Nantwich Waterlogged Deposits: Report No 4

Phase 2: Monitoring Programme Results and Interpretation

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Executive Summary

The Nantwich Waterlogged Deposits Phase 2 monitoring programme was conducted over a five year period from 2011 – 2016 and was designed to provide scientifically robust data on how preservation conditions within the urban waterlogged deposits beneath the town changed over time.

This programme consisted of 18 groundwater dipwells which have been monitored every three months and sampled annually, while rainfall was recorded daily. Water quality was assessed for changes in dissolved oxygen, conductivity, pH, temperature and redox potential. Gas meter readings were also taken quarterly, staggered with the groundwater testing. Groundwater levels were measured using an audible dipmeter, whilst water quality was assessed by inserting a digital water meter into the dipwell. In addition the water level was measured automatically on a daily basis at six key locations, so as to provide more detailed data for comparison with the quarterly monitoring. Groundwater samples were taken annually so that they could be tested in a laboratory for what levels of specific chemicals were present. This provided comparative data and a good control, helping provide confidence in the quarterly results of groundwater sampling.

This Historic England-funded study is a unique attempt to systematically characterize a specific urban environment in which organic archaeological remains have been well-preserved. In Nantwich, two zones of preservation were found: well-preserved organic remains, in areas bordering the river; and more variable preservation, with some active decay, in a higher part of the town. The first zone is a pH-neutral environment with high sulphide and low nitrate content. It is thus conducive to preservation of organic remains such as wooden artefacts and plant material. The second zone was once also waterlogged, and there is grave concern that the burial environment there is drying out more quickly as a result of modern changes in the town centre.

The implications of this research are of value far beyond the Nantwich Supplementary Planning Document for the *Area of Special Archaeological Importance*, which has been produced to guide future development in Nantwich, and which has been included as part of the evidence base for Cheshire East Council's emerging local plan. For example, the issues of ground stability, water management and sustainable development raised by the situation in Nantwich are equally applicable to all urban centres with comparable environments (these are generally those with poor drainage and that are prone to episodic flooding). The success of the Nantwich project in characterizing conditions beneath historic towns makes it a valuable comparator for similar projects in Norway, the Netherlands and other European countries. Indeed, considerable amounts of information and advice have been exchanged at international conferences between these various projects.

However the work has also identified the difficulties involved in producing a coherent understanding of all the complex issues that help to preserve, or threaten, buried remains. Equally challenging is the problem of how to influence decisions at a sufficiently strategic level to provide effective long-term management as the best approach is to change behaviour so that future infrastructure, public realm and building projects in the town are designed in such a way as to encourage re-watering of the deposits. The aim is to raise awareness of the issue among decision-makers in the local authority (including spatial planners and engineers), whilst also educating developers in the importance of the archaeological resource and its sensitivity to intrusive works. Standing buildings are threatened if the drying-out of waterlogged deposits results in subsidence, a factor that might ultimately be more persuasive than concern for the buried archaeology itself.

1.0 INTRODUCTION

This report details the results from a five year programme of monitoring at Nantwich, Cheshire, to assess the variability in hydrological and geochemical conditions within the archaeological deposits that underlie the historic centre of the town. This nationally unique project was funded by Historic England through grant-aid to Cheshire East Council, and has been designed to help establish best practice for a standard methodology for monitoring of waterlogged remains within urban centres. The robust scientific data gathered have allowed analysis of how the conditions conducive to preservation have fluctuated seasonally and annually, and how the unsaturated capillary fringe or vadose zone is an important component in ensuring good preservation conditions for organic remains, in spite of the deposit not being fully saturated. The duration of the monitoring programme has ensured that abnormal results from a single year have not skewed the data, whilst comparison to the baseline established in 2007 has shown that the general burial environment has remained reasonably consistent over the period of investigation.

The five years of monitoring have produced a large corpus of data which is summarised in the Appendices of this report and remains available for consultation as metadata through hosting on the Archaeology Data Service (ADS) website[1]. This report has focused instead on analysis of trends in the data and the interpretations that derive from that analysis. The monitoring data have used proxy indicators to help interpret the degree to which the burial environment enables agents of decay to act on ancient organic remains. These indicators include the degree of saturation within sediments, water quality parameters, and the ratios of oxygen-reducing chemical species on a scale from aerobic – anoxic conditions.

Several papers have been delivered at national and international symposia, and publications from some of these have been produced[2]. These provide interim statements and comparative studies with related types of site and deposits, to complement the final report on completion of the five year programme of monitoring, which is presented in the following chapters. In addition five interim reports have been produced to record the results from the monitoring programme annually, and these reports have been peer reviewed by the project steering group. The need for data compilation and interim report presentation has been extremely beneficial as, together with the challenge and review sessions, it has provided an iterative process which has tested the effectiveness of the methodology and posed research questions as the project progressed, leading to enhanced methods and more robust data sets. In addition, following the success at Nantwich, English Heritage (now Historic England) has commissioned a series of preliminary studies of other urban waterlogged deposits, at Bristol, Berwick, Boston, Carlisle, and Droitwich as part of a tiered approach to help understand the archaeological resource in accordance with a new guidance document[3].

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[1] https://www.google.co.uk/?safe=strict&gws_rd=ssl#safe=strict&q=archaeology+data+service&*

[2] Malim, T. and Panter, I., 2012 Is preservation in-situ an unacceptable option for development control? Can monitoring prove the continued preservation of waterlogged deposits? *Conservation and Management of Archaeological Sites, Vol. 14 Nos 1–4, 2012, 429–41*;

Malim, T., Panter, I., and Swain M. 2015 The hidden heritage at Nantwich and York: Groundwater and the urban cultural sequence *Quaternary International 368, 5-18*;

Malim, T., Morgan, D., and Panter, I. 2015 Suspended preservation: particular preservation conditions within the Must Farm - Flag Fen Bronze Age landscape *Quaternary International 368, 19-30*;

Malim, T., Swain, M., and Panter. I, 2016 Monitoring and Management options in the preservation of urban waterlogged deposits, Nantwich, UK *Conservation and Management of Archaeological Sites, Vol.18 Nos 1-3, 139-155*

[3] https://historicengland.org.uk/images-books/publications/preserving-archaeological-remains/

2.0 BACKGROUND

2.1 The origins to the first phase of the project

In April 2007 Cheshire County Council, with funding from the Historic Environment Enabling Programme, English Heritage, commissioned SLR Consulting to undertake a programme of work on Nantwich's waterlogged deposits, including desktop study, a campaign of field coring, and the preparation of a management strategy. This work aimed to map the extent of waterlogged deposits, to investigate formation processes for the onset of waterlogging, and to characterise the geochemistry and groundwater of the burial environment. One of the outputs was to provide a strategic framework for long-term management and investigation of this rare resource.

The results of this project are presented in:

- *Waterlogged Archaeological Deposits, Nantwich, Cheshire: Desktop study of archaeological and borehole investigations* (SLR Consulting Ltd July 2007);
- *Nantwich Waterlogged Deposits Report No. 2: The Character and Extent of Archaeological Preservation* (SLR Consulting Ltd November 2009); and
- *Nantwich Waterlogged Deposits Report No 3 Management Strategy: Supplementary Planning Document for the Historic Environment and Archaeological Deposits* (SLR Consulting Ltd January 2010).

2.2 Summary results from Phase 1

Investigations in Nantwich over the past 30 years have revealed exceptional finds such as hollowed out oak trunks (known as "salt-ships"), structural timbers and wooden water channels, stave-built barrels and lids, leather shoes, accumulations of organic-rich stable floorings and domestic waste, and deep organic-rich silty deposits. These finds date from the Iron Age - medieval periods. Their distribution throughout the town, however, is not fully understood: the factors that have governed their initial creation and long-term preservation are unknown, and the threats to their continued survival through modern development and hydrological change are of great concern. With limited knowledge about the extent and character of these deposits effective planning control advice has been problematic at times, and the former Historic Environment Team, Cheshire County Council proposed the original project in order to design a well-informed management strategy which could be implemented by the local planning authority.

The original project included the compilation of existing information from boreholes and archaeological investigations, so that information on the occurrence and depth of waterlogged deposits could be layered over geological and historical mapping. GIS modelling was employed to suggest the possible sub-surface topography and natural drainage. A desktop report was produced in June 2007 which informed the selection of 30 borehole locations for further investigation; to aid the iterative process and development of the best methodology this coring programme was undertaken in two stages (in August and September 2007) with a monitoring review between them. A variation was proposed as a consequence of this review process, to improve on the methodology as envisaged in the original project design.

This variation from the original scheme permitted the insertion of 11 dipwells, so that baseline data could be gathered on variations in sub-soil water chemistry and movement. This was an innovative idea to add value to the original scope of the project through implementation of an economical method for long-term monitoring. Money was saved by utilizing the drilling of boreholes during the second stage of geoarchaeological investigation in 2007, rather than requiring a separate phase of drilling to install piezometers. Two locations were chosen to act as control points (AB and L) which lie on the western and

eastern limits of the waterlogged zone, and other locations were selected to reflect the varying state of preservation detected within the area between the control points.

Results from the coring programme and assessment of soil samples recovered from the boreholes have helped in defining the limits and depth of the waterlogged deposits, as well as characterising their nature. Two distinct zones of preservation dependent on urban hydrology have been identified from the geochemical assessment. A low-lying zone adjacent to the river in which well-preserved organic remains have been recovered[4], and a secondary zone along the higher slopes in which organic preservation has been detected but active decay appears to be in progress[5] (Figure 1). The evidence for this comes from poorly preserved invertebrate and diatom remains, as well as high sulphate and nitrate levels in the deposits liable to fluctuation above the present groundwater level. Within this zone, however, it was also noted that sulphate levels decreased and sulphide increased with depth, so that below the water-table good conditions for preservation continued to exist.

The implications of the Nantwich research are of value far beyond the application of a supplementary planning document to manage change within the historic core of one town. Keen interest in the methodology and results from the first phase has been expressed by a wide range of individuals and organizations. Issues of ground stability, sustainable development and urban water management raised by this project are equally applicable to all urban centres with known or potential preservation of organic-rich deposits. European collaboration has included the transfer of information and protocols, and the success of the Nantwich project in characterising the burial conditions and preservation beneath the historic town provides a valuable comparison for similar projects undertaken in Norway, The Netherlands and other European countries. However the work has also identified the difficulties in producing a coherent understanding of all the complex issues involved that help to preserve and to threaten such cultural heritage, and the problems of influencing decisions at a sufficiently strategic level to provide effective long-term management.

Although the Nantwich Phase 1 project enabled informed decision-making at the highest levels, an assessment of the results of the Phase 1 project identified a series of issues which needed further analysis in order to address the long term sustainable management of fragile waterlogged archaeological deposits. This formed the basis of the aims and objectives of this project design for a second phase.

2.3 The sub-surface deposit model

The grid of boreholes drilled over the historic core of Nantwich from both phases of the project has allowed a simple model to be created which is presented below in Figures 2 - 6 as a series of transects running north-west – south-east and west – east across the main area of waterlogged deposits. Basal geology comprises Mercian Mudstone with Glacial Till above, which is present across wide areas to the east and west of the River Weaver and forms the main geology beneath Nantwich. The river terrace deposits which overlie the clay consist of sandy silts with clay and gravel, which can extend to 3 – 5m in thickness. Above the natural geological strata, anthropogenic deposits have accumulated up to c.4m in depth from the current ground surface, comprising organic-rich silts, as well as archaeological horizons with carbonized organic remains, and more recent made-ground. Salt-working and flooding, as well as domestic and stable waste, have contributed to the build-up of deposits, which at times are interspersed with redeposited mineral-rich horizons.

[4] Preservation Zone 1

[5] Preservation Zone 2

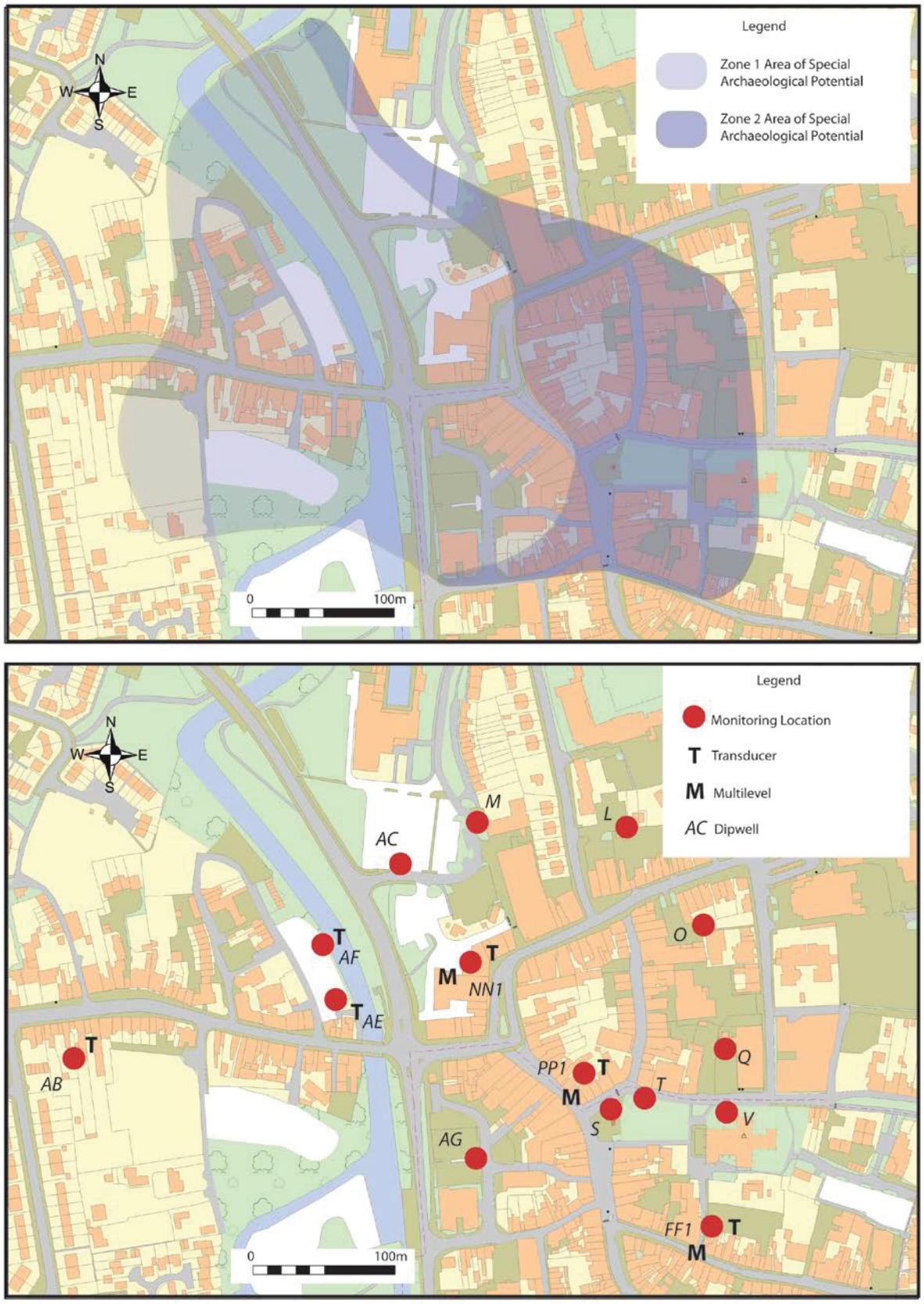


Figure 1
Preservation Zones (Phase 1) and monitoring locations (Phase 2) within Nantwich

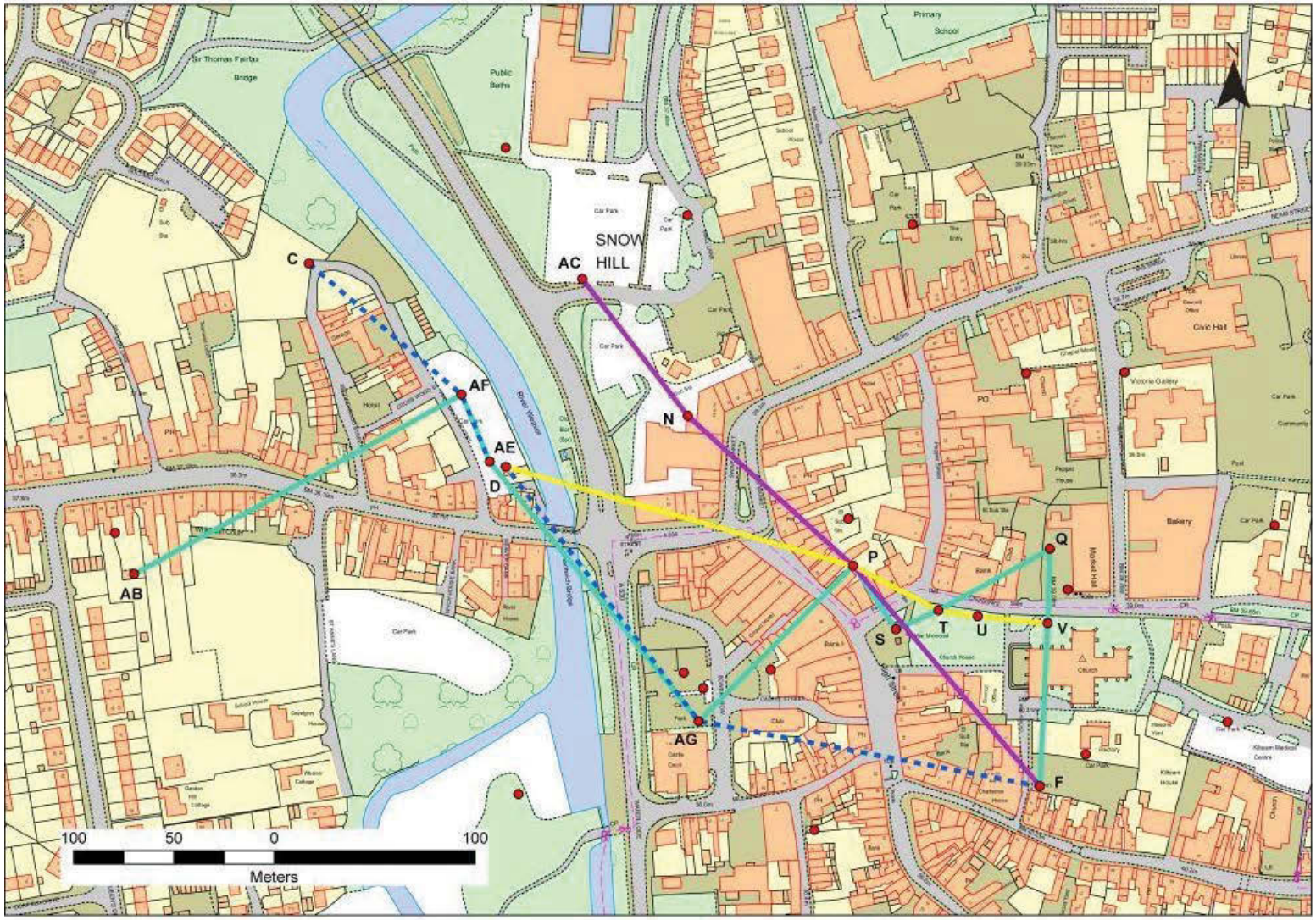


Figure 2 Location of dipwells and drawn transects between boreholes

n.b. Borehole A is located north of the Public Baths, just beyond the edge of the plan

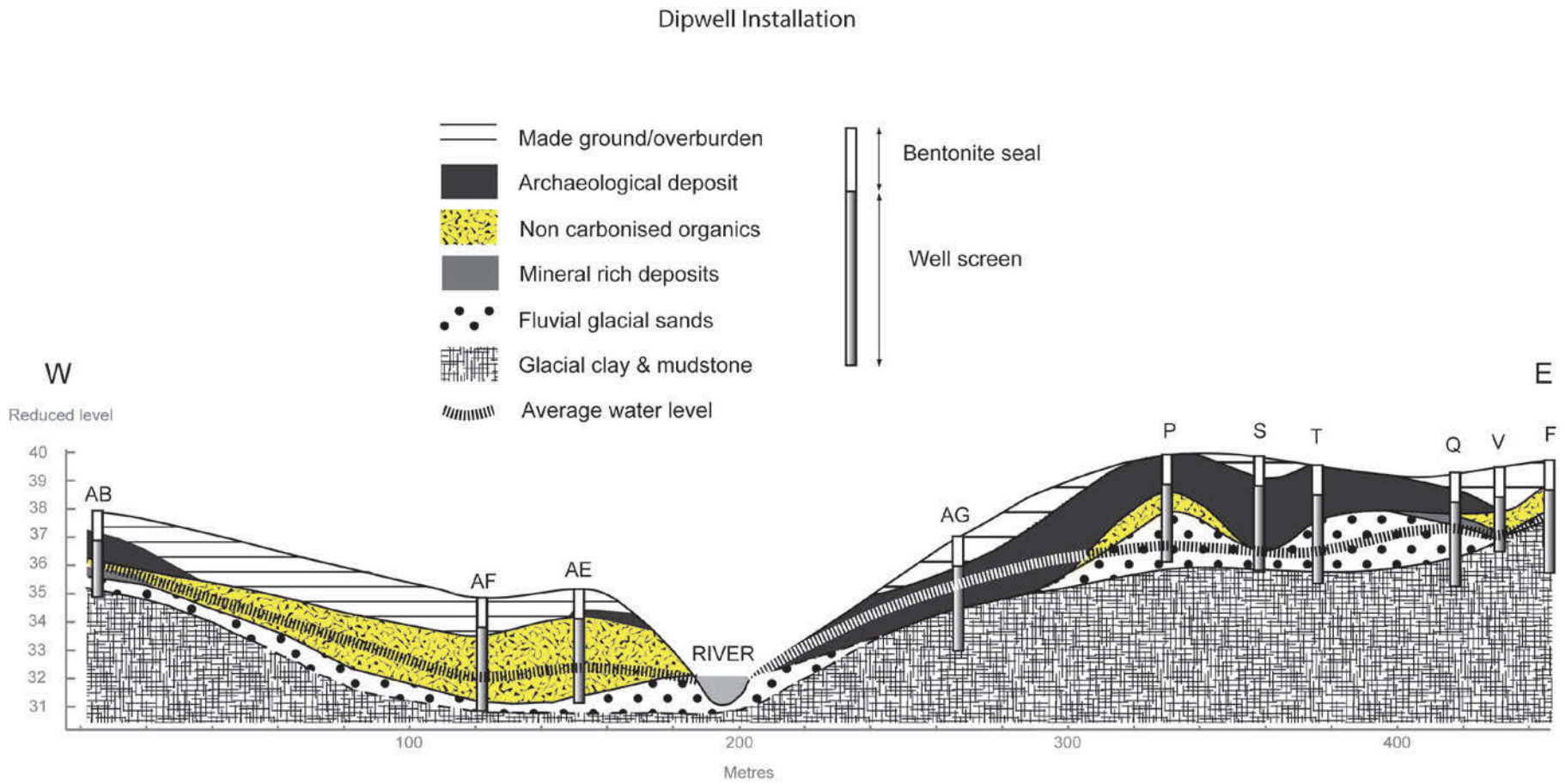


Figure 3 Transect AB, AF, AE, AG, P, S, T, Q, V, F (west and east sides of river Welsh Row – Church Lane) showing deposit model and basal geology

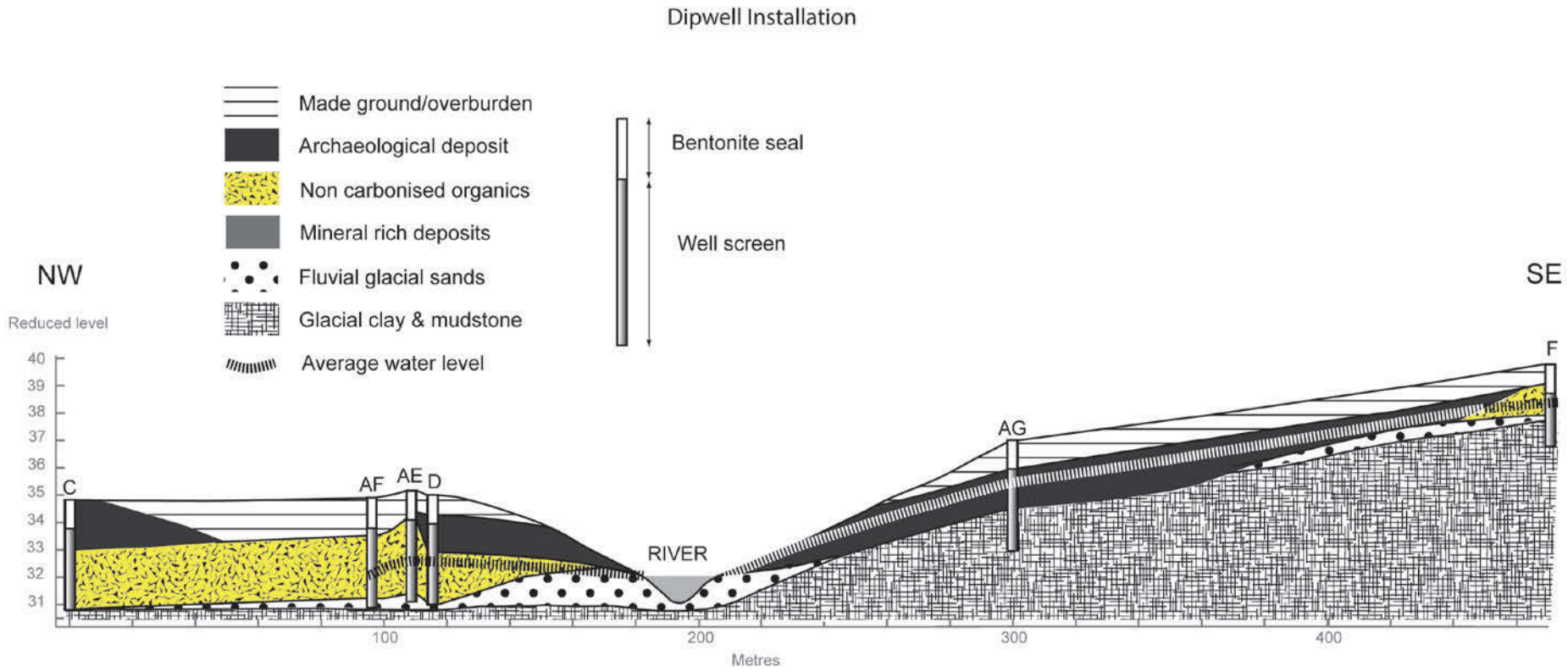


Figure 4 Transect C, AF, AE, D, AG, F (west and east sides of river 2nd Wood Street - Church Lane) showing deposit model and basal geology

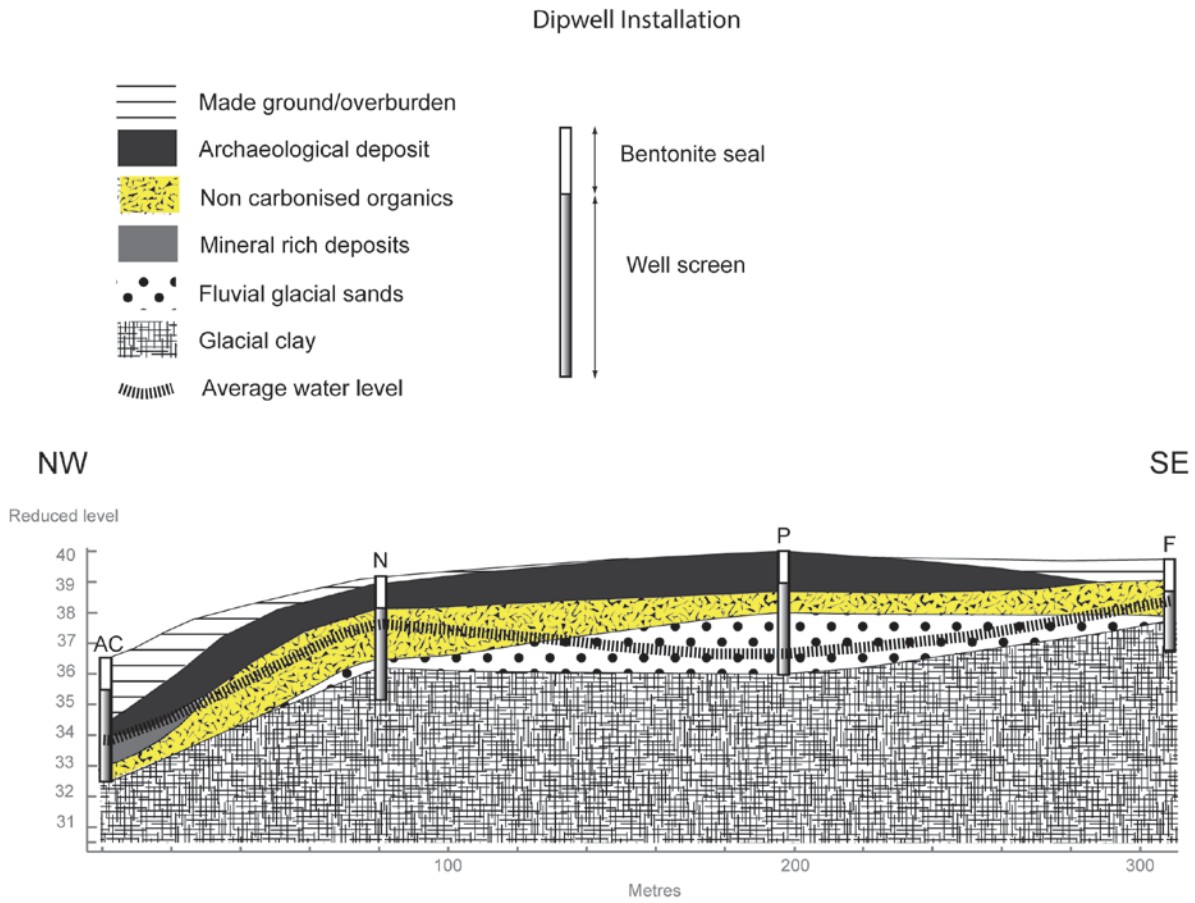
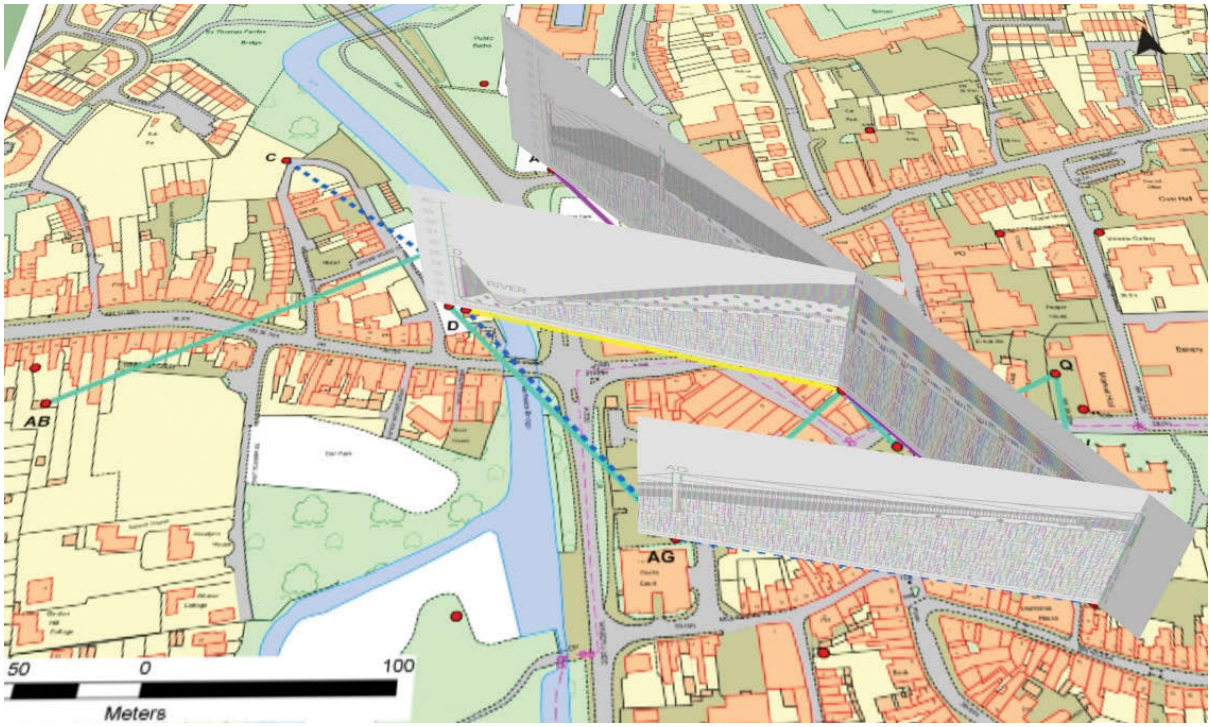


Figure 5 Transect AC, N, P, F (west side of river Snow Hill – Church Lane) showing deposit model and basal geology; 3D model below



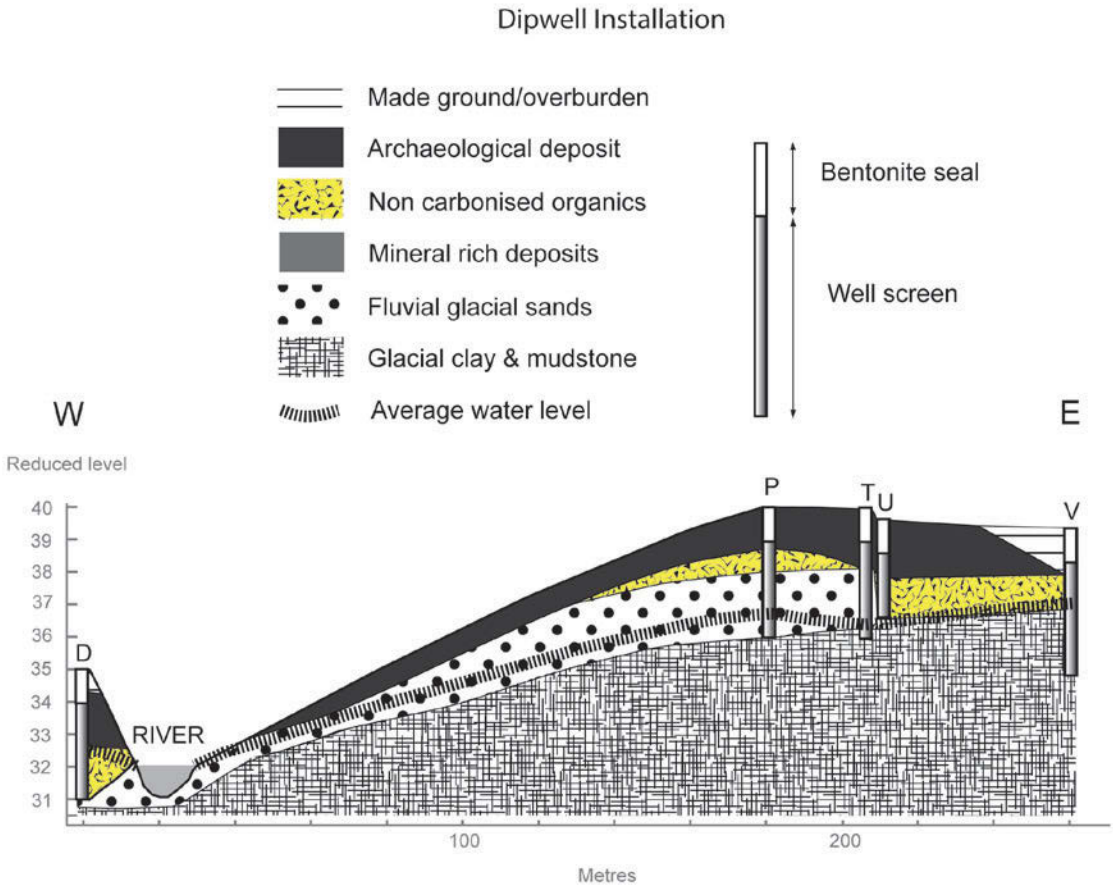


Figure 6 Transect D, P, T, U, V (west and east sides of river Wood Street – Church) showing deposit model and basal geology

The transects represented in Figures 3 – 6 are simplified versions of the borehole logs which can be found in Appendices A and B. The original detailed archaeological descriptions and lenses of each core extracted during the borehole investigations are recorded on one set of logs (Appendix A), and then the multiple descriptions have been interpreted and each description assigned to one of five broad categories of deposit (Interpretation boreholes Appendix B):

- Made ground,
- Archaeological deposit,
- Non-carbonised organics,
- Mineral-rich deposits, and
- Fluvial-glacial sands

These are explained in more detail below (section 7.2) and also in the 2nd report (*Nantwich Waterlogged Deposits Report No. 2: The Character and Extent of Archaeological Preservation* SLR Consulting Ltd November 2009), but the distinction between Made ground and Archaeological deposit can be very diffuse (the made ground assumed to be of relatively modern origin). In addition the Mineral-rich deposit has been adjusted to mean deposits that are probably of natural origin, rather than redeposited sand (as was found at the top of the sequence in BH V for example). Interpretation of the origin, rather than descriptive nature, of the deposit has changed the mineral-rich deposit at top of BH V to made ground, because this was located in the churchyard and is assumed to have derived from grave-digging activity, whereas the mineral-rich deposits in BH A are most likely a result of flooding.

