Special Report 1 Concrete in Aggressive Ground - 2005” for a brownfield site and was undertaken by specialist laboratory (Chemtest, UKAS Lab No 2183). Two soil samples from the Glacial Lake Deposits and one from the Made Ground were tested for soluble Sulphate, pH, Chloride, Nitrate and Magnesium in order to classify the standard of buried concrete for the site.

The results of the geotechnical testing are presented in Appendix D.
6.2 Chemical Testing

The chemical testing undertaken included suites selected based upon the desk study and walkover. The purpose of the testing was to determine the contamination potential of the Made Ground and natural soil encountered on site.

Two samples of the Made Ground together with one sample of the Glacial Lake Deposits were tested for a general range of commonly occurring contaminants.

The samples were analysed for the following suite of contaminants:

- Selected metals suite [arsenic, cadmium, chromium (total), copper, mercury, nickel, lead, zinc, selenium];
- Speciated (to US 16) Polycyclic Aromatic Hydrocarbons (PAH);
- Soil organic matter (SOM);
- pH.

Additionally two samples of the Glacial Lake Deposits were also submitted for inert Waste Acceptance Criteria (WAC) testing.

The number of samples tested was designed to be sufficient to form an initial assessment of the contamination potential of the site, taking into account its known history and the materials encountered in the investigation. Hence, it falls in line with the general requirements of BS10175 'Investigation of Potentially Contaminated Sites'.

MCERTS accredited methods, in accordance with Environment Agency recommendations, were specified where available.

The results of the chemical testing are presented in Appendix D.

7.0 GROUND CONDITIONS

7.1 General

Based on published geological information, it was anticipated that the ground conditions across the site would comprise some Made Ground associated with the previous development of the site overlying Glacial Lake Deposits which may be present to some depth in the form of a drift channel. The solid geology is anticipated to comprise Upper Lias strata comprising clay and mudstone.

The investigation has identified a thin mantling of topsoil in landscaped areas and Made Ground recorded to shallow depth overlying Glacial Deposits. These Glacial Deposits are comprised of an upper horizon of Glacial Till overlying Glacial Lake Deposits, which generally confirms the anticipated geology. Descriptions of the various deposits present beneath the site are given in the following sections.

7.2 Topsoil

Encountered from ground level within DCS101, DCS103 and FEP101 to depths of between 0.20m and 0.28m bgl and comprised clayey sand containing quartzite and siltstone gravel.
7.3 Made Ground

Made Ground was encountered beneath the Topsoil of DCS101 and FEP101 and beneath a layer of Tarmacadam in DCS102 to depths of between 0.50m (DCS101) and 0.70m (DCS102) bgl in the form of a soft to firm sandy clay and clayey sand containing quartzite and chert gravel together with gravel sized material fragments of brick and concrete. These deposits likely represent the sub-base for the existing playground (DCS102) and construction waste from the existing school buildings (DCS101 and FEP101).

7.4 Glacial Till

Glacial Till was encountered beneath the Made Ground / Topsoil within all of the exploratory holes to depths of between 1.90m (DCS101) and 3.90m (DCS103) bgl and to the full depth of FEP101 (1.16m bgl) achieving thicknesses of between 1.40m and 3.70m. The strata comprised firm through to stiff sandy clay containing chert, siltstone, quartzite and sandstone gravel.

Standard Penetration Tests carried out in the Glacial Till recorded SPT ‘N’ values of between N=3 and N=6 and using the average plasticity index of 22% these correlate to mass shear strengths of between approximately 15 and 30kN/m². These correlate to a number of hand shear vane and penetrometer tests which recorded shear strengths of between 28 and 92kN/m² (soft to stiff).

The results of three Atterberg Limit Tests carried out have given unmodified Plasticity Index values generally of between 21% and 24% reflecting the Glacial Till to be of medium plasticity and medium shrinkage potential.

7.5 Glacial Lake Deposits

Glacial Lake Deposits were encountered beneath the Glacial Till within all of the exploratory holes to the full depths of the boreholes with a maximum recorded depth of 8.45m bgl. The Glacial Lake Deposits was recorded as mixed strata generally comprising interlayered firm through to stiff silty clay and clayey silt. The cohesive Glacial Lake Deposits achieved thicknesses of between 0.20m and 4.55m and were universally layered containing frequent silt laminations. Granular interbeds were also encountered within DCS102 and DCS103 achieving thicknesses of between 1.20m and 4.05m and comprising silty sand.

Standard Penetration Tests carried out in the cohesive Glacial Lake Deposits recorded SPT ‘N’ values of between N=6 and N=32 and using an assumed plasticity index of 20% these correlate to mass shear strengths of between approximately 30 and 160kN/m². These correlate to a number of hand shear vane and penetrometer tests which recorded shear strengths of between 75 and 125kN/m² (stiff).

Standard Penetration Tests carried out in the granular Glacial Lake Deposits recorded SPT ‘N’ values of between generally N=21 and N=37 (medium dense to dense) however, a significantly lower value of N=1 (very loose) was recorded within DCS102 at 8.00m bgl associated with a groundwater strike and therefore the density is unlikely to be realistic.
The Glacial Lake Deposits are prone to significant softening on disturbance as moisture is mobilised between sand and silt layers into the clay layers. The loss of fines in the sand and silt layers associated with the movement of this water can also lead to ‘boiling’ silt. As such the disturbance from the SPT tests may have produced locally lower results as recorded within DCS102.

SPT and shear strength versus depth plots are included within Appendix A and show a general increasing trend with depth.

7.6 Existing Foundations

One foundation inspection pit (FEP101) was excavated on the eastern elevation of the existing School buildings located adjacent to the proposed development, the location of which is displayed upon drawing AG1750-12-01 within Appendix A.

Within FEP101 the foundations comprised brickwork extending from ground level down to a depth of 0.22m bgl where they rested upon concrete foundations 0.74m in thickness sitting on firm Glacial Till.

7.7 Groundwater

During formation of the boreholes, groundwater was encountered at depths of 7.40m bgl within DCS102 and as damp strata at depths of 3.00m and 3.70m bgl within DCS103.

Subsequent monitoring of the standpipes indicated standing groundwater levels of between 3.87m and 3.94m bgl within DCS102 whilst the remaining standpipes were dry i.e. groundwater was at a depth greater than 4.00m bgl.

7.8 Contamination

No visual or olfactory evidence of any gross contamination was encountered in the soils encountered.

8.0 RESULTS & SIGNIFICANCE OF LABORATORY TESTING FOR POTENTIAL CONTAMINANTS

8.1 Human Health Risk Assessment Methodology

Suites of contamination testing on soil samples were carried out as described in Section 6.2. The results of this testing are presented in Appendix D of this report.

Where appropriate the contaminant concentrations have been assessed to ascertain whether there is an unacceptable risk to the identified human health receptors for the site.

Applied Geology Limited has followed the guidance given in the CLR 11 publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on The available chemical data is sorted into appropriate datasets depending on sampling
regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and appropriate screening values. Conservative residential without plant uptake screening values have been used for this site, given that the end use will comprise a classroom block.

Risk to human health has been initially assessed by comparing soil results against various published non-statutory screening criteria. These have been sourced from the following, in order of preference:

- Environment Agency/Defra, Soil Guideline Values (SGV) published in 2009, using the new CLEA model;
- LQM/CIEH Generic Assessment Criteria (LQM GAC V2) Version 2, 2009;

Reference has also been made to the Soil Screening Values (SSV) derived by Atkins (ATRISKsoil) and updated and published on their website in March 2011. However, due to the difference in soil type used by Atkins to derive their screening values, Applied Geology has also generated their own screening criteria for various end-uses/SOM combinations but only using published toxicological data (from the above sources) to generate GAC using CLEA v1.06. Applied Geology GAC have therefore generally been used in preference to Atkins SSV as they are more comparable with the EA, LQM/CIEH and EIC/AGS screening values.

If contaminant concentrations exceed these generic screening values, then the results can be assessed in more detail by carrying out a quantitative risk assessment to derive site-specific screening values.

8.2 Results of Human Health Risk Assessment

Based upon the historical plans and the proposed development layout of the site, a single averaging area was considered appropriate for the site.

None of the soil concentrations exceed their corresponding screening values for a residential without plant uptake end use and therefore the site is unlikely to pose a significant risk to human receptors.

8.3 Results of Controlled Waters Risk Assessment

The results of the Desk Study indicate that there are no surface water receptors nearby and the underlying Glacial Till and Glacial Lake Deposits are classified as unproductive. Therefore, in view of the lack of any on site sources of contamination in the soils tested the risk to controlled waters is considered to be negligible.
9.0 ASSESSMENT

9.1 General

Site Proposals

The proposed development comprises a one and two storey classroom block extended out from the existing building in the northeast of the school and will be located largely upon the existing playground and partially upon the grassed landscaping adjacent to the school entrance. Details of these proposals are presented upon Drawing No’s 4012-01 Revision P4 and 4012-04 Revision P1, dated June 2012, produced by pHp Architects and reproduced within Appendix A.

Summary of Ground Conditions

Made Ground was encountered to relatively shallow depth (<0.75m bgl) overlying firm to stiff but locally soft Glacial Till. Interlayered / laminated Glacial Lake Deposits were encountered beneath the Glacial Till comprising generally firm through to stiff frequently laminated silt and clay together with generally medium dense to dense sand. Localised very loose pockets were encountered, generally coinciding with groundwater. Standing groundwater was recorded in the standpipe of DCS102 at depths of between 3.84 m and 3.94 m bgl whilst the remaining two standpipes remained dry (i.e. groundwater at >4.00m bgl).

9.2 Foundation Design

The Made Ground is considered too variable in density / shear strength and in material content to be a reliable bearing formation. Hence foundations should penetrate into the underlying firm through to stiff Glacial Till which were encountered at between 0.20m and 0.70m bgl.

Localised softened pockets were recorded within the Glacial Till generally associated with groundwater strikes or seepage. Owing to the variability of the glacial deposits, care should be taken to assess the founding formation. Any soft or loose zone should be removed and replaced with compacted stone or lean mix concrete.

The ground conditions include soils of medium shrinkage potential, hence a minimum foundation depth of 0.90m bgl will apply. Within the zones of influence of trees or hedges further deepening will be required and minimum foundations depths should initially be based on the appropriate depths given within publications such as the NHBC standards. It should be recognised that in some cases, particularly where groups of trees exist, the potential zone of desiccation may be greater than that indicated by these standards. Therefore all foundations should be inspected by a suitably qualified engineer to ensure footings are placed beneath any obvious evidence of desiccation or presence of tree roots and thereby within moisture stable conditions.

Foundations of depth greater than 1.50m may require anti-heave precautions according to location.
As foundations are likely to span both granular and cohesive strata it is recommended foundations incorporate a light mesh reinforcement to account for any potential differential settlement.

Conventional foundations competently designed to the above criteria may adopt net allowable bearing pressures of 100kN/m² for up to 1.00m wide strip footings or up to 2.5m square pads provided a minimum shear strength of 50 kN/m² at formation level. This reduced bearing capacity is to cater for the laminated and variable nature of the Glacial Lake Deposits and will provide a factor of safety of 3 against bearing capacity failure and should limit total settlements to less than 25mm.

9.3 Floor Slab

It is understood from BCAL, Engineer to the client, that a ground bearing floor slab design is intended for the proposed development and that up to 1m of material is to be removed from beneath the building footprint and the slab will therefore found upon firm Glacial Till. It is important that the formation soils for the proposed ground bearing floor slab are inspected and any soft, loose or desiccated materials are removed and replaced with compacted granular material. The formation should be proof rolled prior to placing an appropriately designed granular blanket upon which to cast the slab.

9.4 Excavations

It should be possible to achieve the required depth for foundation excavations using traditional hydraulic plant.

Excavations are generally expected to be in mainly firm through to stiff but locally soft Glacial Till which are expected to remain stable for short periods however, groundwater seepages were locally recorded and during the investigation this may cause some short term instability. In dry or saturated conditions, granular materials are likely to be unstable. These should either be graded back to a stable angle or trench support should be provided. Vertically sided excavations in clays are liable to sudden collapse particularly where fissuring is present. Trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions.

Significant groundwater ingress is expected to occur below approximately 3.50m which could also lead to trench instability. Shallower excavations may be subject to seepage and run-off, hence allowance should be made for suitable forms of groundwater control such as pumping from sumps in the bottom of trenches. In granular soils, sump pumping can lead to loss of fines or ‘boiling’ silt or sand which can lead to instability. In such cases, trench sheeting where provided should penetrate sufficiently deep below the base of the trench. Alternatively, battered excavations to shallow angles may be suitable.

Dewatering can lead to settlement of ground which could affect neighbouring structures. Any groundwater control measures should be designed by an appropriately qualified engineer or competent person to take into account the required drawdown, support methods, and adjacent structures.

Excavations should be inspected by a geotechnical engineer to check whether the ground conditions are as expected. Any loose or compressible materials present
may need to be excavated and replaced with well compacted granular fill or lean mix concrete prior to placing foundation concrete or service pipes.

Where entry of personnel is necessary, a full risk assessment should be made and shoring or other support provided as necessary. Monitoring of gas levels may be necessary within excavations prior to and during entry where there is a risk of gas ingress or lack of oxygen, in accordance with procedures for working in confined spaces.

Practical guidance on trench excavation is given in CIRIA Report 97 Trenching Practice. Guidance on groundwater control is given in CIRIA Report 113 Control of groundwater for temporary works. Temporary works should be designed by a suitably qualified engineer or a competent person particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design and Management) (CDM) Regulations.

9.5 Pavement Design

A preliminary CBR design value of 6% is suggested for the Glacial Till based on its plasticity (21% – 24%). Where the Made Ground is present a preliminary CBR of less than 2.5% is recommended, however this may be improved with rolling or by importing granular fill, or the Made Ground could be removed from beneath any road formation. Care should be taken to ensure that the surface formation is protected as there is likelihood that it may become softened by the action of rain and plant, leading to rutting and surface deterioration.

The Made Ground and Glacial Till (with low Plasticity Index) may be considered to be frost susceptible and as such should not be present within 450mm of pavement construction.

9.6 Soakaway Design

The two falling head permeability tests were carried out within installations in DCS101 and DCS103 in order to give a crude indication of soakaway potential. The results suggest variable permeability's of 4.0 x 10^{-7} m/s and 1.2 x 10^{-6} m/s respectively, which suggest the infiltration will be governed by natural variations in the Glacial Lake Deposits which comprises interbedded clay, silt and sand. Therefore soakaway potential is likely to be severely restricted and conditions may vary locally. Careful consideration should also be given to the location of soakaways in respect of foundations, both existing and proposed, as discharging surface water into the ground may possibly act to wash fines out of the Glacial Lake Deposits supporting adjacent foundations leading to excess settlements.

9.7 Buried Concrete

The results of the sulphate tests carried out on one sample of the Made Ground and two samples of the Glacial Lake Deposits as part of the geotechnical testing have identified the following characteristic values;

- Water Soluble Sulphate – 0.16 g/l
- pH – 7.5
Testing for potentially pyritic conditions was not undertaken as the Upper Lias strata was not encountered in the boreholes of this investigation.