Non-carbonised organics refer to part of the archaeological sequence that demonstrated clear evidence for inclusion of wood, plant material, or other organic component, as opposed to an Archaeological deposit that was of anthropogenic origin and had bone, pottery, ash or mortar in it, but did not contain specific evidence for organic remains.

Borehole investigation allows a keyhole view of the deposit, but does not characterise it entirely, as it is chance as to whether the extracted sample included organic remains or not. For example boreholes that were located in areas where previous archaeological investigation had occurred, sometimes did not include evidence for organic remains, even though the larger-scale excavation had included such evidence (see for example Tables 1 & 2 in the 1st report (*Waterlogged Archaeological Deposits, Nantwich, Cheshire: Desktop study of archaeological and borehole investigations* SLR Consulting Ltd July 2007)). The data from the boreholes logs and subsequent analyses are included within a project database which will be archived and available for study from the Archaeological Data Services (ADS) website.

3.0 AIMS AND OBJECTIVES

3.1 Aims

3.1.1 National

The nationally strategic aim of the Nantwich Waterlogged Deposits project was to develop and test a scientifically rigorous methodology for characterizing and monitoring the historic buried remains in urban waterlogged deposits so that bespoke management plans could be designed to secure the long-term conservation of such remains in ancient urban centres where this is viable.

3.1.2 Regional

The regional aim of the project was to protect and conserve the historic core of Nantwich, one of the best preserved towns in the northwest, renowned for its variety of standing 16th century and later timber-frame buildings. The group value of the many listed buildings is recognised as an important resource in the conservation area designation, which acknowledges the role of these assets in attracting tourists and providing an improved quality of life. In addition the town centre is built upon an extensive area of deeply stratified and waterlogged deposits containing a wealth of palaeoenvironmental data and organic remains from Iron Age to post-medieval times. The vulnerability of these deposits from desiccation, and from physical or chemical changes to the burial environment, threatens not only the survival of buried remains, but also the structural stability of the above-ground historic environment.

3.1.3 Local

Locally the aim of the project was to design a revised management strategy to help protect Nantwich as an *Area of Special Archaeological Potential,* and to ensure that this strategy is adopted and implemented by the new arrangements for local government and planning control within Cheshire. This will include a requirement for geoarchaeolgical investigation as part of development within the town centre, so that new data are constantly added to the baseline established by the Phase 2 project, and against which changes to the waterlogged deposits can be measured. Such an approach will allow a dynamic management tool to be employed in the conservation of Nantwich's historic environment.

3.2 Objectives

3.2.1 Objective 1

To develop and test an effective methodology for monitoring the preservation of *in situ* waterlogged deposits and organic remains, within the context of extensive urban wetlands. This would be the first such comprehensive methodology to be produced in the UK and would act as a principal guidance document for future projects of a similar nature.

3.2.2 Objective 2

To develop a management tool that will benefit national and international partners as part of a collaborative effort to enhance the care and conservation of important waterlogged deposits at risk from urban development, changes to water management systems and climate change. This tool would need to embrace the core values of spatial and water

management planning in an urban context, and to raise awareness of the needs of the historic environment to be a major consideration as part of such strategic thinking.

3.2.3 Objective 3

To gather data on types and rates of change to the burial environment, which can be measured against the baseline data, in order to enable a greater understanding of the dynamics of conditions that are either conducive, or threatening, to continued preservation. This requires sufficient rigour to be statistically acceptable and to be of comparative value for international studies. These data will form the baseline against which geoarchaeological coring data, required as part of the planning process for any future development in the town centre, can be analysed.

3.2.4 Objective 4

To disseminate the results from both phases of the project as an integrated study, detailing the methodologies that have been developed and their validity for application to other urban areas, and providing interpretation of the results and the preservation process for the specific case study at Nantwich.

3.2.5 Objective 5

To revise the supplementary planning advice note so that Cheshire East Council, the successor authority to Crewe and Nantwich Borough Council, can implement a coherent strategy towards its planning decisions within the historic core of Nantwich. This will include development of a proactive management strategy for the preservation of urban waterlogged deposits.

3.2.6 Objective 6

To raise awareness of the national and international significance of the buried and built heritage of Nantwich to the local community, and to identify the vulnerability to desiccation or incremental change to the local burial environment, that would lead to degradation of the historic value of the town.

3.3 Products and Outcomes

The products and outcomes of Objectives 1, 2 and 3 are presented in sections 4 – 8 below. The products for Objective 4 are listed above under Introduction, and include three international conference papers delivered and published, a published summary in *Historic England Research Online Issue 4*[6]*,* presentation to an English Heritage workshop on urban waterlogged deposits, five annual interim reports (listed in the bibliography) and this final report. The product for Objective 5 was a supplementary planning document[7], which has been endorsed as part of the evidence base for the local plan and is available online at Cheshire East Council. The products for Objective 6 include a presentation at a Cheshire Archaeology Day event, and an article in the Nantwich Museum magazine.

[6] https://historicengland.org.uk/images-books/publications/historic-england-research-4/

[7] http://www.cheshirearchaeology.org.uk/wp-content/uploads/Nantwich_SPD_rev2_final.pdf

4.0 OBJECTIVE 1: THE NANTWICH METHODOLOGY AND ENHANCEMENTS

4.1 Summary of Methodological Tasks Undertaken

The Phase 2 project design underwent a number of iterations between the proposals submitted by the designers (SLR Consulting, YAT and Cheshire Council's Historic Environment Team) and the funders (English Heritage) during the period 2009 – 2010. The original project design was rejected due to the limited budget available at EH, and a reduced scheme for three years monitoring, rather than five years, was substituted. Exceptional rainfall in year two, however, meant that justification for a two year extension was accepted by EH as a variation with additional funding, and the full five year programme was then implemented. This section describes the fieldwork methodology undertaken as part of the project since 2011, which comprised the following key elements:

- Drilling seven additional boreholes and installing dipwells at each of these locations to increase the grid of monitoring locations across Nantwich (AE, AF on west side of River Weaver, AG and F2 on east side), and to provide multi-level monitoring (at N1, P1, F1) where good organic preservation was identified in Phase 1 (see Figure 1);
- Acquiring sediment samples for geochemical and palaeoenvironmental analysis from two cores (AE, AF);
- Installing water level data loggers in key selected dipwells in order to take daily groundwater measurements (AB, AE, AF, N1, P, and F1)[8];
- Installing a rain gauge and barometer at Nantwich Museum to collect daily rainfall and atmospheric pressure measurements;
- Undertaking in situ permeability testing at all fifteen separate dipwell locations;
- Collecting groundwater samples from each of the fifteen separate dipwell locations for geochemical laboratory analysis on an annual basis; and
- Conducting quarterly monitoring at seventeen dipwells for groundwater level, water quality parameters and ground gas concentrations.

The approach for each task is detailed below along with any methodological improvements that were developed to address specific issues that arose during the monitoring programme. In addition two separate English Heritage value-added projects were conducted in 2012 at Location N, N1, designed to compare different methods for monitoring redox[9], and to evaluate methods for measuring moisture content within sediments[10]. The methodology and results from Nantwich have also been used to inform the development of Historic England guidance and related case studies[11].

[8] F1 and F2 were drilled in Phase 2, because in Phase 1 stage 1 no dipwell was installed at Location F. As the organic remains recovered from Location F identified this as a target for the Phase 2 monitoring programme, two new dipwells were required, F1 screened for the non-carbonised organic remains cultural horizon only and to host the transducer, whilst F2 was screened for the full depth of the dipwell to retrieve data comparable with the majority of other dipwells. At Location P a dipwell had been installed in 2011 which was screened for the full sequence beneath the bentonite seal, and P1 was drilled in Phase 2 so that only the non-carbonised organic remains cultural horizon could be screened. Unfortunately P1 was above the watertable, and so the transducer and all measurements had to be taken from the original Phase 1 dipwell at BH P.

[9] Panter, I., and Davies, G. March 2015 Preservation in situ guidance – redox potential measurement Final Report *York Archaeological Trust Conservation Department Report No: 2013/54*, English Heritage project No. 6524

[10] Panter, I., and Davies, G. March 2015 Preservation in situ guidance – Soil Moisture Measurement Final Report *York Archaeological Trust Conservation Department Report No: 2014/70*, English Heritage project No. 6523

[11] https://historicengland.org.uk/images-books/publications/preserving-archaeological-remains/

4.2 Borehole Drilling and Monitoring Well Installation

The drilling of the seven additional boreholes was completed using the same methodology as applied in Phase 1.

Before drilling each location was checked for underground services using a cable avoidance tool, in addition to checking all manhole covers in the vicinity and referring to the services drawings provided by the utilities companies. Safety barriers were set up around the work area to prevent the general public being injured by the window sampling rig. The concrete or tarmacadam hard surfacing was then cut out and removed using a rotary coring device attached to the window sampling rig to enable the percussive drilling of soils to proceed.

A 100mm steel cutting tool containing a plastic core liner was advanced into the ground with a percussive hammer. The percussive hammer was repeatedly lifted and dropped by a revolving chain on the window sampler pushing the window sampler into the ground at an increment of a few centimetres until a depth of one metre had been reached. A tubular steel cylindrical casing was advanced simultaneously outside the cutting tool to prevent loose material collapsing back into the hole.

The cutting tool was then extracted from the hole using a hydraulic extraction system and the plastic core liner containing the sediment core sample was pulled out of the cutting tool. A new plastic core liner was then inserted into the cutting tool ready for the next sample. The empty cutting tool was then placed back into the hole ready to progress the hole by another metre. A steel rod was then screwed into the base of the cutting tool and an additional length of casing was connected to the length already in the ground. The next metre was then advanced using the percussive hammer and the next core sample was extracted using the winch on the rig.

This process was repeated until the desired depth was reached, and the casing was not extracted until the groundwater monitoring-well installation was complete. A 50 mm diameter slotted PVC monitoring well was then installed into each borehole to provide a means of monitoring groundwater and soil gas, and obtaining groundwater and gas samples as required. Although well screens were positioned to target specific archaeological horizons in three locations (F1, N1, P1) and intercept water levels within the underlying sedimentary sequence, most dipwells included a well screen that extended to the full depth below the 1m deep bentonite plug at the top. The top one metre of each borehole was secured with a length of blank casing, and the annulus between blank casing and the borehole was sealed with bentonite and cement to prevent surface water entering the well. A rubber bung with a gas tap was placed on top of each well to allow natural soil gases to accumulate and be monitored using a gas analyser. Each hole was capped off with a stopcock cover set in concrete.

The sediment cores were immediately taken to the Palaeoecology Research Services laboratory in Hull for detailed recording and sampling.

4.2.1 Methodological enhancement

The condition of several monitoring dipwell covers and gas taps gradually deteriorated over time, particularly in areas with high traffic volumes. Ongoing maintenance of the headworks was therefore required to ensure that the wells remained accessible. Generally the survival of the dipwells and lack of vandalism was remarkable, but unfortunately location AG was eventually lost in 2015 due to resurfacing work in the Bowers Row/Crown Hotel car park.

4.3 Characterization of deposits from Phase 2 borehole investigation

4.3.1 Geochemical Soil Analysis

In order to characterise the nature of the burial environment, six additional soil samples were submitted to an accredited laboratory for analysis. Samples were selected following on site assessment of each core in discussion with the project palaeoenvironmentalist. Samples were selected from those deposits that appeared to be "archaeological" and also from deposits that appeared to have an organic component. Although no samples were collected from location AG or the additional boreholes at location F, N and P which had been previously sampled in Phase 1, sufficient samples were taken from a range of deposit types in AE and AF to enable deposit characterisation.

Approximately 250g of sediment per sample was extracted from the core and stored in an airtight plastic container which was then kept at a low temperature until despatch to the laboratory. The majority of samples were despatched within 96 hours of sampling. Rapid despatch was necessary to reduce potential for the samples to become oxidised or to dry out, and this process was carried out in accordance with standard practice[12].

The parameters measured in the laboratory by using standard techniques included pH, loss on ignition, conductivity, natural moisture content ratio and assays for total sulphur, sulphide, sulphate, nitrate, nitrite, ammoniacal nitrogen, total iron, sodium, chloride and phosphate. Unfortunately the laboratory was unable to undertake iron II and III assays.

4.3.2 Palaeoecological Assessment

The boreholes were extracted in one metre plastic sleeves which had to be split in order to examine and describe the sediment sequences on delivery to the laboratory. The properties of the sediments were recorded and a preservation category (PC) assigned to the layers following the state of preservation scale (SOPS) established by NIKU[13] for the recording of borehole samples.

The cores were subdivided into subsamples according to their stratigraphic composition and placed into labelled polythene bags. Where the sediment was consolidated the sampling was undertaken so as to preserve the stratigraphy. Where unconsolidated, the depth range of the sequence was recorded but the internal stratigraphy of the subsample could not be retained. During recording, subsamples were also extracted for chemical analysis, where possible retaining approximately half of the sediment sequence for the preservation study.

The positions of organic inclusions (typically of waterlogged wood) within the boreholes were recorded and they were removed as organic 'spot' samples (*sensu* Dobney et al. 1992) for identification, recording and subsequent submission as possible candidates for radiocarbon dating.

Samples were selected for processing based on their potential to address the project aims (i.e. to provide information on the waterlogged preservation of organic remains in the deposits under Nantwich).

[12] This procedure derived from the BS5930 code of practice for site investigation (BSI 1999)

[13] Riksantikvaren and Norsk Institutt for Kulturminneforskning, 2008, *The Monitoring Manual. Procedures and Guidelines for Monitoring, Recording and Preservation Management of Urban Archaeological Deposits*

Subsamples were processed for the recovery of plant and invertebrate macrofossils, broadly following the techniques of Kenward et al. (1980). The weights of the subsamples were recorded prior to processing. For each of the processed macrofossil subsamples small quantities of sediment (a few tens of grammes) were extracted for a parallel investigation of microfossil preservation.

The assessment techniques were the same as those adopted for Phase 1, as discussed in the report produced on conclusion of the initial project in 2010 (see above in Section 2, Background).

4.4 Groundwater Monitoring and Sampling 2011 - 2015

All of the groundwater monitoring wells installed during the coring programme have been monitored on a quarterly basis and sampled annually between February 2011 and December 2015. The depth to groundwater and the base of the well were measured using a dip meter during each monitoring and sampling visit. The annual sampling for geochemical indicators was designed in order to provide comparative data for the quarterly monitoring. The quarterly monitoring round and daily monitoring by transducers, were included in the monitoring regime to provide data for understanding seasonal variation, as well as relationship to rainfall events.

4.4.1 Annual sampling

For the annual sampling round groundwater samples were taken in accordance with USEPA guidelines[14] using a peristaltic pump discharging through a flow cell connected to a YSI 556™ digital water quality meter. Properties including pH, eH (redox Potential), conductivity, temperature and dissolved oxygen were recorded using the water quality meter, and each dipwell was purged of stagnant water until the water quality parameters stabilised. The flow cell was then disconnected to avoid cross contamination, and the sample containers supplied by the laboratory were filled using the peristaltic pump, and all of the sample containers containing preservatives were filled with water filtered in the field using a 45 micron filter. The preservatives included hydrochloric acid, nitric acid and zinc acetate. The analysis for pH, conductivity, sulphide, sulphate, nitrate, ammoniacal nitrogen, total dissolved iron, iron II, iron III, dissolved manganese, manganese II, manganese IV, sodium, chloride, phosphate and dissolved methane was completed at an accredited laboratory, Jones Environmental Forensics of Deeside.

4.4.2 Quarterly monitoring

For the quarterly monitoring visits when samples were not required, the water quality parameters were recorded in situ using the YSI 556™ digital water quality meter. The measurement probes were placed into the monitoring well using a 4m long cable, instead of using the flow cell and peristaltic pump. The probes were left in situ for approximately 15 minutes until the readings had stabilised and the results for each parameter were recorded. This approach was adopted at the project design stage to save time and reduce costs.

4.4.3 Comparison of Methodologies for Monitoring Water Quality Parameters

A comparison of the techniques for measuring water parameters including redox, dissolved oxygen, electrical conductivity and pH was undertaken at location N as part of a separate

[14] USEPA, 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA/540/S-95/504

English Heritage funded project completed between July 2012 and June 2013, and the results are also of value to this project (see further details in section 6.7 below).

Four methods for comparative water monitoring were undertaken:

- A YSI water quality meter was used to measure these parameters in situ before purging;
- a flow through cell connected to a peristaltic pump;
- sample collection using a passive bailer after purging; and
- in situ after purging.

The tests were repeated on a monthly basis in both monitoring wells at location N, N1, which were screened at different depths in order to target different layers within the deposits.

The tests revealed that although the different techniques had little impact on the pH or redox results, the bailing process, however, was found to oxygenate the water samples. Another problem with the bailing process was that it caused a reduction in water level which then drew in more saline water from a deeper layer and caused a significant increase in conductivity. In contrast the results from both the in situ monitoring and the low flow purging using the flow cell (which generally draws in water horizontally from the surrounding deposits), were broadly consistent (apart from some fluctuations in redox), which helps support the validity of using the less time-intensive technique of in situ monitoring with a water quality meter.

4.4.4 Daily monitoring and Rainfall Data Logger

Daily monitoring was employed at selected locations by installing transducers (data loggers), at three locations on either side of the river, to monitor more detailed changes to water levels than could be achieved on a quarterly interval. The data loggers were also set to automatically record groundwater temperature on a daily basis. The six transducers were installed in dipwells F1, N1, P, AB (as a control on the edge of the Preservation Zone), AE and AF. The transducer that was intended for installation in dipwell AG was moved to AB because no waterlogged deposits were recorded in Bowers Row Car Park, and a transducer was installed in dipwell P instead of P1, because P1 contained insufficient water. The data loggers were installed at the base of each monitoring well, and the data were downloaded using an optical reader connected to a field laptop computer on a quarterly basis. The water level was measured manually using an audible dip meter during installation and at each subsequent data download event to confirm the actual depth to water. A barometric pressure data logger was also installed at Nantwich Museum in order to calibrate the readings from the water level data loggers.

A rain gauge connected to a digital data logger was also installed to the rear of Nantwich Museum. The rain gauge consisted of a calibrated tipping bucket mechanism connected to a data logger that counted the number of tips caused by rainfall.

4.4.5 Methodological issues and enhancements

Water quality meter

Several reliability issues occurred with the YSI 556™ digital water quality meter during the project, and consequently it was not always possible to collect a full data set during each monitoring visit. Additionally some measurements taken on a particular round (pH and dissolved oxygen) appear substantially elevated from the norm (see Table 2 below), which suggest there might have been a defective probe. Sufficient data were collected over the course of the project, however, for this not to present a significant issue overall.

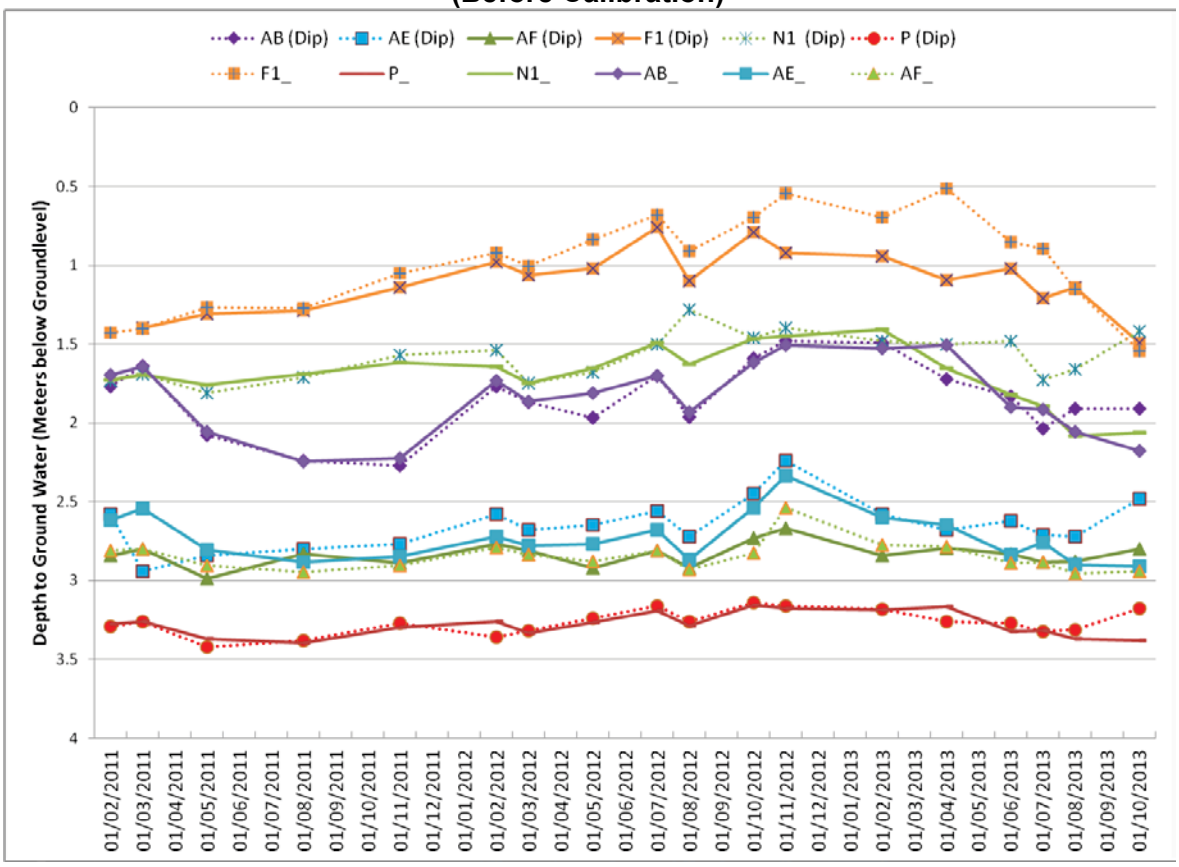
redox

An additional issue was the need to correct measurements taken in the field by the platinum redox electrode by adjustment to the standard hydrogen electrode (SHE) reference measurements. This correction is necessary because it is impractical to use SHE electrodes in the field, and therefore more field-suitable reference electrodes are used. However, this means that field redox measurements then need to be converted to the values that would have been recorded using a SHE electrode in accordance with BS ISO 11271. The difference is generally 211mV lower than the field measurement, but this is temperature dependent. SHE corrections were therefore included into the data processing phase.

Calibration of transducer data

A comparison with the manual dip data (see **Figure 7** below) confirmed that it was necessary to calibrate the information from the water level data-loggers on a regular basis to account for drift in the measurement device and movement of transducers during downloading events. This was achieved by correcting the transducer data to correlate with the manual dip readings.

Figure 7
Groundwater Measurements with Data-logging Transducer v. Dip Meter (Before Calibration)



Rectification of transducer data errors

During 2014 it was noticed that some of the groundwater level data-loggers were becoming unreliable. In order to eliminate the gaps in the data set additional data-loggers were installed in the multilevel monitoring points (Locations F1, N1 and P), and the number of measurements was increased to four readings per day to provide additional back up data. The increased sampling frequency successfully resolved the issue, although the additional

data loggers provided an effective backup system. As the data set grew substantially, quality control procedures (data checking through visual inspection of the dataset) became increasingly important in eliminating human error for the increasing amount of data processing that was required.

Rain gauge and more frequent monitoring visits

The location of the rain gauge at Nantwich Museum was not ideal due to the amount of rain shadow caused by the surrounding buildings and trees, but unfortunately there were no other suitable locations to securely store the device within the town centre.

Nesting insects and larvae blocked the rain gauge between the 17th June and 19th September 2011 and therefore there is gap in the rainfall information for this period[15]. In order to prevent blockages to the rain gauge, a nylon mesh was fitted to the rain collection device in November 2011. This was successful in preventing the build-up of leaf litter and insect larvae that had caused the rain gauge to stop working.

A revised maintenance schedule was also put in place by separating the quarterly water quality and gas monitoring visits by a six week interval. Not only did this allow the rain gauge to be serviced more regularly, but it also enabled additional rounds of groundwater monitoring to be completed using a dip meter to supplement the daily water level data from the six transducer monitoring points.

4.5 Permeability Testing

In situ permeability testing was undertaken in fifteen of the dipwells during 2011 in order to assess the differences in permeability within the varying soil types encountered during the previous borehole investigations. The tests used a plastic cylindrical slug that had been lowered into the water column to displace a fixed volume from the dipwell. Once the groundwater level had returned to rest conditions the plastic cylindrical slug was removed as quickly as possible. The rate of groundwater recharge was then measured using a pressure transducer to calculate the length of time that the water level took to stabilise. The results were then analysed to calculate the permeability of the deposits at each location.

4.6 Gas Monitoring and Sampling

Quarterly ground gas monitoring was undertaken in each of the installed seventeen dipwells using a Geotechnical Instruments GA2000 or GA5000 gas analyser. The Gas Analyser was used to measure the concentration of hydrogen sulphide, methane, oxygen, carbon monoxide and dioxide through the gas taps which have been fitted to the majority of dipwells. Methane and hydrogen sulphide are indicators of anaerobic conditions, whilst oxygen, carbon monoxide and carbon dioxide are more indicative of aerobic deposits.

Liaison with Historic England's scientific dating team and with SUERC identified an acceptable methodology and equipment for sampling gas, and rapidly processing these samples to extract a radiocarbon determination for the potential age of the origin of the gas. A special round of gas monitoring was conducted when barometric pressures were low enough (below 1000mb) on the 16th September 2015, and two dipwells displayed sufficiently high levels of methane (AC) and carbon-dioxide (AE) for sampling purposes.

[15] data available from John Moore's university has been used as a substitute for this period

Sampling was undertaken by pumping through gas taps which seal the dipwells, using a GA5000. The gas was then stored in a 1 litre Tedlar bag, and despatched to SUERC's laboratories next day (**Figure 8**).

Figure 8
Gas sampling for C14

5.0 OBJECTIVE 2: OPTIMUM APPROACH TO CHARACTERIZATION AND MONITORING

In addition to clear documentation on aims, objectives, methodology, parameters, personnel, programme and communications, the results from the monitoring programme have suggested some optimum techniques and methodologies which can be recommended for future monitoring projects in other historic urban centres, or where waterlogged deposits are preserved within the unsaturated or vadose zone. The elements of an effective monitoring programme include:

- appropriately calibrated equipment;
- porosity and permeability testing of the sedimentary deposits;
- a sufficient network of monitoring points across the extent of waterlogged remains;
- a series of georeferenced and levelled borehole logs with descriptions of the deposit sequence detailed enough to identify organic remains, their depths within the sequence, and conditions of preservation (based on the Norwegian protocols);
- geochemical analysis of key parameters from the deposit sequence;
- redox and TDR measurements from deposit horizons which contain organic remains;
- annual geochemical sampling using same suite of parameters as used in baseline;
- gas monitoring for carbon monoxide, carbon dioxide, hydrogen sulphide, methane;
- water level, dissolved oxygen, electrical conductivity, pH, temperature; and
- rainfall measurements

The monitoring interval is dependent on issues such as whether annual or seasonal change is being monitored, but the use of data-loggers allows flexibility. Ideally data should be gathered from the specific horizon with organic remains rather than from a wider zone. The suite of groundwater geochemical testing which has been used as proxy indicators of the conditions for preservation within the waterlogged deposits at Nantwich included:

- Nitrate
- Manganese
- Phosphate
- Sulphate
- Ferric iron (III)
- Ferrous iron (II)
- Sodium
- Ammoniacal nitrogen
- Sulphide
- Chloride
- Calcium carbonate
- Carbon

The monitoring data and laboratory analyses permit assessment of whether high levels of degradation are probable due to aerobic conditions, or reducing levels of microbial activity with anaerobic conditions. For example if dissolved oxygen concentrates exceed 0.5mg/l it is highly likely that aerobic degradation is present[16]. The ratio of oxidised and reduced species allows assessment of the redox conditions, for example nitrate and ammonium, oxidised and reduced forms of iron, and sulphate to sulphide ratios. In summary the chain of electron receptors (or sequence of preference for degradation by micro-organisms) is oxygen → nitrate → iron → sulphate → carbon dioxide. Comparative studies in Norway have

[16] Carey, M.A., Finnamore, J.R., Morrey, M.J.., and Marsland, P.A. 2000 *Guidance on the Assessment and Monitoring of natural Attenuation of Contaminants in Groundwater* Environment Agency R&D Publication 95

suggested that good preservation conditions in sediment require high concentrations of, for example, ammonium (NH_4^+) >50mg/kg, sulphide (S^{2-}) >100mg/kg, sulphate (SO^4) >500 mg/kg, and less than 80% of reduced iron (Fe^{2+})[17]. Poor preservation is characteristically defined by low concentrations, e.g. nitrate (NO_3^-) >10mg/kg, sulphate (SO_4) <500 mg/kg, and reduced iron (Fe^{2+}) <20%.

These chemical analyses inform the initial characterization or baseline survey stage to inform on the current state of preservation, and also during subsequent monitoring to assess whether conditions conducive for preservation exist within the burial environment[18]. During the Nantwich project the current state of preservation was largely assessed through description of the sediment cores (observation and application of the Norwegian National Standard (NS 9451, 2008[19]), assessment of palaeoecological and wood structure, permeability testing, and geochemical analysis of sediment samples. The monitoring regime that followed on from the characterization of current preservation, focused on groundwater and water quality testing, gas emissions, and geochemical analyses of water samples to assess whether conditions appeared to be conducive for preservation.

The presence of water has long been understood as a major factor in the reasons for preservation of organic remains as it blocks oxygen ingress into the sediment pores, and so significantly reduces decay rates. Unsaturated archaeological deposits, however, can still contain well-preserved organic remains, as seen in Nantwich in dipwells AE and AF for example, where the capillary action through the silts draws moisture up from the watertable into the tension-saturated or vadose zone above. Therefore it is the degree of void space within the sediments which determines how preservation conditions will be affected by oxygen ingress.

Recent studies in Bryggen suggest that when the air content of a sediment exceeds 10 -15% by volume, it will have a noticeable effect on decay mechanisms, but that dissolved oxygen brought in by rainwater is of less importance for the introduction of oxygen into the vadose zone[20]. In addition temperature rise accelerates the potential rate of decay for both microbial and chemical reactions, with a 2 – 3 fold increase for a rise of 10^{o}C.[21] This only affected dipwell F1 at Nantwich, as most other dipwells recorded temperature change half this range.

The measurement of pH is also important, not only for assessment of redox conditions, but also as an indicator of other chemical changes over time. Studies at Star Carr for example, have recorded a difference in pH between *in situ* measurements and laboratory samples. Increased acidity seems to have been triggered by exposure to oxygen, and even a small reduction in water level or increase in atmospheric oxygen triggered sulphate production[22].

[17] Martens, V.V., and Bergersen, O. 2015 *In situ* site preservation in the unsaturated zone: Avaldsnes *Quaternary International 368, 68-79*.

[18] See for example Matthiesen, H. 2015 Detecting and quantifying ongoing decay or organic archaeological remains: A discussion of different approaches *Quaternary International 368, 43-50*

[19] Riksantikvaren and Norsk Institutt for Kulturminneforskning, 2008, *The Monitoring Manual. Procedures and Guidelines for Monitoring, Recording and Preservation Management of Urban Archaeological Deposits*

[20] Matthiesen, H., Hollesen, J., Dunlop, R., Seither, A. and De Beer, J. 2015 In situ measurements of oxygen dynamics in unsaturated archaeological deposits *Archaeometry 57, 6, 1078-1094*

[21] Matthiesen, H, Hollesen, J., and Gregory, D. 2015 Chapter 6 Preservation Conditions and Decay Rates in *Monitoring, Mitigation, Management: the groundwater project – safeguarding the world heritage site of Bryggen in Bergen* Riksantikvaren, p.82-3

[22] Boreham, S, Conneller, C., Milner, N., Taylor, B., Needham, A., Boreham, J., and Rolfe, C.J. 2011 Geochemical indicators of preservation status and site deterioration at Star Carr *Journal of Archaeological Science 38, 2833-2857*

6.0 OBJECTIVE 3: ANALYSIS OF DATA

6.1 Baseline and annual results

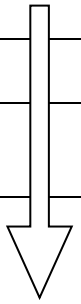
A series of interim reports were produced each year during Phase 2, and were used by the steering group to review progress and monitor success. The baseline results from the physical assessment of the cores retrieved from the dipwell installation were reported in the first two reports[23]. The data gathered during the project have been deposited at ADS.