These characteristic values have identified the Design Sulphate Class to be DS1 and the Aggressive Chemical Environment for Concrete (ACEC) being AC1s for the site as defined by the BRE Special Digest 1, Concrete Aggressive Ground, 2005 for a brownfield site assuming foundations will not come into contact with groundwater. Further reference should be made to BRE Special Digest 1 for requirements in respect of types of cement and aggregate to be used and variations in type of concrete construction.

9.8 Contamination Aspects

9.8.1 Soil

The chemical testing on the Made Ground and Glacial Lake Deposits soils has not highlighted any potential risk to Human Health receptors at the site and therefore no special remedial measures are considered necessary.

It is essential that precautionary measures are taken for construction workers including appropriate Personal Protective Equipment (PPE) and appropriate welfare facilities in line with current health and safety guidance and good practice are available on site.

It is noted that if any excavated material is to be reused on site, a Waste Management Plan (WMP) and / or a Materials Management Plan (MMP) will be required. Any such materials must be suitable for re-use without further treatment, and only the quantity necessary for the specified works should be used. Any materials not within these definitions may need to be considered as waste whereby a Waste Management Licence Exemption will may also be required. In order to obtain an Exemption, one of the Exemption Criteria must be met and the Relative Objectives satisfied.

9.8.2 Updated Conceptual Model

The Conceptual Site Model has been updated following the supplementary site work and laboratory testing and is discussed below and summarised in Table 5.

The chemical testing undertaken as part of this investigation has not highlighted any concentrations of contaminants that are potentially harmful to Human Health given the proposed end use. In addition it is considered that the source-pathway-receptor linkage between the near surface soils on site and future users of the classroom block would largely be broken with the construction of the building and associated external works. Given the low levels of sulphates within the soils tested the risk posed to buried concrete has been downgraded to low.
Table 5 – Updated Conceptual Site Model

<table>
<thead>
<tr>
<th>Source</th>
<th>Pathway</th>
<th>Receptor</th>
<th>Risk*</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential contaminants within Made Ground. – None encountered.</td>
<td>Inhalation, ingestion, dermal contact.</td>
<td>End users</td>
<td>Low</td>
<td>None.</td>
</tr>
<tr>
<td>Elevated Sulphates (particularly within Upper Lias strata) – None in Made Ground, Upper Lias strata not encountered.</td>
<td>Direct Contact</td>
<td>Buried Concrete</td>
<td>Low</td>
<td>Concrete classification: DS1-AC1s.</td>
</tr>
</tbody>
</table>

Within a previously used site it is important to accept that "hot spots" of contamination may exist and care and close vigilance should be part of any site work. Experienced environmental personnel should be available to visit the site and action any unusual material encountered. The information available on this site suggests the risk of any significantly impacted material requiring extensive remediation being found is considered low.

9.8.3 Disposal of Soil Arisings off-Site

Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous for off-site disposal prior to removal from site as required by the “Duty of Care” (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC (“Landfill Directive”). All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included). This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

It is expected that the arisings from the natural soils at the site would fall within the Inert category under the EWC description "Soil and Stones", EWC code 17 05 04 with restrictions excluding topsoil and peat. Waste Acceptance Criteria (WAC) testing undertaken upon samples of the glacial deposits from DCS102 at 0.80m and DCS103 at 0.60m show that the soils meet the criteria for inert waste. The results of the WAC testing are included within Appendix D and any receiving landfill site should be provided with all the results within this report.

Any asbestos must be disposed of by suitably licensed contractors.

9.9 Buried Services

Water supply pipework can be affected by contaminants or aggressive materials within the ground, hence the results of the contamination testing in relation to the
possible effects on any supply pipes should be considered. To fully assess the possible effects on these items consultation should be undertaken with the local Water Authority and reference made to the following document:


This site investigation report is not intended to be used as a Site Assessment Report (SAR) as required by the above referenced document. However, the results of the desk study and chemical testing may provide useful information.

The results of the desk study suggest that chemicals have not been used or stored on or next to the site and therefore there should be no chemical restriction on pipe material selection.

In respect of other buried services, the following documents may be of use:

- Department of the Environment (DoE) Report 2982(P), Effects of Organic Chemicals in Contaminated Land on Buried Services (DWQ 9025), July 1992


As well as assessing the possible aggressive affects of these contaminants on the various cables the possible ignition of combustible soils due to temperature rises in the cables and indeed the possible ageing affects of high temperatures within the soils should also be considered. In addition as many of these cables are laid directly in the ground care should be taken that no large, sharp or heavy objects are left in the soil or within the soils used to backfill these trenches.

10.0 HEALTH & SAFETY

As outlined within the HSE publication ‘Successful Health and Safety Management - HSG65’ this report should inform your development of safe systems of work and information as an input into the safety management system.

When developing risk control systems we suggest making reference to the CIRIA report 132 "A guide for safe working on contaminated sites" and the HSE document "Protection of workers and the general public during the development of contaminated land – HSG66". All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations 2007.
11.0 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

Northamptonshire County Council (the Client) has requested that a Phase I Geoenvironmental Risk Assessment and Phase II ground investigation be performed in order to best investigate the prevailing physical and chemical ground conditions beneath the site. The report is not a comprehensive site characterisation and should not be construed as such.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Northamptonshire County Council. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Applied Geology Limited. If any unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report, and which Applied Geology Limited believes are reliable. Nevertheless, Applied Geology Limited cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced geoenvironmental consultants. Applied Geology Limited does not provide legal advice and the advice of lawyers may also be required.

The opinions presented in this report are based on findings derived from a site inspection and walkover and offsite surveys, a review of records and historical sources, and comments made by interviewees. Applied Geology Limited has not found indicators that suggest that hazardous substances exist at the site at levels likely to warrant mitigation or consideration appropriate to the end use stated by Northamptonshire County Council. Not finding such indicators does not mean that hazardous substances do not exist at the site.

The most recent site inspection/walkover survey was performed on 21st November 2012. Northamptonshire County Council is advised that the conditions observed by Applied Geology Limited are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance and may subsequently have become observable.

It is possible that Applied Geology Limited’s researches, while fully appropriate for a Phase I Geoenvironmental Risk Assessment, failed to indicate the existence of important information sources. Assuming such sources actually exist, their information could not have been considered in the formulation of Applied Geology Limited’s findings and opinions.
Similarly, the work carried out for the Phase II investigation carried out between 1st and 21st of November 2012 can only investigate and monitor a small part of the subsurface conditions. Certain indicators or evidence of hazardous substances may have been, outside the very limited portion of the subsurface investigated or monitored, latent at the time of this work or only partially intercepted by the works and thus their full significance could not have been appreciated. Groundwater levels are particularly susceptible to variation. Accordingly, it is possible that Applied Geology Limited’s work whilst fully appropriate for a Phase II investigation failed to indicate the presence or significance of hazardous substances. Assuming such materials present a hazard, their presence could not have been considered in the formulation of Applied Geology Limited’s findings and opinions. The subsurface geological profiles and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

Applied Geology Limited believes that providing information about limitations is essential to help Northamptonshire County Council identify and thereby manage its risks. These risks can be mitigated - but they cannot be eliminated, through additional research. Applied Geology Limited will on request advise Northamptonshire County Council of the additional research opportunities available, their impact on risk, and their cost.

The investigation was specifically limited by the present use of the school playground, where exploratory holes were not possible.
A) The assessment made in this report is based on the site terrain and ground conditions revealed by the various field investigations undertaken and also any other relevant data for the site including previous site investigation reports (if available) and desk study data. There may be special conditions appertaining to the site, however, which have not been revealed by the investigation and which have not, therefore, been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available. It must be recognised that many of the Environmental Searches obtained during the course of the desk study are often lengthy. Applied Geology have, where appropriate and in the interests of simplicity, only reproduced the summary of the searches within the report. A full copy of all the search data is held at the Applied Geology office and is available for inspection if required.

B) Where any data supplied by the Client or other external source, including that from previous site investigations, has been used it has been assumed that the information is correct. No responsibility can be accepted by Applied Geology for inaccuracies within this data.

C) Whilst the report may express an opinion on possible configurations of strata between or beyond the exploratory locations, or on the possible presence of features based on either visual, verbal or published evidence this is for guidance only and no liability can be accepted for the accuracy.

D) Comments on groundwater (and landfill gas) conditions are based on observations made during the course of the present and past investigations or with reference to published data unless otherwise stated. It should be noted, however, that groundwater (and landfill gas) levels vary due to seasonal (or atmospheric conditions) or other effects.

E) The copyright of this report and other plans and documents prepared by Applied Geology is owned by Applied Geology and no such report, plan or document may be reproduced, published or adapted without the written consent of Applied Geology. Complete copies of the report may, however, be made and distributed by the Client as an expedient in dealing with matters related to its submission.

F) This report is prepared and written in the context of the proposals stated in the introduction to the report and should not be used in a differing context. Furthermore, 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 or after the expiry of one year from the date of the report, the report should be referred to Applied Geology for re-assessment and if necessary, re-appraisal.

G) The survey was conducted and this report was prepared for the sole internal use and reliance of the Client. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Applied Geology. If an unauthorised third party comes into possession of this report they rely on it at their peril and Applied Geology owes them no duty of care and skill.

H) Ground conditions should be monitored during the construction of the works and the recommendations of the report re-evaluated in the light of this data by the supervising geotechnical engineers.

I) Unless specifically stated, the investigation has not taken into account the possible effects of mineral extraction.

J) The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, depends on very many factors in addition to geotechnical considerations and hence its evaluation is outside the scope of this report.

K) Applied Geology operates as a Consultancy and does not operate it's own laboratory for soil testing, this work being sub contracted to known and respected, generally UKAS accredited, laboratories. Applied Geology can therefore not be held responsible for the testing carried out. In a similar manner Applied Geology does not operate it's own drilling crews and all drilling work is sub contracted under our control and direction.
## LIST OF REFERENCES COMMONLY USED BY APPLIED GEOLOGY IN REPORTS

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<tr>
<th>SECTION/TITLE</th>
<th>AUTHOR/PUBLICATION</th>
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### DISPOSAL OF SOIL

- Department of the Environment

### BURIED SERVICES

- Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites, (10/WM/03/21), 2010
  - UK Water Industries Research
- Effects of Organic Chemicals in Contaminated Land on Buried Services (DWQ 9025, Report 2982(P)). 1992
  - Department of the Environment
- The Impact of Contaminated Land on Buried Electrical Cables (CONTAM-2.5AM). 1998
  - ERA Technology

### PAVEMENT DESIGN

- Interim Advice Note 73/06 Rev 1, 2009, Design Guidance for Road Pavement Foundations (Draft HD25)
  - Highways Agency

### HEALTH & SAFETY ASPECTS

  - CIRIA
- Protection of Workers and the General Public During the Development of Contaminated Land (HSG66)
  - Health & Safety Executive
- Construction (Design & Management) Regulations 2006 (CDM)
  - Health & Safety Executive
- Control of Substances Hazardous to Health Regulations 2002
  - Health & Safety Executive
- Workplace Exposure Limits. EH40/2005
  - Health & Safety Executive
- Trenching Practice. Guidance on Groundwater Control (Report 97)
  - CIRIA
- Control of Groundwater for Temporary Works (Report 113)
  - CIRIA

20/02/12
Site Location Plan

Site: St. Andrews Primary School, Northampton
Based on OS Landranger (1:50,000) Sheet 152 'Northampton & Milton Keynes'

Landranger GR: SP 816 627     Project No: AG1750-12     Map 1 of 1

Reproduced from the Ordnance Survey Map with permission of the Controller of Her Majesty's Stationary Office, Crown Copyright. LICENCE No: 100010533
AG1750-12 ST. Andrews Primary School, Northampton

SPT 'N' value Vs Depth (m bgl) Plot

- Glacial Till
- Cohesive Glacial Lake Deposits
- Granular Glacial Lake Deposits

Low values likely associated with groundwater seepage
AG1750-12 St. Andrews Primary School, Northampton

Shear Strength Vs Depth (m bgl) Plot

Shear Strength (kN/m²)

Depth (m bgl)

- Blue square: Glacial Till
- Red triangle: Cohesive Glacial Lake Deposits
Dear Sir/Madam,

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

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.

GroundSure GeoInsight
Aerial Photograph of Study Site

Site Name: NN3 5EN
Grid Reference: 481686,262801
Size of Site: 0.15 ha
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.

<table>
<thead>
<tr>
<th>Report Section</th>
<th>Number of records found within (X) m of the study site boundary</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Geology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Artificial Ground,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.1 Is there any Artificial Ground/Made Ground present beneath the study site?*</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.2 Superficial Geology &amp; Landslips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>1.2.3 Are there any records of landslip within 500m of the study site boundary?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.3 Bedrock, Solid Geology &amp; Faults</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.3.3 Are there any records of faults within 500m of the study site boundary?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.3.4 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?</td>
<td>The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level</td>
<td></td>
</tr>
<tr>
<td>1.3.5 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?</td>
<td>No radon protective measures are necessary</td>
<td></td>
</tr>
</tbody>
</table>

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

Source: Scale 1:50,000 BGS Sheet No:185

Report Reference: EMS-184025_269973
## 2. Ground Workings

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Historical Surface Ground Working Features from Small Scale Mapping</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.2 Historical Underground Workings Features from Small Scale Mapping</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.3 Current Ground Workings</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

## 3. Mining, Extraction & Natural Cavities

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Historical Mining</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.2 Coal Mining</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.3 Johnson Poole and Bloomer Mining Area</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.4 Non-Coal Mining*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.5 Non–Coal Mining Cavities</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.6 Natural Cavities</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.7 Brine Extraction</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.8 Gypsum Extraction</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.9 Tin Mining</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.10 Clay Mining</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

## 4. Natural Ground Subsidence

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>on-site*</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Shrink-Swell Clay</td>
<td>Low</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.2 Landslides</td>
<td>Very Low</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.3 Ground Dissolution of Soluble Rocks</td>
<td>Null</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.4 Compressible Deposits</td>
<td>Moderate</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.5 Collapsible Deposits</td>
<td>Very Low</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.6 Running Sand</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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

## 5. Borehole Records

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 BGS Recorded Boreholes</td>
<td>1</td>
<td>2</td>
<td>24</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

## 6. Estimated Background Soil Chemistry

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Records of Background Soil Chemistry</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
1.1 Artificial Ground Map

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

Report Reference: EMS-184025_269973
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:185

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary?  No

Database searched and no data found.

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.

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

Report Reference: EMS-184025_269973
1.2 Superficial Deposits and Landslips Map

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

Report Reference: EMS-184025_269973
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

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)</th>
<th>Direction</th>
<th>Lex Code</th>
<th>Description</th>
<th>Rock Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>GLLMP-CLSI</td>
<td>GLACIOLACUSTRINE DEPOSITS, MID PLEISTOCENE</td>
<td>CLAY AND SILT</td>
</tr>
<tr>
<td>2</td>
<td>171.0</td>
<td>E</td>
<td>ALV-CSSG</td>
<td>ALLUVIUM</td>
<td>CLAY, SILT, SAND AND GRAVEL</td>
</tr>
<tr>
<td>3</td>
<td>242.0</td>
<td>E</td>
<td>GLLMP-CLSI</td>
<td>GLACIOLACUSTRINE DEPOSITS, MID PLEISTOCENE</td>
<td>CLAY AND SILT</td>
</tr>
<tr>
<td>4</td>
<td>257.0</td>
<td>E</td>
<td>RTD1-SAGR</td>
<td>RIVER TERRACE DEPOSITS, 1</td>
<td>SAND AND GRAVEL</td>
</tr>
<tr>
<td>5</td>
<td>488.0</td>
<td>S</td>
<td>RTD1-SAGR</td>
<td>RIVER TERRACE DEPOSITS, 1</td>
<td>SAND AND GRAVEL</td>
</tr>
</tbody>
</table>

1.2.2 Permeability of Superficial Ground

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

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Direction</th>
<th>Flow type</th>
<th>Maximum Permeability</th>
<th>Minimum Permeability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>On Site</td>
<td>Mixed</td>
<td>Low</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

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.
1.3 Bedrock and Faults Map

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

Report Reference: EMS-184025_269973
1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:185

1.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)</th>
<th>Direction</th>
<th>LEX Code</th>
<th>Rock Description</th>
<th>Rock Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>WHM-MDST</td>
<td>Whitby Mudstone Formation - Mudstone</td>
<td>Toarcian</td>
</tr>
<tr>
<td>2</td>
<td>207.0</td>
<td>NW</td>
<td>NS-ODLF</td>
<td>Northampton Sand Formation - Ooidal Ironstone</td>
<td>Aalenian</td>
</tr>
</tbody>
</table>

1.3.2 Permeability of Bedrock Ground

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

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Direction</th>
<th>Flow type</th>
<th>Maximum Permeability</th>
<th>Minimum Permeability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>On Site</td>
<td>Fracture</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? **No**

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. 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.

1.3.4 Radon Affected Areas

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 not in a Radon Affected Area, as less than 1% of properties are above the Action Level

1.3.5 Radon Protection

Is the property in an area where Radon Protection 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

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

Report Reference: EMS-184025_269973
2. Ground Workings Map

Ground Workings Legend

- Site Outline
- Historic Surface Ground Workings
- Historic Underground Workings
- Current Ground Workings

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Report Reference: EMS-184025_269973
2. Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by GroundSure:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)</th>
<th>Direction</th>
<th>NGR</th>
<th>Use</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>43.0</td>
<td>NW</td>
<td>481646,262843</td>
<td>Cuttings</td>
<td>1981</td>
</tr>
<tr>
<td>2A</td>
<td>45.0</td>
<td>NW</td>
<td>481646,262842</td>
<td>Cuttings</td>
<td>1989</td>
</tr>
</tbody>
</table>

2.2 Historical Underground Workings Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

Report Reference: EMS-184025_269973
3. Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on Mapping:

Database searched. No results found.

3.4 Non – Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.5 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled “Review of mining instability in Great Britain, 1990” PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Report Reference: EMS-184025_269973
3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No
Database searched and no data found.

3.7 Brine Extraction

This dataset provides information from the Brine Compensation Board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary? No
Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No
Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level. More detailed information on potential Tin Mining may be found in Section 3.4 – Non-Coal Mining Hazards.

Are there any Tin Mining areas within 1000m of the study site boundary? No
Database searched and no data found.

3.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No
Database searched and no data found.
4. Natural Ground Subsidence
4.1 Shrink-Swell Clay Map
4.2 Landslides Map

Landslides Legend

- Site Outline
- No Data / Null
- Negligible
- Moderate
- Very Low
- High

Report Reference: EMS-184025_269973
4.3 Ground Dissolution Soluble Rocks Map

Ground Dissolution Soluble Rocks
Legend

- Site Outline
- Search Buffers (m)

Legend:
- No Data / Null
- Negligible
- Low
- Moderate
- High

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4.4 Compressible Deposits Map

Compressible Deposits Legend

- Site Outline
- Search Buffers (m)
- No Data / Null
- Negligible
- Very Low
- Low
- Moderate
- High

Report Reference: EMS-184025_269973
4.5 Collapsible Deposits Map

Collapsible Deposits Legend

- Site Outline
- No Data / Null
- Low
- Negligible
- Moderate
- Very Low
- High

Report Reference: EMS-184025_269973
4.6 Running Sand Map

Running Sand Legend

- Site Outline
- Search Buffers (m)

Legend:
- No Data / Null
- Negligible
- Low
- Moderate
- Very Low
- High

Report Reference: EMS-184025_269973
4. Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

**What is the maximum hazard rating of natural subsidence within the study site’s boundary? Moderate**

4.1 Shrink – Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)</th>
<th>Direction</th>
<th>Hazard Rating</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>Low</td>
<td>Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.</td>
</tr>
</tbody>
</table>

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)</th>
<th>Direction</th>
<th>Hazard Rating</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>Very Low</td>
<td>Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.</td>
</tr>
</tbody>
</table>

4.3 Ground Dissolution of Soluble Rocks

The following Soluble Rocks information provided by the British Geological Survey:

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Direction</th>
<th>Hazard Rating</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>On site</td>
<td>Null-Negligible</td>
<td>Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.</td>
</tr>
</tbody>
</table>

4.4 Compressible Deposits

The following Compressible Ground information provided by the British Geological Survey:

This includes an automatically generated 50m buffer zone around the study site boundary.

*Report Reference: EMS-184025_269973*
<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)*</th>
<th>Direction</th>
<th>Hazard Rating</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>Moderate</td>
<td>Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.</td>
</tr>
<tr>
<td>2</td>
<td>0.0</td>
<td>On Site</td>
<td>Negligible</td>
<td>No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.</td>
</tr>
</tbody>
</table>

### 4.5 Collapsible Deposits

The following Collapsible Rocks information is provided by the British Geological Survey:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)*</th>
<th>Direction</th>
<th>Hazard Rating</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>Very Low</td>
<td>Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.</td>
</tr>
</tbody>
</table>

### 4.6 Running Sands

The following Running Sands information is provided by the British Geological Survey:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)*</th>
<th>Direction</th>
<th>Hazard Rating</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>Negligible</td>
<td>No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.</td>
</tr>
</tbody>
</table>
5. Borehole Records Map

Borehole Records Legend

Site Outline

Search Buffers (m)

Borehole Locations

Crown Copyright. All Rights Reserved
Licence Number: 100035207
5. Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

**Records of boreholes within 250m of the study site boundary:**

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance (m)</th>
<th>Direction</th>
<th>NGR</th>
<th>BGS Reference</th>
<th>Drilled Length (m)</th>
<th>Borehole Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0</td>
<td>On Site</td>
<td>481700,26</td>
<td>SP86WS569</td>
<td>3.0</td>
<td>ECTON BROOK BH37 VOL 2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>29.0</td>
<td>E</td>
<td>481750,26</td>
<td>SP86WS597</td>
<td>8.5</td>
<td>ECTON BROOK BH65 VOL 2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>45.0</td>
<td>SE</td>
<td>481760,26</td>
<td>SP86WS630</td>
<td>6.0</td>
<td>ECTON BROOK BH95 VOL 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>52.0</td>
<td>S</td>
<td>481700,26</td>
<td>SP86WS576</td>
<td>3.0</td>
<td>ECTON BROOK BH44 VOL 2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>79.0</td>
<td>E</td>
<td>481800,26</td>
<td>SP86WS570</td>
<td>3.0</td>
<td>ECTON BROOK BH38 VOL 2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>86.0</td>
<td>W</td>
<td>481600,26</td>
<td>SP86WS568</td>
<td>3.0</td>
<td>ECTON BROOK BH36 VOL 2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>95.0</td>
<td>SE</td>
<td>481800,26</td>
<td>SP86WS577</td>
<td>3.0</td>
<td>ECTON BROOK BH45 VOL 2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>99.0</td>
<td>NW</td>
<td>481600,26</td>
<td>SP86WS561</td>
<td>9.0</td>
<td>ECTON BROOK BH29A VOL 2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>99.0</td>
<td>N</td>
<td>481700,26</td>
<td>SP86WS562</td>
<td>3.0</td>
<td>ECTON BROOK BH30 VOL 2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>105.0</td>
<td>SW</td>
<td>481600,26</td>
<td>SP86WS575</td>
<td>3.0</td>
<td>ECTON BROOK BH43 VOL 2</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>127.0</td>
<td>NE</td>
<td>481800,26</td>
<td>SP86WS563</td>
<td>3.0</td>
<td>ECTON BROOK BH31 VOL 2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>131.0</td>
<td>NW</td>
<td>481600,26</td>
<td>SP86WS560</td>
<td>3.0</td>
<td>ECTON BROOK BH29 VOL 2</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>152.0</td>
<td>S</td>
<td>481700,26</td>
<td>SP86WS583</td>
<td>3.0</td>
<td>ECTON BROOK BH51 VOL 2</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>171.0</td>
<td>SE</td>
<td>481800,26</td>
<td>SP86WS584</td>
<td>3.0</td>
<td>ECTON BROOK BH52 VOL 2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>177.0</td>
<td>SW</td>
<td>481600,26</td>
<td>SP86WS582</td>
<td>3.0</td>
<td>ECTON BROOK BH50 VOL 2</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>179.0</td>
<td>E</td>
<td>481900,26</td>
<td>SP86WS571</td>
<td>3.0</td>
<td>ECTON BROOK BH39 VOL 2</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>186.0</td>
<td>W</td>
<td>481500,26</td>
<td>SP86WS567</td>
<td>3.0</td>
<td>ECTON BROOK BH35 VOL 1</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>186.0</td>
<td>E</td>
<td>481900,26</td>
<td>SP86WS578</td>
<td>3.0</td>
<td>ECTON BROOK BH46 VOL 2</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>189.0</td>
<td>N</td>
<td>481730,26</td>
<td>SP86WS555</td>
<td>3.0</td>
<td>ECTON BROOK BH24 VOL 2</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>198.0</td>
<td>W</td>
<td>481500,26</td>
<td>SP86WS574</td>
<td>3.0</td>
<td>ECTON BROOK BH42 VOL 1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>205.0</td>
<td>NE</td>
<td>481900,26</td>
<td>SP86WS564</td>
<td>3.0</td>
<td>ECTON BROOK BH32 VOL 2</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>211.0</td>
<td>NW</td>
<td>481500,26</td>
<td>SP86WS559</td>
<td>3.0</td>
<td>ECTON BROOK BH28 VOL 1</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>214.0</td>
<td>N</td>
<td>481800,26</td>
<td>SP86WS556</td>
<td>3.0</td>
<td>ECTON BROOK BH25 VOL 2</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>217.0</td>
<td>NW</td>
<td>481600,26</td>
<td>SP86WS554</td>
<td>3.0</td>
<td>ECTON BROOK BH23 VOL 2</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>235.0</td>
<td>SE</td>
<td>481900,26</td>
<td>SP86WS585</td>
<td>3.0</td>
<td>ECTON BROOK BH53 VOL 2</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>237.0</td>
<td>W</td>
<td>481460,26</td>
<td>SP86WS573</td>
<td>3.0</td>
<td>ECTON BROOK BH41 VOL 1</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>244.0</td>
<td>SW</td>
<td>481500,26</td>
<td>SP86WS581</td>
<td>3.0</td>
<td>ECTON BROOK BH49 VOL 1</td>
<td></td>
</tr>
</tbody>
</table>

Additional online information is available for the following boreholes listed above:

#1: [http://scans.bgs.ac.uk/sobi_scans/boreholes/355344](http://scans.bgs.ac.uk/sobi_scans/boreholes/355344)
#2: [http://scans.bgs.ac.uk/sobi_scans/boreholes/355372](http://scans.bgs.ac.uk/sobi_scans/boreholes/355372)
#3: [http://scans.bgs.ac.uk/sobi_scans/boreholes/355405](http://scans.bgs.ac.uk/sobi_scans/boreholes/355405)
#4: [http://scans.bgs.ac.uk/sobi_scans/boreholes/355351](http://scans.bgs.ac.uk/sobi_scans/boreholes/355351)
#5: [http://scans.bgs.ac.uk/sobi_scans/boreholes/355345](http://scans.bgs.ac.uk/sobi_scans/boreholes/355345)
#6: [http://scans.bgs.ac.uk/sobi_scans/boreholes/355343](http://scans.bgs.ac.uk/sobi_scans/boreholes/355343)

Report Reference: EMS-184025_269973
6. Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Direction</th>
<th>Sample Type</th>
<th>Arsenic (As)</th>
<th>Cadmium (Cd)</th>
<th>Chromium (Cr)</th>
<th>Nickel (Ni)</th>
<th>Lead (Pb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>On Site</td>
<td>RuralSoil</td>
<td>25 - 35 mg/kg</td>
<td>&lt;1.8 mg/kg</td>
<td>90 - 120 mg/kg</td>
<td>30 - 45 mg/kg</td>
<td>&lt;150 mg/kg</td>
</tr>
<tr>
<td>0.0</td>
<td>On Site</td>
<td>RuralSoil</td>
<td>35 - 45 mg/kg</td>
<td>&lt;1.8 mg/kg</td>
<td>90 - 120 mg/kg</td>
<td>30 - 45 mg/kg</td>
<td>&lt;150 mg/kg</td>
</tr>
</tbody>
</table>

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.
7. Contacts

EmapSite
Telephone: 0118 9736883
sales@emapsite.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

British Gypsum
British Gypsum Ltd, East Leake, Loughborough, Leicestershire, LE12 6HX
Tel: www.british-gypsum.com

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5  www.coal.gov.uk

Johnson Poole & Bloomer Limited
Harris and Pearson Building, Brettel Lane, Brierley Hill, West Midlands DY5 3LH
Tel: +44 (0) 1384 262 000
Email: enquiries.gs@jpb.co.uk
Website: www.jpb.co.uk

Ordnance Survey
Romsey Road, Southampton SO16 4GU
Tel: 08456 050505

Getmapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Peter Brett Associates
Caversham Bridge House, Waterman Place, Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761  E-mail: reading@pba.co.uk

Acknowledgements

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.


6.5 The Client shall (and shall procure that any recipients of the Report as permitted under clause 4.2 shall):

6.1 Subject to the provisions of clause 4.1, the Client and the Beneficiary hereby acknowledge that all Intellectual Property in the Services and Content are and shall remain owned by GroundSure.

6.2 The Client shall acknowledge the ownership of the Screening Reports.

6.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.

6.4 The Client acknowledges that the proprietary rights subsisting in copyright, database rights and any other intellectual property rights in respect of any data and information in the Report and/or the Screening Report are and remain the exclusive property of GroundSure and the Client and Beneficiary may not:

- remove, suppress or modify any trade mark, copyright or other proprietary marking from the Report or Mapping;
- create any product which is derived directly or indirectly from the data contained in the Report or Mapping;
- (c) reformat or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.

6.5 GroundSure shall have no liability in respect of any opinion or report given to such Beneficiaries by the Client or a third party.
8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper
(ii) fire, storm, flood, tempest or epidemic;

7.7 the Client accepts and shall procure that any other Beneficiary shall accept that it has no claim or recourse to any Data Provider or to GroundSure in respect of the acts or omissions
7.6 Any claim under the Contract in relation to Consultancy Services, must be brought within six years from the date the Consultancy Services were completed.