6.2 A guide to redox geochemistry of groundwater

Dissolved oxygen at levels of 0.5 – 2 mg/L indicate that aerobic respiration is probably occurring. The Oxygen – Reduction Potential (ORP or Eh) is the relative tendency of a solute to gain or lose electrons, which in groundwater is normally due to the activity of organisms leading to biodegradation. This is measured in electrical current passing through the groundwater and recorded in mV, and calibrated to the standard hydrogen electrode (SHE) so that oxidising conditions occur above c.400mV with increasingly reducing conditions occurring as the measurement drop to -400mV.

Proxy indicators assess what chemical reactions are happening in groundwater, and how this compares to the scale of reduction occurring. The presence of methane and hydrogen sulphide generated from obligate and facultative anaerobes indicate a high level reducing environment, whereas the presence of sulphate, ferric iron and magnesium indicate reducing conditions, with nitrates and phosphates indicating a mildly reducing environment. The absence of these indicators is found in oxidising conditions (see Table 1).

Table 1
Summary of Principal redox Indicators

Description	Species present/absent	redox value (mV)	Microbes present	Decreasing rate of decay
Oxidising	Oxygen present	400 and above	Aerobes	
Mildly reducing	Nitrate, Manganese (Mn^{4+}) decline,	100 to 400	Facultative anaerobes	
Reducing	Sulphate, ferric Iron (Fe^{3+}) present	-100 to 100	Facultative anaerobes and obligate anaerobes	
Highly reducing	Sulphate and ferric Iron (Fe^{3+}) disappear Sulphide (S^{2-}), ammonium (NH_4^{+}), ferrous Fe^{2+} and methane present	-400 to -100	Obligate anaerobes	

System	redox potential range (mV) corrected to pH 7	Microbiology	Burial environment
Oxygen disappearance	+500 to +350	Aerobes	Oxic
Nitrate disappearance	+350 to +100	Facultative anaerobes	Sub-oxic
Manganese^{2+} formation	Below +400	Facultative anaerobes	
Fe^{2+} formation	Below +400	Facultative anaerobes	
Sulphide formation	0 to -150	Obligate anaerobes	Anoxic
Methane formation	below -150	Obligate anaerobes	

[23] January 2011 and November 2011 Nantwich Waterlogged Deposits Cheshire Phase 2 Interim Report No 1 English Heritage HEEP 3839 Main

6.3 Results of analysis of key parameters

A selection of some of the key parameters have been used to review how conducive for preservation the burial conditions have been at each of the monitoring locations over the five year period. A comparison between the observed state of preservation recorded during description of the original cores, and annual summary of groundwater parameters over the five year monitoring period, is presented in Table 2.

Table 2
Comparison of Different Monitoring Techniques – Annual Results

Location	Observed Baseline Preservation Conditions	Date	Dissolved Oxygen (mg/l)	Dissolved Methane (mg/l)	Saturation Conditions of archaeological deposit (hydrographs)	Geochemical Conditions from annual laboratory analysis	Eh Difference from Iron Boundary (mV)	Redox Environment
AB	LOUSY	Nov-07	0	0	UNSATURATED	OX	-155.4	RED
		Feb-11	1.85	0	VADOSE	OX	3.05	OX
		Feb-12	3.94	0.006	VADOSE	OX	149.25	OX
		Feb-13	0.76	0.007	VADOSE	OX	-52.65	RED
		Feb-14	2.85	0	VADOSE	OX	-42.5	RED
		Feb-15	0.01	0	VADOSE	OX	-349.5	RED
AC	POOR	Nov-07	0	0.051	VADOSE	RED	-226.35	RED
		Feb-11	0.77	0	VADOSE	RED	-186.05	RED
		Feb-12	1.12	0.364	VADOSE	RED	161.7	OX
		Feb-13	0.49	0	VADOSE	RED	-90.85	RED
		Feb-14	1.48	0	VADOSE	RED	-183.15	RED
		Feb-15	0.17	0.0	VADOSE	RED	-480.2	RED
AE	MEDIUM	Feb-11	0.86	1.981	VADOSE	RED	-117	RED
		Feb-12	0.7	5.273	VADOSE	RED	242.1	OX
		Feb-13	0.47	0	VADOSE	RED	-80.95	RED
		Feb-14	1.33	0	VADOSE	RED	-30.25	RED
		Feb-15	-	0	VADOSE	RED	-460.5	RED
AF	POOR	Feb-11	0.82	3.396	VADOSE	RED	-153.75	RED
		Feb-12	0.65	3.765	VADOSE	RED	245.7	OX
		Feb-13	0.51	4.019	VADOSE	RED	-97.55	RED
		Feb-14	1.24	0.11	VADOSE	RED	-194.9	RED
		Feb-15	-	1.0	VADOSE	RED	-450.7	RED
AG	MEDIUM	Feb-11	1.05	0.009	UNSATURATED	RED	170.4	OX
		Feb-12	1.05	0.012	SATURATED	RED	170.1	OX
		Feb-13	0.9	0	SATURATED	RED	-73.8	RED
		Feb-14	3.52	0	SATURATED	RED	51.65	OX
		Feb-15	-	1	SATURATED	RED	-332.9	RED
F1	MEDIUM	Feb-12	2.14	-	VADOSE	-	179.7	OX
		Feb-13	1.63	-	VADOSE	-	-64.55	RED
		Feb-14	5.78	-	UNSATURATED	-	0.4	OX
		Feb-15	-	-	VADOSE	-	-	-
F2	MEDIUM	Feb-11	0.94	0	SATURATED	RED	268.65	OX
		Feb-12	1.08	0.943	SATURATED	RED	217.4	OX
		Feb-13	1.03	0	SATURATED	RED	-23.25	RED
		Feb-14	2.48	0	SATURATED	RED	-4.7	RED
		Feb-15	-	0	SATURATED	RED	-295.4	RED
L	NULL	Nov-07	0.95	0.003	UNSATURATED	OX	-113.7	RED

Location	Observed Baseline Preservation Conditions	Date	Dissolved Oxygen (mg/l)	Dissolved Methane (mg/l)	Saturation Conditions of archaeological deposit (hydrographs)	Geochemical Conditions from annual laboratory analysis	Eh Difference from Iron Boundary (mV)	Redox Environment
		Feb-11	1.21	0.032	UNSATURATED	OX	-37.9	RED
		Feb-12	1.12	0	VADOSE	OX	139.8	OX
		Feb-13	0.46	0.012	UNSATURATED	OX	-26.65	RED
		Feb-14	6.14	0	UNSATURATED	OX	81.55	OX
		Feb-15	-	0	UNSATURATED	OX	-289.8	RED
M	LOUSY	Nov-07	0	0.008	VADOSE	OX?	-84.2	RED
		Feb-11	1.17	0	VADOSE	OX?	-46.35	RED
		Feb-12	1.25	0	VADOSE	OX?	181.6	OX
		Feb-13	1.24	0	VADOSE	OX?	-50.9	RED
		Feb-14	2.24	0	VADOSE	OX?	77	OX
		Feb-15	3.00	0	VADOSE	OX?	-408.6	RED
N	GOOD	Nov-07	1.08	2.9	VADOSE	RED	-224.2	RED
		Feb-11	0.97	-	VADOSE	-	-54.2	RED
		Feb-12	1.12	-	VADOSE	-	182.15	OX
		Feb-13	0.72	-	VADOSE	-	-42.95	RED
		Feb-14	2.15	-	VADOSE	-	95.9	OX
		Feb-15	0.83	-		-	-315.3	RED
N1	GOOD	Feb-11	1.22	8.107	VADOSE	RED	-48.85	RED
		Feb-12	1.36	6.777	VADOSE	RED	180.3	OX
		Feb-13	0.47	2.783	VADOSE	RED	-54.2	RED
		Feb-14	1.83	2.2	VADOSE	RED	-45.6	RED
		Feb-15	0.07	2	VADOSE	RED	-	-
O	POOR	Nov-07	0.07	2.2	VADOSE	RED	-191.85	RED
		Feb-11	2.37	0	VADOSE	RED	-20.2	RED
		Feb-12	1.13	0	VADOSE	RED	182.8	OX
		Feb-13	0.73	0	VADOSE	RED	-78	RED
		Feb-14	1.56	0	VADOSE	RED	30.75	OX
		Feb-15	-	0	VADOSE	RED	-385	RED
P	MEDIUM	Nov-07	0.00	0	UNSATURATED	OX	-195.95	RED
		Feb-11	0.82	0.007	UNSATURATED	OX	58.55	OX
		Feb-12	0.84	0	UNSATURATED	OX	148.45	OX
		Feb-13	0.69	0	UNSATURATED	OX	-80.9	RED
		Feb-14	1.94	0	UNSATURATED	OX	-110.15	RED
		Feb-15	0.94	0	UNSATURATED	OX	-380	RED
Q	NULL	Nov-07	0.51	0	UNSATURATED	OX	-140.05	RED
		Feb-11	1.14	0	UNSATURATED	OX	-100.8	RED
		Feb-12	2.1	0	UNSATURATED	OX	168.85	OX
		Feb-13	0.76	0	UNSATURATED	OX	-53	RED
		Feb-14	2.13	0.0056	UNSATURATED	OX	-42.45	RED
		Feb-15	-	0	UNSATURATED	OX	-387.9	RED
S	NULL	Nov-07	0.00	0	UNSATURATED	OX	-89.7	RED
		Feb-11	0.91	0.017	UNSATURATED	OX	117	OX
		Feb-12	1.27	0.005	UNSATURATED	OX	165.55	OX
		Feb-13	0.88	0.011	VADOSE	OX	-79.95	RED
		Feb-14	2.14	0	VADOSE	OX	-26.7	RED
		Feb-15	-	0.00	UNSATURATED	OX	-	-

Location	Observed Baseline Preservation Conditions	Date	Dissolved Oxygen (mg/l)	Dissolved Methane (mg/l)	Saturation Conditions of archaeological deposit (hydrographs)	Geochemical Conditions from annual laboratory analysis	Eh Difference from Iron Boundary (mV)	Redox Environment
T	POOR	Nov-07	0.04	3	UNSATURATED	RED	-220.65	RED
		Feb-11	0.9	2.97	UNSATURATED	RED	123.9	OX
		Feb-12	1.38	2.02	UNSATURATED	RED	189.15	OX
		Feb-13	1.4	0	UNSATURATED	RED	-61.95	RED
		Feb-14	4.95	0	UNSATURATED	RED	-15.65	RED
		Feb-15	-	0.00	UNSATURATED	RED	-	-
V	MEDIUM	Nov-07	0.00	0	VADOSE	RED	-222.9	RED
		Feb-11	1.23	0.094	VADOSE	RED	-198.7	RED
		Feb-12	1.42	0.026	VADOSE	RED	198.7	OX
		Feb-13	0.68	0.006	VADOSE	RED	-160.2	RED
		Feb-14	2.78	0	VADOSE	RED	-87	RED
		Feb-15	-	0	VADOSE	RED	-492.8	RED

6.3.1 Table 2: Criteria for data collection and processing

The observed baseline preservation conditions have been taken from the description of the cores, which applied the Norwegian Standard for characterizing deposits[24].

The dissolved oxygen and redox measurements were taken using a peristaltic pump discharging through a flow cell connected to a YSI 556™ digital water quality meter during the annual sampling round. The redox measurements were then corrected to standard hydrogen electrode (SHE) reference values and then comparing the results against the iron oxidation and reduction boundary (which varies depending on pH values) to determine if the conditions were oxidising or reducing.

The saturation conditions were determined by the location of the water table in relation to the archaeological deposits. The archaeological deposits were considered to be saturated or unsaturated if the groundwater was located above or below these deposits (see Appendix C hydrographs). If the water table was recorded within the archaeological deposits the location was considered to be located within the vadose zone. These archaeological deposits include the non-carbonised organic category as well as deposits that were of archaeological origin but did not have evidence for organic remains within the cores extracted. The archaeological deposits do not generally include the uppermost level, which is categorized as made ground.

The groundwater samples collected during the annual sampling round were analysed for dissolved methane concentrations by an accredited laboratory (Jones Environmental Forensics of Deeside), and the laboratory results are summarised in Appendix D.

The assessment of the geochemical conditions was completed by reviewing the overall suite of geochemical parameters indicative of aerobic and anaerobic processes (also shown in Appendix D).

[24] Riksantikvaren and Norsk Institutt for Kulturminneforskning, 2008, *The Monitoring Manual. Procedures and Guidelines for Monitoring, Recording and Preservation Management of Urban Archaeological Deposits*

6.3.2 Table 2: general comments on results of analysis

The table shows very interesting results and has been sub-divided into saturated, vadose and unsaturated conditions based on the water level in relation to archaeological deposits. This sub-division is crude because in some instances the organic remains have been found as a particular horizon within the more general description of archaeological deposits, either entirely below the water level, or occasionally above it, but the attribution of whether it is saturated depends on how the water level relates to the compete archaeological sequence.

The final two columns show a surprising divergence between results from geochemical proxy indicators taken from samples processed in the laboratory, with the redox readings taken from water *in situ*. The geochemical results suggest more oxidising conditions in many instances, than the redox measurements indicate.

The left hand column shows the contrast with how each deposit was described following visual inspection and baseline description when the original cores were extracted.

6.3.3 Table 2: comparison between baseline and monitoring results

Predominantly reducing conditions were recorded over the monitoring period in ten of the groundwater monitoring wells that were fully saturated or located within the vadose zone. Dissolved oxygen and methane concentrations indicate that the most reducing conditions were recorded within the archaeological deposits at locations N, V and AF, and the baseline preservation conditions were all medium or good in these areas. Archaeological deposits with oxidising conditions were detected at locations AB and M, and this is consistent with the baseline lousy preservation conditions recorded from the cores.

The groundwater parameter results indicate that archaeological deposits were consistently unsaturated in only three (P, Q and T) out of the seventeen groundwater monitoring wells. Due to the lack of water in the archaeological deposit, this prevents a direct comparison to the baseline conditions from the groundwater preservation parameters at these locations.

The unsaturated archaeological deposits in T and vadose archaeological deposits in AC, AF and O recorded poor preservation conditions at baseline, and although the unsaturated deposits at location P recorded medium preservation conditions at baseline, they also exhibited signs of active decay.

In summary the dissolved oxygen, dissolved methane, saturation condition and geochemical results were generally consistent with the observed baseline preservation conditions. The redox measurements from the groundwater quality meter, however, showed a significant amount of fluctuation and the results did not necessarily correlate with the other recorded preservation parameters.

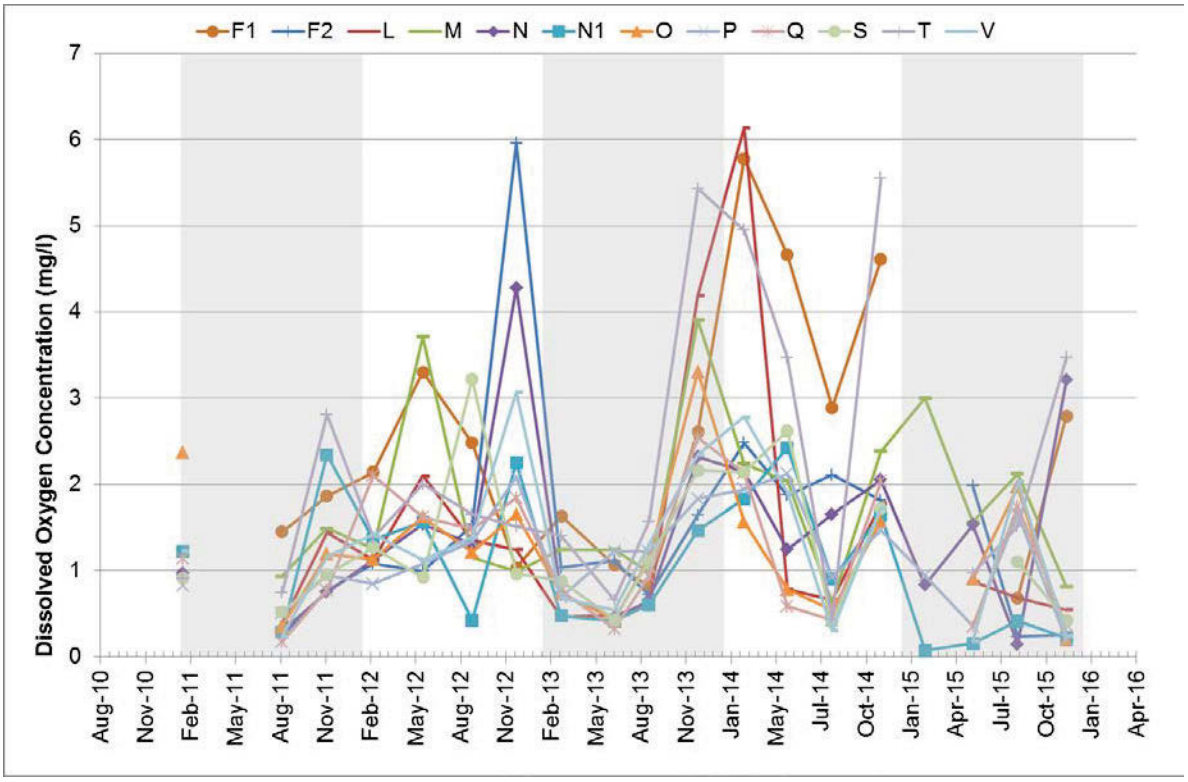
Comparison between the baseline data with the monitoring results recorded between 2011 and 2015 indicate that overall conditions have remained generally consistent, although closer analysis of the dissolved oxygen and methane could suggest that there is a trend for slightly increasing levels of oxidation over the five year monitoring period. This is particularly evident in areas with good preservation (N/N1, AE and AF) where dissolved methane concentrations are declining. The apparent trend from the dissolved oxygen, however, is suspect because there are substantially elevated levels recorded for February 2014, which appear inconsistent with previous values and with comparative data. This could reflect a faulty probe used during the data collection round. February 2015 measurements were so

erratic that have been removed from Table 2, and it is possible that the apparent drop in eH values during that same data capture round, could be due to an error in the pH probe, which would affect the relationship between the mV measured to the reducing/oxidising iron boundary.

Further analysis of the dissolved methane strongly suggests a causal link between elevated measurements and ingress of rain water during the period of abnormally high rainfall between 2012 and 2013. This is not consistent throughout all locations, but could be significant at AB, AC, AE, AF, F2, and T.

This trend is also reflected within the seasonal fluctuations, with increased concentrations of dissolved oxygen recorded following the infiltration of oxygen from effective rainfall in winter periods 2012-13 and 2013-14 (See **Figure 9**). Seasonal variations were less evident in the pH and conductivity groundwater data. At the multilevel locations the average value of dissolved oxygen throughout the monitoring period at Church Lane were 2.49mg/l for F1 (targeted to archaeological deposit) and 1.48mg/l for F2, whilst the average value at Snow Hill was 1mg/l at N1 (targeted to archaeological deposit) and 1.4mg/l at N. At F1 the relatively high level of dissolved oxygen could have been caused by the proximity of the dipwell to the car park drainage system c.2-3m to the north, suggesting a direct hydrological relationship between the deposit and rainfall events. At location N1 the archaeological deposit has a reduced amount of dissolved oxygen compared to the adjacent deeper dipwell which includes the underlying groundwater, and thus suggests the lower oxygen concentrations would be more conducive to the preservation of non-carbonised organic remains in the archaeological deposit.

Figure 9
Seasonal Variations in Dissolved Oxygen



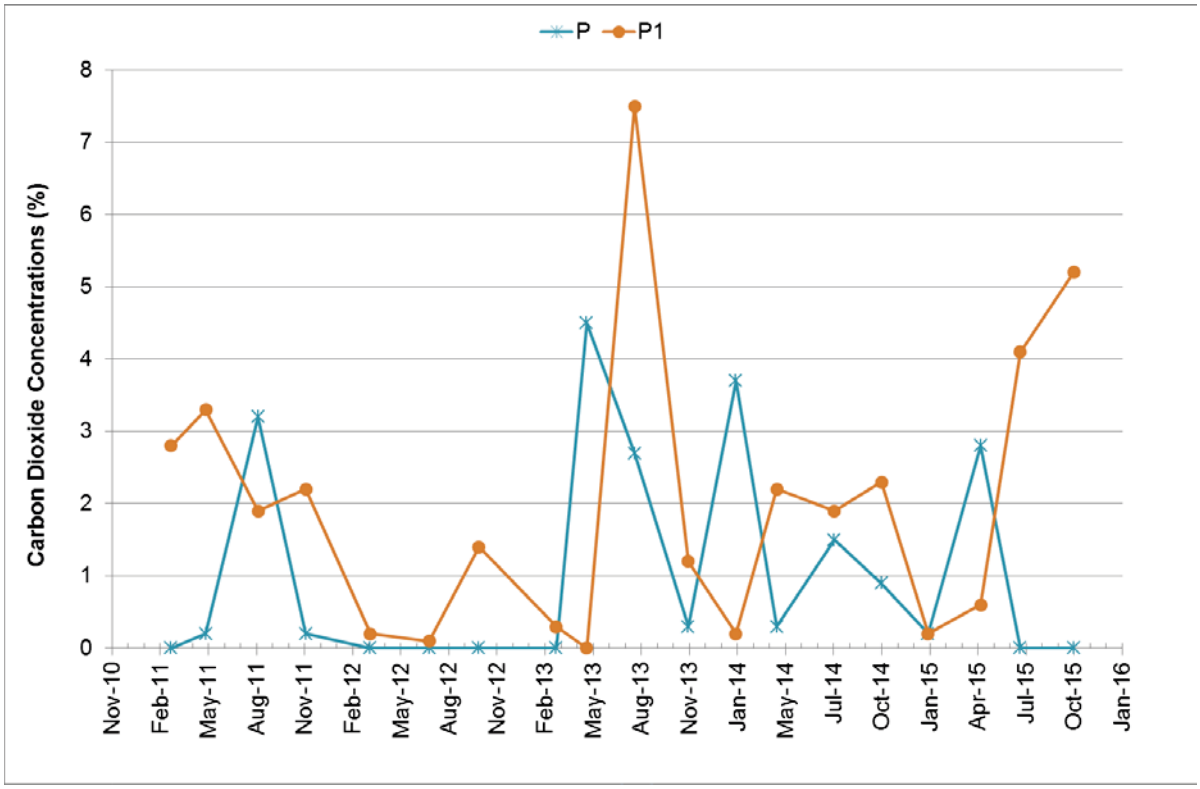
6.4 Comparison of data from multilevel dipwell installations

Multilevel dipwell installations were installed at locations F1, N1 and P1 to specifically target the cultural horizons (archaeological deposit) and assess the differences between these targeted zones with the more general results from the adjacent dipwells (F2, N and P) that were screened to include both the archaeological deposits and the underlying geological strata. However, there are no groundwater data available for comparison from P1 as the groundwater level remained below the base of the archaeological deposit throughout the monitoring period.

The groundwater monitoring data from the water quality meter show that there is a direct correlation in redox and pH values in the multilevel monitoring wells at both locations F1/F2 and N/N1 (Appendix C). This is also generally the case for conductivity values, although location N generally shows an increase in conductivity values when groundwater is drawn in from the deeper deposits with higher salinity contents, in contrast to the values recorded in N1.

The gas data from location P (See **Figure 10** below) show that dipwell P1 generally recorded higher concentrations of CO_2 and depleted levels of oxygen compared to dipwell P. As indications of active decay were observed in the archaeological deposits at location P it is possible that increased levels of CO_2 may be caused by the breakdown of organic deposits in this area. This trend is also present at location F1/F2 although it is less evident at location N/N1. The dissolved oxygen (DO) concentrations in monitoring well F1 are typically higher than the deeper well at location F2 and this may be due to the increased influence of oxygenated runoff from the nearby car park drainage system in this area, which is also evident in the water level and temperature data from the transducer. This trend is not replicated at location N/N1 where the DO concentrations are generally consistent in both wells.

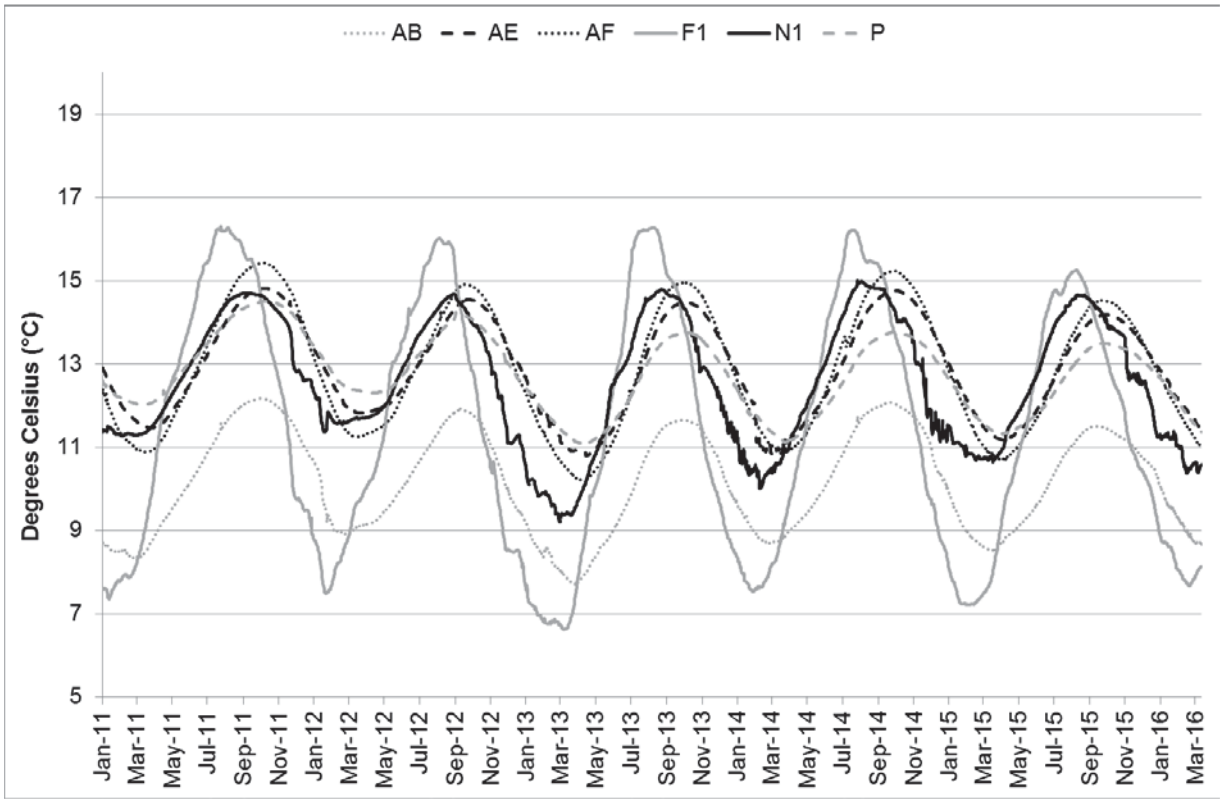
Figure 10
Carbon Dioxide Concentrations at Locations P and P1



6.5 Groundwater Temperature

The data loggers installed in borehole locations AB, AE, AF, F1, N1 and P were also set to record groundwater temperature on a daily basis, and these results are shown in **Figure 11** below:

Figure 11
Groundwater Temperature Fluctuations



As expected, the groundwater temperature shows a strong correlation with seasonal fluctuation, generally reaching a maximum during October and a minimum in April. The total span for recorded groundwater temperature over all locations showed they remained in a temperate range of 6.6 to 16.3°C. Groundwater temperature can have a significant impact on the speed of oxidisation and reduction processes, but although temperature rise accelerates the potential rate of decay for both microbial and chemical reactions, with a 2 – 3 fold increase for a rise of 10°C[25], such a range only appears to effect dipwell F1 at Nantwich, as most other dipwells recorded temperature change of half this range.

The data from locations AB, AE, AF and P show very consistent seasonal trends, with temperature fluctuation of approximately 3 - 4°C. This would suggest that these locations are generally influenced by natural groundwater flow. However, the results from F1 do not seem to follow the same natural cycle. Although a strong seasonal fluctuation is still present, they exhibit a wider range of temperature fluctuation (up to 9.7°C in F1), they reach their seasonal minimums and maximums up to 2 months before the other locations and generally exhibit more erratic temperature trends. This suggests that preferential drainage pathways

[25] Matthiesen, H, Hollesen, J., and Gregory, D. 2015 Chapter 6 Preservation Conditions and Decay Rates in *Monitoring, Mitigation, Management: the groundwater project – safeguarding the world heritage site of Bryggen in Bergen* Riksantikvaren, p.82-3

have a significant impact on groundwater within this area, which is located in close proximity to car park drainage infrastructure.

6.6 Duration of monitoring project

The initial Phase 2 project design was for a three year programme of monitoring due to budgetary constraints within English Heritage. A variation was agreed in 2013 to extend the monitoring for a further two years, due to the exceptionally variable amounts of rainfall that had occurred in 2012 which risked skewing the data if not balanced against a longer monitoring period than just three years. The results from the monitoring programme demonstrate the validity of a longer duration, as shown in **Figure 12** which compares the total annual rainfall recorded between 2011 and 2015.

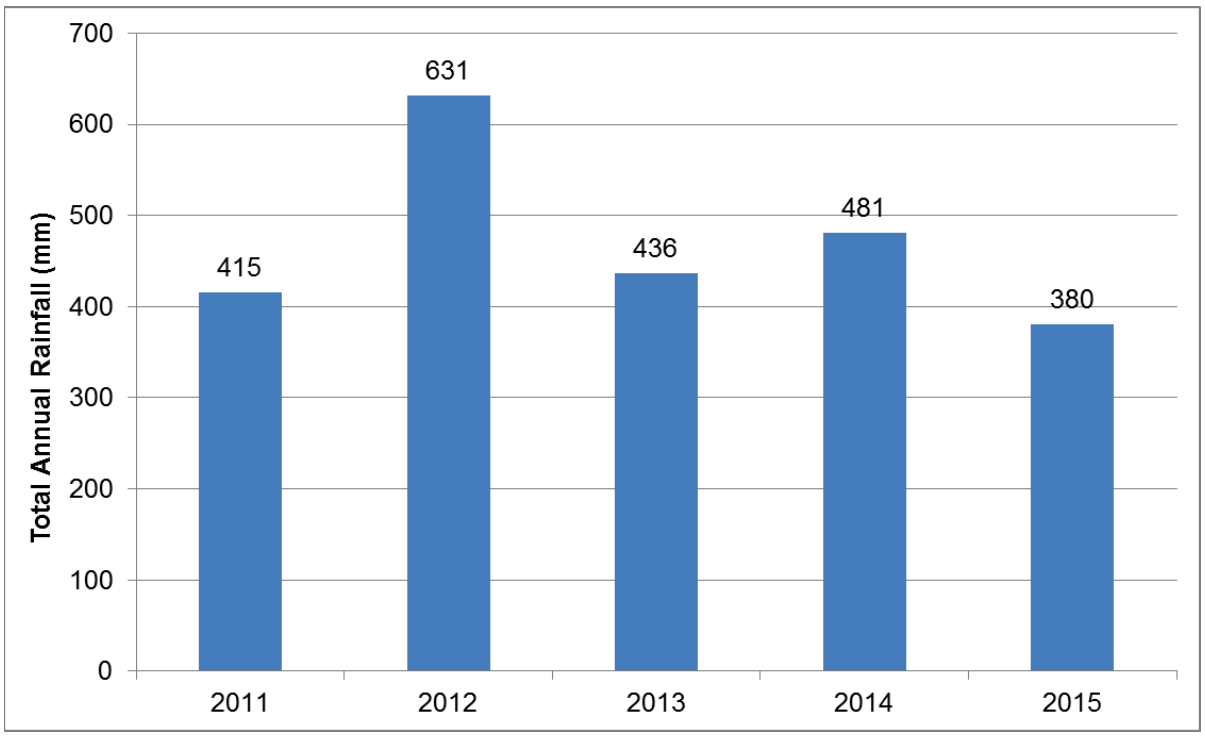


Figure 12
Graph showing total annual rainfall in Nantwich between 2011 and 2015

Figure 12 shows that the annual rainfall in 2012 was approximately 35% higher than the average rainfall recorded during the five year monitoring period (469mm per year). The average rainfall for the first three years (2011 – 2013 inclusive) was 494mm per year, whereas for the following two year extension (2014 – 2015 inclusive) it was 430mm per year, so it was approximately 14% higher during the initial period. Extending the initial monitoring period by 2 years allows greater confidence to be placed on the impact of oxygenated rainfall on the other data-sets during the monitoring period by reducing the effect of the exceptional rainfall recorded in 2012 on the average data. For example, analysis of dissolved methane (Table 2) shows that the majority of elevated levels were detected during the period effected by higher rainfall.

The disparity in results that would have occurred with only three years of data is also shown clearly when groundwater level is plotted for specific dipwells. In **Figure 13** for example,

dipwell F1 shows a rapid rise in groundwater level as a response to the exceptionally high level of rainfall in 2012, whereas the level drops again over the succeeding years, which better represents the average conditions. Location F is probably more responsive than most dipwells to rainfall events, as in common with other locations in car parks, it appears as though the run-off and drainage from such zones directly affect the groundwater level in those dipwells in the immediate vicinity.