7.8 Nothing in these terms and conditions:
(i) loss of profit, revenue, business or goodwill, losses relating to business interruption, loss of anticipated savings, loss of or corruption to data or for any special, indirect or
(v) strikes, labour disputes or industrial action;

11.6 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:
(i) the Client shall fail to pay any sum due to GroundSure within 28 days of the Payment Date; or
(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an

9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a

10  Consequences of Withdrawal, Termination or Suspension

11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in

11.12 If the Client or Beneficiary has a complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will

7.5 In the case of a Client being in breach of this Section 7.5, and the Services have yet to be commenced, the Client may be asked to pay the agreed Monthly and Initial Fee due from the date when the Beneficiary became aware that it may have a claim and in no event may a claim be brought twelve years or more after completion of such a Contract. For the avoidance of doubt, any claim in respect of which proceedings are notified to GroundSure in writing within the expiry of the time periods referred to in this clause 7.5 shall survive the expiry of those time periods provided

11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.

11.10 If the Client or Beneficiary has any complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will

1999 to enforce any terms of the Contract.

11.11 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in

11.3 No failure on the part of Groundsure to exercise to exercise and no delay in exercising, any right, power or provision under these terms and conditions shall operate as a waiver thereof.

11.4 Save as expressly provided in clauses 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey may enforce breach of clause 6.1 of these terms and conditions against the Client

11.12 If the Client or Beneficiary has any complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will

11.13 No failure on the part of GroundSure to exercise and no delay in exercising, any right, power or provision under these terms and conditions should operate as a waiver thereof.

1.5 Any failure by any party to perform any of their obligations hereunder or non-performance, whether in whole or in part, or any other breach of any provision hereof or any

1.3 No failure on the part of the Client/Beneficiary or on GroundSure's part to exercise any right, power or provision hereunder or any other breach of any provision hereof or any

1.2 Both parties agree to be bound to the terms of this Contract unless otherwise agreed in writing.

1.1 The Client/Beneficiary and GroundSure Limited ("GroundSure") agrees to supply the Client/Beneficiary with services ("Services") to perform upon request by the Client/Beneficiary.

11.1 The Client’s attention is drawn to this Provision

11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

11.8 Such notice may or product or report which has been made good.

11.10 Should GroundSure or the Client/Beneficiary have any complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will respond in a timely manner.

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Report Reference: EMS-184025_269973
GroundSure EnviroInsight

Address: NN3 5EN

Dear Sir/Madam,

Thank you for placing your order with emapsite. Please find enclosed the GroundSure EnviroInsight as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.
GroundSure EnviroInsight
Aerial Photograph of Study Site

Site Name: NN3 5EN
Grid Reference: 481686,262801
Size of Site: 0.15 ha
Overview of Findings

For further details on each dataset, please refer to each individual section in the main 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.

<table>
<thead>
<tr>
<th>Report Section</th>
<th>Number of records found within (X) m of the study site boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Environmental Permits, Incidents and Registers</td>
<td></td>
</tr>
<tr>
<td>1.1 Industrial Sites Holding Environmental Permits and/or Authorisations</td>
<td></td>
</tr>
<tr>
<td>Records of historic IPC Authorisations</td>
<td>0</td>
</tr>
<tr>
<td>Records of Part A(1) and IPPC Authorised Activities</td>
<td>0</td>
</tr>
<tr>
<td>Records of Water Industry Referrals (potentially harmful discharges to the public sewer)</td>
<td>0</td>
</tr>
<tr>
<td>Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)</td>
<td>0</td>
</tr>
<tr>
<td>Records of List 1 Dangerous Substances Inventory sites</td>
<td>0</td>
</tr>
<tr>
<td>Records of List 2 Dangerous Substances Inventory sites</td>
<td>0</td>
</tr>
<tr>
<td>Records of Part A(2) and Part B Activities and Enforcements</td>
<td>0</td>
</tr>
<tr>
<td>Records of Category 3 or 4 Radioactive Substances Authorisations</td>
<td>0</td>
</tr>
<tr>
<td>Records of Licensed Discharge Consents</td>
<td>0</td>
</tr>
<tr>
<td>Records of Planning Hazardous Substance Consents and Enforcements</td>
<td>0</td>
</tr>
<tr>
<td>1.2 Records of COMAH and NIHHS sites</td>
<td>0</td>
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<tr>
<td>1.3 Environment Agency Recorded Pollution Incidents</td>
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</tr>
<tr>
<td>National Incidents Recording System, List 2</td>
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</tr>
<tr>
<td>National Incidents Recording System, List 1</td>
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</tr>
<tr>
<td>1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990</td>
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<tr>
<td>2. Landfill and Other Waste Sites</td>
<td></td>
</tr>
<tr>
<td>2.1 Landfill Sites</td>
<td></td>
</tr>
<tr>
<td>Environment Agency Registered Landfill Sites</td>
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</tr>
<tr>
<td>Landfill Data – Operational Landfill Sites</td>
<td>0</td>
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<tr>
<td>Environment Agency Historic Landfill Sites</td>
<td>0</td>
</tr>
<tr>
<td>Landfill Data – Non-Operational Landfill Sites</td>
<td>0</td>
</tr>
<tr>
<td>BGS/DoE Landfill Site Survey</td>
<td>0</td>
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<tr>
<td>GroundSure Local Authority Landfill Sites Data</td>
<td>0</td>
</tr>
<tr>
<td>2.2 Landfill and Other Waste Sites Findings</td>
<td></td>
</tr>
<tr>
<td>Operational Waste Treatment, Transfer and Disposal Sites</td>
<td>0</td>
</tr>
<tr>
<td>Non-Operational Waste Treatment, Transfer and Disposal Sites</td>
<td>0</td>
</tr>
<tr>
<td>Environment Agency Licensed Waste Sites</td>
<td>0</td>
</tr>
</tbody>
</table>

Report Reference: EMS-184025_269974
3. Current Land Uses

<table>
<thead>
<tr>
<th>Current Land Uses</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
<th>1001-1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Current Industrial Sites Data</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>3.2 Records of Petrol and Fuel Sites</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.3 Underground High Pressure Oil and Gas Pipelines</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

4. Geology

<table>
<thead>
<tr>
<th>Description</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?</td>
<td></td>
</tr>
<tr>
<td>4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?</td>
<td>Yes</td>
</tr>
<tr>
<td>4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.</td>
<td></td>
</tr>
</tbody>
</table>

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

4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site? Yes

Source: Scale: 1:50,000 BGS Sheet 185

5. Hydrogeology and Hydrology

<table>
<thead>
<tr>
<th>Hydrogeology and Hydrology</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
<th>1001-1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Are there any records of Productive Strata in the Superficial Geology within 500m of the study site?</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2 Are there any records of Productive Strata in the Bedrock Geology within 500m of the study site?</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3 Groundwater Abstraction Licenses (within 2000m of the study site).</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>5.4 Surface Water Abstraction Licences (within 2000m of the study site).</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5.5 Potable Water Abstraction Licences (within 2000m of the study site).</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5.6 Are there any Source Protection Zones within 500m of the study site?</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.7 River Quality</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Is there any Environment Agency information on river quality within 1500m of the study site?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.8 Detailed River Network entries within 500m of the site</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.9 Surface water features within 250m of the study site</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

6. Flooding

<table>
<thead>
<tr>
<th>Flooding</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?</td>
<td></td>
</tr>
<tr>
<td>6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?</td>
<td>Yes</td>
</tr>
<tr>
<td>6.3 Are there any Flood Defences within 250m of the study site?</td>
<td>No</td>
</tr>
<tr>
<td>6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?</td>
<td>No</td>
</tr>
<tr>
<td>6.5 Are there any areas used for Flood Storage within 250m of the study site?</td>
<td>No</td>
</tr>
<tr>
<td>6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?</td>
<td>Negligible</td>
</tr>
<tr>
<td>6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Report Reference: EMS-184025_269974
### 7. Designated Environmentally Sensitive Sites

<table>
<thead>
<tr>
<th>Category</th>
<th>0-50</th>
<th>51-250</th>
<th>251-500</th>
<th>501-1000</th>
<th>1001-2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Records of Sites of Special Scientific Interest (SSSI)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.2 Records of National Nature Reserves (NNR)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.3 Records of Local Nature Reserves (LNR)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7.4 Records of Special Areas of Conservation (SAC)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.5 Records of Special Protection Areas (SPA)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.6 Records of Ramsar sites</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.7 Records of World Heritage Sites</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.8 Records of Environmentally Sensitive Areas</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.9 Records of Areas of Outstanding Natural Beauty (AONB)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.10 Records of National Parks</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.11 Records of Nitrate Sensitive Areas</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7.12 Records of Nitrate Vulnerable Zones</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7.13 Records of Ancient Woodlands</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### 8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence? Moderate

### 9. Mining

9.1 Are there any coal mining areas within 75m of the study site? No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site? Negligible
9.3 Are there any brine affected areas within 75m of the study site? No

Report Reference: EMS-184025_269974
Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites. These searches are conducted using radii of up to 500m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.
10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (08444 159000) for further information and guidance.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.
1. Environmental Permits, Incidents and Registers Map

Authorisations, Incidents and Registers Legend

- Site Outline
- Search Buffers (m)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

Report Reference: EMS-184025_269974
1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

**Records of historic IPC Authorisations within 500m of the study site:** 0
Database searched and no data found.

**Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:** 0
Database searched and no data found.

**Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:** 0
Database searched and no data found.

**Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:** 0
Database searched and no data found.

**Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:** 0
Database searched and no data found.

**Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:** 0
Database searched and no data found.

**Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:** 0
Database searched and no data found.

**Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site:** 0
Database searched and no data found.

**Records of Licensed Discharge Consents within 500m of the study site:** 0
Database searched and no data found.

Report Reference: EMS-184025_269974
Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 0
Database searched and no data found.

### 1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0
Database searched and no data found.

### 1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: 1

The following NIRS List 2 records are represented as points on the Authorisations, Incidents and Registers Map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NGR</th>
<th>Incident Date: 23/9/2002</th>
<th>Incident Identification: 109990</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>213.0</td>
<td>NE</td>
<td>481910, 262900</td>
<td>Water Impact: Category 3 (Minor)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pollutant Description: Unidentified Oil</td>
<td>Land Impact: Category 4 (No Impact)</td>
</tr>
</tbody>
</table>

Records of National Incidents Recording System, List 1 within 250m of the study site: 0
Database searched and no data found.

### 1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0
Database searched and no data found.

Report Reference: EMS-184025_269974
2. Landfill and Other Waste Sites Map
2. Landfill and Other Waste Sites

2.1 Landfill Sites

Records from Environment Agency landfill data within 1000m of the study site: 0
Database searched and no data found.

Records of operational landfill sites sourced from Landmark within 1000m of the study site: 0
Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: 5

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NGR</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not shown</td>
<td>1404.0</td>
<td>S</td>
<td>481300, 261200</td>
<td>Site Address: The Causeway, Crow Lane, Northampton Waste Licence: Yes Site Reference: N/007 Waste Type: Inert, Regis Reference: - Licence Issue: 02/06/1980 Licence Surrendered: 18/08/1982 Licence Hold Address: Norjon House, Newby Road, Stockport Operator: -</td>
</tr>
</tbody>
</table>

Records of non-operational landfill sites sourced from Landmark within 1000m of the study site: 0
Database searched and no data found.

Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 0
Database searched and no data found.

Records of Local Authority landfill sites within 1500m of the study site: 1
Report Reference: EMS-184025_269974
The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>Site Address</th>
<th>Source</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not shown</td>
<td>687.0</td>
<td>S</td>
<td>Refuse Tip</td>
<td>1984 mapping</td>
<td>Polygon</td>
</tr>
</tbody>
</table>

### 2.2 Other Waste Sites

Records of operational waste treatment, transfer or disposal sites within 500m of the study site:

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NGR</th>
<th>Site Address</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A</td>
<td>461.0</td>
<td>S</td>
<td>481600, 262300</td>
<td>Site Address: Lower Ecton Lane W.R.C, NORTHAMPTON, Northamptonshire, Landfill Licence: 30EAMKAL EA Reference: - Waste Type: Putrescible Rating: Putrescible Transfer Known Restrictions: No known restriction on source of waste</td>
<td>Record Date: 01-Sep-1992 Transfer Date: Modification Date: 01-Mar-1997 Status: Operational as far as is known Category: CIVIC AMENITY Regulator: EA - Anglian Region - Northern Area (Kettering) Size: Small (&lt;25,000 tonnes/year)</td>
</tr>
</tbody>
</table>

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: 0

Database searched and no data found.

Records of Environment Agency licensed waste sites within 1500m of the study site: 17