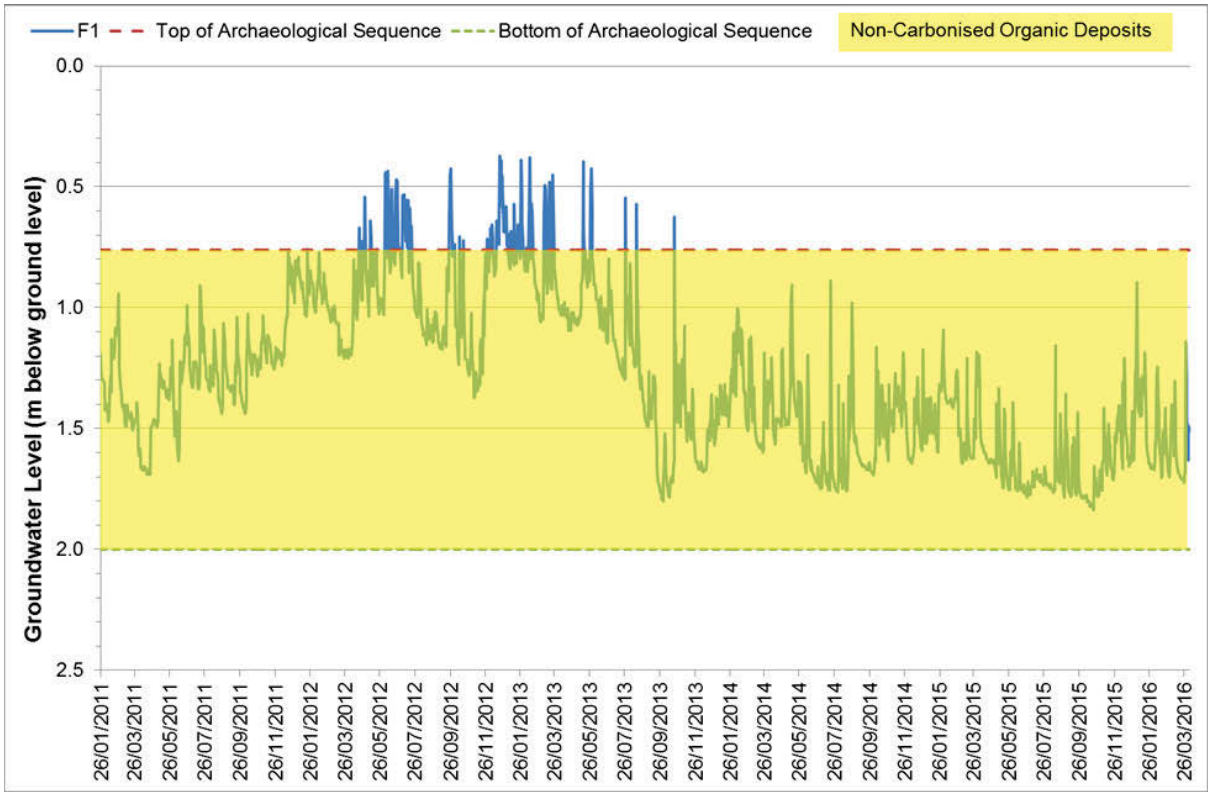


Figure 13
Groundwater levels at location F1 over five years

6.7 Additional studies: redox measuring techniques and soil moisture

6.7.1 Measuring redox (Historic England Project 6524).

Additional redox monitoring was carried out by inserting two types of in situ probes into the deposits adjacent to Boreholes N and N1, and collecting readings over a twelve month period from July 2012 to June 2013.

The probes were one rigid resin rod, with two platinum rings collecting readings at c. 1.0 m and 1.5 m below ground surface and three platinum-tipped heavy gauge copper wires also inserted to 1.5m below ground surface. Manual readings from the copper probes were collected on a monthly basis using a WTW pH3110™ meter with a Silver Chloride reference electrode, whilst the resin- made probe was connected to a Hypnos III™ datalogger

collecting readings at hourly intervals. Another silver chloride reference electrode connected to the data logger was permanently installed in the ground to complete the circuit with the resin probe.

A monthly measuring programme was initiated to take readings from the copper probes, download data from the Hypnos datalogger as well as recording groundwater redox values with the YSI ORP probe using four sampling techniques on groundwater samples from the dipwell at N1 thus:

- Pre-purge in situ
- Low-Flow sample
- Bailer sample
- Post-purge in situ

The Eh/pH stability plot (**Figure 14**) for these groundwater sampling techniques indicates that throughout the twelve month period groundwater redox values can be described as reducing in character, and mainly neutral to slightly alkaline, with two outliers (a bailed and low flow sample) located above the iron boundary suggesting oxidising conditions, and two further samples (pre-and post-purge samples) reducing and slightly acidic.

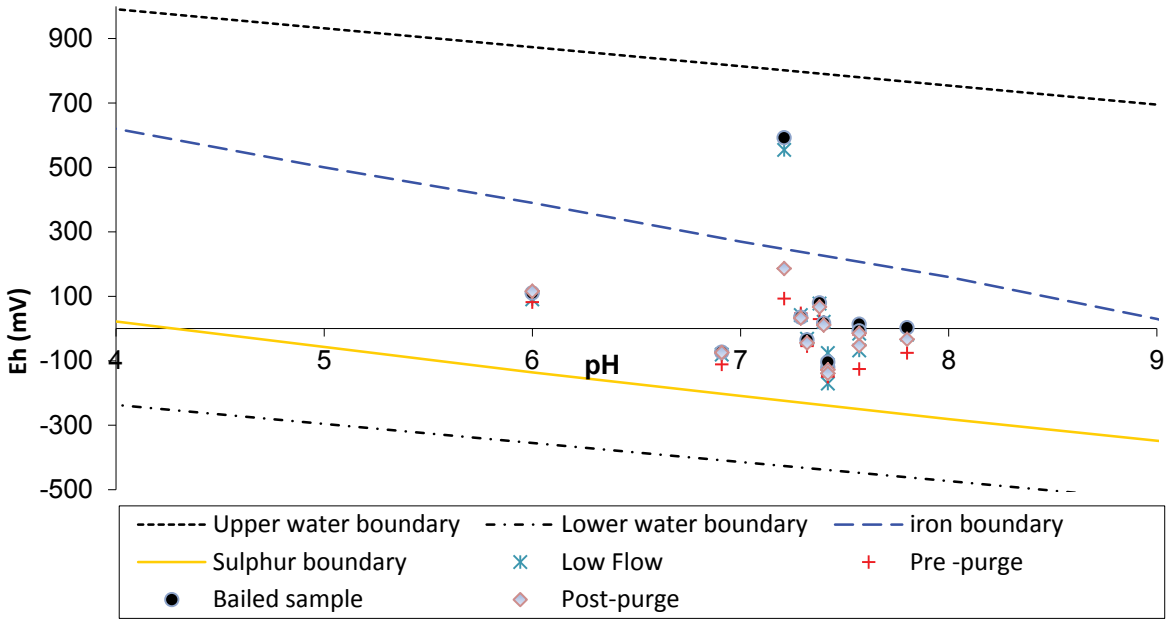


Figure 14
Eh/pH stability plot at dipwell N, N1

When comparing the annual linear trend for all groundwater sampling methods (**Figure 15**, redox values calibrated to SHE), the broad trend is predominantly moderately reducing conditions , with episodes of more oxidising conditions, followed by slow recovery to a more reducing environment. The highest values were recorded following a period of high rainfall during May 2013, with two samples (from bailing as well as low flow) measuring above 750mV, calibrated to SHE.

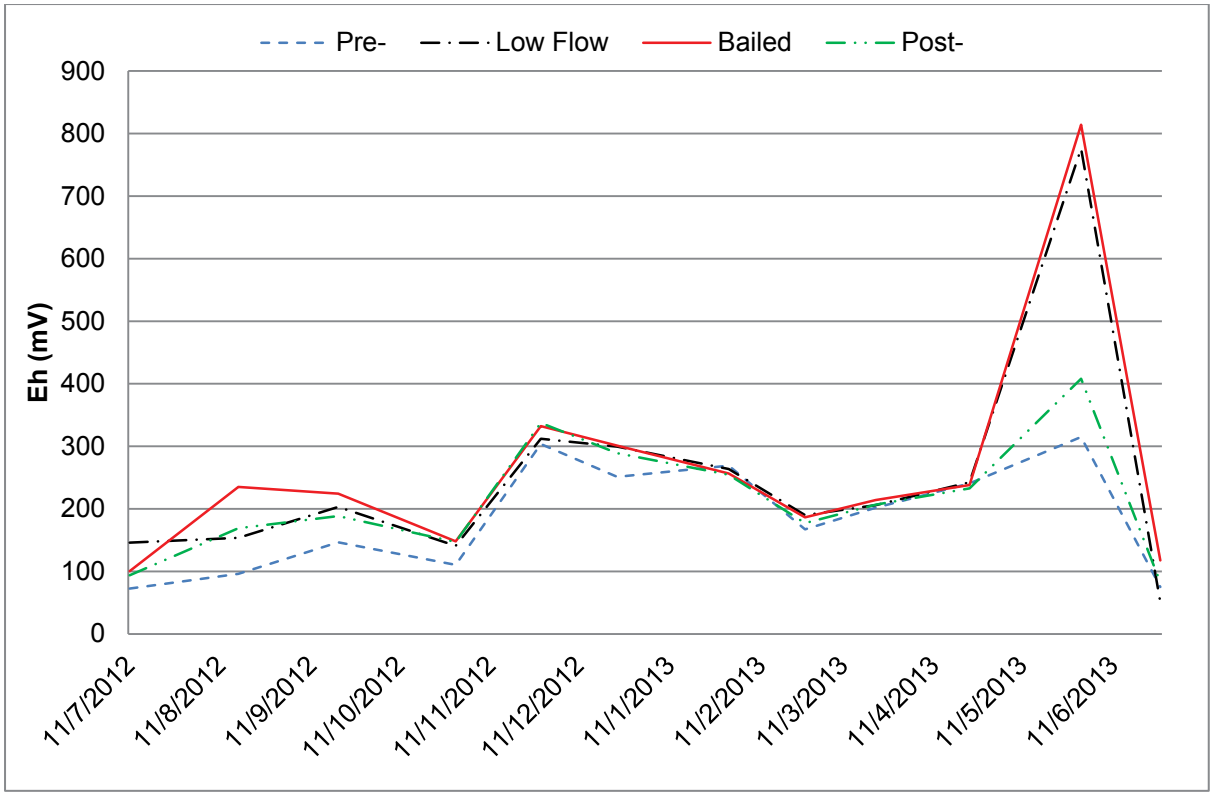


Figure 15
Comparison of groundwater sampling methods at dipwell N1

The lowest values throughout the year were observed from *in situ* groundwater standing in the dipwell N1 prior to sampling where initially conditions were reducing (less than -100mV), although throughout the twelve months conditions became less reducing as a result of higher rainfall during 2012. A large peak recorded at the end of May 2013 when conditions became highly oxidising coincided with a period of high rainfall during that month.

The highest values were recorded from bailed samples, effectively proving that the physical action of bailing introduces oxygen into the sample. Readings taken from groundwater refilling the dipwell following bailing out were also high as the water becomes oxygenated from the air contained in the empty dipwell. This phenomena has been observed before (Caple and Dungworth, 1998, p.28[26]) who stated that "*This demonstrates that the condition of 'fresh' groundwater in purged dipwells is not representative of that found in situ in archaeological burial environments.*"

It is also of interest that the low flow-through cell readings were also higher than the pre-purged groundwater. Because of problems inherent in measuring redox from groundwater samples, two types of *in situ* probe were tested during the field trials to identify their potential for redox studies - three copper/platinum probes, and one resin/platinum probe.

[26] Caple, C. & Dungworth, D. 1998 Waterlogged Anoxic Archaeological Burial Environments Unpublished Ancient Monuments Laboratory Report 22/98. Historic Buildings and Monuments Commission, London.

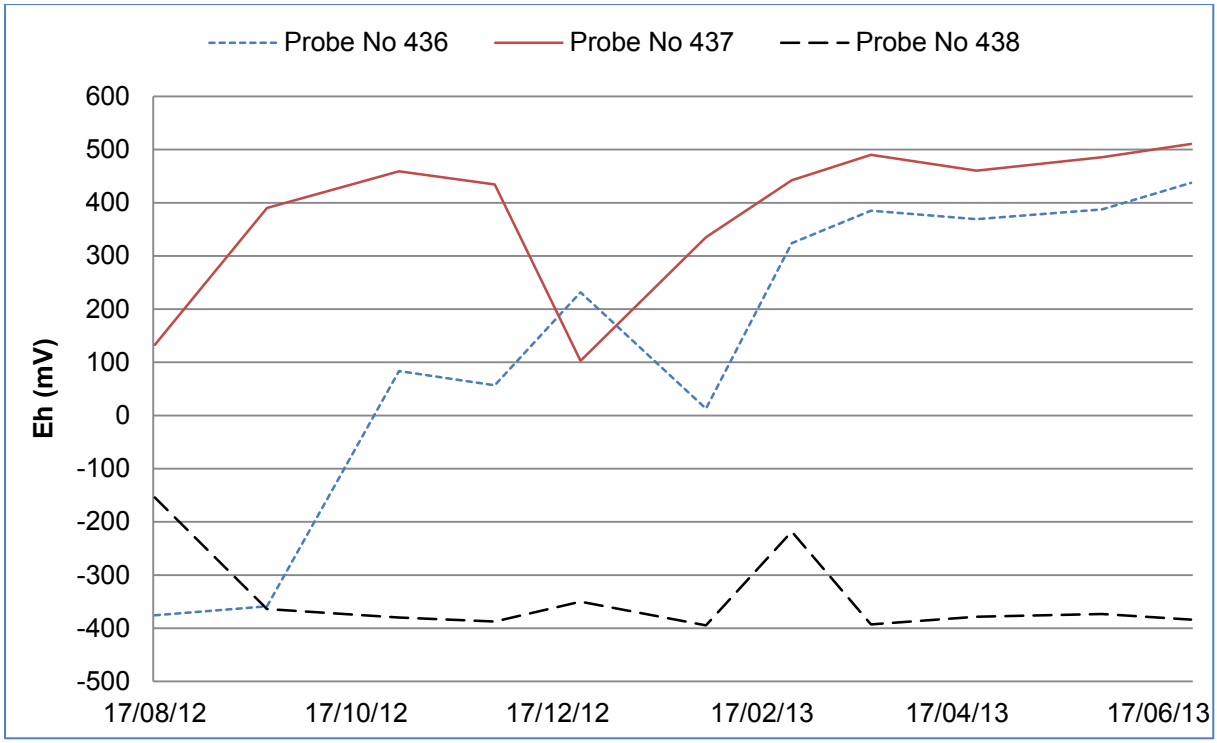


Figure 16
Comparison of redox probe results from location N, N1

Figure 16 shows the linear trend for the three copper/platinum probes during the twelve month field trial, where two probes (P436 and P437) indicated conditions were becoming oxidising whilst the third (P438) suggests that the deposits are in a highly reducing condition. The results are not entirely unexpected as although the cluster of three probes were installed all to the same depth, the installation was not without its problems, due to the pliant nature of the copper used to make the probes and the presence of below ground obstructions that affected the installation process. Other workers in the field have experienced similar problems and have resorted to installing clusters of five probes or more, and either averaging the readings or ignoring single outliers as anomalies.

The results from the resin/platinum probe (**Figure 17**) indicate highly reducing conditions were re-established approximately 26 days after the probe had been installed, and continued until the datalogger was flooded with groundwater ten days later, when it ceased to function.

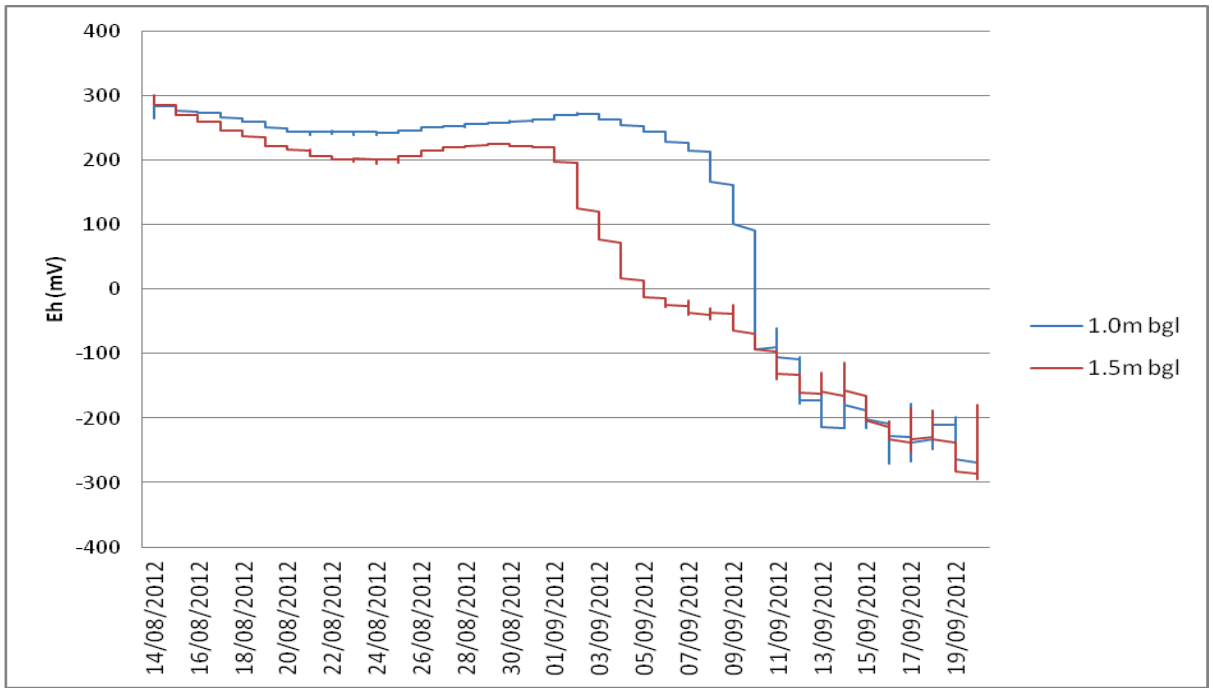


Figure 17
Results for resin/platinum probe from location N, N1

However, periodic manual reading using a millivolt meter indicate that reducing conditions continue to be maintained particularly at 1.5m depth below ground surface. Conditions at 1.0m depth were mainly reducing (Table 3) apart from on two occasions when the readings imply an oxidising environment (23rd March 2013 and 27th June 2013), although there appears to be no correlation between excess rainfall on the two dates.

Table 3
Calibrated redox values at Location N, N1

DATE	Calibrated Eh values (mV)	
	1.0m bgs	1.5m bgs
26/02/2013	-217.2	-172.6
22/03/2013	-138.9	-190.3
23/04/2013	567.4	-177.3
31/05/2013	-201.8	-182.3
27/06/2013	559.8	-129.6

6.7.2 Measuring soil moisture (Historic England Project 6524)

The volumetric soil moisture content of the below ground deposits at monitoring point N and N1 were measured using Time Domain Reflectometry (TDR) during field trials conducted between March 2013 and March 2014. TDR technology involves measuring the reflectance time for an electromagnetic pulse travelling through a soil or sediment, which is determined by the dielectric properties of the soil which in turn is influenced by the soil moisture content.

For the purpose of this study, two TDR devices were evaluated: a Trime™-Pico 64/160mm probe (**Figure 18a**) which was inserted into deposits circa 1.0m below the ground surface,

and a Pico T3P™ Profile Probe which was permanently installed into a dry access tube to record soil moistures at specific depths, thereby recording moisture through a vertical profile **(Figure 18b**)

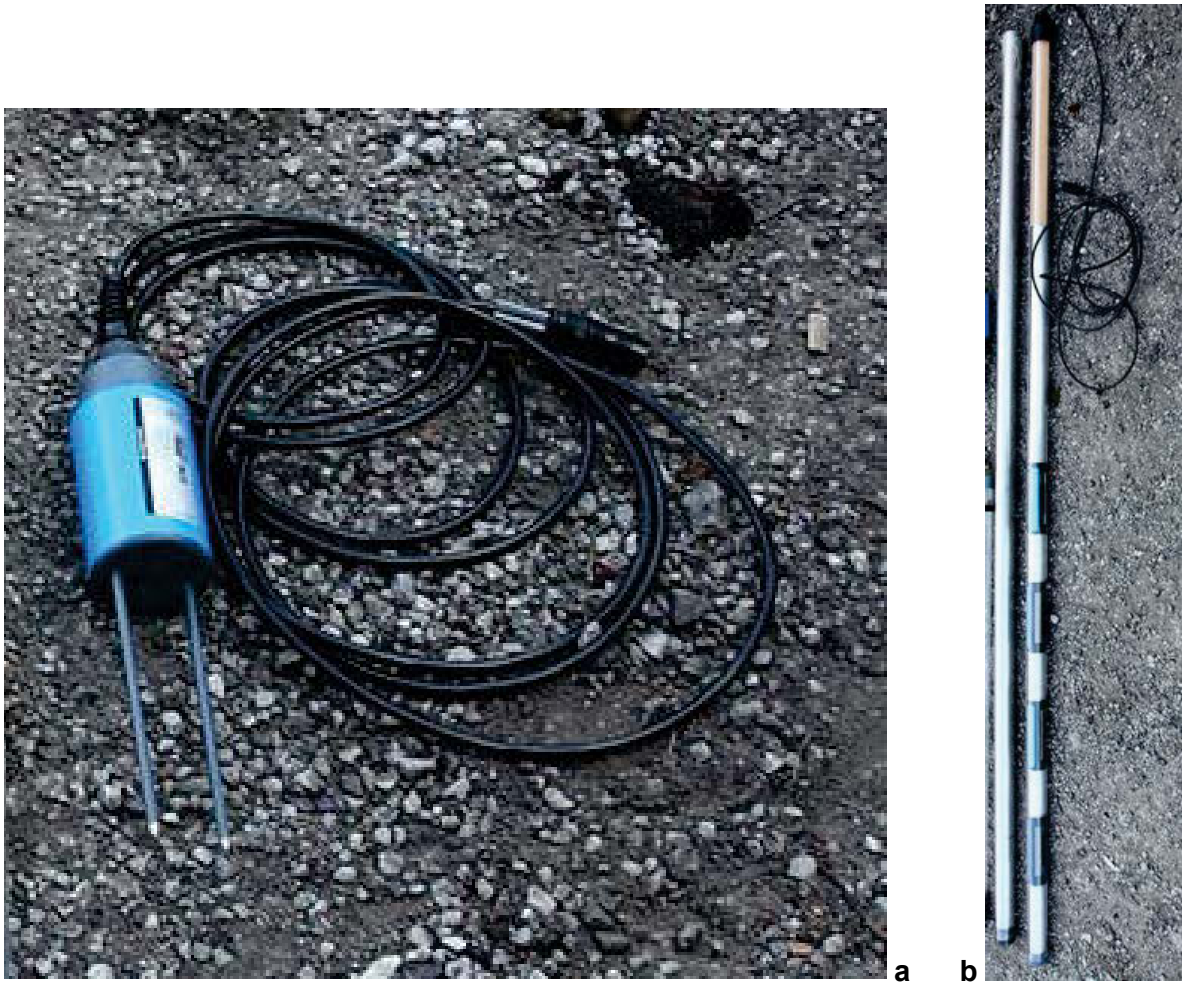


Figure 18
a) Trime Pico 64/160mm probe; b) Pico T3P Profile Probe

The TRIME-PICO unit (reference 34687) was installed at a depth of circa 1.0 m below ground level to record volumetric moisture content in the capillary fringe zone at a single location. The hand auger was used to core through the upper deposits, and then the TDR unit was hand pushed into the deposit to ensure close contact between the wave guides and the soil. A bentonite seal was formed around the top of the TRIME-PICO unit to prevent surface water ingress. The unit was then hard-wired to the datalogger.

The datalogger was set to capture moisture contents once every 12 hours, and the measuring system was set to operate with a universal calibration for mineral soils (where clay content >50%, organic content >10%, bulk density <1.1kg/dm3 or >1.7kg/dm3) which is pre-programmed into the datalogger.

Initially both devices worked well capturing soil moisture data which was transmitted via the datalogger at daily intervals. However, between 13/07/13 and 20/07/13 no data were transmitted from the PICO profile probe sensors. Data were then captured and transmitted from the two uppermost sensors (between 0.95m - 1.06m bgl and 1.20 -1.31 m bgl) until 24/07/13 when no data was captured or transmitted. A fault with the data logger was ruled out as data were being captured and transmitted from the TRIME-PICO 64 unit. A site visit

was made on the 8th August 2013 where it was discovered that the access tube was filled with water. The probe unit was removed, dried and electrical contacts cleaned, and attempts were made to bail out the water and insert a new bung to seal the base of the access tube. This proved unsuccessful and as it was impossible to prevent further groundwater ingress into the access tube, this element of the trial was abandoned. The single point TRIME-PICO 64 unit performed well though, and continued to operate throughout the 12 month period.

Soil moisture values from the TRIME-PICO 64 unit have been plotted alongside rainfall events during the year (**Figure 19**) showing a slight reduction in soil moisture content (below 43%) during the summer months followed by a gradual increase during the winter months (peaking at over 46%). There is also a broad correlation between increased rainfall events and increased soil moisture (albeit with a slight time lag before the impacts are detected), implying that deposits circa 1.0m bgl are influenced by rainfall and downward surface water percolation.

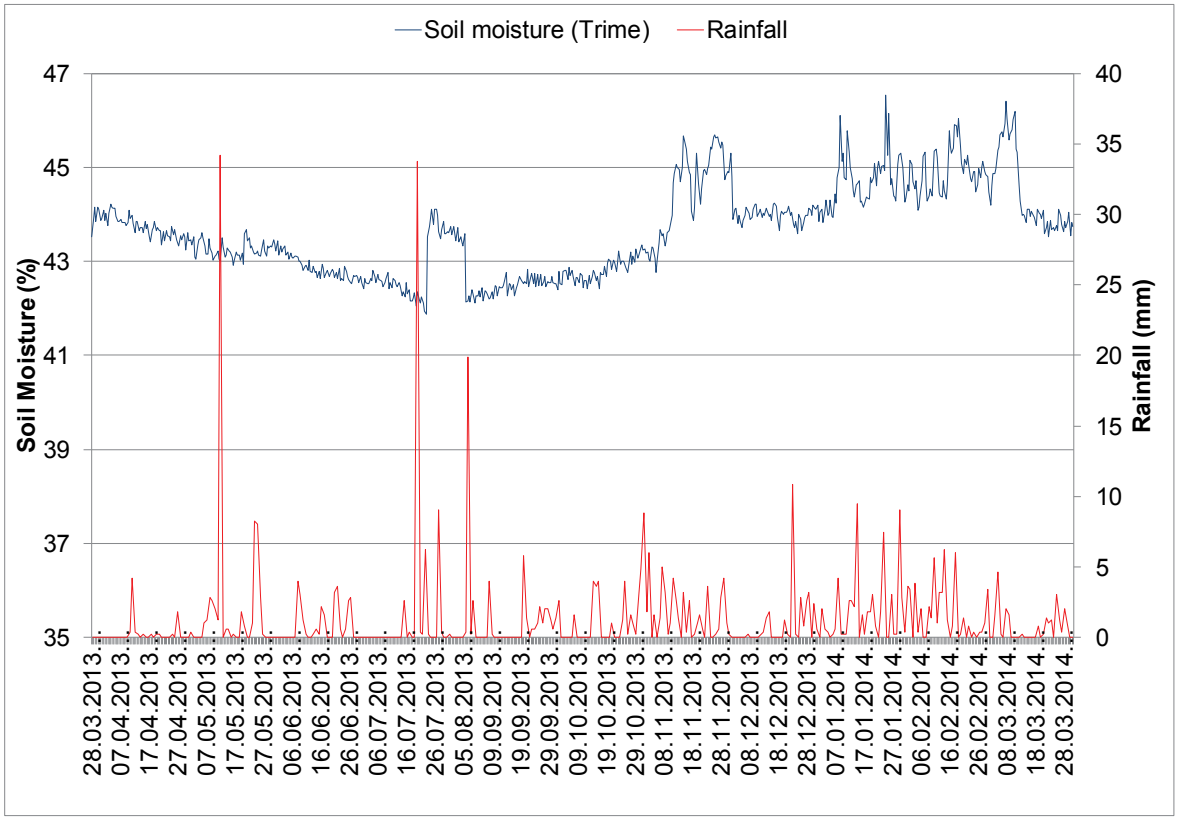


Figure 19
Soil moisture readings against rainfall from location N, N1

Before ceasing to function, the data (**Figure 20**) provided by the PICO T3P sensor units demonstrate increasing soil moisture content with increasing depth, with fully saturated conditions (100% soil moisture content) observed in the zone at between 1.70 and 1.81 m bgl. Within the zone between 1.45 to 1.56m bgl, the soil moisture content is around 60%, and around 50% in the zone between 1.20 to 1.31m bgl.[27]

[27] Organic remains were found in BH N from 1.13m – 1.80m bgl, although more abundant and better preserved organic content occurs from 1.88 – 2.85m bgl. A layer of greyish-blue clayey-silt with possible vivianite occurs from 1.80 – 1.88m bgl. Water levels were 1.54m bgl at baseline and in general fluctuated seasonally between c.1.0 – 1.5m bgl over the duration of the monitoring period.

One anomaly appears to be data from the zone between 0.95 and 1.06m bgl where soil moisture contents from the profile sensor were between 79% and 95%, which are at variance with data from the TRIME-PICO unit, where soil moisture contents ranged between 43 and 45%. This disparity is likely to be due to the access tube acting as a conduit for surface water ingress, especially if the bentonite seal was of insufficient thickness, thereby creating the false impression of higher than actual soil moisture contents. Voids around the access tube will also produce anomalous results as such pockets can fill with surface water and give the impression of highly saturated conditions. This reinforces the requirement to ensure that the TDR access tubes are in as close contact with the soil as is possible, for without that intimate contact, erroneous results will occur.

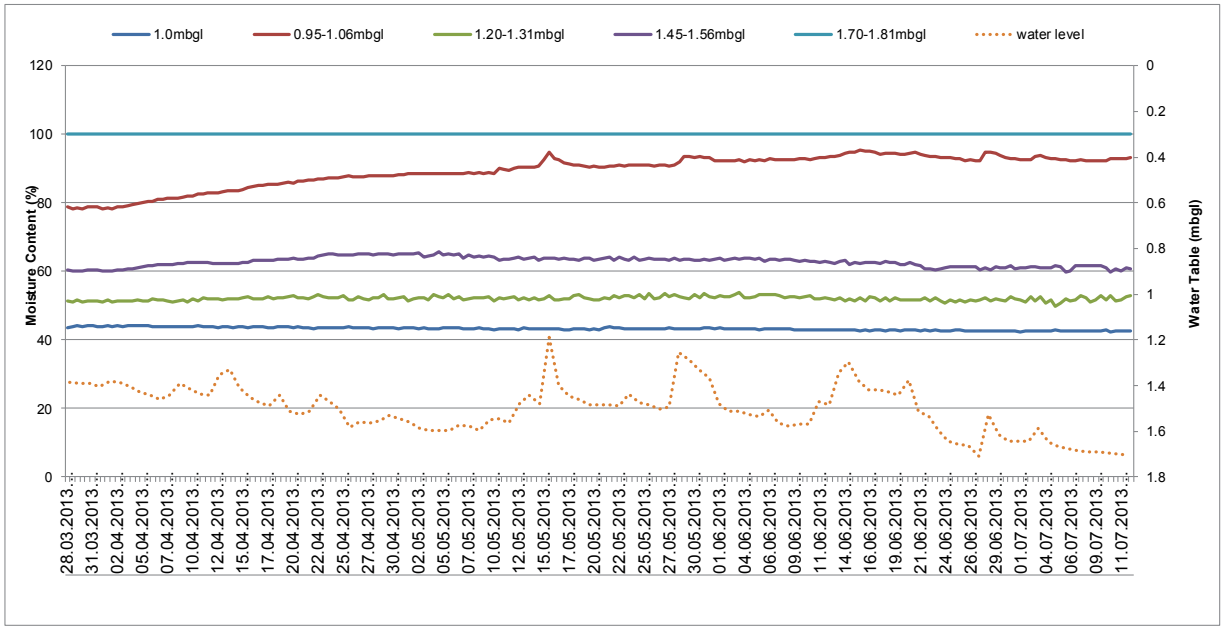


Figure 20
Increasing soil moisture with depth bgl at location N, N1

7.0 OBJECTIVE 3: CHARACTERIZATION OF THE GEOLOGY, HYDROGEOLOGY & HYDROLOGY EFFECTING NANTWICH'S WATERLOGGED DEPOSITS

7.1 Geology of Nantwich

The British Geological Survey (BGS) indicates that Nantwich is underlain by superficial (drift) deposits consisting of Alluvium, River Terrace Deposits, Glacial Till and undifferentiated Glaciofluvial Deposits. The superficial deposits are underlain by solid geological strata of the Mercian Mudstone Wilkesley Halite Formation.

The ground conditions encountered during the investigations completed in 2007 and 2011 were generally as anticipated from the desk study (SLR July 2007), with natural superficial strata of Alluvium, River Terrace Deposits and Glacial Till overlain by made ground in the developed areas. Archaeological deposits were widespread throughout the study area, with layers of waterlogged organic deposits clearly defined within the shallow sequence.

The mudstone bedrock of the Wilkesley Halite Formation was not encountered in any of the boreholes during the intrusive investigations. This indicates that the superficial deposits are generally in excess of 4m thick within the study area.

The ground conditions are described in detail in the borehole logs shown in Appendix A, and a summary of the superficial strata is provided in the section below.

7.2 Overview of Stratigraphy

The borehole logs in Appendix A show that a diverse range of superficial strata were encountered during the shallow soil investigations, although there were sufficient similarities to enable the deposits to be classified into five broad categories, and the borehole logs showing the categories are presented in Appendix B. These categories enabled comparisons to be made between the various borehole locations and provided a basis for cross sections to be constructed throughout the study area.

The five categories for the superficial deposits are summarised below:

- Made ground
- Archaeological deposits
- Non-carbonised organic-rich deposits
- Mineral-rich deposits
- Fluvio-glacial deposits

<u>Made Ground</u>

A variable thickness of made ground was encountered beneath the developed areas of the town, with typical thicknesses of between 0.2m and 2m recorded.

The made ground comprised a variety of naturally sourced soils and sediments (clays, silts, sands and gravels) containing fragments of man-made materials including brick, masonry, ceramics, glass, ash/clinker and wood fragments etc.

Waterlogged Deposits

The archaeological deposits encountered were typically described as moist/wet dark grey or dark brown organic silts. They were divided into two categories:

- Archaeological deposits consisting of silts, clays and sands, black – light grey in colour, which contained evidence of human activity such as ash, charcoal, pottery, bone, and:

- Non-carbonised organic-rich deposits which included plant-microfossils, wood, leather, plant debris and sulphide odours.

Mineral-rich Deposits and Alluvium

Alluvial deposits were typically found in association with the archaeological and organic deposits, between the made ground and glacio-fluvial deposits, in the boreholes drilled close to the river. The Alluvium encountered consisted of cohesive deposits typically comprising occasionally organic clayey silts and sandy silty clays, but did not contain archaeological material, and were therefore designated as mineral-rich deposits.

Some boreholes also contained mineral-rich deposits that were not deposited by natural fluvio-glacial processes, and these sediments did not contain organic or archaeological material either. It was assumed that these were re-worked natural deposits, as they were frequently encountered overlying archaeological deposits (e.g. BH U at the churchyard, perhaps due to grave-digging).