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NGR</th>
<th>Site Address</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>10A</td>
<td>461.0</td>
<td>S</td>
<td>481600, 262300</td>
<td>Site Address: Northamptonshire County Council, Lower Ecton Lane, Northampton, Northants, NN3 5HQ Type: Non-hazardous &amp; hazardous HWA Site Size: &lt; 25000 tonnes Regis Licence Number: NOR010 EPR reference: MP3395NG/V001 Operator: Northamptonshire County Council Waste Management licence No: 70626 Annual Tonnage: 0.0</td>
<td>Issue Date: 01/09/1992 Effective Date: - Modified: 20/05/2010 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Ecton Lane Household Waste Recycling Centre Correspondence Address: -</td>
</tr>
<tr>
<td>11A</td>
<td>461.0</td>
<td>S</td>
<td>481600, 262300</td>
<td>Site Address: Northamptonshire County Council, Ecton Lane, Northampton, Northants, NN3 5HQ Type: Household, Commercial &amp; Industrial Waste T Stn Size: &lt; 25000 tonnes Regis Licence Number: NOR010 EPR reference: - Operator: Northamptonshire County Council Waste Management licence No: 70626 Annual Tonnage: 25000.0</td>
<td>Issue Date: 01/09/1992 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Ecton Lane Household Waste Recycling Centre Correspondence Address: Northamptonshire County Council, County Hall, Po Box 163, Northampton, Northants, NN1 1AX</td>
</tr>
</tbody>
</table>
| Not shown | 714.0 S | 481913, 262064 | Site Address: Land At Great Billing S T W, Lower Etton Lane, Great Billing, Northampton, Northants, NN3 9BX  
Type: Household, Commercial & Industrial Waste T Stn  
Size: >= 75000 tonnes  
Regis Licence Number: MCO17  
EPR reference: EA/EPR/RP3495EU/A001  
Operator: Mick George Ltd  
Waste Management licence No: 100161  
Annual Tonnage: 200000.0  
Issue Date: 20/12/2007  
Effective Date: -  
Modified: -  
Cancelled Date: -  
Status: Issued | Site Name: Mick George Ltd  
Correspondence Address: - | Issue Date: 20/12/2007  
Effective Date: -  
Modified: -  
Cancelled Date: -  
Status: Issued |
| Not shown | 746.0 S | 481597, 262012 | Site Address: Northamptonshire County Council, Etton Lane, Northampton, Northants, NN3 9HQ  
Type: Household Waste Amenity Site  
Size: < 25000 tonnes  
Regis Licence Number: NOR010  
EPR reference: MP3395NG/A001  
Operator: Northamptonshire County Council  
Waste Management licence No: 70626  
Annual Tonnage: 25000.0  
Issue Date: 01/09/1992  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Issued | Site Name: Ecton Lane Household Waste Recycling Centre  
Correspondence Address: - | Issue Date: 01/09/1992  
Effective Date: 06/07/2010  
Modified: -  
Surrendered Date: 06/04/2010  
Expiry Date: -  
Cancelled Date: -  
Status: Transferred |
| Not shown | 746.0 S | 481597, 262012 | Site Address: Northamptonshire County Council, Etton Lane, Northampton, Northants, NN3 9HQ  
Type: Non-hazardous & hazardous HWA Site  
Size: < 25000 tonnes  
Regis Licence Number: EMS015  
EPR reference: EA/EPR/GP3994VR/T001  
Operator: Enterprise Managed Services Ltd  
Waste Management licence No: 70626  
Annual Tonnage: 74999.0  
Issue Date: 01/09/1992  
Effective Date: 06/07/2010  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Issued | Site Name: Ecton Lane Household Waste Recycling Centre  
Correspondence Address: - | Issue Date: 01/09/1992  
Effective Date: 06/07/2010  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Issued |
| Not shown | 819.0 SE | 482134, 262045 | Site Address: 23, Crow Lane, Little Billing, Great Billing, Northants, NN3 9BX  
Type: Transfer Station taking Non-Biodegradable Wastes  
Size: < 25000 tonnes  
Regis Licence Number: ANG064  
EPR reference: EA/EPR/CP3595EV/A001  
Operator: Anglian Water Services Ltd  
Waste Management licence No: 100060  
Annual Tonnage: 0.0  
Issue Date: 17/12/2008  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Modified | Site Name: Great Billing W W T W  
Correspondence Address: - | Issue Date: 17/12/2008  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Modified |
| Not shown | 900.0 S | 481510, 261870 | Site Address: Great Billing Wwtw, Crow Lane, Little Billing, Northampton, Northants, NN3 9BX  
Type: Physico-Chemical Treatment Facility  
Size: < 25000 tonnes  
Regis Licence Number: ANG087  
EPR reference: EA/EPR/CPE3899LV/V002  
Operator: Anglian Water Services Ltd  
Waste Management licence No: 73270  
Annual Tonnage: 0.0  
Issue Date: 17/12/2008  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Modified | Site Name: Great Billing Sludge Treatment Centre  
Correspondence Address: - | Issue Date: 17/12/2008  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Modified |
| Not shown | 900.0 S | 481510, 261870 | Site Address: 23, Crow Lane, Little Billing, Northampton, Northants, NN3 9BX  
Type: Sewage sludge treatment  
Size: < 25000 tonnes  
Regis Licence Number: ANG087  
EPR reference: EA/EPR/FP3899LV/V002  
Operator: Anglian Water Services Ltd  
Waste Management licence No: 73270  
Annual Tonnage: 250000.0  
Issue Date: 17/12/2008  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Modified | Site Name: Great Billing Sludge Treatment Centre  
Correspondence Address: - | Issue Date: 17/12/2008  
Effective Date: -  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Modified |
| Not shown | 1122.0 S | 481300, 261700 | Site Address: Rmc House, Jackdaw Close, Crow Lane Ind. Estate, Billing, Nantns, NN3 9ER  
Type: Material Recycling Treatment Facility  
Size: >= 25000 tonnes < 75000 tonnes  
Regis Licence Number: NOR020  
EPR reference: EA/EPR/RP3495EU/A001  
Operator: Biffa Waste Services Ltd  
Waste Management licence No: 73123  
Annual Tonnage: 0.0  
Issue Date: 02/01/2003  
Effective Date: 09/01/2004  
Modified: -  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Transferred | Site Name: Northampton Transfer Station & Recycling Facility  
Correspondence Address: - | Issue Date: 02/01/2003  
Effective Date: 09/01/2004  
Modified: 03/12/2003  
Surrendered Date: -  
Expiry Date: -  
Cancelled Date: -  
Status: Transferred |
<table>
<thead>
<tr>
<th>Table Cell</th>
<th>Text Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not shown</td>
<td>1122.0 S 481300, 261700</td>
</tr>
<tr>
<td>Not shown</td>
<td>1122.0 S 481300, 261700</td>
</tr>
<tr>
<td>Not shown</td>
<td>1155.0 S 481800, 261600</td>
</tr>
<tr>
<td>Not shown</td>
<td>1155.0 S 481800, 261600</td>
</tr>
<tr>
<td>Not shown</td>
<td>1266.0 S 481500, 261500</td>
</tr>
<tr>
<td>Not shown</td>
<td>1266.0 S 481500, 261500</td>
</tr>
<tr>
<td>Not shown</td>
<td>1355.0 S 481600, 261400</td>
</tr>
<tr>
<td>Not shown</td>
<td>1355.0</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Site Address: Lakeside Works, Crow Lane, Great Billing, Northampton, Northants, NN3 9BZ</td>
<td></td>
</tr>
<tr>
<td>Type: Household, Commercial &amp; Industrial Waste T Stn</td>
<td></td>
</tr>
<tr>
<td>Size: &gt;= 75000 tonnes</td>
<td></td>
</tr>
<tr>
<td>Regis Licence Number: TH0003</td>
<td></td>
</tr>
<tr>
<td>EPR reference: EA/EPR/CP3998LZ/V002</td>
<td></td>
</tr>
<tr>
<td>Operator: Thomas (Haulage) Ltd</td>
<td></td>
</tr>
<tr>
<td>Waste Management licence No: 73039</td>
<td></td>
</tr>
<tr>
<td>Annual Tonnage: 25000.0</td>
<td></td>
</tr>
<tr>
<td>Issue Date: 16/07/1998</td>
<td></td>
</tr>
<tr>
<td>Effective Date: -</td>
<td></td>
</tr>
<tr>
<td>Modified: 10/07/2009</td>
<td></td>
</tr>
<tr>
<td>Surrendered Date: -</td>
<td></td>
</tr>
<tr>
<td>Expiry Date: -</td>
<td></td>
</tr>
<tr>
<td>Cancelled Date: -</td>
<td></td>
</tr>
<tr>
<td>Status: Modified</td>
<td></td>
</tr>
<tr>
<td>Site Name: Thomas (Haulage) Ltd</td>
<td></td>
</tr>
<tr>
<td>Correspondence Address: -, -</td>
<td></td>
</tr>
</tbody>
</table>
3. Current Land Use Map

Current Land Use Legend

- Site Outline
- Search Buffers (m)
- Current Industrial Sites
- Petrol & Fuel Sites
- Underground High Pressure Oil & Fuel Pipelines

Report Reference: EMS-184025_269974
3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

The following records are represented as points on the Current Land Uses map.

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>Company</th>
<th>Address</th>
<th>Activity</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>54.0</td>
<td>NE</td>
<td>Gas Governor</td>
<td>NN3</td>
<td>Gas Features</td>
<td>Infrastructure and Facilities</td>
</tr>
<tr>
<td>2</td>
<td>69.0</td>
<td>NW</td>
<td>Mast</td>
<td>NN3</td>
<td>Telecommunications Features</td>
<td>Infrastructure and Facilities</td>
</tr>
<tr>
<td>3</td>
<td>90.0</td>
<td>SE</td>
<td>Integrated Vehicle Technology Ltd</td>
<td>9, Riverwell, Northampton, NN3 SE5</td>
<td>Special Purpose Machinery and Equipment</td>
<td>Industrial Products</td>
</tr>
<tr>
<td>4</td>
<td>117.0</td>
<td>SE</td>
<td>Electricity Sub Station</td>
<td>NN3</td>
<td>Electrical Features</td>
<td>Infrastructure and Facilities</td>
</tr>
<tr>
<td>5</td>
<td>170.0</td>
<td>N</td>
<td>Electricity Sub Station</td>
<td>NN3</td>
<td>Electrical Features</td>
<td>Infrastructure and Facilities</td>
</tr>
<tr>
<td>6</td>
<td>181.0</td>
<td>SW</td>
<td>Electricity Sub Station</td>
<td>NN3</td>
<td>Electrical Features</td>
<td>Infrastructure and Facilities</td>
</tr>
</tbody>
</table>

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NGR</th>
<th>Company</th>
<th>Address</th>
<th>LPG</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>418.0</td>
<td>SE</td>
<td>481992, 262434</td>
<td>Esso</td>
<td>Nene Valley Service Area North, Nene Valley Way, Nene Valley Way, Northampton, Northamptonshire, NN3 5LU</td>
<td>No</td>
<td>Open</td>
</tr>
</tbody>
</table>

| 8  | 477.0    | SE        | 482012, 262374 | Esso | Nene Valley Service Area South, Nene Valley Way, Nene Valley Way, Northampton, Northamptonshire, NN3 5LU | No | Open |

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site:

Database searched and no data found.

Report Reference: EMS-184025_269974
4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

<table>
<thead>
<tr>
<th>Lex Code</th>
<th>Description</th>
<th>Rock Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLMP-CLSI</td>
<td>GLACIOLACUSTRINE DEPOSITS, MID PLEISTOCENE</td>
<td>CLAY AND SILT</td>
</tr>
</tbody>
</table>

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

4.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

<table>
<thead>
<tr>
<th>LEX Code</th>
<th>Description</th>
<th>Rock Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHM-MDST</td>
<td>WHITBY MUDSTONE FORMATION</td>
<td>MUDSTONE</td>
</tr>
</tbody>
</table>

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

For more detailed geological and ground stability data please refer to the “GroundSure GeoInsight”. Available from our website.

Report Reference: EMS-184025_269974
5a. Hydrogeology - Aquifer Within Superficial Geology
5b. Hydrogeology - Aquifer Within Bedrock
Geology and Abstraction Licenses

Aquifer Within Bedrock Geology Legend

- Principal Aquifer
- Secondary (A) Aquifer - Permeable Layers
- Secondary (B) Aquifer - Lower Permeability Layers
- Secondary Aquifer - Undifferentiated Layers
- Unproductive
- Unknown (tanks and landslip)
- Groundwater Abstraction Licence
- Surface Water Abstraction Licence

Report Reference: EMS-184025_269974
5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

Legend

- Site Outline
- Search Buffers (m)
- Source Protection Zone 1 - Inner Catchment
- Source Protection Zone 2 - Outer Catchment
- Source Protection Zone 3 - Total Catchment
- Source Protection Zone 4 - Zone of Special Interest
- Potable Water Abstraction Licence

Report Reference: EMS-184025_269974
5d. Hydrology – Detailed River Network and River Quality

Hydrology Legend

- **Primary River**
- **Secondary River**
- **Tertiary River**
- **Lake/Reservoir**
- **Underground River (inferred)**
- **Search Buffers (m)**
- **Site Outline**
- **Canal**
- **Canal Tunnel**
- **Extended Culvert (greater than 50m)**
- **D/S of High Water Mark**
- **D/S seaward extension**
- **General Quality Assessment: Chemistry**
- **General Quality Assessment: Biology**

Report Reference: EMS-184025_269974
5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of productive strata within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency’s Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance [m]</th>
<th>Direction</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.0</td>
<td>On Site</td>
<td>Unproductive</td>
<td>These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow</td>
</tr>
<tr>
<td>1</td>
<td>171.0</td>
<td>E</td>
<td>Secondary A</td>
<td>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</td>
</tr>
<tr>
<td>3</td>
<td>242.0</td>
<td>E</td>
<td>Unproductive</td>
<td>These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow</td>
</tr>
</tbody>
</table>

5.2 Aquifer within Bedrock Deposits

Are there records of productive strata within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency’s Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance [m]</th>
<th>Direction</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.0</td>
<td>On Site</td>
<td>Unproductive</td>
<td>These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow</td>
</tr>
<tr>
<td>1</td>
<td>207.0</td>
<td>NW</td>
<td>Secondary A</td>
<td>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</td>
</tr>
</tbody>
</table>

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NGR</th>
<th>Details</th>
</tr>
</thead>
</table>

Report Reference: EMS-184025_269974
### 5.4 Surface Water Abstraction Licences

**Are there any Surface Water Abstraction Licences within 2000m of the study site?**  
No

Database searched and no data found.

### 5.5 Potable Water Abstraction Licences

**Are there any Potable Water Abstraction Licences within 2000m of the study site?**  
No

Report Reference: EMS-184025_269974
5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

5.7 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

Biological Quality:

Database searched and no data found.

Chemical Quality:

Database searched and no data found.

5.8 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (5d):

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>186.0</td>
<td>E</td>
<td>River Name: ECTON BROOK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: ECTON BROOK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Primary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
<tr>
<td>2</td>
<td>186.0</td>
<td>E</td>
<td>River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Secondary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
<tr>
<td>3</td>
<td>188.0</td>
<td>E</td>
<td>River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: ECTON BROOK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Primary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
<tr>
<td>4</td>
<td>194.0</td>
<td>E</td>
<td>River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Secondary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
<tr>
<td>5</td>
<td>197.0</td>
<td>E</td>
<td>River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: ECTON BROOK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Primary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
<tr>
<td>6</td>
<td>216.0</td>
<td>SE</td>
<td>River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Secondary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
<tr>
<td>7</td>
<td>218.0</td>
<td>SE</td>
<td>River Name: ECTON BROOK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water Course Name: ECTON BROOK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Welsh River Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alternative Name: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>River Type: Primary River</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Catchment: -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Drain: NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main River Status: Currently Undefined</td>
</tr>
</tbody>
</table>

Report Reference: EMS-184025_269974
### 5.9 Surface Water Features

**Are there any surface water features within 250m of the study site? Yes**

The following surface water records are not represented on mapping:

<table>
<thead>
<tr>
<th>Distance to Surface Water (m)</th>
<th>on-site</th>
<th>0-50</th>
<th>51-250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface water features within 250m of the study site</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Report Reference: EMS-184025_269974
6. Environment Agency Flood Map

Environment Agency Flood Legend

- Site Outline
- Zone 2 Floodplain
- Zone 3 Floodplain
- Flood Storage Area
- Area Benefitting from Flood Defences
- Flood Defences

Report Reference: EMS-184025_269974
6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? Yes

The following floodplain records are represented as green shading on the Flood Map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>Update</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>180.0</td>
<td>E</td>
<td>03-Oct-2012</td>
<td>Zone 2 - (Fluvial Models)</td>
</tr>
</tbody>
</table>

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? Yes

The following floodplain records are represented as blue shading on the Flood Map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>Update</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>180.0</td>
<td>E</td>
<td>03-Oct-2012</td>
<td>Zone 3 - (Fluvial Models)</td>
</tr>
</tbody>
</table>

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? No

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

6.5 Areas used for Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.6 Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the boundary of the study site? No
### 6.7 Groundwater Flooding Confidence Areas

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?</td>
<td>Negligible</td>
</tr>
<tr>
<td>What is the British Geological Survey confidence rating in this result?</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

**Notes:**

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.
7. Designated Environmentally Sensitive Sites Map

Designated Environmentally Sensitive Sites Legend

- SAC
- SSSI
- NNR
- World Heritage Sites
- SPA
- Ramsar
- LNR
- Environmentally Sensitive Areas

Areas of Outstanding Natural Beauty

Nitrate Vulnerable Zones

Nitrate Sensitive Areas

National Parks

Ancient Woodlands

Report Reference: EMS-184025_269974
7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 0
Database searched and no data found.

Records of National Nature Reserves (NNR) within 2000m of the study site: 0
Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 2000m of the study site: 0
Database searched and no data found.

Records of Special Protection Areas (SPA) within 2000m of the study site: 0
Database searched and no data found.

Records of Ramsar sites within 2000m of the study site: 0
Database searched and no data found.

Records of Local Nature Reserves (LNR) within 2000m of the study site: 1
The following Local Nature Reserve (LNR) records provided by Natural England/Countryside Council for Wales and Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>LNR Name</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1115.0</td>
<td>NW</td>
<td>Lings Wood</td>
<td>Natural England</td>
</tr>
</tbody>
</table>

Records of World Heritage Sites within 2000m of the study site: 0
Database searched and no data found.