Fluvio-glacial Deposits

- The River Terrace Deposits were generally encountered beneath the Alluvium in the vicinity of the river, at elevations below approximately 30m aOD, gradually rising to 38m to 39m aOD beneath the higher ground with distance away from the river. These deposits consisted of predominantly granular materials typically described as slightly clayey sands with occasional gravels.

- The Glacial Till was the deepest strata encountered beneath Nantwich. This consisted of a cohesive stratum typically described as very stiff brown clay, occasionally sandy and with occasional gravel.

7.3 Hydrogeology

The regional geology is dominated by the Mercia Mudstone Group, which is generally considered to comprise a non-aquifer.

The Wilkesley Halite formation that underlies Nantwich, is a thick saliferous, basinal deposit, that occurs within the Mercian Mudstone of the Cheshire Basin. Groundwater movement within the Halite may occur along fractures, bedding planes and dissolution features. However, due to the limited quantity of groundwater within the formation, and its poor brackish quality, this unit is also considered an unproductive aquifer. The low permeability of the bedrock means that the top of the Wilkesley Halite effectively acts as an aquiclude, with shallow groundwater perched within the superficial fluvio-glacial and alluvial deposits above.

This means that the sands and gravels of the River Terrace Deposits form the most significant aquifer beneath Nantwich, although lenses of perched water are also present at even shallower depth within more permeable horizons of the alluvium and made ground.

Although groundwater may also be present in the more permeable horizons of glacial sands and gravels within the Glacial Till, the glacial deposits encountered within the boreholes were generally more cohesive in nature with high clay content. Therefore, the Glacial Till is more likely to be unproductive in nature and act as a low permeability aquitard for the more granular deposits above.

The lenses of perched water within the made ground and alluvium may exist as isolated pockets or, where permeable deposits are extensive, or hydraulic continuity exists within the River Terrace Deposits, allow some lateral flow of groundwater towards the River Weaver. However, the higher permeability River Terrace Deposits associated with the River Weaver provide preferential flow pathways that control the local hydraulic gradients beneath Nantwich, with groundwater flowing in the general direction of the River Weaver and its northward drainage. The historical drainage systems within Nantwich also appear to exploit the natural flow pathways by culverting small and ephemeral streams, enhancing the preferential flow pathways that were already present (see **Figure 22**).

7.4 Hydrology

The principal surface water feature in the vicinity of the study area is the River Weaver and its broad shallow river valley. The Weaver flows northward through the town, with a number of small tributaries draining the slightly higher ground to the west and east, to join the River Weaver at Nantwich. Cheney Brook flows north westward across the eastern valley side joining the River Weaver north of the town.

The River Weaver bisects the town of Nantwich, and the Environment Agency's web-based Flood Map indicates that the extent of the flood plain associated with the River Weaver is limited to a stretch approximately 100m in width.

The Shropshire Union Canal also runs approximately parallel to the River Weaver, marking the western extent of the town. It is likely that some leakage of surface water from the canal occurs, and makes some contribution to groundwater flow within the superficial deposits and therefore to surface water springs/issues.

Numerous springs, sinks and issues are observed, particularly on the western side of the River Valley. These may reflect the presence of dissolution features in the underlying Halite formation, and the variable permeability of the overlying drift deposits.

7.5 Groundwater Monitoring Data

The results of the final round of groundwater level monitoring completed in December 2015 are tabulated below, and the results from the previous rounds of monitoring are contained in Appendix C.

Permeability and preferential flow paths

The permeability test results are shown in the third column of Table 4. The type of sediment in which the water strike occurred and enabled permeability testing is listed in the second column.

The average depth to the groundwater level within the anthropogenic deposits was approximately 1.9m below ground level, with evidence from the west side of the river showing groundwater depth increasing towards the River Weaver (2.79m in borehole AF). Deeper groundwater levels were detected in those dipwells located within deposits that contained a high percentage of granular material, reaching a maximum depth of 3.23m below ground level in dipwell S within the free draining sand deposits located around St

Mary's Church (See **Figures 21 and 22** below). The figure shows the preferential flow pathways which helps to explain why groundwater depth is deeper for dipwells P, S, and T, as the sandier matrix probably derives from a natural drainage channel in this zone.

Table 4
Groundwater Level Monitoring Data

Dipwell No	Predominant Strata Type at watertable	Permeability (m/day)	Surface elevation (m OD)	Depth to groundwater (m)	Water elevation (m OD)
AB	SILT & SAND	0.5	37.93	1.93	36.00
AC	Clayey SAND	0.1	36.42	2.50	33.92
AE	Very sandy SILT	0.3	35.19	2.56	32.63
AF	Sandy SILT	0.2	34.89	2.79	32.10
AG	CLAY	0.01	37.03	Destroyed	-
F1	Sandy SILT & CLAY	-	39.69	1.42	38.27
F2	Sandy SILT & CLAY	0.1	39.69	1.58	38.12
L	SAND	2	38.71	2.10	36.61
M	SAND	3	37.81	1.42	36.40
N	SILT & CLAY	0.02	39.17	1.42	37.74
N1	SILT & CLAY	-	39.16	1.49	37.67
O	CLAY	0.001	39.64	1.33	38.31
P	SAND	2	39.93	3.19	36.74
Q	Silty SAND	0.7	39.22	1.68	37.54
S	SAND	3	39.77	3.23	36.55
T	SAND	6	39.50	3.04	36.45
V	Slightly clayey SAND	4	39.39	1.85	37.54

[1] Depths are below ground measurements made relative to ordnance datum
See borehole logs in Appendix A for detailed data

Figure 21 shows the maximum and minimum groundwater elevations plotted against ten borehole logs from the key borehole locations. This suggests that the Phase 1 conclusions were accurate in suggesting that the saturation of shallow sands overlying boulder clay is a contributing factor to the waterlogging of deposits, whereas areas with deeper sand deposition contribute to rapid drainage.

Although the direction of groundwater flow is generally towards the River Weaver, the results from the groundwater monitoring indicate that the higher permeability deposits appear to have a significant influence on local flow direction. This is particularly evident in the area around St Mary's Church where the sand and gravel deposits associated with a former tributary of the River Weaver seem to be acting as a preferential flow pathway (See **Figure 23** below).

Figure 21
Groundwater elevations plotted against borehole logs

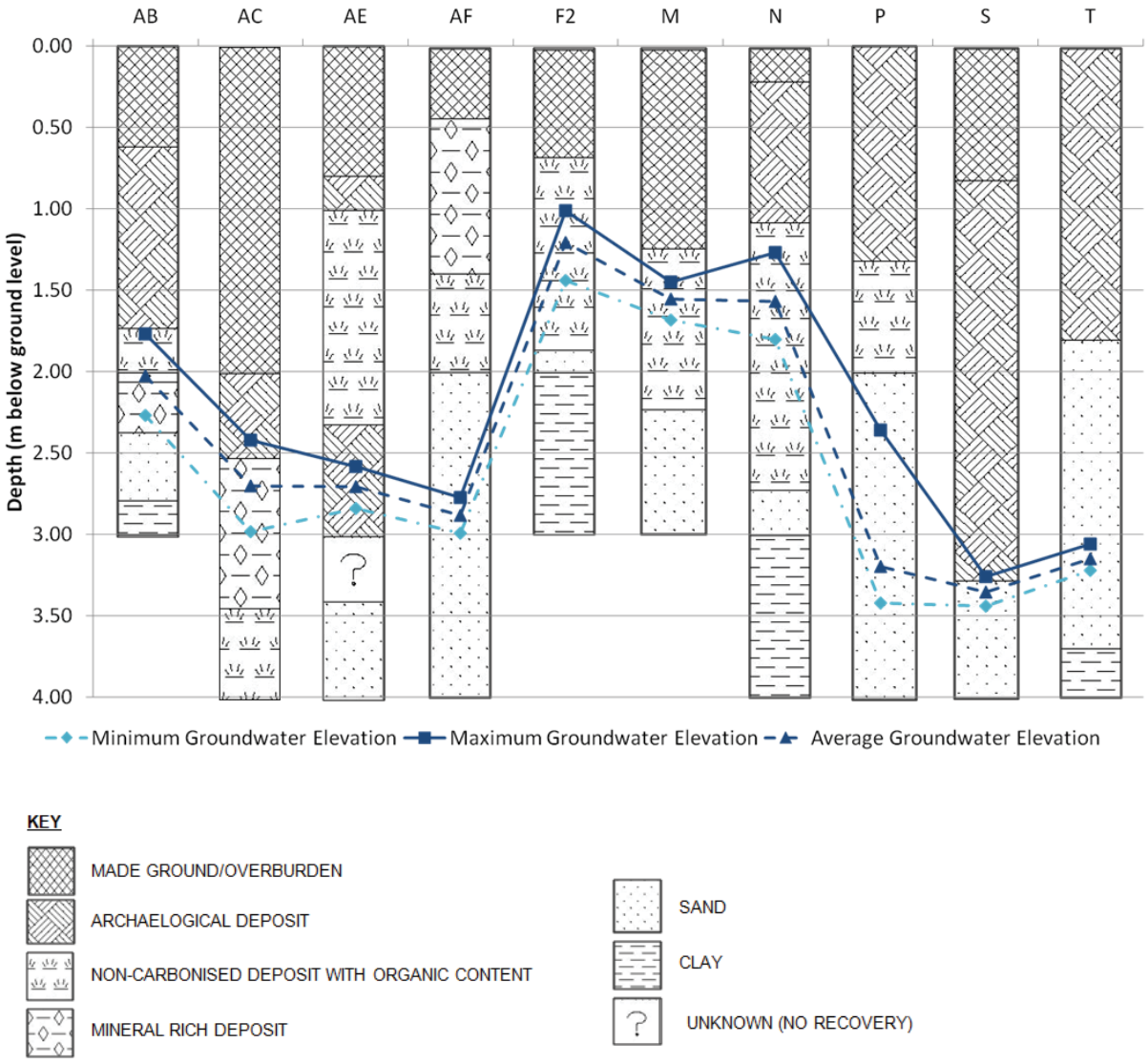
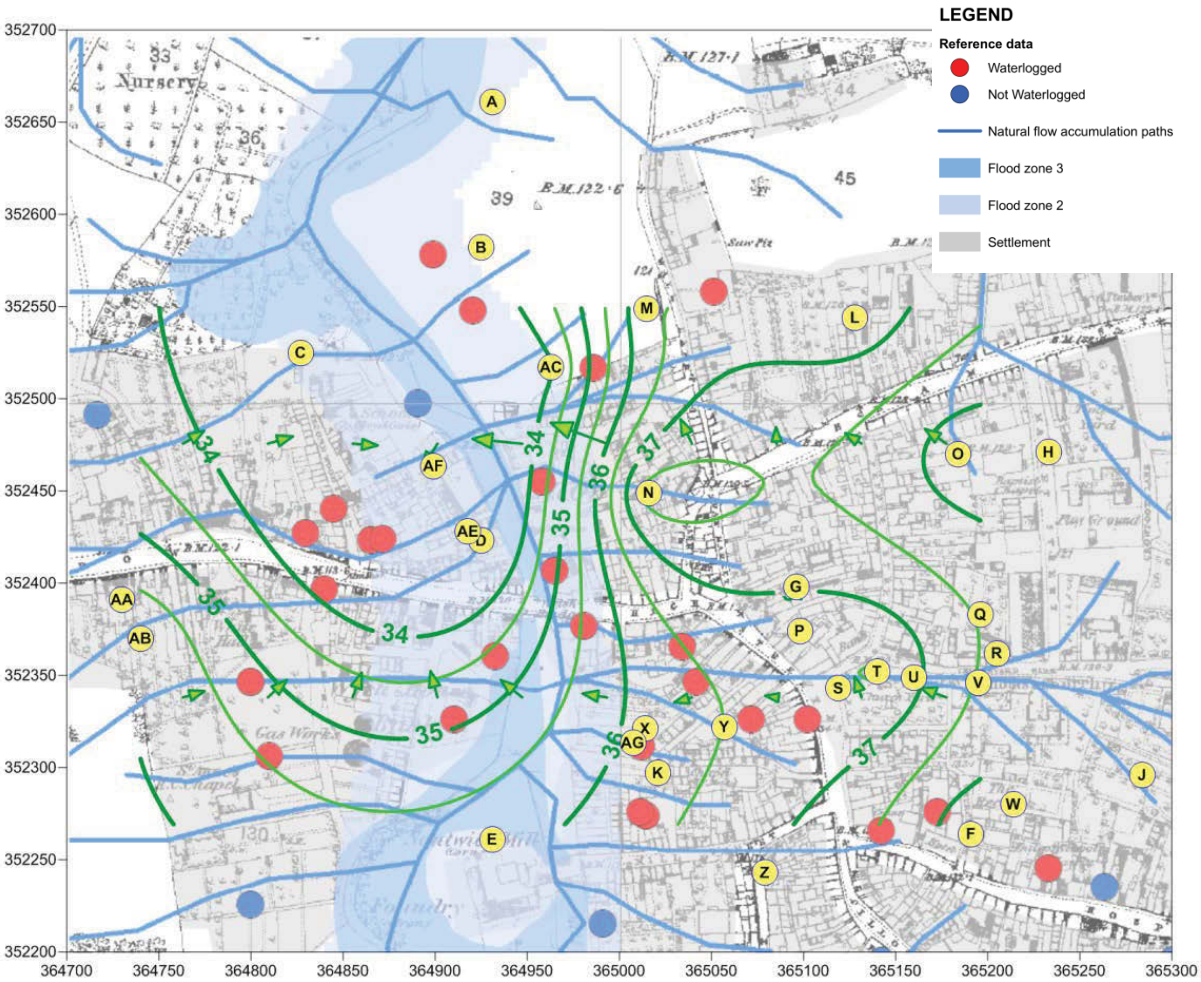
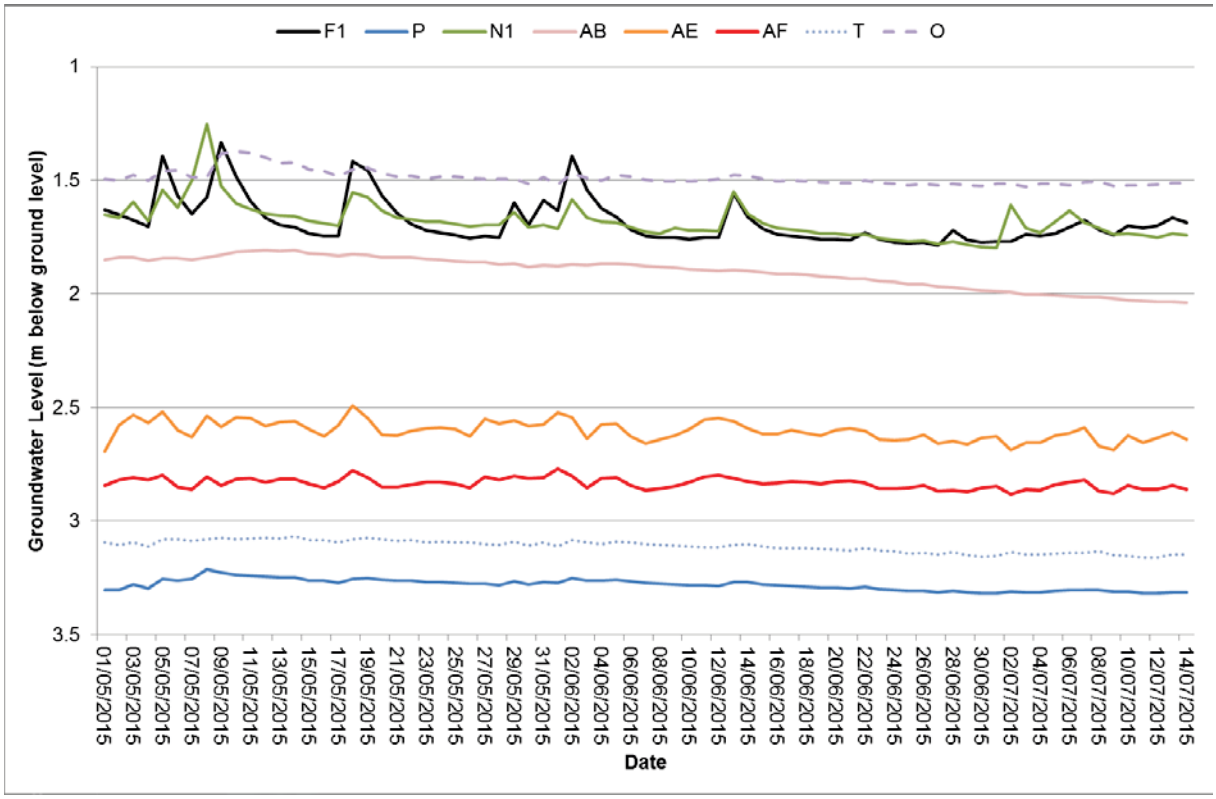


Figure 22
Hydrological Map of Nantwich with Groundwater Flow Contours



In order to assess the relationship between permeability and fluctuations in groundwater level following periods of rainfall, additional data logging transducers were installed into BH O and BH T. The results of this comparison are shown in **Figure 23** below.

Figure 23
Comparison between Groundwater Fluctuation and Permeability



The results indicate that the groundwater fluctuations observed in BH T are similar to those observed in BH P, and the behaviour of BH O was most similar to BH AB. However, neither BH T nor BH O exhibited the high levels of fluctuation observed in boreholes F1, N1, AE or AF. Consequently there does not appear to be a direct relationship between permeability and groundwater fluctuation as the trend observed in BH O does not match the fluctuations observed in other low permeability locations. However, it is possible that the groundwater fluctuations may be influenced by preferential drainage routes and surface runoff as F1, N1, AE or AF are all located in car parks or hard surfaced areas, whereas O, P, T and AB are all located on or close to areas without hard surfacing. For example drainage within the car parks may be via soakaways, or leakage could occur around the drains contributing to sudden pulses from the surface run-off.

8.0 C14 RESULTS AND THE EARLY MEDIEVAL INCEPTION OF ANTHROPOGENIC DEPOSITS

8.1 Results of radiocarbon dating

The radiocarbon results for the samples submitted during all phases of the project (Phase 1 2007, Phase 2 in 2012, and 2015) are shown in Table 5 below. The table also presents the depth below ground surface and sedimentary context from which they derived, and the type of material used for dating. The following sections include a discussion on the reliability of the results by year of submission, and a general discussion over the implications of the dates for the onset of waterlogged deposits and preservation of organic remains.

Table 5 Radiocarbon samples and age determinations

Laboratory number	Sample reference and depth in core	Sediment description	Material dated	$\delta^{13}C$ (‰)	Radiocarbon age (BP)	Calendar date (95% confidence)
		Borehole F (Church Lane)				
OxA-18722	Spot sample 3, 0.76–0.82m	*Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT Wood frags, sulphide odour*	*Ulmus* sp. sapwood	-24.6	150 ±23	cal AD 1660–1950
SUERC-18781	076100F06, 0.76–1.00m	*Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT. Wood frags, sulphide odour*	hazel nutshell	-25.7	775 ±30	cal AD 1210–1290
OxA-18683	100125F05, 1.00–1.25m	*Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT. Wood frags, sulphide odour*	hazel nutshell	-24.5	946 ±20	cal AD 1020–1160
SUERC-18780	125150F04, 1.25–1.50m	*Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT. Wood frags, sulphide odour*	sloe stone	-27.1	970 ±30	cal AD 1010–1160
OxA-18721	150186F03, 1.50–1.86m	*Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT. Wood frags, sulphide odour*	hazel nutshell	-24.3	966 ±23	cal AD 1010–1160
		Borehole N (Snow Hill)				
OxA-18684	Spot sample 6A, 2.00–2.05m	*Wet, dark brown, soft, very organic SILT, with a pale blueish-grey clay inclusion. Abundant waterlogged herbaceous detritus, large wood fragments and also twigs throughout. Overpowering sulphide odour*	*Salix* sp. wood	-24.8	1068 ±23	cal AD 890–1020
SUERC-18782	Spot sample 6B, 2.00–2.05m	*Wet, dark brown, soft, very organic SILT, with a pale blueish-grey clay inclusion. Abundant waterlogged herbaceous detritus, large wood fragments and also twigs throughout. Overpowering sulphide odour*	*Corylus* sp. wood	-27.2	1130 ±30	cal AD 780–990
SUERC-18783	Spot sample 8, 2.23–2.33m	*Wet, dark brown, soft, very organic SILT, with a pale blueish-grey clay inclusion. Abundant waterlogged herbaceous detritus,*	*Alnus* sp. wood	-27.1	1215 ±30	cal AD 690–890

Laboratory number	Sample reference and depth in core	Sediment description	Material dated	$\delta^{13}C$ (‰)	Radiocarbon age (BP)	Calendar date (95% confidence)
		large wood fragments and also twigs throughout. Overpowering sulphide odour				
OxA-18723	Spot sample 9, 2.35–2.40m	*Wet, dark brown, soft, very organic SILT, with a pale blueish-grey clay inclusion. Abundant waterlogged herbaceous detritus, large wood fragments and also twigs throughout. Overpowering sulphide odour*	*Fraxinus* sp. roundwood	-28.5	1071 ±24	cal AD 890–1020
OxA-18724	Spot sample 10A, 2.62–2.70m	*Moist to wet, very dark grey-brown, crumbly (works soft), slightly silty, clayey SAND. Large roundwood (?wattle) inclusions. Very slight sulphide odour*	*Salix* sp. roundwood	-28.2	1192 ±24	cal AD 730–940
SUERC-18784	Spot sample 10B, 2.62–2.70m	*Moist to wet, very dark grey-brown, crumbly (works soft), slightly silty, clayey SAND. Large roundwood (?wattle) inclusions*	*Salix* sp. roundwood	-27.1	1215 ±30	cal AD 690–890
		Borehole P (Pepper Street)				
SUERC-18786	150163P09, 1.50–1.63m	*Just moist, mid to dark, slightly purplish-brown, amorphous organic humified peat. Fragments of moss stems and leaves', sedge (Carex) nulets and rootlets.*	hazel nutshell	-25.2	865 ±30	cal AD 1040–1260
OxA-18726	163173P08, 1.63–1.73m	*Just moist, dark brown to dark grey-brown, crumbly (working more or less soft), silty very humified amorphous organic PEAT.*	hazel nutshell	-20.6	840 ±25	cal AD 1160–1260
SUERC-18785	173191P07, 1.73–1.91m	*Moist, dark brown to dark grey-brown, crumbly (working soft), slightly clayey SILT with some charcoal upper interface*	hazel nutshell	-27.7	910 ±30	cal AD 1030–1210
OxA-18725	191200P06, 1.91–2.00m	*Humified peat collapsed and loose in core tube.*	hazelnut shell	-23.3	841 ±24	cal AD 1160–1260
		Borehole AC (Snow Hill)				
SUERC-64289	AC-1		Methane gas sample	-30.9	1138 ±38	cal AD 770–970
SUERC-64290	AC-2		Methane gas sample	-42.0	1190 ±38	cal AD 770–970
		Borehole AD (Welsh Row brushwood trackway: in road fronting 14 Welsh Row)				
GrN-31797	Timber 1 2.3m bgl	*sandy and organic-rich deposits*	*Acer campestre*	-29.6	945 ±15	cal AD 1020–1150
GrN-31798	Timber 2 2.3m bgl	*sandy and organic-rich deposits*	*Alnus* sp.	-27.8	970 ±15	cal AD 1025–1160
		Corduroy roadway from gas main inspection pit adjacent 33 Welsh Row (SJ 6490 5239)				

Laboratory number	Sample reference and depth in core	Sediment description	Material dated	$\delta^{13}C$ (‰)	Radiocarbon age (BP)	Calendar date (95% confidence)
Ian Tyers[28] Dendro	Welsh Row trackway 0.75m bgl	*yellow sand lenses interleaved with organic-rich dark sandy SILT layers.*	*Oak, 189 rings, 4 sap*		Measured sequence 1065 - 1253	AD 1259 – 95
		Borehole AE (Wood Street)				
SUERC-39418	AE 6T - A 3.4 – 4.0m	*Very dense dark grey silty fine SAND with rare patches of black staining*	hazelnut shell	-26.9	1495 ±30	cal AD 535--640
OxA-26170	AE 6T – B 3.4 -4.0m	*Very dense dark grey silty fine SAND with rare patches of black staining*	plant remains	-22.9	1532 ±29	cal AD 430--605
SUERC-64291	AE-1		CO2 gas sample	-14.9	3780 ±38	2280–2040 cal BC
SUERC-64292	AE-2		CO2 gas sample	-12.2	3724 ±38	2280–2040 cal BC
		Borehole AF (Wood Street)				
SUERC-39419	AF 17/T – A 2.0 – 2.27m	*Very soft dark greyish brown sandy organic SILT with occasional patches of black - sulphide staining.*	twig	-28.8	890 ±30	cal AD 1035-1220
OxA-26232	AF 17/T – B 2.00 – 2.27m	*Very soft dark greyish brown sandy organic SILT with occasional patches of black - sulphide staining.*	wood twig	-27.2	826 ±30	cal AD 1160-1270
SUERC-39423	AF 19/T – A 2.48 – 3.0m	*Very soft greyish brown slightly clayey sandy SILT*	hazelnut shell	-28.0	875 ±30	cal AD 1045-1225
OxA-26171	AF 19/T - B 3.4 – 4.0m	*Very soft greyish brown slightly clayey sandy SILT*	plant remains	-23.3	897 ±27	cal AD 1035-1215

8.2 Discussion

8.2.1 Phase 1 sampling results 2007 (John Meadows)

Each sample consisted of a single-entity short-lived plant macrofossil or timber (Ashmore 1999). The samples from Boreholes F, N, and P were dated by Accelerator Mass Spectrometry (AMS) radiocarbon dating at the Scottish Universities Environmental Research Centre in East Kilbride (SUERC; technical procedures are described by Vandenputte *et al* (1996), Slota *et al* (1987), and Xu *et al* (2004)), or at the Oxford Radiocarbon Accelerator Unit (OxA; laboratory methods are given by Bronk Ramsey *et al* (2002; 2004)). The Welsh Row timbers were dated by Gas Proportional Counting at the Centre for Isotope Research, Groningen University, The Netherlands, following Mook and Streurman (1983). Internal quality assurance procedures at all three laboratories and international inter-comparisons (Scott 2003) indicate no laboratory offsets, and validate the measurement precision quoted.
The results reported are conventional radiocarbon ages (Stuiver and Polach 1977). The calibrated date ranges have been calculated by the maximum intercept method (Stuiver and Reimer 1986), using the program OxCal v4.05(Bronk Ramsey 1995; 1998; 2001; 2008) and the IntCal04 data set (Reimer *et al* 2004), and are quoted in the form recommended by Mook (1986), with the ranges rounded outwards by 10 years, or by 5 years where the

[28] Tyers, I., 2008 Tree-ring spot-date from an archaeological sample: Welsh Row Gas Main works, Nantwich *Dendrochronological Consultancy Ltd Report 103* (funded by Cheshire County Council)

radiocarbon error is less than ±25. The probability distributions shown in the figure below have been calculated using the probability method (Stuiver and Reimer 1993), and the same data.

The four results from **Borehole P** are statistically consistent with a single radiocarbon age (T' = 4.1, T'(5%) = 7.8, v = 3; Ward and Wilson 1978), and could thus be of the same calendar date (during the **11th – 12th centuries AD**). This is what we would expect to find if the organic deposit between 1.50 and 2.00m depth in this core had accumulated very rapidly.

The six results from **Borehole N** are not statistically consistent (T' = 35.4, T'(5%) = 11.1, v = 5), and these samples therefore cannot all be of the same date. You can see from the figure that although SUERC-18783 (spot sample 8) appears to be slightly earlier than the underlying OxA-18723 (spot sample 9), there is a general trend for samples from stratigraphically-earlier levels to be older than those from later levels, which we would expect to find if the samples were not intrusive or residual, and if a period of time had elapsed between deposition at 2.70m and 2.00m. **This suggests that the waterlogged deposit in this section of the borehole dates to the late Saxon period**, an impression reinforced by the statistical consistency between results from the two samples at the top of this deposit, 6A and 6B (OxA-18684 and SUERC-18782; T' = 2.7, T'(5%) = 3.8, v = 1), and those at the base of it, 10A and 10B (OxA-18724 and SUERC-18784; T' = 0.4, T'(5%) = 3.8, v = 1). It is difficult to say precisely when sedimentation at these levels took place, or what time span is represented by the waterlogged deposit between 2.00 and 2.70m; **it could be as little as a few decades in the 9th or 10th centuries AD**.

The five results from **Borehole F** fail the test of consistency by a wide margin (T' = 872.1, T'(5%) = 9.5 v = 4), but this is due to the post-medieval elm spot sample 3 (OxA-18722) at 0.76–0.82m depth. The four medieval results are still not consistent, however (T' = 31.0, T'(5%) = 7.8, v = 3), and the nutshell at 0.76–1.00m is appreciably more recent than the three samples from lower in the core. Whether the thirteenth-century date of this sample provides more than just a *terminus post quem* for this deposit is worth thinking about, but at any rate the deposit appears to be significantly later than the waterlogged deposit between 1.86 and 1.00m in the core, which may have accumulated rapidly in the **11th or 12th centuries AD**; the three results here are statistically indistinguishable (T' = 0.6, T'(5%) = 6.0, v = 2).

The two results from **Borehole AD** are statistically consistent with a single radiocarbon age (T' = 1.4, T'(5%) = 3.8, v = 1; Ward and Wilson 1978), and could thus be of the same calendar date – as expected, given that neither timber had a significant intrinsic age and that the two timbers formed part of the same structure. If we assume that this trackway was built of freshly-felled timber, it was built between the **early-mid 11th century and the middle of the 12th century cal AD**. This is somewhat later than the post-Roman date permitted by the sherds in the underlying deposit, and a century or two earlier than the dendro-dated corduroy trackway nearby.

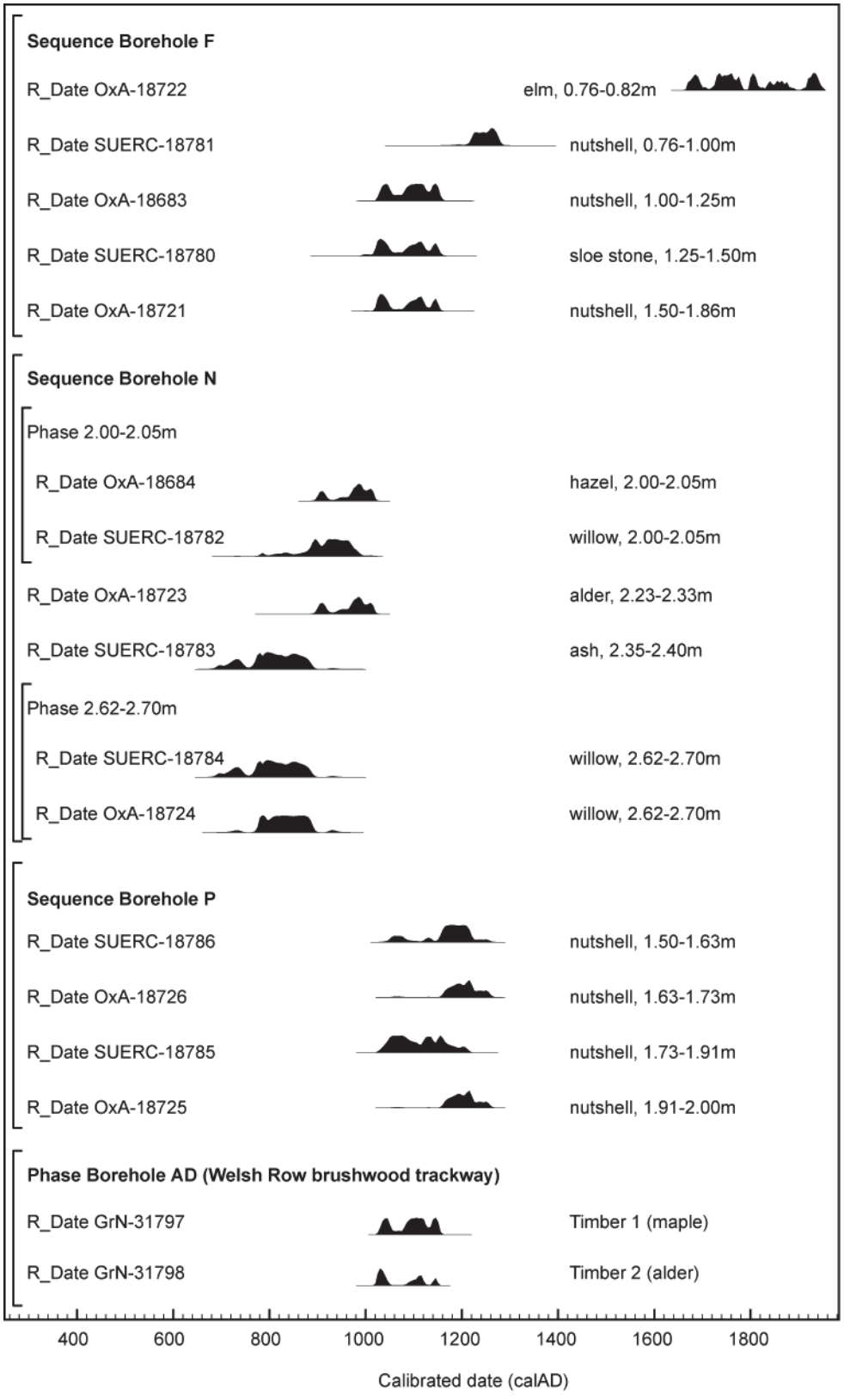


Figure 24
Probability distributions for radiocarbon calibrated date ranges

8.2.2 AE and AF 2012 sampling results (Alex Bayliss)

The samples were dated by Accelerator Mass Spectrometry (AMS) at the Scottish Universities Environmental Research Centre in East Kilbride (SUERC-) and the Oxford Radiocarbon Laboratory (OxA-) respectively. The samples dated at SUERC were pre-treated using methods outlined in Stenhouse and Baxter (1983), combusted following Vandeputte et al (1996), graphitized as described by Slota et al (1987), and measured by AMS (Xu et al 2004). The samples processed at ORAU were pre-treated using a standard acid/base/acid method followed by an additional bleaching step (Brock et al 2010), combusted, converted to graphite, and dated as described by Bronk Ramsey et al (2004). Internal quality assurance procedures and international inter-comparisons (Scott 2003; Scott et al 2010) indicate no laboratory offsets and validate the measurement precision quoted.

The results reported are conventional radiocarbon ages (Stuiver and Polach 1977). The calibrated date ranges have been calculated by the maximum intercept method (Stuiver and Reimer 1986), using the program OxCal v4.1 (Bronk Ramsey 1995; 1998; 2001; 2009) and the IntCal09 data set (Reimer et al 2009). They quoted in the form recommended by Mook (1986), rounded outwards to 5 years. The probability distributions of the calibrated dates, shown below, have been calculated using the probability method (Stuiver and Reimer 1993), and the same data.

Each of the pairs of duplicate radiocarbon measurements from the specific heights in the different boreholes are statistically consistent at 95% confidence:

Nantwich borehole AE6/T 340-400 (T'=0.8; (T'(5%)=3.8; v =1; Ward and Wilson 1978); Nantwich borehole AF19/T 248-300 (T'=0.3; (T'(5%)=3.8; v =1; Ward and Wilson 1978); Nantwich borehole AF17/T 200-227 (T'=2.3; (T'(5%)=3.8; v =1; Ward and Wilson 1978).

The dated duplicate samples from each bore hole could therefore represent material of the same actual age, for **Borehole AE 5th to 6th centuries AD**, and for **Borehole AF 11th to 13th centuries AD.**

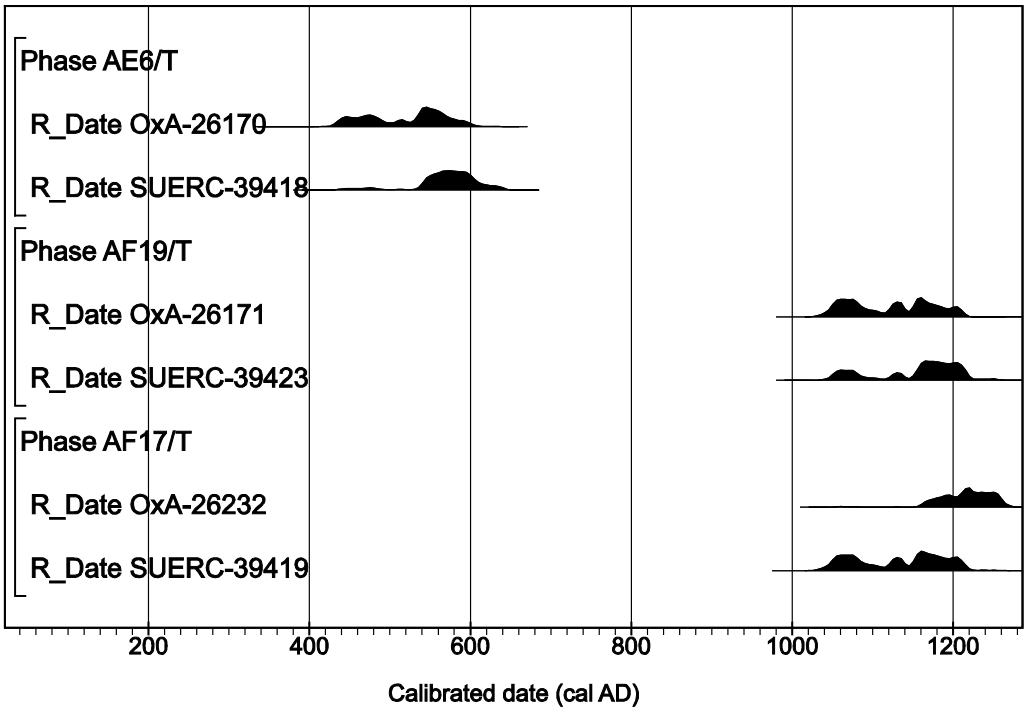


Figure 25
calibration of radiocarbon results from the Nantwich boleholes 2012 series by the probability method (Stuiver and Reimer 1993)

8.2.3 AC and AE 2015 methane and carbon dioxide (Peter Marshall)

Samples of methane (CH_4) and carbon dioxide (CO_2) from two dipwells – Snow Hill (AC-1) and Wood Street (AE-1), Nantwich - were submitted to the Scottish Universities Environmental Research Centre for radiocarbon dating. The samples were processed and dated by Accelerator Mass Spectrometry as described in Dunbar *et al* (in press).

The results reported are conventional radiocarbon ages (Stuiver and Polach 1977). Replicate measurements are available on samples of the same gas from both dipwells. In both cases the measurements are statistically consistent at 95% confidence (Table 1; Ward & Wilson, 1978). These measurements have therefore been combined by taking a weighted mean before calibration.

The calibrated date ranges have been calculated by the maximum intercept method (Stuiver and Reimer 1986), using the program OxCal v4.2(Bronk Ramsey 1995; 2009) and the IntCal13 data set (Reimer et al 2013), and are quoted in the form recommended by Mook (1986), with the ranges rounded outwards by 10 years. The probability distributions shown in Figure 1 have been calculated using the probability method (Stuiver and Reimer 1993).

The wide discrepancy in ages between the CO_2 and CH_4 components suggests that either the gases are derived from different sources or that they are composed from a mixture of sources (Garnett *et al* 2013). The considerable older age of the CO_2 (**Borehole AE, Early Bronze Age**) would suggest that it is derived from much deeper organic waterlogged deposits. The methane samples from **Borehole AC** are more consistent with previous radiocarbon determinations from the Nantwich Waterlogged Deposits project and lie within the **8th to 10th centuries AD**. Submission of further gas samples from dipwells together with water and peat samples may help in determining the C source of gases and in particular the CO_2 component from the Wood Street dipwell AE (cf Charman *et al* 1999).

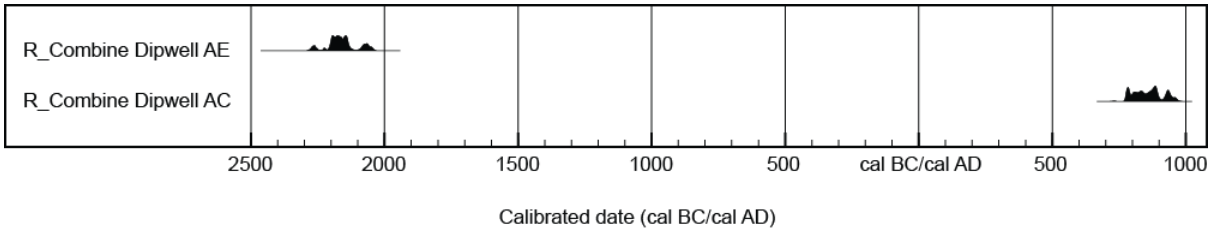


Figure 26
Probability distributions of radiocarbon dates from Snow Hill (AC-1) and Wood Street (AE-1), Nantwich, carpark dipwells. The distributions are the result of simple radiocarbon calibration (Stuiver and Reimer 1993)

8.2.4 Implications for the origins and preservation of waterlogged deposits

The earliest radiocarbon dates were those from the CO_2 samples from Borehole AE in Wood Street car park on the west side of the River Weaver. These suggest organic remains of Early Bronze Age date, whilst the proximity of the borehole to the river suggests that the material could derive from river-borne deposition, or inundation of riverside vegetation.

The onset and development of waterlogged conditions for the historic salt town at Nantwich range from the Middle Saxon period through to the High medieval period. The earliest indication of waterlogging also comes from Borehole AE in Wood Street car park with a pair of dates in the 5th – 7th centuries from 3.4 – 4m below ground level (bgl), from hazelnut shells found when sampling the basal sand, which was not described in the logging as of anthropogenic origin (i.e. as an Archaeological deposit or Non-carbonised organics). This location for the earliest evidence of waterlogging in the historic town is not surprising, as this lies adjacent to the west bank of the River Weaver, in a zone that archaeological evidence has shown had intensive salt-working during the medieval period.

Slightly later Saxon dates were recovered from Boreholes N and AC, both located at Snow Hill, just uphill on the east bank of the River Weaver, and an area which historic documentation (1624 Survey of Nantwich: walling lands, wych houses) identifies as the core zone for salt making in the post-medieval period. From Borehole N dates from the 8th to 11th centuries AD have been recovered at c.2m, 2.2 – 2.4m, and 2.6 – 2.7m bgl, whereas at Borehole AC methane gas gave two similar dates from the 8th to the 10th centuries. Snow Hill has also produced the earliest radiocarbon dates associated with salt-working, which were structural timbers from the Iron Age found during monitoring by Malcolm Reid prior to the present project[29].

Dates during the Late Saxon and Norman periods (9th – 12th centuries) were obtained from Borehole F (Church Lane uphill on the east side of the river, from depths between 1 – 1.86m bgl), and Borehole AD, the brushwood trackway in Welsh Row on the west side of the Weaver (at 2.3m depth bgl). The distance apart of these locations shows how extensive waterlogging had become by the Late Saxon period, both uphill near the church, as well as low down near the river and bridge, where material was laid to form a dry walkway.

Medieval dates have been recovered from Boreholes F (Church Lane, from 0.76 – 1m depth bgl), P (Pepper Street), AF (Wood Street car park), and Welsh Row (dendrochronological

[29] Reid, M., 2004 Archaeological Observations at Snow Hill Car Park, Nantwich, Cheshire *Journal of the Chester Archaeological Society 79, 25-36*

date from a corduroy trackway at 0.75m bgl). The date ranges all end in the 13th century, although start of the range varies between the 11th and 12th centuries.

A single post-medieval date was obtained from the upper part of Borehole F (Church Lane, at 0.76 – 0.82m bgl).

The depths at which the samples came from within the core sequences at each location, appear to be consistent with the dates calculated in that the early dates come from the deepest deposits, and later dates come from samples higher in the sequence.

The type of deposit and state of preservation from which the samples were taken include wet or moist, organic-rich silts and sands with sulphide odour for the Saxon - Norman dates, and just moist, humic sandy-silt or humified peat for the Norman – medieval dates. The state of preservation for all deposits sampled at Borehole F were labelled as A3 (unsaturated with medium preservation), whereas those from Borehole N were C4 (saturated with good preservation) for the higher deposits sampled, and C3 (saturated with medium preservation) for the lowest samples. Borehole P was mostly labelled as A2 (unsaturated with poor preservation), whilst AC varied throughout its sequence from higher deposits labelled as A1 (unsaturated with lousy preservation) to base labelled as B2 (vadose (fluctuation) zone with poor preservation). There was no state of preservation documented for Borehole AD or the corduroy trackway in Welsh Row. Boreholes AE and AF ranged from A4 (unsaturated with good preservation) in the 2 – 2.27m depth range, changing to vadose zone and saturated conditions lower in the sequence.

The possible causes for the onset of waterlogging have been discussed in the 2nd report (*Nantwich Waterlogged Deposits Report No. 2: The Character and Extent of Archaeological Preservation* SLR Consulting Ltd November 2009). In summary changing climatic conditions could have contributed, whilst proximity to the river and salt-working were probably significant factors for the earliest deposits, and infill of dips in the terrain with domestic, industrial and stable rubbish further up the hill. The geological conditions were such that the natural sand became saturated because of a low permeability or impervious clay beneath, inhibiting downward drainage, and therefore allowing waterlogging higher up which prevented decay of the organic components within the rubbish deposits. This led to gradual accumulation over several centuries, until a reversal in the process was effected under Victorian sanitisation programmes in the mid-19th century. Drains were inserted and streets paved over, so that the amount of surface water replenishing the ground-water system was reduced, and desiccation of the deposits began to occur.

9.0 CONCLUSIONS

9.1 Geochemical Assessment

9.1.1 Sediment samples

Baseline geochemical conditions were described during the initial borehole survey conducted in 2007, following analysis of samples from sediment samples extracted from window samplers. The concentrations of principal redox sensitive parameters, including sulphates, sulphides, nitrates as well as nutrients such as phosphates were determined using UKAS standards[30]. The conclusions drawn from these data were that whilst shallow surface sediments were oxidising, deeper sediments could be considered as more reducing in character because the sulphate and nitrate concentrations were low, sulphide was detected in several samples and the pH values were broadly neutral. Taking everything into consideration, the evidence pointed to redox conditions residing between the sulphur and iron boundaries, conditions that, although not optimum, could be conducive to the continued preservation of organic materials, especially where deposits remained saturated and anoxic.

Highly reducing conditions would have been indicated by the presence of higher levels of sulphide, and the low levels/absence of sulphides was surprising, especially given the overall good level of preservation of wood and palaeoenvironmental remains in the samples as well as the strong odour of hydrogen sulphide gas detected from a couple of the boreholes. However it is very likely that the perceived low levels/absence of sulphide is due in part to the sampling and testing procedures adopted at this stage of the project despite of following established practice (BS5930). Where possible sediment subsamples were taken after the recording of the sediment profile and packaged in re-sealable polythene bags, after much of the air had been squeezed out. Samples were then stored in a cool box at a temperature initially around 5° C with some rising throughout the day to ambient, and in Phase 2 there was a delay before the samples reached the laboratory. Therefore there is a possibility that samples reacted with atmospheric oxygen and what were once reduced chemical species became oxidised before any subsequent analyses performed at the testing laboratory. Laboratory analysis of samples seldom record sulphide, a phenomenon which is attributed to the unstable nature of sulphide, which will oxidise to sulphate as quickly as it can, and therefore it is not surprising that low levels of sulphides with commensurate high levels of sulphates were recorded from some of these boreholes at Nantwich.

Similar results were observed during a recent sampling programme at Guys Hospital, London, where the well preserved remains of a Roman boat were discovered in 1958, and re-evaluated three years ago. Sulphide concentrations were below the detection level, but sulphates and total sulphur were recorded in all six samples taken from three boreholes[31]. The difference between the percentage concentrations of total sulphur and sulphate implied that sulphides were present and conditions could be described as reducing. This conclusion was supported by the presence of ammoniacal nitrogen, which is often regarded as an indicator of reduced conditions in the natural environment (Christensen et al, 2000[32])

[30] (UK Accreditation Service for laboratory testing)

[31] Report from Derwentside Environmental Testing Services, 11th January 2016

[32] Christensen, T.H., Bjerg, P.L., Banwart, S. A., Jakobsen, R. Heron, G., Albrechtsen, H-J., 2000. Characterisation of redox conditions in groundwater contaminant plumes. *Journal of Contaminant Hydrology 45 165-241*.

9.1.2 Methodological improvement

If geochemical assay of sediment samples continues to be used as one of the suite of techniques used to assess the character of the burial environment it is recommended that the methodology employed recently at Avaldsnes, Norway (Martens and Bergersen 2015[33]) is followed. In this study sediment samples were packed in plastic bags which were then inserted into another plastic bag containing an oxygen scavenger to create anaerobic conditions. All samples were stored at 4°C and opened in a nitrogen atmosphere with analysis of redox sensitive parameters also conducted in a nitrogen atmosphere. Whether commercial UKAS approved facilities have this capability will need to be ascertained, as the methodology does not appear to be included with the relevant British Standard (BS 1377, part 3, 1990). A similar problem with potential ingress of atmospheric oxygen into the groundwater sample bottles could be mitigated by the use of vacuum canisters.

9.1.3 Groundwater samples

Further geochemical assays were carried out on groundwater samples collected annually between 2011 and 2015, measuring a suite of redox sensitive parameters including total sulphur, sulphate, sulphide, ferrous and ferric iron and nitrate and the nutrient phosphate. Samples were extracted by peristaltic pump and stored in plastic bottles into which were added preservatives including hydrochloric acid, nitric acid and zinc acetate. Testing was carried out at a UKAS accredited laboratory. In situ testing for dissolved methane gas was also carried out on site at each visit.

The results are broadly similar to those obtained from the sediment samples in 2007 (see Table 2 above), and can be characterised as having moderate to high levels of sulphate, low to no sulphide, total sulphur not detected, and iron detected in both states, ferrous and ferric, with low levels of phosphate detected too. Sulphate was recorded in all groundwater samples over the 5 year period, as was phosphate (although occasionally below test detection levels), and nitrates. Sulphide and ferric and ferrous iron were occasionally not detected, and total sulphur levels were either zero or not detected at all.

The pH of the groundwater fluctuates slightly on either side of neutral, exhibiting a greater degree of variety then observed in the sediment samples. However this is a function of the larger number of readings taken from groundwater samples as opposed to the sediment samples, and is therefore a truer reflection of the variation in groundwater pH ranges.

Groundwater samples collected from borehole N1 have moderate levels of sulphate, slight traces of sulphide, ferrous and ferric iron plus low levels of nitrate. Based on these, the dominating redox process appears to be either sulphur or iron. This is corroborated by the groundwater redox potential measurements which, when plotted on a typical Eh/pH stability chart lie between the sulphur and iron boundaries, where sulphates and ferrous iron would dominate. Therefore conditions can be described as reducing in character.

As for the results of analyses, the low levels of sulphide are at first disappointing, as one would have expected higher concentrations especially at N1 where a good level of organic preservation has been recorded. However, whilst there will again be an issue of oxidation of the groundwater as it enters the dipwell (and also when the water is pumped into the sample containers, which could be reduced in future by inline sampling), there is also a possibility

[33] Martens, V.V., and Bergersen, O. 2015 In situ site preservation in the unsaturated zone: Avaldsnes Quaternary International 368, 68-79.

(identified elsewhere) that the low levels of detected sulphide could be attributed its low solubility when ferrous iron is present in ground water[34].

9.1.4 Gas samples

The highest concentrations of dissolved methane gas were recorded from borehole N1 indicating that highly reducing conditions exist somewhere within the locality of the dipwell. Methane gas can travel some distance from its source, and the source of the methane has been confirmed as archaeological material through carbon 14 dating at dipwell AC (other sources for methane gas include fractured gas pipes and buried modern rubbish dumps). Methane gas was also detected in two boreholes installed in the river Weaver floodplain, designated as AE and AF, where concentrations of sulphates would infer reducing rather than highly reducing conditions.

The likelihood for highly reducing conditions at borehole N1 is supported by the presence of methane gas and strongly negative redox potential readings recorded from the rigid resin/platinum in situ probe installed to a depth c. 1.5m below ground surface (bgs) for the redox trial (see **Figure 16**). Uncalibrated soil moisture contents, as measured by a TDR profile probe (**Figure 20**) were around 60% at c. 1.5m bgs and 100% at c. 1.70mbgs. Water contents at both depths were fairly static throughout the monitoring period indicating that deposits probably remained anaerobic throughout this period.

Further investigation into the use of methane gas as a proxy indicator for defining the dominating redox processes should be actively pursued, although it has to be stressed that methane gas was not detected at all locations where organic materials were preserved.

9.2 Validity of measured parameters

Some key parameters have been identified, and it is possible to identify the most essential elements from the suite employed during the monitoring programme. This helps for planning the cost effectiveness of future monitoring schemes within waterlogged areas in the UK.

From the Nantwich experience a targeted monitoring programme of sufficient rigour to supply valid data for monitoring purposes could be employed comprising the following techniques:

Essential techniques

- Permeability and porosity testing of sediments, and in particular the cultural horizons and sediments vertically adjacent;
- Geochemical testing of sediments particularly ammoniacal nitrogen, ferrous and ferric iron, sulphates and sulphides (or percentage difference between total sulpur and sulphates) to establish baseline sample storage and laboratory testing to be done under as oxygen -free conditions as possible);
- Redox measurements using in situ rigid resin/platinum probes connected to a datalogger (redox cannot be measured in unsaturated conditions);
- Water levels and rainfall on a daily basis;

Desirable (but not essential) techniques

- Water quality dip meter testing particularly dissolved oxygen on a quarterly basis;

[34] Christensen, T.H., Bjerg, P.L., Banwart, S. A., Jakobsen, R. Heron, G., Albrechtsen, H-J., 2000. Characterisation of redox conditions in groundwater contaminant plumes. Journal of Contaminant Hydrology 45 165-241

- Gas monitoring, particularly methane and carbon dioxide on a quarterly basis;
- Geochemical analysis of water samples on an annual basis to confirm validity of water testing dip-meter results;
- In situ soil moisture testing from sediments which comprise the cultural horizon and from the stratigraphic sequence above and immediately below it, using either TDR or FDR techniques.

9.3 C14 dating of gas samples

The validity of gas emissions in helping to characterize whether conditions conducive for preservation exist, requires accurate scientific dating so that modern contamination does not present misleading data. The Nantwich project has built on previous experimental work to show how this can be achieved, and a detailed methodology for gas sampling is included above. The importance of the accurately dated gas emissions is that the results can be considered as closely related to the organic remains which have been preserved, rather than providing data from more indirect water quality proxy indicators derived from a mixture of sources which have become combined within the dipwell.

9.4 How relevant can quantities (mg/l or mg/kg) be for other urban centres?

Dissolved oxygen at levels of 0.5 – 2 mg/L indicate that aerobic respiration is probably occurring. If dissolved oxygen concentrates exceed 0.5mg/l it is highly likely that aerobic degradation is present[35].

Norwegian studies of sediments have characterized good preservation conditions as including ammonium at levels of over 50 mg/kg, sulphide at over 100 mg/kg, sulphate at over 500mg/kg and reduced iron at over 80%. Poor conditions are represented by nitrate at levels of over 10 mg/kg, sulphate at less than 500 mg/kg, reduced iron at less than 20%[36].

Analysis of potentially comparative data sets would be an interesting outcome, but is beyond the scope of the present project. In Table 2 above, however, the relationship between iron reduction and oxidisation at Nantwich is presented, and in these data 91 entries have been made of which c.29% show good reducing conditions (less than -140mV) and c.24% with more highly oxidising conditions (over 100 mV). The rest of the data suggest conditions fluctuate either side of the boundary, and overall c.68% indicate more reducing than oxidising conditions. Compared with the Norwegian example above, it would indicate that Nantwich on average is close to having good preservation conditions.

This assessment is not supported by the dissolved oxygen, however, which has 71 out of 84 entries in Table 2 as having concentrations above the 0.5 mg/l threshold. This equates to 84% of the recorded dissolved oxygen levels as indicative of aerobic degradation occurring.

Further research into preservation conditions in urban waterlogged deposits is required to identify key trigger points for minimum and maximum conditions necessary for the continued preservation of organic remains.

[35] Carey, M.A., Finnamore, J.R., Morrey, M.J.., and Marsland, P.A. 2000 *Guidance on the Assessment and Monitoring of natural Attenuation of Contaminants in Groundwater* Environment Agency R&D Publication 95

[36] Martens, V.V., and Bergersen, O. 2015 *In situ* site preservation in the unsaturated zone: Avaldsnes *Quaternary International 368, 71*.

9.5 The role and importance of the capillary fringe

The significance of the vadose zone for preservation of organic remains has often been overlooked in the past, although various studies have been conducted in the last decade aimed at increasing understanding of the role that capillary action can play in producing conditions conducive for preservation.

At Nantwich there is clear evidence for the importance of this zone, specifically at dipwells AE and AF. These are located adjacent to the river, in an area where previous archaeological investigations over several decades have produced abundant evidence for well-preserved organic remains, in a deposit zone that lies up to 1.5m above the water-table (generally in a zone of 2.5 – 3.0m bgl.). The relatively low permeability of the silty sediments beneath the organic remains would inhibit rapid drainage, whilst capillary forces may have contributed to preservation through drawing water up into the voids within the sediments.

Anaerobic deposits can therefore exist above the water level if the voids within sediments are sufficiently saturated to exclude the ingress of oxygen. At Location N/N1 soil moisture testing has demonstrated that although the water level fluctuated seasonally to 1.5m bgl, the upper levels with organic remains maintained soil saturation levels of 50 – 60% in the overlying zone from 1.20 – 1.56m bgl.

In contrast at location P/P1 organic remains were also found preserved elevated above the water-table (between 3.0 – 3.5m bgl), although in this case the predominance of sand content beneath the cultural horizon (at 1.3 – 2.0m bgl) contributes to easy drainage. It probably also results in less capillary action, and thus a lower tension-saturated zone, allowing increased rates of decay within the archaeological deposit.

9.6 River zone v. perched water-table near the church

The topography at Nantwich would logically suggest that preservation would deteriorate with increasing altitude, as the lower-lying zone close to the river would be more inclined to become waterlogged than higher ground near the church for example. Good preservation has been found in both zones, however, and the reasons for this are complex. The sub-surface deposit sequence and the terrain underlying the superficial deposits contribute to preferential flow paths and retention of water. In addition to the principal drainage provided by the northwards flow of the River Weaver, the southern edge to the waterlogged deposits runs along what was originally slightly higher ground that is followed by Hospital Street. Between this and the northern edge of the waterlogged deposits the original ground surface formed a shallow valley, and within a band running west from the church through dipwells U, T, S, and P a thick deposit of sand underlying archaeological layers is interpreted as representing a former watercourse. During wetter periods such as the late Saxon and early medieval periods, organic matter from domestic, industrial and stable waste accumulated in depressions and gradually raised the level within this part of Nantwich. Although the underlying sand should have acted as an aquifer, glacial clay beneath the sand prevented drainage and allowed the sand to become saturated, thus inhibiting the decay of organic remains. At Locations F, V and O for example, which define the eastern edge to the waterlogged deposits, the monitoring results show that conditions are generally reducing, and therefore conducive for preservation. Location F has evidence for well-preserved organic remains, substantiated by excavations at the adjacent Lamb Hotel in 2004[37], a situation which suggests the existence of a perched water-table.

[37] Gifford and Partners Ltd 2005 *The Lamb Hotel, Nantwich: An Archaeological Watching Brief*

The lower-lying zone on either side of the river was also an area which experienced intensive salt-working during medieval and post-medieval times. This process may have contributed to the deep accumulation of waterlogged deposits, with recharge from rainfall and surface water, as well as capillary action, helping to retain water content within these raised deposits, leading to good organic preservation. The area south-east of the bridge, where the castle once stood, has displayed variable conditions of preservation from archaeological investigations over the years[38]. This has been attributed to good survival in man-made deep features such as ditches, and poor survival in areas where other activities (such as the castle mound) had been undertaken.

9.7 How does the data help with future management of the resource?

In the Phase 1 study the conclusions included reasons for why the waterlogged deposits had accumulated and been preserved, as well as what the threat was to them now. Rainfall contributed to a relatively high water-table historically due to the ground absorbing the water. The introduction of drainage and hard surfaces during the Victorian period directed rainfall away from permeating the ground and has led to a lower water-table and thus desiccation of deposits. The increased use of impermeable surfaces during the last 50 years has intensified this problem and added flood risk to the town.

The data gathered during the baseline and monitoring programme have allowed a far more detailed understanding of the character and variable nature of the burial environment in Nantwich. This has enabled a sufficiently robust evidence base for design of a management strategy, documented in a Supplementary Planning Document (SPD) which has been endorsed by Cheshire East Council as a supporting document for its local plan. The emphasis of this strategy is for a holistic approach from spatial planners, engineers, developers, utility companies and others engaged in disturbance to below ground conditions and hydrological conditions, to ensure that every opportunity is taken to manage rainfall so that it can be stored and absorbed into the ground, rather than channelled away from the deposits that underlie the historic centre of the town. By preventing gradual desiccation of the waterlogged archaeological deposits not only will the strategy help in preserving archaeological remains, but it will also help prevent subsidence of the built heritage within the Conservation Area, and reduce the likelihood of flash flooding. As appropriate any future development permitted within the Area of Special Archaeological Potential would be required to investigate and monitor the deposits, and such data recovered by these means would help to enhance and revise the existing model derived from the project to date.

9.8 Was it all worth it for the results achieved?

The Nantwich study has demonstrated the need to adopt an holistic approach to the understanding of the dynamics of the urban waterlogged environment. Neither a single parameter, nor single test will adequately describe the nature of the burial environment and the degree of preservation of the archaeological resource. The study has also revealed the pitfalls inherent in using proxy indicators such as redox and gas measurement, where there are significant risks in "over-interpreting" the results - soil redox reactions are by their very nature highly complex and influenced by external factors. Too much can be read into a set of single spot readings. Although the correlation between good preservation and a highly reducing environment is well established, the precise mechanics of preservation in a highly dynamic urban environment remains less understood. The vadose zone remains one of the least understood environments, and further research, along the lines conducted in Nantwich,

[38] SLR July 2007 *Waterlogged Archaeological Deposits, Nantwich, Cheshire: Desktop study of archaeological and borehole investigations Cheshire County Council and English Heritage 2663/522*

should be initiated to help solve the conundrum of well-preserved organic archaeological materials found above the saturated deposits.

Duration of data gathering for monitoring the waterlogged deposits has demonstrated the risks for this over too short a period, and it was necessary to adopt five years at Nantwich to achieve a robust understanding of trends in the data, and to average out particular events which would otherwise have skewed the results. It is recommended that future monitoring programmes gather data over a period of at least five years. Furthermore the results have raised some potential discrepancies between redox measurements and what geochemical conditions would suggest, and this highlights the need for specific research comparing in situ sampling and analysis, with ex situ laboratory testing of samples[39].

9.9 Legacy

The Nantwich database curated by the Archaeological Data Service at York (ADS) provides a dynamic series of data-sets for further analysis with a wealth of research potential and comparative study. The data provide a baseline for the situation in 2016 against which new development within Nantwich town centre can be measured. The Nantwich project has provided internationally comparable data-sets, analyses and reports, in its archive and publications[40]. It has been a major player in the creation of national guidance on preservation of archaeological remains[41], as well as providing a valuable planning tool for the local authority[42].

[39] Feedback received from three geoarchaeologists who reviewed the draft report offered very different opinions and levels of scepticism about the validity of sampling anaerobic deposits and laboratory testing of them. However, the holistic approach adopted at Nantwich allowed for in situ and ex situ complementary techniques so that the effect of potential methodological flaws could be minimised.

[40] https://historicengland.org.uk/images-books/publications/historic-england-research-4/

[41] https://historicengland.org.uk/images-books/publications/preserving-archaeological-remains/

[42] http://www.cheshirearchaeology.org.uk/wp-content/uploads/Nantwich_SPD_rev2_final.pdf

10.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

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BOREHOLE LOG

BOREHOLE No. **A**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	30/07/07	33.29maOD	E364931 N352661

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							33.25		0.04	No Recovery	
							32.89	(0.36)	0.40	Moist, mid to dark grey/brown, crumbly (working soft), slightly clayey SILT. Rootlets present to 0.14m.	
							32.29	(0.60)	1.00	Moist, light to mid brown, soft (working more or less plastic), clayey SILT.	
1							32.23		1.06	No Recovery	
					0		31.29	(0.94)	2.00	Moist, mottled light grey yellow/brown stiff (working plastic), very slightly silty CLAY. 1.61 - 1.63 Discontinuity of moist to wet, soft to unconsolidated, light grey, sand.	
2							30.94	(0.35)	2.35	No Recovery	
					0		30.49	(0.45)	2.80	Moist, light to mid brown (with some patches of light to mid orange-brown), stiff and sticky (working plastic), silty CLAY. 2.35 - 2.65 Very granular appearance caused by presence of indurated clay lumps (<3 mm) within the matrix.	
							30.37		2.92	No Recovery	
3					0		29.81	(0.56)	3.48	Moist, light to mid brown to grey, soft (working slightly sticky and then more or less plastic), slightly silty CLAY. 3.20 - 3.48 Becoming slightly wetter and more sticky.	
					0		29.39	(0.46)	3.90	Moist to wet, light to mid grey, unconsolidated, fine to coarse SAND.	
4										Borehole complete at 3.90m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **AA**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	37.97maOD	E364730 N352391

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							37.62		(0.35) 0.35	Collapsed and loose in core tube - just moist, mid brown to mid to dark grey-brown, unconsolidated, silty SAND. Abundant brick/tile (<55mm) throughout.	
					0		37.33		(0.29) 0.64	Moist, mid to dark grey to grey-brown, firm/stiff (working soft), slightly sandy clayey SILT. 0.35 - 0.54 Crushed brick and tile fragments present (<20mm).	
					0		36.97		(0.36) 1.00	Moist, light brown (discoloured to mid to dark grey-brown from layer above at 0.64-0.74m), unconsolidated, SAND. 0.64 - 0.74 Becomes dark greyish brown.	
1											
					0		35.37		(1.60) 2.60	Moist, light to mid grey, unconsolidated, fine SAND.	
2											
					0		34.97		(0.40) 3.00	Just moist, mid brown to grey-brown, very stiff (working plastic), CLAY.	
3										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **AB**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	37.93maOD	E364740 N352370

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
									(0.43)	Light grey SAND. Modern fragments of brick and tile present (<70mm).	
							37.50		0.43	0.34 - 0.43 Brick becoming abundant.	
					0		37.45		0.48	Dark grey, compacted ashen SILT.	
					0		37.32		0.61	Dark grey ashen gravelly SILT. Gravel is of conglomerate 'hard core' (<100 mm).	
					0				(0.39)	Dark grey ashy SILT. Traces of brick and tile (<4mm), coal (<20mm) and charcoal (<6mm) fragments present throughout.	
1							36.93		1.00		
							36.83	?	1.10	No Recovery.	
					0				(0.63)	Moist, dark grey to brown, silty fine SAND. Occasional black gravels of ash/cinder (<10mm).	
							36.20		1.73		
					1				(0.27)	Moist, dark grey to brown humic, slightly sandy, slightly clayey SILT. 1.73 - 2.00 Slight sulphide odour.	
2							35.93		2.00		
						1	35.87	?	2.06	No Recovery.	
					0				(0.31)	Moist, fine sandy SILT. Occasional rounded pebbles (<50 mm) present throughout.	
							35.56		2.37		
					0				(0.42)	Moist to wet, light yellow to brown, unconsolidated, coarse SAND.	
							35.14		2.79	2.70 - 2.79 Rounded pebbles (<20 mm) common.	
					0		34.93		3.00	Moist, brown, compacted sandy CLAY. Rounded pebbles (<60mm) common throughout.	
3										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 2.13m bgl. Well headspace concentration 40ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **AC**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	36.42maOD	E364963 N352517

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							35.96		(0.46) 0.46	Most of core volume composed of angular 'hard core' stone (<65 mm), with occasional fragments of brick/tile (<45 mm) in a dry, light grey to brown SAND matrix.	
							35.83		0.59	Dry, mid brown to dark grey, firm sandy CLAY. Occasional stones (<15 mm) and brick/tile (<50 mm) fragments present.	
							35.69		0.73	Large brick rubble GRAVEL and COBBLES (<120 mm).	
							35.42		(0.27) 1.00	Dry, mid brown to dark grey, firm sandy CLAY. 0.77 - 0.80 Brick and tile fragments (<40 mm) present.	
1										0.99 - 1.00 Modern glass fragments (<40 mm) present.	
							34.91		(0.51) 1.51	Moist, dark grey, firm to unconsolidated, ashen, slightly sandy SILT. Occasional modern pot fragments (<18 mm) and patches of rotted mortar.	
					0		34.84		1.58	Large brick and tile rubble of GRAVEL and COBBLES (<100 mm).	
					1		34.42		(0.42) 2.00	Moist, dark grey, firm to unconsolidated, ashen, slightly sandy SILT. Occasional fragments of brick/tile (<10mm) and traces of fine roots throughout.	
2					0		34.15		(0.27) 2.27	Moist, dark grey, firm to unconsolidated, ashen, slightly sandy, slightly clayey SILT.	
					0		33.90		(0.25) 2.52	Moist to wet, dark grey to grey-brown, firm (working soft and somewhat plastic), clayey SILT. 2.38 - 2.44 Rotted mortar (<12 mm) present.	
					0		33.80		2.62	Moist to wet, mid grey, crumbly (working soft and sticky), clayey SILT. Stones (<20mm) present throughout.	
					0		33.69		2.73	Moist, light to mid grey, firm and slightly sticky (working soft and somewhat plastic), silty CLAY, with a slight surface 'dusting' of sand.	
					0	1	33.55		2.87	Moist to wet, light grey to mid grey-brown, unconsolidated, coarse clayey SAND.	
3					1		33.42		3.00	Moist, light to mid grey, stiff and slightly sticky (working plastic), very slightly sandy CLAY. Occasional black patches from sulphide staining left by rotting organics.	
					0		33.19		3.23	Moist, mid to dark brown, crumbly to unconsolidated, very slightly clayey SAND.	
					0		33.12		3.30	Moist, light to mid grey, soft (working more or less plastic), slightly silty CLAY.	
					2		32.98		3.44	Moist, mid to dark brown, crumbly to unconsolidated, very slightly clayey SAND.	
					2		32.56		(0.42) 3.86	Moist, dark brown to grey-brown, compacted and firm (working soft), clayey SAND. Occasional fragments of organic detritus throughout. 3.55 - 3.59 Large stone inclusions (<60mm). 3.63 - 3.68 Large stone inclusions (<60mm).	
4							32.42		4.00	No Recovery.	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 2.83m bgl. Well headspace concentration 20 000ppm.