Records of Environmentally Sensitive Areas within 2000m of the study site: 0
Database searched and no data found.

Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: 0
Database searched and no data found.

Report Reference: EMS-184025_269974
Records of National Parks (NP) within 2000m of the study site: 0
Database searched and no data found.

Records of Nitrate Sensitive Areas within 2000m of the study site: 0
Database searched and no data found.

Records of Nitrate Vulnerable Zones within 2000m of the study site: 2
The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

<table>
<thead>
<tr>
<th>ID</th>
<th>Distance</th>
<th>Direction</th>
<th>NVZ Type</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.0</td>
<td>On Site</td>
<td>NVZ Area</td>
<td>DEFRA</td>
</tr>
</tbody>
</table>

Not shown

1686.0 W NVZ Area DEFRA

Records of Ancient Woodland within 2000m of the study site: 0
Database searched and no data found.

Report Reference: EMS-184025_269974
8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a GroundSure GeoInsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

**What is the maximum Shrink-Swell* hazard rating identified on the study site?** Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

<table>
<thead>
<tr>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground conditions predominantly medium plasticity. Do not plant trees</td>
</tr>
<tr>
<td>with high soil moisture demands near to buildings. For new build,</td>
</tr>
<tr>
<td>consideration should be given to advice published by the National</td>
</tr>
<tr>
<td>House Building Council (NHBC) and the Building Research Establishment</td>
</tr>
<tr>
<td>(BRE). There is a possible increase in construction cost to reduce</td>
</tr>
<tr>
<td>potential shrink-swell problems. For existing property, there is a</td>
</tr>
<tr>
<td>possible increase in insurance risk, especially during droughts or</td>
</tr>
<tr>
<td>where vegetation with high moisture demands is present.</td>
</tr>
</tbody>
</table>

8.1.2 Landslides

**What is the maximum Landslide* hazard rating identified on the study site?** Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

<table>
<thead>
<tr>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope instability problems are unlikely to be present. No special</td>
</tr>
<tr>
<td>actions required to avoid problems due to landslides. No special</td>
</tr>
<tr>
<td>ground investigation required, and increased construction costs or</td>
</tr>
<tr>
<td>increased financial risks are unlikely due to potential problems with</td>
</tr>
<tr>
<td>landslides.</td>
</tr>
</tbody>
</table>

8.1.3 Soluble Rocks

**What is the maximum Soluble Rocks* hazard rating identified on the study site?** Null - Negligible

Soluble rocks are not present in the search area. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

**What is the maximum Compressible Ground* hazard rating identified on the study site?** Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

<table>
<thead>
<tr>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Reference: EMS-184025_269974</td>
</tr>
</tbody>
</table>
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

### 8.1.5 Collapsible Rocks

**What is the maximum Collapsible Rocks* hazard rating identified on the study site?** Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

<table>
<thead>
<tr>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.</td>
</tr>
</tbody>
</table>

### 8.1.6 Running Sand

**What is the maximum Running Sand* hazard rating identified on the study site?** Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

<table>
<thead>
<tr>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.</td>
</tr>
</tbody>
</table>

* This indicates an automatically generated 50m buffer and site.
9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No
Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? Negligible
*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Database searched and no data found.
10. Contacts

**EmapSite**
Telephone: 0118 9736883
sales@emapsite.com

**British Geological Survey (England & Wales)**
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276. Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

**Environment Agency**
National Customer Contact Centre
PO Box 544
Rotherham
S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk

**Health Protection Agency**
Chilton, Didcot, Oxon, OX11 0RQ
Tel: 01235 822622 www.hpa.org.uk/radiation
Radon measures and general radon information and guidance

**The Coal Authority**
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5
Web: www.groundstability.com

**Ordnance Survey**
Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

**Local Authority**
Authority: Northampton Borough Council
Phone: 01604 837837
Web: www.northampton.gov.uk
Address: The Guildhall, St Giles Square, Northampton, NN1 1DE

**Get Mapping PLC**
Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements
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Licence Number [03421028].
This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Report Reference: EMS-184025_269974
1 Definitions

In these conditions unless the context otherwise requires:

- **Beneficiary** means the party or the customer of the Client for whom the Client has procured the Services.
- **Commercial** means any building which is not Residential.
- **Consultancy Services** means consultancy services provided by GroundSure including, without limitation, carrying out interpretation of third party and in-house environmental data, provision of environmental consultancy advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
- **Contract** means any contract or agreement between Groundsure and a Client for the performance of the Services which arises upon GroundSure's acceptance of an Order or Commission and which shall incorporate these conditions.
- **Data Report** means reports comprising factual data with no professional interpretation in respect of the level of likely risk and/or liability available from GroundSure.
- **Document** means any document in any medium.
- **GroundSure** means Groundsure Limited, a company registered in England and Wales under number 03421028 and whose registered office is at Greater London House, Hampstead Road, London NW1 7E).
- **Groundsure Materials** means all materials prepared by GroundSure as a result of the provision of the Services, including but not limited to Data Reports, Mapping and Risk Screening Reports.
- **Intelectual Property** means any patent, copyright, design rights, service marks, moral rights, data protection rights, know-how, trade mark or any other intellectual property rights.
- **Mapping** means an electronic map or other graphic representation of real estate data.
- **Order** means any form of request for Services from Groundsure in respect of a specified Site.
- **Order Website** means online platform via which Orders may be placed.
- **Report** means a Risk Screening Report or Data Report for commercial or residential property available from GroundSure relating to the Site prepared in accordance with the specifications set out in the relevant User Guide.
- **Reporting Fragment** means any building used as or suitable for use as an individual dwelling.
- **Risk Screening Report** means one of Groundsure’s risk screening reports, comprising factual data with interpretation in respect of the level of likely risk and/or liability, excluding any professional interpretation.
- **Scope of Services** means the provision of any Report, Mapping or Consulation Services which GroundSure has agreed to carry out for the Client/Beneficiary on these terms and conditions in respect of the Site.
- **Site** means the land in respect of which GroundSure provides the Services.
- **Third Party Content** means any data, database or other information contained in a Report or Mapping which is provided to GroundSure by a Data Provider.
- **User Guide** means the relevant current version of the user guide, available upon request from GroundSure.

2 Scope of Services

2.1 GroundSure agrees to carry out the Services in accordance with the Contract and to the extent set out therein.
2.2 The Client shall have full authority to exercise all the rights and powers of a reasonable person in the performance of the Services.
2.3 The Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in the Contract.
2.4 Terms and conditions appearing on a Client's order form, printed stationery or other communication, including invoices, to GroundSure, its employees, servants, agents or officers or any terms implied by custom or course of dealing shall be of no effect and these terms and conditions shall prevail over all others.
2.5 If a Client/Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to procure such insurance, but makes no warranty or representation that GroundSure does or does not offer or provide such insurance.
2.6 GroundSure’s quotations/proposals are valid for a period of 30 days only. GroundSure reserves the right to withdraw any quotation at any time before GroundSure accepts an Order or Commission.

3 Reliance

3.1 The Client shall ensure the Beneficiary complies with and is bound by the terms and conditions set out in the Contract and shall provide that Groundsure may in its own right enforce the terms and conditions against the Beneficiary pursuant to the Contracts (Rights of Third parties) Act 1999 for the benefit of GroundSure as if it were the Client.
3.2 The Client shall (or shall procure that the Beneficiary shall) supply to GroundSure as soon as practical and without charge all information necessary and accurate data including the names and addresses of all parties who are entitled, or who may be entitled to receive a copy of the Site where the Services are to be carried out.
3.3 Where Client/Beneficiary approval or decision is required, such approval or decision shall be given or procured in reasonable time as not to delay or disrupt the performance of any other part of the Services.
3.4 The Client shall not and shall not knowingly permit the Beneficiary to, save as expressly permitted by these terms and conditions, re-sell, alter, add to, amend or use out of context the content of any Report, Mapping or, in respect of any Services, information given by GroundSure. For the avoidance of doubt, the Client and Beneficiary may make the Report, Mapping or Groundsure’s findings available to a third party who is considering acquiring the whole or part of the Site, or providing funding in relation to the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.
3.5 The Client is responsible for maintaining the confidentiality of its user name and password if using GroundSure’s internet ordering service and accepts responsibility for any activity that occurs under such account and password.

4 Reliance

4.1 Upon full payment of all relevant fees and subject to the provisions of these terms and conditions, the Client and Beneficiary are granted an irrevocable royalty-free licence to access the information contained in a Report, Mapping or in any report prepared by GroundSure in respect of or arising out of Consultancy Services. The Services may be only used for the benefit of the Client and those persons listed in clauses 4.2 and 4.3.
4.2 In reliance on the third party providers' Information and other information data or service; or (d) re-format or otherwise change (whether by modification, addition or enhancement) data or images contained in the Report or Mapping.
4.3 In relation to Consultancy Services, reliance shall be limited to the Client, Beneficiary and named parties on the Report.
4.4 In clauses 4.2 and 4.3 unless otherwise agreed in writing by GroundSure, the Client and any other party cannot rely on the information supplied by GroundSure as part of the Services, including (but not limited to) insurance underwriters, does so at their own risk and GroundSure has no legal obligations to such party unless otherwise agreed in writing.
4.5 The Client shall not and shall not knowingly permit any person (including the Beneficiary) who is provided with a copy of any Report, except as permitted herein or by separate agreement with GroundSure to: (a) remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to the Services; (b) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or re-use any information obtained as part of the Services provided in respect of adjacent or nearby sites;
8.1 In the event that GroundSure reasonably believes that the Client or Beneficiary as applicable has not provided the information or assistance required to enable the proper
performance of the Services, GroundSure shall be entitled on fourteen days written notice to suspend all further performance of the Services until such time as any such deficiency
has been made good.

8.2 GroundSure may additionally terminate the Contract immediately on written notice in the event that:
(i) the Client has failed to pay any sum due to GroundSure within 28 days of the Payment Date; or
(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an
Administration Order made against it or if a Receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or
(iii) the Client or the Beneficiary breaches any material term of the Contract (including, but not limited to, the obligations in clause 4) incapable of remedy or if remediable, is not
remedied within 14 days of notice of breach.

9. Client’s Right to Terminate and Suspend
9.1 Subject to clause 10.2, the Client may at any time after commencement of the Services by notice in writing to GroundSure require GroundSure to terminate or suspend immediately
performance of all or any of the Services.

9.2 The Client waives all and any right of cancellation it may have under the Consumer Protection (Distance Selling) Regulations 2000 (as amended) in respect of the Order of a
Report/Mapping. This does not affect the Beneficiary’s statutory rights.

10. Consequences of Withdrawal, Termination or Suspension
10.1 Upon termination or any suspension of the Services, GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed
and shall remove from the Client/Beneficiary any possession or control of the Services and shall deliver to the Client/Beneficiary any property of the Client/Beneficiary in GroundSure's
possession or control.

10.2 In the event of termination/suspension of the Contract under clauses 8 or 9, the Client shall pay to GroundSure all and any fees payable in respect of the performance of the Services
up to the date of termination/suspension. In respect of any Consultancy Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination/suspension of the Contract.

11. General
11.1 The mapping contained in the Services is protected by Crown copyright and must not be used for any purpose outside the context of the Services or as specifically provided in
these terms.

11.2 GroundSure reserves the right to amend these terms and conditions. No variation to these terms shall be valid unless signed by an authorised representative of GroundSure.

11.3 No person employed by or under GroundSure to exercise any right, power or privilege under the terms and conditions shall operate as a waiver thereof.

11.4 Save as expressly provided in clauses 4.2, 4.3, 6.3 and 11.5, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

11.5 The Secretary of State for Communities and Local Government acting through Ordnance Survey may enforce breach of clause 6.1 of these terms and conditions against the Client
in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

11.6 GroundSure shall not be liable to the Client if the performance of the Service is delayed or prevented by one or more of the following circumstances:
(i) the Client or Beneficiary’s failure to provide facilities, access or information;
(ii) fire, storm, flood, tempest or epidemic;
(iii) acts of God or the public enemy;
(iv) riot, civil commotion or war;
(v) strikes, labour disputes or industrial action;
(vi) any regulations of any governmental or other agency;
(vii) suspension or delay of services at public registries by Data Providers; or
(viii) any change in law.

11.7 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent first class post, facsimile or by email to the address, facsimile
number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address
of the other party.

11.8 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email and on the second working day after the day of posting if sent
by first class post.

11.9 The Contract constitutes the entire contract between the parties and shall supersede all previous arrangements between the parties.

11.10 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity
and enforceability of the remaining provisions shall not in any way be tainted or impaired.

11.11 These terms and conditions shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with these terms and conditions
shall be subject to the exclusive jurisdiction of the English courts.

11.12 If the Client or Beneficiary has a complaint about the Services, notice can be given in any format eg writing, phone, email to the Compliance Officer at GroundSure who will
respond in a timely manner.

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Report Reference: EMS-184025_269974
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Technical Helpline
Tel: 01273 819 700
maps&data@groundsure.com
www.groundsure.com
Site Details:

Client Ref: EMS_184025_269972
Report Ref: EMS-184025_269972
Grid Ref: 481705, 262775

Map Name: County Series
Map date: 1923
Scale: 1:10,560
Printed at: 31 October 2012

To view map legend click here: Legend
Site Details:

- Client Ref: EMS_184025_269972
- Report Ref: EMS-184025_269972
- Grid Ref: 481705, 262775
- Map Name: County Series
- Map date: 1884
- Scale: 1:10,560
- Printed at: 1:10,560

Legend

Surveyed 1884
Revised 1884
Edition N/A
Copyright N/A
Leveillé N/A

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sales@emapsite.com

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Production date: 31 October 2012

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Technical Helpline:
Tel: 01273 819 700
maps&data@groundsure.com
www.groundsure.com
Site Details:
Client Ref: EMS_184025_269972
Report Ref: EMS-184025_269972
Grid Ref: 481705, 262775

Map Name: MasterMap
Map date: 2012
Scale: 1:1,250
Printed at: 1:2,500

To view map legend click here
Legend
Site Details:

- Client Ref: EMS_184025_269972
- Report Ref: EMS-184025_269972
- Grid Ref: 481705, 262775

Map Details:

- Map Name: National Grid
- Map date: 1967
- Scale: 1:2,500
- Printed at: 1:2,500

Production date: 31 October 2012

To view map legend click here: Legend
Site Details:

Client Ref: EMS_184025_269972
Report Ref: EMS-184025_269972
Grid Ref: 481705, 262775

Map Name: County Series
Map date: 1926
Scale: 1:2,500
Printed at: 1:2,500

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Production date: 31 October 2012
To view map legend click here  Legend
Site Details:

Client Ref:  EMS_184025_269972
Report Ref:  EMS-184025_269972
Grid Ref:  481705, 262775

Map Name:  County Series
Map date:  1900
Scale:  1:2,500
Printed at:  1:2,500

Legend

To view map legend click here  Legend
<table>
<thead>
<tr>
<th>Date</th>
<th>01/11/2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depth</strong> (m)</td>
<td><strong>Co-ordinates</strong></td>
</tr>
<tr>
<td>0.40</td>
<td>ES</td>
</tr>
<tr>
<td>0.60</td>
<td>D</td>
</tr>
<tr>
<td>1.20</td>
<td>SPT</td>
</tr>
<tr>
<td>1.50</td>
<td>HV</td>
</tr>
<tr>
<td>1.80</td>
<td>HV</td>
</tr>
<tr>
<td>2.00</td>
<td>SPT</td>
</tr>
<tr>
<td>2.30</td>
<td>D</td>
</tr>
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<td>SPT</td>
</tr>
<tr>
<td>3.50</td>
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</tr>
<tr>
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<td>SPT</td>
</tr>
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</tr>
<tr>
<td>5.00</td>
<td>SPT</td>
</tr>
<tr>
<td>6.00</td>
<td>SPT</td>
</tr>
</tbody>
</table>

**Description of Strata**

0.40 | ES | Grass onto dark brown clayey gravelly fine to medium SAND with occasional rootlets. Gravel is fine to medium subrounded quartzite and siltstone. (TOPSOIL)

0.60 | D | Brown clayey gravelly fine to coarse SAND. Gravel is fine to coarse subrounded quartzite and rare chert. Also containing material fragments of concrete and brick. (MADE GROUND)

1.20 | SPT | Firm to stiff light brown slightly gravelly silty CLAY. Gravel is fine to medium subrounded to rounded to subangular chert. (GLACIAL TILL)

1.50 | HV | Firm light brown laminated silty CLAY. (GLACIAL LAKE DEPOSITS)

1.80 | HV | Firm becoming stiff light brown and light orange-brown mottled clayey SILT. (GLACIAL LAKE DEPOSITS)

2.00 | SPT | 6N

2.30 | D | 6/300

3.00 | SPT | 13N

3.50 | P | 75

4.00 | SPT | 22N

4.50 | P | 100

5.00 | SPT | 28N

6.00 | SPT | 32N

**End of Borehole at 6.45 m**

**GENERAL REMARKS:**

Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed to 4.00m bgl, plain pipe ground level to 1.00m with bentonite seal and slotted pipe 1.00m to 4.00m with gravel pack.

**GROUNDWATER**

<table>
<thead>
<tr>
<th>Struck</th>
<th>Cased</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Groundwater Encountered</td>
<td>20 mins</td>
<td>Date</td>
</tr>
</tbody>
</table>

**Scale:** 1:50
**GENERAL REMARKS:**

Surface hardstanding penetrated with the aid of an hydraulic breaker. Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed to 4.00m bgl, plain pipe ground level to 1.00m with bentonite seal and slotted pipe 1.00m to 4.00m with gravel pack.

**GROUNDWATER**

<table>
<thead>
<tr>
<th>Struck</th>
<th>Cased</th>
<th>20 mins</th>
<th>Sealed</th>
<th>Date</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>01/11/2012</td>
<td></td>
</tr>
</tbody>
</table>
**GENERAL REMARKS:**
Hand dug service inspection pit excavated to 1.20m bgl. 50mm diameter standpipe installed to 4.00m bgl, plain pipe ground level to 1.00m with bentonite seal and slotted pipe 1.00m to 4.00m with gravel pack.

**GROUNDWATER**

<table>
<thead>
<tr>
<th>Struck</th>
<th>Cased</th>
<th>20 mins</th>
<th>Sealed</th>
<th>Date</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>01/11/2012</td>
<td>Damp</td>
</tr>
<tr>
<td>3.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>01/11/2012</td>
<td>Damp</td>
</tr>
</tbody>
</table>
## Trial Pit Log

**Job No.:** AG1750-12  
**Site:** St Andrews Primary School, Northampton  
**Client:** Northampton County Council  
**Engineer:** BCAL  
**Trial Pit Log**  
**FEP101**  
**Sheet 1 of 1**  

### Method

<table>
<thead>
<tr>
<th>Length (m)</th>
<th>Breadth (m)</th>
<th>Orientation</th>
<th>Depth (m)</th>
<th>Ground Level</th>
<th>Co-ordinates</th>
<th>Ground Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.65</td>
<td>0.30</td>
<td>-</td>
<td>1.16</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### SOIL SAMPLES/TESTS

<table>
<thead>
<tr>
<th>Type</th>
<th>Strength</th>
<th>PID</th>
<th>PL/LL</th>
<th>M/C</th>
<th>Ease of Dig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Description of Strata

- Grass onto dark brown clayey gravelly fine to medium SAND. Gravel is fine to medium subrounded to rounded quartzite. (TOPSOIL)
- Firm slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded quartzite. Also containing material fragments of brick and concrete. (MADE GROUND)
- Firm light brown and yellow-brown slightly gravelly silty CLAY. Gravel is fine to coarse subrounded to subangular chert. (GLACIAL TILL)

### GROUNDWATER DETAILS:

Groundwater not encountered.

### STABILITY OF PIT WALLS:

Stable.

### GENERAL REMARKS:

Hand pit excavated to expose foundations - see separate diagram for details.

### KEY

- **SAMPLES:**
  - B = Bulk
  - D = Tub
  - W = Water
  - SPT = In situ Penetration Test

- **SHEAR STRENGTH:**
  - V = Hand Vane
  - P = Hand Penetrometer

- **GROUNDWATER:**
  - ▽ Entry
  - ▼ Standing Level

- **Ease of Dig:**
  - E = Easy
  - M = Moderate
  - H = Hard
  - VH = Very Hard

**Tel:** 02476511822  
**Fax:** 02476697682  
0.65  
0.30  
0.28  
0.60  
1.16  
1:25
Grass onto dark brown clayey gravelly fine to medium SAND.
Gravel is fine to medium subrounded to rounded quartzite. (TOPSOIL).

Firm slightly sandy slightly gravelly CLAY. Gravel is fine to coarse
subrounded quartzite. Also containing material fragments of brick
and concrete. (MADE GROUND).

Firm light brown and yellow brown slightly gravelly silty CLAY.
Gravel is fine to coarse subrounded to subangular chert (GLACIAL TILL).
APPENDIX D
### Test Results:
- **Laboratory Reference:** PL3913-1/1
- **Sample Reference:**
- **Sample Description:** Firm light brown silty CLAY
- **Location:** DCS101
- **Depth:** 1.50m
- **Sample Preparation:** As Received
- **Estimated % Passing 425µm BS Test Sieve:***

<table>
<thead>
<tr>
<th>Moisture Content (%)</th>
<th>Liquid Limit [%]</th>
<th>Plastic Limit [%]</th>
<th>Plasticity Index</th>
<th>% Passing 425µm BS Test Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>44</td>
<td>20</td>
<td>24</td>
<td>99</td>
</tr>
</tbody>
</table>

![Graph showing liquid limit and plasticity index relationship]

**Comments:**

---

**Approved Signatory:** M. Hartnup - Laboratory Manager

**Signed:** [Signature]

---

**Date Reported:** 16.11.2012

**Form Number:** EN/C/704 Version 25

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

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Determination of Liquid & Plastic Limits

Test Results:

- Laboratory Reference: PL3913-1/2
- Sample Reference: PL3913-1/2/704
- Sample Description: Firm light brown slightly sandy silty CLAY
- Location: DCS102
- Depth: 1.20m
- Sample Preparation: As Received
- % Passing 425µm BS Test Sieve: 100

<table>
<thead>
<tr>
<th>Moisture Content (%)</th>
<th>Liquid Limit [%]</th>
<th>Plastic Limit [%]</th>
<th>Plasticity Index</th>
<th>% Passing 425µm BS Test Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>43</td>
<td>22</td>
<td>21</td>
<td>100</td>
</tr>
</tbody>
</table>

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager

Date Reported: 16.11.2012
Form Number: EN/C/704 Version 25
Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation
This report may not be reproduced other than in full without the prior written approval of the issuing laboratory

for and on behalf of Enverity Ltd

Registered in England & Wales
Registration Number: 6930692
Reg Office: Diasma, Willie Snith Rd
Newmarket, Suffolk, CB8 7SQ
Client: Applied Geology Ltd  
Certificate Number: PL3913-1/3/704  
Client Address: Unit 23 Abbey Park  
Stareton Kenilworth  
Warwickshire  
CV8 2LY  
Client Reference: AG1750-12  
Job Number: PL3913-1  
Date Sampled: Unknown  
Contact: Adam Perks  
Date Received: 08.11.2012  
Date Tested: 15.11.2012  
Site Name: St Andrews School  
Site Address: Northampton  
Certificate of Sampling: N/A  
Sampling Certificate No.: N/A  
Sampled By: Client  

**Test Results:**

<table>
<thead>
<tr>
<th>Moisture Content (%)</th>
<th>Liquid Limit [%]</th>
<th>Plastic Limit [%]</th>
<th>Plasticity Index</th>
<th>% Passing 425µm BS Test Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>42</td>
<td>20</td>
<td>22</td>
<td>99</td>
</tr>
</tbody>
</table>

Sample Description: Firm light brown slightly silty CLAY  
Location: DCS103  
Depth: 1.50m  
Sample Preparation: As Received  
Estimated % Passing 425µm BS Test Sieve

<table>
<thead>
<tr>
<th>Moisture Content (%)</th>
<th>Plasticity Index</th>
<th>% Passing 425µm BS Test Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>22</td>
<td>99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plasticity Index</th>
<th>Liquid Limit (%)</th>
<th>Plasticity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>MI</td>
<td>MI</td>
</tr>
<tr>
<td>MH</td>
<td>MH</td>
<td>MH</td>
</tr>
<tr>
<td>MV</td>
<td>MV</td>
<td>MV</td>
</tr>
<tr>
<td>ME</td>
<td>ME</td>
<td>ME</td>
</tr>
<tr>
<td>CL</td>
<td>CL</td>
<td>CL</td>
</tr>
<tr>
<td>CI</td>
<td>CI</td>
<td>CI</td>
</tr>
<tr>
<td>CH</td>
<td>CH</td>
<td>CH</td>
</tr>
<tr>
<td>CV</td>
<td>CV</td>
<td>CV</td>
</tr>
<tr>
<td>CE</td>
<td>CE</td>
<td>CE</td>
</tr>
</tbody>
</table>

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager  
Signed:

Date Reported: 16.11.2012  
Page 1 of 1

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Registered in England & Wales  
Registration Number: 6930692  
Reg Office: Diasma, Willie Snail Rd  
Newmarket, Suffolk, CB8 7SQ
## TEST RESULTS

<table>
<thead>
<tr>
<th>Laboratory Reference</th>
<th>Sample Reference</th>
<th>Location</th>
<th>Depth Top</th>
<th>Depth Base</th>
<th>Description</th>
<th>Moisture Content [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL3913-1/1</td>
<td>DCS101</td>
<td></td>
<td>1.50m</td>
<td>N/A</td>
<td>Firm light brown silty CLAY</td>
<td>30</td>
</tr>
<tr>
<td>PL3913-1/2</td>
<td>DCS102</td>
<td></td>
<td>1.20m</td>
<td>N/A</td>
<td>Firm light brown slightly sandy silty CLAY</td>
<td>28</td>
</tr>
<tr>
<td>PL3913-1/3</td>
<td>DCS103</td>
<td></td>
<td>1.50m</td>
<td>N/A</td>
<td>Firm light brown slightly silty CLAY</td>
<td>23</td>
</tr>
</tbody>
</table>

**Comments:**

Approved Signatory: M. Hartnup - Laboratory Manager

Date Reported: 16.11.2012
Form Number: EN/C/705 Version 15

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for and on behalf of Enverity Ltd

Registered in England & Wales
Registration Number: 6930692
Reg Office: Diasma, Willie Snaith Rd
Newmarket, Suffolk, CB8 7SQ

**Client:** Applied Geology Ltd
**Client Address:** Unit 23 Abbey Park
Stareton Kenilworth
Warwickshire
CV8 2LY

**Contact:** Adam Perks

**Site Name:** St Andrews School
**Site Address:** Northampton

**Certificate Number:** PL3913-1/1/705
**Client Reference:** AG1750-12
**Job Number:** PL3913-1
**Date Sampled:** Unknown
**Date Received:** 08.11.2012
**Date Tested:** 12.11.2012
**Certificate of Sampling:** N/A
**Sampling Certificate No.:** N/A
**Sampled By:** Client
Dear Adam Perks

Test Report Number 215767
Your Project Reference AG1750 - St. Andrews Primary School, Northampton

Please find enclosed the results of analysis for the samples received 5 November 2012.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely

Darrell Hall, Director

Notes to accompany report:
- The sign < means ‘less than’
- Tests marked ‘U’ hold UKAS accreditation
- Tests marked ‘M’ hold MCertS (and UKAS) accreditation
- Tests marked ‘N’ do not currently hold UKAS accreditation
- Tests marked ‘S’ were subcontracted to an approved laboratory
- n/e means ‘not evaluated’
- i/s means ‘insufficient sample’
- u/s means ‘unsuitable sample’
- Comments or interpretations are beyond the scope of UKAS accreditation
- The results relate only to the items tested
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- None of the test results included in this report have been recovery corrected
# LABORATORY TEST REPORT

## CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

Results of analysis of 4 samples received 5 November 2012

---

### Solid Waste Analysis

<table>
<thead>
<tr>
<th>Determinand</th>
<th>SOP</th>
<th>*</th>
<th>Units</th>
<th>2:1 Eluate mg l⁻¹</th>
<th>8:1 Eluate mg l⁻¹</th>
<th>2:1 Eluate mg kg⁻¹</th>
<th>10:1 Cumulative Eluate mg kg⁻¹</th>
<th>Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Organic Carbon</td>
<td>2625</td>
<td>M</td>
<td>%</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss on Ignition</td>
<td>2610</td>
<td>N</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total BTEX</td>
<td>2761</td>
<td>M</td>
<td>mg kg⁻¹</td>
<td>&lt;0.005</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Total PCBs (7 congeners)</td>
<td>2811</td>
<td>N</td>
<td>mg kg⁻¹</td>
<td>&lt;1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TPH Total WAC</td>
<td>2670</td>
<td>M</td>
<td>mg kg⁻¹</td>
<td>&lt;10</td>
<td></td>
<td></td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Total (of 17) PAHs</td>
<td>2700</td>
<td>N</td>
<td>mg kg⁻¹</td>
<td>&lt;2</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>2010</td>
<td>M</td>
<td></td>
<td>7.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acid Neutralisation Capacity</td>
<td>2015</td>
<td>mol kg⁻¹</td>
<td>0.004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Eluate Analysis

<table>
<thead>
<tr>
<th>Determinand</th>
<th>SOP</th>
<th>*</th>
<th>2:1 Eluate mg l⁻¹</th>
<th>8:1 Eluate mg l⁻¹</th>
<th>2:1 Eluate mg kg⁻¹</th>
<th>Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Barium</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Cadmium</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Chromium</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Copper</td>
<td>1450</td>
<td>N</td>
<td>0.002</td>
<td>0.001</td>
<td>&lt;0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Mercury</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.0005</td>
<td>&lt;0.0005</td>
<td>&lt;0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Nickel</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Lead</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Antimony</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>Selenium</td>
<td>1450</td>
<td>N</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Zinc</td>
<td>1450</td>
<td>N</td>
<td>0.007</td>
<td>0.006</td>
<td>&lt;0.5</td>
<td>4</td>
</tr>
<tr>
<td>Chloride</td>
<td>1220</td>
<td>N</td>
<td>21</td>
<td>4.2</td>
<td>42.1</td>
<td>49.1</td>
</tr>
<tr>
<td>Fluoride</td>
<td>1220</td>
<td>N</td>
<td>0.14</td>
<td>0.14</td>
<td>&lt;1</td>
<td>1.4</td>
</tr>
<tr>
<td>Sulfate</td>
<td>1220</td>
<td>N</td>
<td>24</td>
<td>7.2</td>
<td>48.1</td>
<td>79.1</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>1040</td>
<td>N</td>
<td>120</td>
<td>41</td>
<td>240</td>
<td>444</td>
</tr>
<tr>
<td>Phenol Index</td>
<td>1920</td>
<td>N</td>
<td>&lt;0.030</td>
<td>&lt;0.030</td>
<td>&lt;0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>1610</td>
<td>N</td>
<td>8.9</td>
<td>7.9</td>
<td>&lt;50</td>
<td>79.4</td>
</tr>
</tbody>
</table>