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **AE**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	10/01/11	35.19maOD	E364917.887 N352428.049

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							35.04		0.15	MADE GROUND: Tarmac over sub base	
							34.64	?	(0.40) 0.55	No recovery	
							34.49		0.70	Very loose dark greyish brown silty sandy medium GRAVEL	
							34.40		0.79	Medium dense dark grey gravelly coarse SAND	
							34.29		0.90	Medium dense greyish white GRAVEL of mortar with rare brick/tile fragments	
1							34.19	×	1.00	Very dense dark greyish brown silty fine SAND, with rare flecks of mortar 0.97 - 1.00 ...Large brick/tile fragment (60 mm).	
							33.19	×	(1.00) 2.00	Very soft greyish brown sandy SILT, with rare brick/tile and slight sulphide odour and rotted wood fragments.	
2							33.02	×	2.17	Very soft dark grey slightly sandy coarse SILT with frequent brick/tile and mortar	
							32.88	×	2.31	Very soft coarse SILT, with abundant charcoal and rare mortar fragments 2.27 - 2.31 ...Very rotted wood fragments.	
						▼1	32.19	×	(0.69) 3.00	Very soft greyish brown sandy coarse SILT with reddish brown mottling and rare fragments of brick/tile, mortar and charcoal 2.70 - 3.00 ...Becoming slightly clayey.	
3							31.79	?	(0.40) 3.40	No recovery	
							31.19	×	(0.60) 4.00	Very dense dark grey silty fine SAND with rare patches of black staining	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **AF**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	11/01/11	34.89maOD	E364899.123 N352463.451

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							34.74		0.15	MADE GROUND: Tarmac over sub base	
							34.59		0.30	No recovery	
							34.46		0.43	Very loose greyish brown slightly silty slightly sandy coarse GRAVEL	
							34.06	(0.40)	0.83	Stiff brown CLAY	
							33.89		1.00	Firm brown to dark grey slightly sandy silty CLAY 0.98 - 1.00 ...Single coarse gravel fragment.	
1							33.50	(0.39)	1.39	Stiff brown CLAY 1.17 - 1.20 ...Cinder fragments up to 18 mm. 1.30 ...Single coarse gravel fragment.	
							32.89	(0.61)	2.00	Firm dark grey silty CLAY, becoming increasingly silty with depth 1.52 - 1.56 ...Wood fragments up to 15 mm . 1.72 - 1.78 ...Pocket of brown clay.	
2							32.41	(0.48)	2.48	Very soft dark greyish brown sandy organic SILT with occasional patches of black - sulphide staining.	
						1	31.23	(1.18)	3.66	Very soft greyish brown slightly clayey sandy SILT	
3							30.89	(0.34)	4.00	Very dense greyish brown to dark grey slightly clayey fine SAND	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No.
AG

Client:
ENGLISH HERITAGE & CHESHIRE EAST COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	11/01/11	37.03maOD	E365007.316 N352313.389

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							36.88		0.15	MADE GROUND: Tarmac over sub base	
								?	(0.75)	No recovery	
							36.13		0.90		
							36.03		1.00	Very loose light grey slightly sandy silty coarse GRAVEL	
1								?	(0.90)	No recovery	
							35.13		1.90		
							35.03		2.00	Firm brown slightly sandy silty gravelly CLAY with abundant dark grey/black ash.	
2								?	(0.30)	No recovery	
							34.73		2.30		
							34.53		2.50	Firm brown slightly sandy silty gravelly CLAY with abundant dark grey/black ash.	
						1				Stiff brown CLAY	
3									(1.50)		
							33.03		4.00		
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **B**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	30/07/07	36.62maOD	E364925 N352582

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 2

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							36.54		0.08	Moist, mid brown to mid grey-brown, stiff (working plastic), slightly silty CLAY. Fresh grass and associated rootlet penetration at current ground surface. Small stones and occasional cinder (<3 mm) and mortar/sand flecks at 0.05m. Second very recent ground surface with fresh (still green) grass and clover. Live earthworm. 0.06 - 0.08 Becoming mid to dark grey-brown.	
							36.50		0.12		
							36.40		0.22		
									(0.78)	Moist, mid brown to mid grey-brown, stiff (working plastic), sandy CLAY. Becomes more sandy and working soft with depth. Fresh grass, clover and associated rootlet penetration from third recent surface at interface with next lowest section. Live earthworm and rounded pebble (<45 mm) present at lower interface.	
1							35.62		1.00	Moist, mid to dark grey-brown, stiff to crumbly (working soft), slightly silty clayey SAND. Rootlet penetration from third recent land surface and flecked with light grey-brown sand grains throughout. Moist and rather rotted wood fragment declined at approximately 30 degrees at interface with next lowest section (~100 x 15-25 x 20 mm). Rounded pebble (<12 mm) at 0.21-0.22m. Live earthworm.	
							35.48		1.14		
									(0.32)	Just moist, mid to dark grey to grey-brown, crumbly (working more or less soft), slightly silty, clayey SAND. Occasional inclusions of rounded pebbles and brick/tile. 'Hard core' present throughout.	
							35.16		1.46	Just moist, mid to dark grey to grey-brown, crumbly (working more or less soft), slightly silty, clayey SAND. Occasional inclusions of soft, very rotted charcoal.	
							35.00		1.62	Just moist, mid to dark grey to grey-brown, stiff (working more or less plastic), slightly sandy CLAY. Make-up/levelling inclusions, e.g. brick, glass, coal, throughout. Asbestos fragment at 1.44m.	
									(0.38)	Just moist, light to mid brown, stiff (working plastic) CLAY. Boundary to next lowest section with cinder, brick and mortar inclusions.	
2							34.62		2.00	Just moist, mid brown to grey-brown, stiff and slightly sticky (working more or less plastic), slightly sandy CLAY. Becomes slightly wetter in lowest 0.20m. Occasional 'build up' inclusions - e.g. brick (at 1.71m), metal (at 1.92m - 1.94m), glass (at 1.93m).	
									(0.44)	Just moist, mid brown to grey-brown, stiff and slightly sticky (working more or less plastic), slightly sandy CLAY. Small organic inclusions at upper interface (looks to be 'ancient' rootlet). Brick (at 2.05m - 2.18m), stone (at 2.19m), white (modern) tile (at 2.26m-2.28m), large (<30 mm) bottle glass fragments (at 2.42m).	
							34.18		2.44	Just moist, light to mid brown, stiff (working plastic) CLAY. Cinder present at 2.54m.	
					0		33.98		2.64	Moist, mid to dark grey- brown, slightly silty, slightly clayey SAND. Cinder (<12 mm) and other burnt material throughout but particulary at 2.68m and 2.85m.	
					0				(0.36)	Just moist, mid to dark (slightly blueish) grey, stiff and slightly sticky (working soft), slightly clayey, slightly sandy SILT. Becomes slightly wetter with depth. Small stones from 3.70m becoming more frequent and larger with depth (<20mm). Rounded edged pot fragment (~11mm) at 3.92m.	
3							33.62		3.00	3.00 - 4.00 Slight sulphide odour.	
					0				(1.00)		
							32.62		4.00		
4					0		32.27		(0.35) 4.35	Moist, mid brown to grey-brown, soft, clayey SILT. Grades into moist, light to mid yellow-brown, stiff (working plastic), very slightly silty clay from 4.10 - 4.35m. Occasional very small stones (<2 mm).	
					0		31.62		(0.65) 5.00	Moist, light to mid yellow-brown, stiff (working plastic), very slightly silty CLAY.	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **B**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	30/07/07	36.62maOD	E364925 N352582

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 2 of 2

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							31.44	?	5.18	No Recovery.	
					0		31.27		5.35	Moist to wet, light to mid brown, firm to soft and sticky (working more or less plastic), slightly silty CLAY.	
					0		31.18		5.44	Moist, light to mid yellow-brown, stiff (working plastic), very slightly silty CLAY.	
					0		30.93	(0.25)	5.69	Moist to wet, light to mid brown, soft, sandy CLAY.	
					0		30.83		5.79	Wet, light to mid brown, unconsolidated, slightly clayey SAND.	
					0		30.67		5.95	Moist to wet, light to mid grey-brown, soft and sticky, sandy clayey SILT.	
6					0		30.62		6.00	Moist to wet, light to mid grey, soft to unconsolidated, clayey SAND.	
										Borehole complete at 6.00m	
7											
8											
9											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **C**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	34.87maOD	E364827 N352525

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							34.57	?	(0.30) 0.30	No Recovery.	
							34.52		0.35	Just moist, mid to dark grey, unconsolidated, slightly silty SAND. Modern rootlet penetration throughout.	
					1		33.87		(0.65) 1.00	Just moist, light to mid brown to mid to dark grey-brown, unconsolidated, slightly silty SAND. Modern rootlet penetration throughout. Probable fine ash/cinder throughout (concentration, <9mm, at 0.81m), occasional stones (<12mm) throughout. Ancient rootlet at 0.70-0.81m and from 0.94m downwards.	
1					2		32.97		(0.90) 1.90	Just moist, light to mid brown to mid to dark grey-brown, unconsolidated, slightly silty SAND. Rootlet continues to 1.06m and also seen at 1.40m, 1.50m and 1.68m, charcoal flecks (<3mm) at around 1.58m. Waterlogged and very fragile roundwood fragments at 1.72m and 1.78m. 1.47 - 1.52 Pocket of orange sand. 1.60 - 1.62 Pocket of light grey-brown sand.	
2					2 1 0 2		32.92 32.87 32.78 32.68		1.95 2.00 2.09 2.19	Moist, dark grey, slightly sticky (works soft), slightly sandy SILT. Rootlet at upper interface (1.90m), waterlogged and soft roundwood at 1.95m (~7mm diameter). 1.90 - 1.95 Slight sulphide odour. Moist, light to mid brown to mid to dark grey-brown, slightly sticky (working soft), silty SAND. Rootlet at 1.98-1.99m. Moist to wet, light to mid grey-brown, unconsolidated and somewhat thixotropic, slightly clayey SILT.	
					2		31.87		(0.81) 3.00	Moist, mid grey-brown, soft, sandy SILT. Thin sliver of very decayed wood (<40mm, declined at ~15 degrees to horizontal). Moist, mid grey to grey-brown, firm (working soft), clayey SILT with occasional pockets of clay. Suplhide staining throughout but markedly at 2.37-2.43m, 2.58-2.60m, 2.68-2.75m, 2.79-2.93m. Perhaps all resulting from decayed rootlet. 2.19 - 3.00 Moderate sulphide odour.	
3					1		30.87		(1.00) 4.00	Moist, mid grey-brown, fairly stiff and sticky (working soft and sticky), clayey SILT. Small 'thread-like' filaments throughout - ?fungal hyphae. Occasional black patches - perhaps sulphide staining but no associated odour - notable at 3.21-3.24m and 3.80-3.84m.	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH File 406.0889.00003.005 NANTWICH ARCHAELOGICAL LOGS.GPJ 26-05-16

BOREHOLE LOG

BOREHOLE No. **D**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	35.03maOD	E364925 N352423

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							34.83		0.20	No Recovery.	
							34.60		0.43	Small amount of matrix (~20%) of moist, mid to dark grey-brown, unconsolidated slightly clayey, silty SAND. Mostly brick (<75mm) and stone (<30mm) rubble, with a piece of modern glass (<45mm) at 0.23m.	
					0		34.56		0.47	Small amount of matrix (~20%) of moist, mid to dark grey-brown, unconsolidated slightly clayey, silty SAND with pockets of black ash/cinder.	
					0		34.33		0.70	More or less dry, white, unconsolidated mortar GRAVEL grades into next lowest layer from 0.63-0.70m.	
					0		34.03		(0.30) 1.00	Moist, mid brown to mid to dark grey-brown, firm to crumbly (working soft), slightly clayey SILT, with occasional patches of light brown sand. Black cinder/ash and white mortar throughout.	
1							33.81		1.22	No Recovery.	
					0		33.76		1.27	Moist, light brown to mid to dark grey-brown, soft to crumbly (working soft), slightly clayey sandy SILT. Occasional ash/cinder thoroughout.	
					0		33.52		(0.24) 1.51	Just moist, dark grey to black, unconsolidated sandy SILT, with a high fine cinder/ash content. Occasional mid to dark brown patches where the cinder/ash content is less. Very light grey/grey-brown mortar inter-mixed with matrix.	
					0		33.43		1.60	More or less dry, white, unconsolidated mortar GRAVEL grades into next lowest layer from 0.63-0.70m.	
					0		33.26		1.77	Mid brown SAND. Mostly composed of dry brick rubble (<40mm), with some black ash/cinder (at 1.66-1.71m) and mortar common (at 1.72-1.77m).	
					0		33.11		1.92	Moist, mid brown and dark grey, sticky (working soft), slightly clayey SILT. Black ash/cinder common throughout and mortar present at 1.88-1.92m.	
2					0		33.03		2.00	Moist, mid brown, soft (working soft to more or less plastic), silty CLAY. Darker (dark grey/ black) and more silty in lowest 0.02m, possibly stained by fine ash/cinder or perhaps sulphides.	
					0		32.94		2.09	Moist, mid brown to dark grey-brown, crumbly to unconsolidated, slightly silty SAND. Occasional black pockets possibly stained by fine ash/cinder or perhaps sulphides. Very rotted charcoal in small patches.	
					0		32.66		(0.28) 2.37	2.00 - 2.09 Slight sulphide odour.	
					2		32.03		(0.63) 3.00	Moist, varicoloured (from light to mid brown to mid to dark grey-brown in shades of brown and grey-brown), unconsolidated to crumbly, slightly silty SAND.	
3							31.03		(1.00) 4.00	Moist, mid brown, firm to crumbly (working soft), slightly silty clayey SAND. Becomes slightly wetter with increasing depth. Rotted wood present at 2.47-2.50m.	
					0					Saturated, light to mid brown, unconsolidated (works sticky and soft), slightly sitly clayey SAND. Appears to be within ground water at least from 3.10m downwards.	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **E**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	35.34maOD	E364931 N352261

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							35.23	?	0.11	No Recovery.	
							35.17	× ×	0.17	Moist, dark brown to grey-brown, slightly humic, crumbly (working soft), slightly clayey sandy SILT. Fresh grass at 0.11m. Modern rootlet throughout.	
								× ×	(0.75)	Moist, dark brown to grey-brown, slightly humic, crumbly (working soft), slightly clayey sandy SILT. Modern rootlet penetration to 0.36m. Frequent modern brick (<60mm; notably at 0.21-0.32m, 0.37-0.44m, 0.57-0.58m) with associated white flecks of mortar.	
							34.42	× ×	0.92		
							34.34	×	1.00	More or less dry, mid to dark grey-brown, unconsolidated silty SAND. Mostly modern brick (<78mm) and mortar (<58mm) rubble, with a fragment of modern clear glass (<28mm).	
1								× ×	(0.50)	Core section mostly collapsed. Moist, dark brown to grey-brown, slightly humic, crumbly (working soft), slightly clayey sandy SILT. Brick fragments small and sparse from 1.00-1.25m becoming common and larger (<42mm) from 1.25-1.50m. Large stones including cobble fragments (<50mm) and slate (<62mm) at 1.00-1.06m and very large cobble (<90mm) at 1.15-1.24m. Trace of old rootlet at 1.44-1.50m.	
							33.84	× ×	1.50		
					0		33.60	×	(0.24) 1.74	Core section mostly collapsed. More or less dry, mid to dark grey-brown, crumbly to unconsolidated, silty SAND.	
					0		33.48		1.86	Just moist, light to mid brown to grey-brown, stiff (working plastic), CLAY.	
					0		33.40	×	1.94	Just moist, light brown to light to mid grey-brown, unconsolidated, slightly silty SAND. Abundant rounded pebbles (<36mm) forming approximately half of this section.	
2					0		33.34		2.00	Just moist, light to mid brown to grey-brown, stiff (working plastic), CLAY.	
					0		33.22		2.12	Core section largely collapsed. Mix of unconsolidated coarse sand and lumps (<70mm) of stiff (working plastic) CLAY, both just moist and light to mid brown in colour.	
					1		33.10		2.24	Just moist and light to mid brown, stiff (working plastic) CLAY. Rootlets at 2.24m.	
					1		32.93	× ×	2.41	Just moist, dark grey-brown, brittle, slightly clayey SILT. Rootlets noted throughout, with occasional fragments of brick (<10 mm at 2.35m) and black ash lumps (<6mm at 2.41m).	
					0				(0.59)	Just moist, mid grey-brown, stiff (working plastic), CLAY. Large brick inclusion at 2.59-2.70m (fragments <110 mm - probably shattered by corer).	
3							32.34		3.00	No Recovery.	
							32.16	?	3.18	Moist, mid grey-brown, stiff (working plastic), CLAY. Becomes wetter in lower 0.20m. Occasional black flecks of ash/charcoal (<1mm) throughout.	
					0				(0.80)		
							31.36		3.98		
4					0		31.34		4.00	Moist, light grey-brown, unconsolidated, slightly silty SAND.	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **F**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	01/08/07	39.74maOD	E365191 N352264

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
									(0.60)	Moist (dry in top 0.10m), loose gravel (<70mm). Terram membrane at base (0.60m).	
							39.14		0.60		
					0		39.07		0.67	Moist, light brown to mid grey (in shades of brown and grey-brown) slightly silty CLAY. Abundant stones and brick fragments (<30mm) throughout.	
					0		38.98		0.76		
					3		38.78		0.96	Moist, light to mid grey-brown, stiff (working soft and more or less plastic), slightly silty CLAY. Occasional brick fragments (<20mm) throughout and sliver of bone (<55mm) at 0.75m.	
1					1		38.74		1.00		
										Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT. Abundant waterlogged wood fragments (<60mm) concentrated at 0.76-0.81m.	
										0.76 - 0.96 Moderate sulphide odour.	
					3				(0.86)	More or less dry, compacted and brittle to crumbly very slightly sandy slightly clayey SILT.	
										0.96 - 1.00 Slight sulphide odour.	
							37.88		1.86	Moist, very dark grey-brown to black, crumbly to unconsolidated (working soft), humic, very slightly sandy slightly clayey SILT. Occasional wood chips and twig/root fragments and rounded pebbles (<15mm) throughout.	
					0		37.78		1.96		
2					0		37.74		2.00	1.00 - 1.40 Dusted with sand grains.	
										1.00 - 1.86 Slight sulphide odour. 1.48 - 1.52 Light grey sand intrusions (at ~45 degrees to horizontal). 1.50 - 1.86 Becomes wet. 1.56 - 1.60 Light grey sand intrusions (at ~45 degrees to horizontal). 1.64 - 1.72 Light grey sand intrusions (at ~45 degrees to horizontal). 1.76 - 1.80 Fibrous organic content.	
					0				(1.00)	Moist, light to mid grey, soft to unconsolidated (working more or less plastic), sandy CLAY. Large pebble (<100 mm) present.	
										Moist, light to mid brown to grey-brown, unconsolidated, SAND. Occasional black patches perhaps sulphide staining from rotted organics or perhaps very rotted charcoal.	
3							36.74		3.00	1.96 - 2.00 Slight sulphide odour.	
										Core tube split and sequence largely unrecordable. Terminated in 0.08 m of moist, light to mid brown, very stiff (working plastic), CLAY.	
										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **F1**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	10/01/11	39.69maOD	E365188.877 N352269.226

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.09	?	(0.60) 0.60	No recovery	
							38.90		0.79	MADE GROUND: Stiff light to mid-brown gravelly CLAY. Gravel is medium to coarse (up to 48mm) and angular.	
							38.69		1.00	Moist soft dark grey-brown/grey clayey SILT 0.79 ...Rootlet at strata interface. 0.80 - 0.82 …Traces of decayed mortar.	
1							38.56	?	1.13	0.88 - 0.94 …Patches of black and brown discoloration.	
							38.46		1.23	0.96 …Bone fragment.	
						1	38.31		1.38	No recovery	
									(0.48)	Dark greyish brown to black slightly silty slightly sandy PEAT with fine herbaceous detritus throughout.	
							37.83		1.86	Soft moist dark greyish brown slightly sandy slightly clayey SILT 1.27 - 1.29 …Rounded pebbles present up to 14mm. 1.32 - 1.38 …Occasional fragments of plant tissue.	
2							37.69		2.00	Moist dark grey clayey SAND 1.58 - 1.61 …Rounded pebbles present up to 12mm.	
										Moist to wet greyish brown SAND	
										Borehole complete at 2.00m	
3											
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **F2**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	10/01/11	39.69maOD	E365188.877 N352269.226

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							38.69		(1.00) 1.00	MADE GROUND: Moist greyish brown slightly silty sandy GRAVEL (poor recovery)	
						1	38.19	?	(0.50) 1.50	No recovery	
							38.10		1.59	MADE GROUND: Moist greyish brown slightly silty sandy fine to coarse GRAVEL	
							38.04		1.65	MADE GROUND: Moist dark brownish grey SAND with white patches of decayed mortar/lime (up to 10 mm) present throughout.	
							37.69		(0.35) 2.00	Moist grey SAND with brown mottling. 1.72 - 1.75 …Rounded pebbles present up to 9mm. 1.81 - 1.86 …Inclusions of light grey clay. 1.95 - 2.00 …Becoming wet.	
							37.37	?	(0.32) 2.32	No recovery	
							37.03		(0.34) 2.66	Wet greyish brown SAND 2.56 - 2.66 …Becoming slightly clayey with abundant coarse rounded gravel up to 60 mm	
							35.69		(1.34) 4.00	Moist stiff brown CLAY	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **G**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	01/08/07	39.60maOD	E365096 N352398

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.33		(0.27) 0.27	Core section collapsed and occupies only ~one-third of the core tube. More or less dry, mid grey-brown, unconsolidated, humic, silty SAND. Fresh grass at 0.00m, current ground surface. Modern rootlet and other herbaceous detritus throughout. Stones, brick, mortar (<45mm) present throughout.	
					0		39.20		0.40	Just moist, mid grey-brown, unconsolidated, slightly silty SAND, with some small areas (<10mm) of moist, light brown, stiff (working plastic), clay. Rotted brick fragments (<10mm) at 0.36-0.40m.	
					0		39.12		0.48		
					0		39.07		0.53		
					0		39.06		0.54	Moist, mid to dark grey, firm (working soft), clayey SILT. Frequent (~30%) inclusions of black ash/cinder and traces of rotted brick throughout.	
					0		39.04		0.56		
					0		38.60		(0.44) 1.00	Moist, very pale (off-white), rather slimy, very fine grained lime or lime-rich CLAY.	
1										Collapsed band of moist, unconsolidated, fine sandy GRAVEL.	
							38.35		(0.25) 1.25	Moist, very pale (off-white), rather slimy, very fine grained lime or lime-rich CLAY.	
					1		38.12		1.48	Moist, dark grey-brown to very dark grey, crumbly to firm (working soft and somewhat plastic), silty CLAY. Black ash and/or very rotted charcoal/cinder quite common (~10%) throughout, with some rotted charcoal pieces (<12mm) also present. Very rotted shell (soft and disintegrates) at 0.87-0.88m, tile fragments at 0.62-0.66m (<55 mm) and 0.91-0.93 (<20mm).	
					0		38.00		1.60	No Recovery.	
					0		37.61		(0.39) 1.99	Just moist, dark grey, crumbly to unconsolidated (working soft and somewhat plastic), sandy clayey SILT. Black inclusions of very rotted charcoal throughout. Rootlets at 1.27-1.29m and 1.39-1.48m.	
2					0		37.60		2.00	Moist, light brown, unconsolidated SAND.	
					0		37.45		2.15	Moist, mid to dark grey, crumbly to unconsolidated (working soft), slightly clayey, silty SAND. Rounded quartz pebble (<15mm) at 1.71-1.72m and black flecks of rotted charcoal at 1.81-1.82m.	
					0		37.25		2.35	Moist, light brown, unconsolidated SAND.	
					0		37.16		2.44	Moist, light grey to grey-brown, unconsolidated SAND.	
					0		36.60		(0.56) 3.00	Moist, light to mid grey, firm (working soft then more or less plastic), slightly silty CLAY.	
3										Moist, mid grey, compacted (crumbles when worked), slightly silty SAND.	
										Core section collapsed. Moist to wet, light brown to grey-brown, unconsolidated, coarse SAND. Stones (<30mm) common (~30%), becoming abundant (>50%) in last 0.05m.	
4										Borehole complete at 3.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **H**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	01/08/07	39.35maOD	E365233 N352471

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.29		0.06	No Recovery.	
							39.15		0.20	Topsoil of moist, mid to dark brown, crumbly (working soft), sandy clayey SILT. Modern rootlet penetration throughout,	
							38.99		0.36	Topsoil of moist, mid brown, crumbly (working soft), sandy clayey SILT. Inclusion of light to mid brown, stiff clay at 0.21-0.24m. Occasional modern rootlet fragments throughout.	
					0		38.97		0.38		
					0		38.89		0.46		
					0		38.86		0.49	Moist, light to mid pinkish-orange ('salmon' pink), unconsolidated SAND.	
					0				(0.51)	More or less dry, mid to dark brown, unconsolidated, slightly silty SAND. Abundant cinder (<18mm) and a little fine charcoal throughout.	
							38.35		1.00	More or less dry, very pale yellow-white, cushed mortar layer.	
1									(0.42)	Just moist, mid grey (occasional small areas of mid brown), crumbly (working soft), slightly clayey silty SAND. Crushed brick (at 0.52-0.54m), mortar flecks (at 0.60-0.63m), glass (at 0.69-0.71m) and occasional small rounded stones (<10mm) throughout.	
							37.93		1.42	No Recovery.	
					0		37.83		1.52	Moist, light to mid grey, unconsolidated, slightly silty clayey SAND.	
					0				(0.38)	Just moist, mid brown, very stiff (working plastic) CLAY.	
							37.45		1.90		
							37.35		2.00	No Recovery.	
2					0				(1.00)	Just moist, mid brown, very stiff (working plastic) CLAY.	
							36.35		3.00		
3					0				(1.00)	Just moist, mid brown, very stiff (working plastic) CLAY. Only 0.35 metres of sediment in core tube, rest void - sediment mobile within tube so any depth record spurious.	
							35.35		4.00		
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. I

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	38.96maOD	E365308 N352394

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
					1		38.10		(0.86) 0.86	Moist, mid to dark grey, unconsolidated, slightly silty SAND. Stones (<65mm) present throughout - rounded to angular. Decayed rootlet at 0.30-0.34m, 0.37-0.46m and 0.62-0.72m. Traces of cinder and coal (<7mm) at 0.74m and 0.77-0.86m and of brick/tile (<3mm) at 0.82m. 0.00 - 0.86 Very slight sulphide odour.	
1					3 0		38.00		0.96	Moist, light to mid brown to grey-brown, unconsolidated, SAND with some discrete mid grey clay lumps (<40mm). Large woody root fragments at 0.69-0.72m, small stones at 0.86-0.88m, cinder/ash at 0.88-0.92m.	
							37.96		1.00		
					0		37.59		(0.37) 1.37	Moist, light to mid brown, stiff (working plastic) CLAY.	
					0		37.38		1.58	Moist to wet, mid grey, unconsolidated, slightly silty SAND. Occasional rounded quartz pebble (<6mm). Horizontal band of small rounded stones (<10mm) at 1.30-1.31m.	
					0		36.96		(0.42) 2.00	Core section collapsed. Moist, light to mid brown, unconsolidated, fine to coarse SAND. Moist, mid brown to grey-brown, very stiff (working plastic) CLAY.	
2											
					0		35.96		(1.00) 3.00	Just moist, light to mid brown, very stiff (working plastic) CLAY. Rotted sandstone lumps (<12mm) at 2.72-2.75m.	
3											
					0		35.26		(0.70) 3.70	Just moist, light to mid brown, very stiff (working plastic) CLAY.	
										Borehole complete at 3.70m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **J**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	40.04maOD	E365284 N352296

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.68		(0.36) 0.36	Just moist, dark brown, unconsolidated, silty SAND. Modern woody root and rootlet throughout.	
					0		39.60		0.44	No real matrix. Lumps of furnace slag/'hard core' (<115 mm).	
					0		39.18		(0.42) 0.86	Modern sand and gravel dry mix hard core. Two layers of terram membrane at 0.86m.	
1					2		39.04		1.00	Moist, dark brown to grey-brown, crumbly (working soft) CLAY. Small fragments of cinder (<3mm) in 0.86-0.89m and a few modern rootlet fragments throughout.	
					0		38.78		(0.26) 1.26	Moist, mid to dark grey-brown, unconsolidated to crumbly, slightly clayey slightly silty SAND. Occasional rounded pebbles (<24mm) throughout.	
					2		38.29		(0.49) 1.75	Moist, light brown, unconsolidated, SAND (last 0.02m slightly wetter and slightly clayey). Occasional rounded pebbles (<15mm) at 1.26-1.46m.	
2					0		38.04		(0.25) 2.00	Moist, mid to mid to dark brown, stiff, CLAY (slightly sandy in upper 0.02m).	
					0		37.04		(1.00) 3.00	Just moist, mid brown, very stiff and slightly sticky (working plastic), CLAY.	
3					0		36.04		(1.00) 4.00	Just moist, mid brown, very stiff and slightly sticky (working plastic), CLAY. 3.00 - 3.20 Slightly silty pocket. 3.34 - 3.40 Slightly silty pocket.	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **K**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	37.14maOD	E365021 N352297

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							36.30		(0.84) 0.84	Largely void, with loose stones (<55mm) from 0.00-0.35m (very approximately) followed by a mix of brick (<30mm), coal (<50mm) and cinder (<22mm).	
1							36.14		1.00	Moist, light to mid grey-brown, crumbly (working soft and somewhat plastic), sandy, silty CLAY. Crushed brick/tile, black ash/cinder and stones (<12mm) throughout. Diesel oil odour.	
					0		35.14		(1.00) 2.00	Just moist, mid brown, very stiff (working plastic), CLAY. Stained dark grey/black by diesel oil contamination from 1.00-1.04m.	
2					0		34.64		(0.50) 2.50	Large voids in tube - also contained just moist, mid brown, very stiff (working plastic), CLAY. Stained dark grey/black by diesel oil contamination from 1.00-1.04m. Any depth record spurious owing to voids.	
					0		34.14		(0.50) 3.00	Large voids in tube - also contained just moist, mid brown, very stiff (working plastic), CLAY. Stained dark grey/black by diesel oil contamination from 1.00-1.04m. Any depth record spurious owing to voids.	
3										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **L**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	38.71maOD	E365128 N352544

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							38.21		(0.50) 0.50	Collapsed and loose in core tube - no matrix. Tarmac and stone (<60mm) modern 'hard core'.	
							38.05		0.66	A little matrix of more or less dry, light to mid grey, stiff (working plastic), CLAY. Stone (<80mm) 'hard core'.	
							37.96		0.75	No matrix. Loose 'hard core' stones (<80mm).	
1					0		37.41		(0.55) 1.30	Moist, dark brown to dark grey-brown, compacted to crumbly, ashy, slightly clayey SILT. Post-medieval/modern pottery fragment (<35mm) at 0.97-1.00m.	
					0		36.71		(0.70) 2.00	Just moist, light brown, unconsolidated, SAND - stained darker from layer above at 1.30-1.38m.	
2					0	1	36.26		(0.45) 2.45	Moist, light brown, unconsolidated, SAND. Abundant stones (<80mm) at 2.00-2.35m forming ~90% of tube contents at 2.00-2.20m.	
3					0		34.73		(1.53) 3.98	Moist, mid brown, very stiff (working plastic) CLAY.	
4							34.71		4.00	No Recovery.	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 2.28m bgl. Well headspace concentration 35ppm.