### Solid Information

- Dry mass of test portion/kg: 0.175

### Leach Test Information

- Leachant volume 1st extract/l: 0.319
- Leachant volume 2nd extract/l: 1.4
- Eluate recovered from 1st extract/l: 0.074

---

All tests undertaken between 5-Nov-2012 and 14-Nov-2012

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

---

Column page 1

Report Page 1 of 2

LIMS sample ID range AH92239 to AH92242
LABORATORY TEST REPORT

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

Results of analysis of 4 samples received 5 November 2012

AG1750 - St. Andrews Primary School, Northampton

Report Date
14 November 2012

Login Batch No 215767
Chemtest LIMS ID AH92242 Soil: AH92240
Sample ID DCS103
Sample No
Sampling Date 01/11/2012
Depth 0.60m

Solid Waste Analysis

<table>
<thead>
<tr>
<th>Determinand</th>
<th>SOP</th>
<th>Units</th>
<th>Limit Values for Compliance Leaching Test Using BS EN 12457-3 at L/S 10 l/kg</th>
</tr>
</thead>
</table>
| Total Organic Carbon | 2625 | M % | 0.62
| Loss on Ignition | 2610 | N % | 4.1
| Total BTEX | 2761 | Mg kg⁻¹ | <0.005
| Total PCBs (7 congeners) | 2811 | Mg kg⁻¹ | <1
| TPH Total WAC | 2670 | Mg kg⁻¹ | <10
| Total (of 17) PAHs | 2700 | Mg kg⁻¹ | <100
| pH | 2010 | M | 7.8
| Acid Neutralisation Capacity | 2015 | mol kg⁻¹ | 0.005

Eluate Analysis

<table>
<thead>
<tr>
<th>Determinand</th>
<th>SOP</th>
<th>Units</th>
<th>2:1 Eluate mg l⁻¹</th>
<th>8:1 Eluate mg l⁻¹</th>
<th>2:1 Eluate mg kg⁻¹</th>
<th>Cumulative 10:1 Eluate mg kg⁻¹</th>
<th>Limit Values for Compliance Leaching Test Using BS EN 12457-3 at L/S 10 l/kg</th>
</tr>
</thead>
</table>
| Arsenic | 1450 | N | <0.001 | <0.001 | <0.05 | <0.05 | 0.5 | 2 | 25
| Barium | 1450 | N | 0.009 | <0.001 | <0.5 | <0.5 | 20 | 100 | 300
| Cadmium | 1450 | N | <0.0005 | <0.0005 | <0.01 | <0.01 | 0.04 | 1 | 5
| Chromium | 1450 | N | <0.001 | <0.001 | <0.05 | <0.05 | 0.5 | 10 | 70
| Copper | 1450 | N | <0.003 | <0.002 | <0.05 | <0.05 | 2 | 50 | 100
| Mercury | 1450 | N | <0.0005 | <0.0005 | <0.01 | <0.01 | 0.01 | 0.2 | 2
| Molybdenum | 1450 | N | <0.001 | <0.001 | <0.05 | <0.05 | 0.5 | 10 | 40
| Nickel | 1450 | N | <0.001 | <0.001 | <0.05 | <0.05 | 0.4 | 10 | 40
| Lead | 1450 | N | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5
| Antimony | 1450 | N | <0.001 | <0.001 | <0.01 | <0.01 | 0.06 | 0.7 | 5
| Selenium | 1450 | N | <0.001 | <0.001 | <0.01 | <0.01 | 0.1 | 0.5 | 7
| Zinc | 1450 | N | 0.005 | 0.002 | <0.5 | <0.5 | 4 | 50 | 200
| Chloride | 1220 | N | 2.6 | 2.4 | 5.21 | 24.1 | 800 | 15000 | 25000
| Fluoride | 1220 | N | 1 | 0.49 | 2 | 5.18 | 10 | 150 | 500
| Sulfate | 1220 | N | 14 | 4.6 | 28 | 51.1 | 1000 | 20000 | 50000
| Total Dissolved Solids | 1040 | N | 120 | 56 | 240 | 595 | 4000 | 60000 | 100000
| Phenol Index | 1920 | N | <0.030 | <0.030 | <0.5 | <0.5 | 1 | | |
| Dissolved Organic Carbon | 1610 | N | 12 | 8.8 | <50 | 89.8 | 500 | 800 | 1000 |

Solid Information

Dry mass of test portion/kg 0.175

Leach Test Information

Leachant volume 1st extract/l 0.324
Leachant volume 2nd extract/l 1.4
Eluate recovered from 1st extract/l 0.0948

All tests undertaken between 5-Nov-2012 and 14-Nov-2012
* Accreditation status
This report should be interpreted in conjunction with the notes on the accompanying cover page.

Landfill Waste Acceptance

Criteria Limits

Stable Inert Waste Landfill
Non-reactive Hazardous Waste in Non-Hazardous Landfill
Hazardous Waste Landfill

Solid Waste Analysis

Dry mass of test portion/kg 0.175

All tests undertaken between 5-Nov-2012 and 14-Nov-2012
* Accreditation status
This report should be interpreted in conjunction with the notes on the accompanying cover page.

Landfill Sample ID range AH92239 to AH92242
Dear Adam Perks

Test Report Number 215763
Your Project Reference AG1750 - St. Andrews Primary School, Northampton

Please find enclosed the results of analysis for the samples received 5 November 2012.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely

Keith Jones, Technical Manager

Notes to accompany report:
- The sign < means ‘less than’
- Tests marked ‘U’ hold UKAS accreditation
- Tests marked ‘M’ hold MCertS (and UKAS) accreditation
- Tests marked ‘N’ do not currently hold UKAS accreditation
- Tests marked ‘S’ were subcontracted to an approved laboratory
- n/e means ‘not evaluated’
- i/s means ‘insufficient sample’
- u/s means ‘unsuitable sample’
- Comments or interpretations are beyond the scope of UKAS accreditation
- The results relate only to the items tested
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
  - For all other tests the samples were dried at < 37°C prior to analysis
  - Uncertainties of measurement for the determinands tested are available upon request
  - None of the test results included in this report have been recovery corrected
LABORATORY TEST REPORT  
Results of analysis of 5 samples  
received 5 November 2012  
AG1750 - St. Andrews Primary School, Northampton

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Sampling Date</th>
<th>Matrix</th>
<th>Depth</th>
<th>Sample No</th>
<th>CAS No</th>
<th>Determinand</th>
<th>Units</th>
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<tr>
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<td>1/11/2012</td>
<td>SOIL</td>
<td>0.40m</td>
<td>AH92232</td>
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<td>Arsenic</td>
<td>mg kg⁻¹</td>
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All tests undertaken between 05/11/2012 and 12/11/2012  
* Accreditation status  
This report should be interpreted in conjunction with the notes on the accompanying cover page.
## LABORATORY TEST REPORT

Results of analysis of 5 samples
received 5 November 2012

AG1750 - St. Andrews Primary School, Northampton

### 215763

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Date</th>
<th>Depth</th>
<th>PAH</th>
<th>M (mg kg⁻¹ M)</th>
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<td>Benzo[a]pyrene</td>
<td>&lt; 0.1</td>
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<td>0.30m</td>
<td>Benzo[a]pyrene</td>
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<td>Benzo[a]pyrene</td>
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<td>Benzo[a]pyrene</td>
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<td>1/11/12</td>
<td></td>
<td>Benzo[a]pyrene</td>
<td>&lt; 0.1</td>
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</table>

**All tests undertaken between 05/11/2012 and 12/11/2012**

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

LIMS sample ID range: AH92232 to AH92236
Site: St. Andrews Primary School, Northampton  
Job No: AG1750-12  
Land Use: Residential without plant uptake  
Dataset: Made Ground and Glacial Lake Deposits  
Soil Organic Matter (%): 1%

| Exploratory Hole Reference |  
| Depth (m) | DC3101 0.40 Made Ground | DC3102 0.30 Made Ground | DC3103 0.25 Glacial Lake Deposits | No. of samples (n) | Arithmetic mean (x) | Normalised upper bound (U{sub}B) | Soil Screening Value (1% SOM) | Source & Justification |
| Strata | Units | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| Organic Matter (%) | % | 1.1 | 0.5 | 0.8 | 3 | 0.81 | | | |
| Arsenic | mg kg{sup}-1 | 24 | 15 | 13 | 3 | 17.33 | 27.21 | 35 | Atkins ATRISK (March 2011) |
| Cadmium | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 84 | Atkins ATRISK (March 2011) |
| Chromium | mg kg{sup}-1 | 31 | 24 | 20 | 3 | 25.00 | 34.39 | 327 | AG derived using published data & CLEA v1.06 |
| Copper | mg kg{sup}-1 | 11 | 9.4 | 13 | 3 | 11.13 | 14.17 | 6200 | AG derived using published data & CLEA v1.06 |
| Lead | mg kg{sup}-1 | 14 | 11 | 12 | 3 | 13.33 | 18.75 | 383 | Atkins ATRISK (March 2011) |
| Mercury | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 238 | AG derived using published data & CLEA v1.06 |
| Nickel | mg kg{sup}-1 | 23 | 18 | 18 | 3 | 19.87 | 24.53 | 130 | Atkins ATRISK (March 2011) |
| Selenium | mg kg{sup}-1 | 0.2 | 0.2 | 0.2 | 3 | 0.20 | 0.20 | 595 | Atkins ATRISK (March 2011) |
| Zinc | mg kg{sup}-1 | 66 | 52 | 54 | 3 | 57.33 | 70.10 | 40431 | AG derived using published data & CLEA v1.06 |
| Acenaphthene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 2020 | AG derived using published data & CLEA v1.06 |
| Acenaphthylene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 1950 | AG derived using published data & CLEA v1.06 |
| Anthracene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 19800 | AG derived using published data & CLEA v1.06 |
| Benzo[a]anthracene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 3.7 | AG derived using published data & CLEA v1.06 |
| Benzo[a]pyrene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 1.00 | AG derived using published data & CLEA v1.06 |
| Benzo[b]fluoranthene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 6.8 | AG derived using published data & CLEA v1.06 |
| Benzo[j]fluorene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 47 | AG derived using published data & CLEA v1.06 |
| Benzo[k]fluoranthene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 10.0 | AG derived using published data & CLEA v1.06 |
| Benzo[l]pyrene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 9 | AG derived using published data & CLEA v1.06 |
| Benzo[a]pyrene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 0.9 | AG derived using published data & CLEA v1.06 |
| Fluoranthene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 972 | AG derived using published data & CLEA v1.06 |
| Fluorene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 1850 | AG derived using published data & CLEA v1.06 |
| Indeno[1,2,3-cd]pyrene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 4.2 | AG derived using published data & CLEA v1.06 |
| Naphthalene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 1.8 | AG derived using published data & CLEA v1.06 |
| Phenanthrene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 837 | AG derived using published data & CLEA v1.06 |
| Pyrene | mg kg{sup}-1 | 0.1 | 0.1 | 0.1 | 3 | 0.10 | 0.10 | 2330 | AG derived using published data & CLEA v1.06 |

Key:  
- Values in sample set exceed screening value  
- Statistical value exceeds screening value  
- Values in bold are reported at the laboratory limit of detection

Source & Justification:
- Made Ground
- Glacial Lake Deposits
- No. of samples
- Arithmetic mean
- Normalised upper bound (U{sub}B)
- Soil Screening Value (1% SOM)
<table>
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<tr>
<th>Monitoring Visit</th>
<th>DCS101</th>
<th>DCS102</th>
<th>DCS103A</th>
</tr>
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<tr>
<td></td>
<td>Water Level (m bgl)</td>
<td>Base of installation (m bgl)</td>
<td>Water Level (m bgl)</td>
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<td>14/11/2012</td>
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<td>4.00</td>
<td>DRY</td>
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<td>21/11/2012</td>
<td>DRY</td>
<td>3.98</td>
<td>DRY</td>
</tr>
</tbody>
</table>
Variable Head Permeability Test Data Sheet

Job Name: St. Andrews Primary School
Job Number: AG1750-12
Borehole No: DCS101

<table>
<thead>
<tr>
<th>Elapsed Time (t) (mins)</th>
<th>Depth to water from top of casing or standpipe (m)</th>
<th>Head (H) (m)</th>
<th>Head Ratio (H/H₀)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.00</td>
<td>4.10</td>
<td>1.000</td>
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<tr>
<td>0.5</td>
<td>0.81</td>
<td>3.29</td>
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<td>0.776</td>
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<tr>
<td>1.5</td>
<td>1.04</td>
<td>3.06</td>
<td>0.746</td>
</tr>
<tr>
<td>2.0</td>
<td>1.11</td>
<td>2.99</td>
<td>0.729</td>
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<tr>
<td>3.0</td>
<td>1.22</td>
<td>2.88</td>
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<td>4.0</td>
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<td>2.87</td>
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<td>6.0</td>
<td>1.24</td>
<td>2.86</td>
<td>0.698</td>
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<tr>
<td>7.0</td>
<td>1.27</td>
<td>2.83</td>
<td>0.690</td>
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<tr>
<td>10.0</td>
<td>1.45</td>
<td>2.65</td>
<td>0.646</td>
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<td>15.0</td>
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Permeability Results

Does Plot of Time vs Head Ratio go below H/H₀ = 0.37?  
Yes  Use Basic Time Lag  
NO   Use General Approach

Basic Time Lag Approach:

\[ k = \frac{A}{FT} \]

Basic Time Lag T = 59 mins
Permeability k = 4.02E-07 m/sec
**Variable Head Permeability Test Data Sheet**

**Job Name:** St. Andrews Primary School  
**Job Number:** AG1750-12  
**Borehole No:** DCS103

### Field Data

<table>
<thead>
<tr>
<th>Elapsed Time (t) (mins)</th>
<th>Depth to water from top of casing or standpipe (m)</th>
<th>Head (H) (m)</th>
<th>Head Ratio (H/H₀)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.00</td>
<td>4.10</td>
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<td>0.5</td>
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<td>2.83</td>
<td>0.690</td>
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### Permeability Results

Does Plot of Time vs Head Ratio go below H/H₀ = 0.37?  

- **Yes** Use Basic Time Lag  
- **NO** Use General Approach

#### Basic Time Lag Approach:

\[ k = \frac{A}{F T} \]

Basic Time Lag \( T = 19.5 \text{ mins} \)  
Permeability \( k = 1.21 \times 10^{-6} \text{ m/sec} \)