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **M**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	37.81maOD	E365015 N352549

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							37.46		(0.35) 0.35	More or less dry, mid grey-brown (flecked with light brown sand), uncosolidated (collapsed and loose in upper 0.18m of tube), sandy SILT. Stones (<12mm) and rootlets present throughout; the latter abundant from 0.00-0.09m.	
					0		37.36		0.45	Dry, mid to dark grey-brown, unconsolidated, sandy SILT (approx. 50% of core section volume). Abundant brick/tile rubble (<38mm) - approx. 50% of core section volume. Cinder (<12mm) and fine (but woody) rootlet common throughout.	
					0		37.32		0.49		
					0		37.29		0.52		
					0		37.26		0.55		
					0		37.23		0.58		
					0		37.01		0.80	No matrix. All of section was of angular, pale grey/grey-brown, stone (<24mm).	
					0		36.81		1.00	Dry, mid to dark grey layer of ashy SILT. Abundant burnt stones (<12mm).	
1										Dry, mid to dark grey and mid to dark red-brown SILT.	
					0		36.58		1.23	Dry, mid to dark grey-brown, unconsolidated, ashy sandy SILT; very much a minor component (~10%) of this section. Mostly of dry, angular, brick/tile (<35mm), with a little mortar (<37mm).	
					1		36.37		1.44	Just moist, mid brown, stiff (working plastic) CLAY. Cinder and ash lumps (<12mm) present throughout.	
					1	▼ 1	36.21		1.60	Just moist, mid to dark grey-brown to mid to dark grey, crumbly (working more or less plastic), silty CLAY. Abundant fine ash throughout. Large brick/tile fragment (<108mm) at 0.80-0.88m, with a little associated mortar (<10mm).	
					1				(0.40)	Just moist, very dark grey to black, crumbly to unconsolidated, very ashy sandy SILT. Large lumps (<110mm) of conglomerate ?floor surface at 1.13-1.20m overlying a thin band with abundant angular and rounded stones (<50mm) at 1.20-1.23m.	
2							35.81		2.00		
					1		35.58		2.23	Moist, very dark grey to black, soft to unconsolidated, slightly clayey SILT. Fine ash, rootlets, stones (<12mm) and possible other waterlogged organic material throughout.	
										1.23 - 1.44 Slight sulphide odour.	
					0				(0.61)	Moist, very dark grey to black, soft to unconsolidated, slightly sandy SILT. Fine ash, rootlet, stones (<12mm) and possible other waterlogged organic material throughout. Standing ground water from ~1.50m downwards. Very rotted charcoal (<3mm) and some coal (<4mm) at 1.60m.	
							34.97		2.84		
										1.44 - 1.60 Slight sulphide odour.	
3					0		34.81		3.00	Moist, very dark grey to black, soft to unconsolidated, slightly silty, slightly clayey SAND. Fine ash, rootlet, stones (<12mm) and possible other waterlogged organic material throughout.	
										1.60 - 2.00 Slight sulphide odour.	
										Moist, very dark grey to black, soft to unconsolidated, slightly silty, slightly clayey SAND with small clast of mid brown sand (<10mm). Fine ash, rootlet, stones (<12mm) and possible other waterlogged organic material throughout.	
										2.00 - 2.23 Very slight sulphide odour.	
										Wet, light to mid brown, unconsolidated, coarse SAND. Rounded stones (<14mm) present at 2.64-2.84m.	
4										Largely void as core section collapsed. Remaining matrix of loose, saturated, coarse SAND. Abundant rounded pebbles (<45mm).	
										Borehole complete at 3.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 1.58m bgl. Well headspace concentration 905ppm.

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **N**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	39.17maOD	E365016 N352449

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 2

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							38.97		0.20	Core section collapsed in tube. No matrix. More or less dry, light and dark grey, mostly cinder (<30mm) and ash, with some pieces of aggregate (<40mm).	
					0		38.67	(0.30)	0.50	Just moist, mid brown to mid to dark grey-brown, unconsolidated, ashy and slightly silty, SAND. Crushed cinder and coal (<4mm), brick/tile (<28mm) and mortar (<8mm, very rotted) present throughout.	
					0		38.54		0.63	Just moist, mid brown, stiff (working plastic), CLAY. Surface discoloured to dark grey from 0.55-0.63m (transfer in sampling tube).	
					0		38.17	(0.37)	1.00	Moist (becoming wet from 0.70 downwards - standing ground water), mid to dark grey-brown to dark grey to black, soft and slightly sticky (works very sticky), sandy CLAY, with occasional small clasts (<20mm) of light to mid brown clay. Abundant very rotted charcoal (<8mm) and very rotted mortar throughout (with a mortar concentration at 0.95-1.00m).	
1					0		38.10		1.07		
					1		37.95		1.22	Core section collapsed in tube. Moist to wet, dark grey, unconsolidated and slightly sticky (working soft), slightly sandy clayey SILT.	
					2	1	37.88		1.29		
					2		37.85		1.32	Moist to wet, dark grey, soft (working soft and slightly sticky), slightly sandy, clayey SILT. Very rotted wood at 1.08-1.10m and coal (<3mm) fragments (at 1.13-1.14m) present.	
					1		37.59	(0.26)	1.58		
					0		37.57		1.60	Moist, black, unconsolidated to crumbly (working more or less soft), very humic, amorphous slightly silty organic material. Bark fragment (<50mm) at 1.25-1.26m.	
					3		37.42		1.75		
					2		37.37		1.80		
					0		37.29		1.88	No matrix. Consist entirely of a piece of poorly preserved saturated wood.	
					0		37.26		1.91		
2					4		37.17		2.00	Wet, light to mid grey-brown to dark grey-brown, soft and somewhat thixotropic, silty sandy CLAY, perhaps with a little amorphous organic content at 1.32-1.35m.	
					4		36.71	(0.46)	2.46	Wet to waterlogged, light grey-brown, unconsolidated and rather granular, slightly sandy CLAY - granules moslty seem to be small (<2 mm) lumps of indurated clay.	
					0		36.56		2.61	Wet, light to mid grey-brown to dark grey-brown, soft and somewhat thixotropic, silty sandy CLAY, perhaps with a little amorphous organic content at 1.32-1.35m. Twig fragments (<3mm diameter) at 1.67m.	
					3		36.45		2.72		
					2		36.32		2.85	Wet, mid grey to dark grey-brown (and shades between), soft (working sticky), silty CLAY. Coal/cinder (<4mm) present throughout, bone fragment (<11mm) at 1.74m and wood fragment (saturated and rotted) at 1.80m.	
3					1		36.17		3.00		
					0		35.37	(0.80)	3.80	Discrete components of wet, pale blueish-grey, sticky, clay and wet, mid to dark brown to grey-brown, sticky (working soft), clayey SILT. Small coal fragments (<5mm) present throughout.	
										Band of wet, dark brown, slightly sticky (working soft), ?humic, slightly sandy clayey SILT. Blue ?vivianite (<12mm) at 1.91m.	
										1.88 - 1.91 Slight sulphide odour.	
										Wet, dark brown, soft, very organic SILT. Abundant waterlogged herbaceous detritus. Hazelnut fragment at 1.93-1.94m.	
										1.91 - 2.00 Overpowering sulphide odour.	
					0		35.19		3.98	Wet, dark brown, soft, very organic SILT, with a pale blueish-grey clay inclusion. Abundant waterlogged herbaceous detritus, large wood fragments and also twigs throughout.	
4					0		35.17		4.00		
										2.00 - 2.46 Overpowering sulphide odour.	
										Moist to wet, very dark grey-brown, soft, silty clayey SAND.	
										Moist to wet, very dark grey-brown, crumbly (works soft), slightly silty, clayey SAND. Large roundwood (?wattle) inclusions at 2.62-2.64m and 2.67-2.70m.	
										2.61 - 2.72 Very slight sulphide odour.	
										Moist, light grey-brown to mid to dark grey (in shades of grey and grey-brown), unconsolidated, SAND. Large rounded stones (<40mm) at 2.73-2.75m.	
										Section collapsed in tube. Moist, light grey-brown to mid to dark grey (in shades of grey and grey-brown), unconsolidated, SAND. Small sliver of decayed wood at 2.85m.	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 1.37m bgl. Well headspace concentration 80ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **N1**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	10/01/11	39.16maOD	E365016 N352449

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
										No recovery	
									(0.53)		
							38.63		0.53		
							38.60		0.56	MADE GROUND: Soft moist greyish brown gravelly CLAY with oocasional fragments of brick and tile up to 15mm throughout.	
									(0.39)	Moist stiff brown CLAY, possibly redeposited, with inclusions of black charcoal and ash throughout	
							38.21		0.95	0.56 - 0.60 …Single large stone present (approximately 55mm)	
1							38.16		1.00	Moist dark greyish brown gravelly clayey SILT with abundant fragments of black charcoal and ash throughout	
							37.99		1.17	No recovery	
							37.82		1.34	Moist stiff brown slightly gravelly CLAY, possibly redeposited.	
						1			(0.66)	Moist dark greyish black organic sandy clayey SILT with moderate sulphide odour increasing with depth. 1.46 - 1.47 ...Decayed wood fragments 1.63 - 1.65 …Decayed mortar/lime up to 15mm.	
2							37.16		2.00	1.92 - 1.94 …Roundwood fragments up to 35mm.	
							36.93		2.23	No recovery	
									(0.48)	Moist dark greyish black organic sandy clayey SILT with moderate sulphide odour. 2.23 - 2.30 …Large wood inclusion. 2.23 - 2.51 …Fine herbaceous detritus present. 2.51 - 2.71 …Abundant wood fragments up to 12mm.	
							36.45		2.71		
							36.39		2.77	Coarse rounded GRAVEL	
							36.16		3.00	Light brown very decayed Wood 2.89 - 3.00 …Wood becomes less decayed and darker in colour.	
3										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **N**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	39.17maOD	E365016 N352449

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 2 of 2

SAMPLES & TESTS						Water	STRATA				Instrument/ Backfill
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N		Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	
										Just moist, mid brown, very stiff (working plastic), CLAY.	
										Just moist, light to mid grey, stiff (working plastic), CLAY.	
										Moist, light to mid grey, sticky (working soft), sandy CLAY.	
										Borehole complete at 4.00m	

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7

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Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 1.37m bgl. Well headspace concentration 80ppm.

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **O**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	39.64maOD	E365184 N352470

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.24		(0.40) 0.40	Section collapsed in tube. Small amount of matrix of just moist, mid to dark grey, slightly clayey sandy SILT. Fresh grass and moss from current ground surface at 0.00-0.02m and associated rootlet penetration to 0.14m. Brick/tile (<30mm), mortar (<15mm), cinder (<12mm) and large lumps of slag (<70mm) formed the bulk of this section of the core.	
							39.10		0.54	Section collapsed in tube. Small amount of matrix of just moist, mid to dark grey, slightly clayey sandy SILT. Fresh grass and moss from current ground surface at 0.00-0.02m and associated rootlet penetration to 0.14m. Brick/tile (<30mm), mortar (<15mm), cinder (<12mm) and large lumps of slag (<70mm) formed the bulk of this section of the core.	
					0		38.96		0.68	0.50 - 0.52 Pocket of mid brown sand.	
					0		38.85		0.79	0.50 - 0.54 Brick/tile which becomes the dominant component.	
					0		38.74		0.90	Moist, dark grey (occasionally mid to dark grey-brown), unconsolidated, ashy, slightly clayey silty SAND. Rotted mortar at 0.62-0.68m.	
1					0		38.64		1.00	Moist, dark grey (occasionally mid to dark grey-brown), unconsolidated, ashy, slightly clayey silty SAND. Mostly composed of cinder, slag, mortar and coal (<20mm).	
					0		38.44		1.20	Just moist, light grey, stiff (working more or less plastic), slightly silty CLAY.	
					2	1	37.87		(0.57) 1.77	No matrix. Almost entirely composed of dry, shattered brick (<60 mm), with a little associated mortar and traces of ash/cinder.	
2					0		37.64		2.00	Section collapsed in tube. Relatively small amount of matrix (~40% of volume) of moist, mid to dark grey-brown, soft (working more or less plastic), silty CLAY. Mostly of shattered brick (<70mm), also one piece of ?Victorian pottery noted.	
							37.25	?	(0.39) 2.39	Section collapsed in tube. Relatively small amount of matrix (~40% of volume) of moist, mid to dark grey-brown, soft (working more or less plastic), silty CLAY. Infrequent brick/tile and stones (<10mm), large lumps of coal (<60mm) at 1.41-1.47m and fine waterlogged plant remains present throughout (most appears to be fine rootlet).	
					0		36.75		(0.50) 2.89	1.20 - 1.77 Slight sulphide odour.	
3					0		36.64		3.00	Wet (possibly within standing ground water from 1.77m downwards), mid to dark grey-brown, sticky (working plastic), CLAY. Brick/tile fragment (<25mm) at 1.77m.	
					0		35.64		(1.00) 4.00	1.97 - 2.00 Becomes slightly sandy.	
4										No Recovery.	
										Waterlogged, mid to dark grey-brown, unconsolidated and slightly sticky, slightly clayey silty SAND. Occasional rounded stones (<15mm) throughout.	
										2.39 - 2.89 Slight sulphide odour.	
										Just moist, mid brown to mid to dark grey-brown, stiff (working plastic), CLAY.	
										Just moist, mid brown to mid to dark grey-brown, stiff (working plastic), CLAY. No recovery at 3.36-3.44m.	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 1.44m bgl. Well headspace concentration 10ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **P**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/09/07	39.93maOD	E365098 N352374

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
					0		39.86		0.07	More or less dry, light to mid slightly pinkish-brown, stiff (working plastic), slightly sandy CLAY. Small stones (<6mm) present throughout.	
					0		39.66		0.27	No real matrix - perhaps a little sand though this may be from the rotted mortar. More or less dry, loose and collapsed in core tube, mix of cinder/coal (<4mm - common becoming abundant at 0.19-0.27m), brick/tile (<8mm) and mortar (<8mm).	
					0		39.61		0.32		
					0		39.57		0.36		
					0		39.33		(0.24) 0.60	More or less dry, mid brown (slightly reddish in places), crumbly (working soft), clayey SAND. Coal (<10mm) present throughout.	
					2		38.93		(0.40) 1.00	More or less dry, approximately equal mix of buff, unconsolidated, sand and small lumps (<8mm) of mid to dark grey-brown clayey SAND. More or less dry, light brown to light to mid grey-brown, firm (working more or less soft), clayey SAND. Occasional flecks of coal (<3mm) throughout.	
1					2		38.80		1.13	Collapsed and loose in core tube - just moist, mid grey to mid grey-brown, unconsolidated (working soft and somewhat plastic), silty CLAY. Occasional fragments of brick/tile (<70mm) present and modern roots noted at 0.65-0.70m.	
					3		38.62		1.31		
					2		38.43		1.50	Collapsed and loose in core tube - just moist, mid grey, crumbly (working soft), slightly sandy clayey SILT. Some charcoal and root fragments present.	
					2		38.30		1.63		
					2		38.20		1.73	Just moist, mid grey, crumbly (working soft), slightly sandy clayey SILT, with some inclusions of light grey-brown crumbly sand at 1.13-1.24m. Roots (at 1.13-1.19m) and charcoal (at 1.17-1.21m) were common with charcoal becoming abundant from 1.21-1.31m. Animal bone fragment (<20mm) at 1.30-1.31m.	
					0		38.02		1.91		
2					2		37.93		2.00	Just moist, dark brown to dark grey-brown, crumbly (working more or less soft), silty very humified amorphous organic PEAT, flecked with buff sand/rotted mortar.	
					0		37.26		(0.67) 2.67	Just moist, mid to dark, slightly purplish-brown, amorphous organic humified peat. Fragments of moss 'stems and leaves', sedge (Carex) nulets and rootlets. Just moist, dark brown to dark grey-brown, crumbly (working more or less soft), silty very humified amorphous organic PEAT.	
					0		36.93		(0.33) 3.00	Moist, dark brown to dark grey-brown, crumbly (working soft), slightly clayey SILT. A little fine charcoal (<6mm) at upper interface. Humified peat collapsed and loose in core tube.	
3					0	1	36.43		(0.50) 3.50	Moist, dark grey, crumbly (working soft), clayey SAND, becomes more clay at 2.48-2.67m and works soft and somewhat plastic. Moist, light brown, unconsoildated, very 'clean' SAND. 2.67 - 3.00 Slight sulphide odour. Moist, light grey-brown than light brown, unconsoildated, very 'clean' SAND. Rounded pebbles (<30mm) common to abundant throughout.	
					0		35.93		(0.50) 4.00	Wet, mid brown, unconsoildated, very 'clean' SAND. Rounded pebbles (<40mm) common to abundant throughout.	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 3.33m bgl. Well headspace concentration 170ppm.

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **P1**

Client: **ENGLISH HERITAGE & CHESHIRE EAST COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.00889.00005	10/01/11	39.93maOD	E365098 N352374

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
								?	(0.50)	No recovery	
							39.43		0.50		
							39.31		0.62	Moist greyish brown gravelly SAND	
							39.22		0.71	Moist greyish brown clayey SAND	
							39.19		0.74	Moist stiff brown redeposited CLAY	
									(0.26)	Dry dark greyish brown sandy clayey gravelly SILT with rootlets and cinder throughout. Possibly a former ground surface. 0.77 - 0.84 …Lump of clay.	
1							38.93		1.00		
								?	(0.55)	No recovery	
							38.38		1.55		
							38.21		1.72	Moist grey sandy clayey gravelly SILT	
							38.11		1.82	Dark greyish brown silty gravelly amorphous PEAT with wood fragments and lumps of clay throughout.	
							37.93		2.00	Moist dark greyish brown slightly humic slightly sandy SILT with occasional herbaceous detritus and organic remains.	
2										Borehole complete at 2.00m	
3											
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Monitoring well is dry at 2.0m depth.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

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LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **Q**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/09/07	39.22maOD	E365196 N352383

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
								(0.48)		Collapsed and loose in core tube - just moist (to dry in places), light grey-brown to mid brown, unconsolidated, silty SAND. Abundant stones (<30mm) throughout and modern glass fragment (<25mm) at 0.43-0.45m.	
							38.74		0.48		
							38.68		0.54	Just moist, very dark grey to black, compressed (working more or less soft), very ashy, slightly clayey SILT, with some light to mid brown sand on outer surface in places. Cinder/part burnt coal (<20mm) present throughout and occasional pieces of rotted mortar (<8mm).	
								(0.46)			
1							38.22		1.00	Just moist, dark grey-brown, firm (working soft), slightly clay sandy silt (more sandy in places) grading into stiff (working more or less plastic) slightly sandy slightly silty CLAY. Small rounded pebbles (<12mm) and occasional pieces of cinder/coal (<8mm) present throughout. Small modern glass fragment (<7mm) at 0.70m.	
					0			(0.47)			
							37.75		1.47	Just moist, dark grey-brown, firm (working soft), slightly clay sandy silt (more sandy in places) grading into stiff (working more or less plastic) slightly sandy slightly clayey SILT.	
					0		37.72		1.50		
					0	1	37.59		1.63	Just moist, dark grey-brown, firm (working soft), slightly clay sandy silt (more sandy in places) grading into stiff (working more or less plastic) slightly sandy slightly clayey SILT. Mortar and crushed brick/tile (<15mm) common to abundant.	
					0		37.39		1.83		
					0		37.22		2.00	Wet, mid to dark brown to grey-brown, stiff (working soft then more or less plastic), slightly sandy silty CLAY, becomes more sandy with depth and grades into next lowest section. Stones (<30mm) common at 1.53-1.55m and present throughout the rest of this section	
2							37.12	?	2.10		
					0			(0.38)		Wet, mid to dark brown to grey-brown, compacted/firm, slightly clayey slightly silty SAND. Occasional rounded pebbles (<20mm) throughout.	
							36.74		2.48	Collapsed and loose in core tube - wet, mid brown, unconsolidated, coarse SAND.	
										No Recovery.	
					0			(0.40)		Moist to wet, light to mid brown to mid grey-brown, compacted (firm but crumbles), slightly silty SAND. Stones (<15mm) present throughout.	
							36.34		2.88		
					0		36.24		2.98	Moist to wet, light to mid grey-brown, unconsolidated, coarse SAND. Occasional stones (<25mm) present throughout but larger (<70mm) and more frequent at 2.83-2.88m.	
3					0		36.22		3.00		
										Moist to wet, mid brown, stiff (working soft then plastic), CLAY.	
										Moist to wet, light to mid grey-brown, unconsolidated, coarse SAND. Stones (<50mm) present throughout.	
					0			(0.80)		Core tube broken and only 0.8m metres long - just moist, mid brown, very stiff (working plastic), CLAY. Occasional stone - e.g. small rrounded pebble (<12mm) at 3.50-3.51m.	
							35.42		3.80	3.00 - 3.03 Slight 'dusting' of light to mid brown sand. 3.21 - 3.24 Pocket of moist, mid brown, unconsolidated, sand.	
4										Borehole complete at 3.80m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 1.71m bgl. Well headspace concentration 170ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **R**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/09/07	39.18maOD	E365205 N352362

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							38.68		(0.50) 0.50	Largely collapsed in core tube - no real matrix. Slightly moist mix of mortar, brick, stones, cinder and sand, with a particular concentration of brick at 0.44-0.50m.	
					0		38.18		(0.50) 1.00	Just moist, very dark grey, soft (working soft and slightly plastic), ashy, slightly sandy clayey SILT, flecked with occasional light coloured sand grains. Traces of brick/tile (<8mm) and occasional stones (<9mm) throughout, mortar (<30mm) at 0.8m. Flecks of granular black cinder/part burnt coal (<5mm) at 0.95-1.00m.	
1							38.09	?	1.09	No Recovery.	
					0		37.82		(0.27) 1.36	Just moist, very dark grey, soft (working soft and slightly plastic), ashy, slightly sandy clayey SILT, clecked with occasional light coloures sand grains. Occasional clasts (<10mm) of light to mid brown sticky clay.	
					0		37.62		1.56	Moist to wet, light brown to light to mid grey-brown, soft, coarse SAND. Rounded pebbles (<25mm) at 1.53-1.56m.	
					0		37.58		1.60	Grades from sediment above (1.36 to 1.56) into sediment below.	
					0		37.44		1.74	Moist,light to mid grey, firm (working soft and somewhat plastic) CLAY.	
					0		37.31		1.87	Moist, light to mid brown to grey-brown, soft (working more or less plastic CLAY, with indurated 'granules' of mid brown clay (<2mm).	
2					0		37.18		2.00	Moist to wet, light brown to light to mid grey-brown, soft, coarse SAND. Abundant rounded pebbles (<35mm).	
							36.68	?	(0.50) 2.50	No Recovery.	
					0		36.18		(0.50) 3.00	Moist (to wet from 2.35 downwards), mid brown to mid grey-brown, stiff (working plastic), CLAY.	
3							36.10	?	3.08	No Recovery.	
					0		35.18		(0.92) 4.00	Moist, mid brown to mid grey-brown, stiff (working plastic), CLAY.	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **S**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	39.77maOD	E365119 N352343

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
					0		39.61		0.16	Just moist, light brown, unconsolidated to soft, very 'clean' SAND.	
					0		38.96		(0.65) 0.81	No matrix. More or less dry, unconsolidated (collapsed and loose in tube), angular stone (<80mm).	
1					0		38.77		1.00	Just moist, dark grey-brown, crumbly, slightly ashy, slightly silty SAND.	
							38.49		(0.28) 1.28	Poor recovery, with a little collapsed moist, mostly mid to dark grey-brown, unconsolidated, slightly silty SAND.	
					0		37.77		(0.72) 2.00	Moist, mostly mid to dark grey-brown, unconsolidated, slightly silty SAND, with occasional light brown patches of sand at 1.40m, 1.60m, 1.70m and dark grey sand at 1.53m and 1.74m. Small stones (<8mm) present throughout. Traces of brick/tile (<7mm) from 1.90-2.00m.	
2					0		37.41		(0.36) 2.36	Moist, mostly mid to dark grey-brown, unconsolidated, slightly silty SAND. Small stones (<8mm) present throughout.	
					0		37.33		2.44	No matrix. Brick surface - large fragments (<130mm).	
					0		37.22		2.55	No matrix. Angular stone and conglomerate (<50mm) - looks to be hardcore for overlying brick surface (2.36-2.44m).	
					0		37.15		2.62	Moist, mid to dark to dark grey, unconsolidated SAND. Flecks of rotted charcoal (<6mm) and small stones (<8mm) present throughout.	
3					0		36.49		(0.66) 3.28	Moist, light brown to light grey-brown, unconsolidated, fairly coarse 'clean' SAND. Possibly deliberately laid 'bedding'.	
					0	1	35.77		(0.72) 4.00	Moist, light brown to light grey-brown, unconsolidated, fairly coarse 'clean' SAND. Abundant rounded pebbles (<20mm) throughout.	
4										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 3.34m bgl. Well headspace concentration 130ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **T**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	14/09/07	39.50maOD	E365140 N352352

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
					2		37.90		(1.60) 1.60	Collapsed and loose in core tube - moist, light to mid brown to mid grey-brown, unconsolidated, slightly clayey slightly silty SAND. Rootlets at 0.00-0.24m and 1.24-1.27m, stones (<25mm) present throughout 0.00-1.00 and becoming larger (<60mm) and common from 1.00-1.60m, ?human skull fragment at 0.70m and a ?charred bone fragment (<20mm) at 1.59m. 0.10 - 0.22 Occasional lumps of just moist, pale yellow, slightly stiff (working more or less plastic) clay.	
					0		37.70		1.80	Moist, dark brown to very dark grey-brown to black, crumbly to unconsolidated (working soft), slightly sandy clayey SILT. Large ?sandstone inclusion (<80mm) at 1.66-1.73m and brick/tile (<50mm) at 1.68-1.73m.	
					2	1	35.80		(1.90) 3.70	1.60 - 1.80 Very slight sulphide odour. Collapsed and loose in core tube - moist, light brown to light to mid grey-brown, unconsolidated, fine and coarse SAND (becoming more coarse with increasing depth). Large rounded pebbles (<80mm) abundant at 3.44-3.54m.	
					2		35.50		(0.30) 4.00	Moist mid brown, very stiff (working plastic) CLAY.	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 3.16m bgl. Well headspace concentration 140ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **U**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	14/09/07	39.43maOD	E365160 N352349

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
					0		38.43		(1.00) 1.00	Collapsed and loose in core tube - moist, mid brown to mid grey-brown to mid to dark grey, unconsolidated, slightly silty clayey SAND. Stones (<60mm) and fragments of brick/tile (<90mm) present throughout. Animal bone fragment (<55mm) at 0.35m and several fragments of ?human skull (<40mm) at 0.60-0.65m.	
1					0		37.93		(0.50) 1.50	Moist (becomes wet at around 1.50), mid to dark grey-brown, slightly sticky (working soft then crumbly), slightly clayey sandy SILT. Occasional stones (<35mm) and pieces of coal (<8mm) throughout. Large ?human skull fragment (<80mm) at 1.00-1.08m.	
					0		37.86		1.57	Wet, mid to dark grey-brown, unconsolidated, slightly clayey sandy SILT. Single large rounded cobble (<70mm).	
					0		37.66		1.77	Moist to wet, mid to dark grey-brown, slightly sticky (working soft then crumbly), slightly clayey, silty SAND, with a small patch of light brown coarse sand at 1.77m. Stones (<15mm) present throughout.	
					1		37.47		1.96		
2							37.43		2.00	Moist to wet, dark grey-brown, brittle (working soft and slightly plastic), clayey SILT. Trace of ?waterlogged organic detritus and an occasional rounded pebble (<18mm) present.	
					2		37.26		2.17	1.77 - 1.96 Slight sulphide odour.	
										No Recovery.	
										Moist to wet, dark grey-brown, brittle (working soft and slightly plastic), clayey SILT. Root at 2.03m.	
					2				(0.83)	2.00 - 2.17 Slight sulphide odour.	
							36.43		3.00	Collapsed and loose in core tube - moist to wet, mid brown, unconsolidated (occasionally slightly sticky), slightly clayey coarse SAND. Rotted wood fragment (<60mm) at 2.17-2.23m, rounded pebbles (<60mm) abundant throughout.	
3										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **V**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	14/09/07	39.39maOD	E365195 N352346

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
					3				(1.00)	Collapsed and loose in core tube - more or less dry, mid to dark brown, unconsolidated, SAND. Rounded stones (<20mm) present throughout and root penetration to 0.40m (with traces at 0.90m).	
1							38.39		1.00		
					0				(0.44)	More or less dry, mid to dark brown, unconsolidated, SAND, becoming moist from around 1.40m downwards. Rounded stones (<20mm) present throughout.	
							37.95		1.44		
					3		37.88	?	1.51	No matrix. Large wood fragment at 45 degrees to horizontal.	
					3		37.69		1.70	Moist, mid to dark brown, unconsolidated, slightly clayey SAND. Rounded stones (<20mm) present throughout and two areas with waterlogged wood fragments - several small pieces (<15mm) at 1.51-1.54m and slightly larger fragments (<35mm) at 1.56-1.63m (rather decayed and orange-coloured); also root fragment through a larger wood fragment.	
					3		37.60		1.79		
					0	1	37.39		2.00		
2										Moist, mid grey, crumbly to unconsolidated (working soft), clayey SAND, with some patches of mid orange unconsolidated sand. Large stone (<60mm) at 1.71-1.77m and large (<60mm) horizontal wood fragment at 1.75-1.79m.	
					2				(0.50)	Moist, mid grey-brown, stiff (working soft and somewhat plastic), sandy CLAY. Occasional rounded pebbles (<15mm) present.	
							36.89		2.50	Half void - moist, mid brown, mid grey and mid grey-brown, unconsolidated, slightly clayey SAND (more clay at 2.00-2.15m, works soft and slightly plastic). Rounded pebbles (<70mm) common and an occasional rotted wood fragment (<60mm), e.g. at 2.15-2.20m.	
										Whole tube marked as 2.50-3.50 but core discontinuous in 2 parts and total deposit length present 0.86 m - both section of core the same just moist, mid brown, very stiff (working plastic), CLAY. upper surface (2.50-2.60m) sandy, very compacted and with inclusions of stones (<30mm).	
3					0				(1.00)		
							35.89		3.50		
										Just moist, mid brown, very stiff (working plastic), CLAY. Pieces of contaminant fresh grass on outer surface of core.	
4					0				(1.00)		
							34.89		4.50		
										Borehole complete at 4.50m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	Groundwater present at 1.95m bgl. Well headspace concentration 60ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No. **W**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	40.03maOD	E365214 N352280

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.03		(1.00) 1.00	Collapsed and loose in core tube - moist, mid to dark brown to grey-brown, unconsolidated, SAND. Roots and ?ornamental bark at 0.00-0.15m, modern pot fragment (<30mm) at 0.50m, stones (<15mm) present throughout becoming common from 0.80-1.00m.	
1					3		38.67		(0.36) 1.36	Just moist, dark grey-brown, crumbly to unconsolidated (working more or less soft), sandy clayey SILT. Occasional stones and brick/tile fragments (<15mm) present throughout, root at 1.05-1.10m and 1.35m (continuing down to 1.48m), single pot sherd (<30mm) at ~1.20m.	
					3		38.26		(0.41) 1.77	Moist, mid brown, grey and grey-brown, crumbly to unconsolidated, SAND. Root as noted above continues to 1.48m and stones (<15mm) were present at around 1.55m.	
					0		38.03		2.00	Moist, light to light to mid brown/orange-brown, crumbly to unconsolidated, SAND - orange colouration from ?iron pan/oxide. Stone (<55mm) present at 1.97-2.00m.	
2					0		37.55		(0.48) 2.48	Collapsed and loose in core tube. Moist, light to light to mid brown/orange-brown, crumbly to unconsolidated, SAND - orange colouration from ?iron pan/oxide.	
					0		37.39		2.64	Small amount of matrix of moist, light to mid slightly blue grey, sticky (working more or less plastic), slighly sandy CLAY - more sandy at 2.58-2.64m and this area more mid grey-brown in colour. Most of core section composed of abundant large stones (<65mm).	
					0		37.03		(0.36) 3.00	Just moist, mid brown, very stiff (working plastic) CLAY.	
3										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **X**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	37.62maOD	E365014 N352321

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							37.28		(0.34) 0.34	Collapsed and loose in core tube - a little matrix of dry, light to mid grey, unconsolidated CLAY. Mostly loose angular 'hard core' stones (<45mm).	
							37.02		(0.26) 0.60	Just moist, mid to dark brown to dark brown, unconsolidated, silty sand TOPSOIL. Brick/tile (<20mm), mortar (<15mm), modern rootlets and stones (<35mm) present throughout.	
					2		36.50		(0.52) 1.12	Moist, mid brown, very stiff (working plastic), CLAY, with sandy intrusion at 0.83-0.90m. Stones at 0.83-0.90m, and rootlets at 0.80-0.85m and 0.94m.	
1					0		36.20		(0.30) 1.42	Just moist, light brown to mid grey-brown to mid to dark grey, unconsolidated SAND. Stones (<15mm) present throughout.	
					0		35.62		(0.58) 2.00	Moist, mid brown, very stiff (working plastic) CLAY. Occasional stones (<10mm) present - particularly at 1.75-1.85m, also a large angular rock (<80mm) inclined at ~45 degrees to horizontal at 1.53-1.59m.	
2							35.41	?	2.21	No Recovery.	
					0		34.78		(0.63) 2.84	Moist, mid brown, very stiff (working plastic) CLAY. Occasional fairly large stones present, e.g. rounded pebble (<65mm) at 2.48-2.55m.	
							34.74	?	2.88	No Recovery. Single large angular stone (<85mm) penetrates into underlying clay to 2.92m - vertically aligned relative to greatest dimension.	
3					0		34.62		3.00	Moist, mid brown, very stiff (working plastic) CLAY.	
										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **Y**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	39.90maOD	E365057 N352322

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							39.40		(0.50) 0.50	Collapsed and loose in core tube - conglomerate 'hard core' in lumps (<80 mm) 'cemented' stones and loose light brown dry SAND.	
							39.07		(0.33) 0.83	Collapsed and loose in core tube - above but also with large stones (<80mm), SAND component moist and mid brown in colour.	
1					0		38.90		1.00	Collapsed and loose in core tube - a little matrix of moist, mid to dark brown, unconsolidated SAND. Brick and stone rubble (<60mm), with ?black ash/fine cinder common at 0.83-0.92m.	
							38.10	?	(0.80) 1.80	No Recovery.	
2					0		37.90		2.00	No matrix. Dry shattered brick (<90mm).	
					0		37.84		2.06	No matrix. 'Plug' of dry brick (<100mm).	
					0		37.78		2.12	'Plug' of moist mid to dark grey-brown to dark grey, compressed (working crumbly), silty SAND. Crushed brick (<50mm) and black ash/cinder abundant at upper surface.	
					0		37.15		(0.63) 2.75	Moist, light brown to light to mid grey-brown (rather orange from 2.12-2.30m probably from surface contamination from brick above), unconsolidated SAND.	
3					0		36.90		(0.25) 3.00	Collapsed and loose in core tube - moist, light brown to light to mid grey-brown, unconsolidated SAND. Abundant rounded pebbles (<50mm) form approximately 90% of the volume of this section.	
					0		36.16		(0.74) 3.74	Moist, light brown to light to mid grey-brown, unconsolidated SAND (slightly reddish area (?iron pan/oxide) at 3.38-3.44m). Occasional rounded pebbles (<40mm) present throughout, small 'lens' of pebbles (<25mm) at 3.44-3.50m, rounded pebbles (<25mm) common at interface with layer below (3.71-3.74m).	
4					0		35.90		(0.26) 4.00	Just moist, mid brown, very stiff (working plastic) CLAY.	
										Borehole complete at 4.00m	

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:		

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No. **Z**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	38.46maOD	E365079 N352243

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS							STRATA				
Depth	Type No	HS(ppm)	HV(kPa)	PP(kPa)	SPT-N	Water	Reduced Level	Legend (Thick-ness)	Depth	DESCRIPTION	Instrument/ Backfill
							38.21		(0.25) 0.25	Collapsed and loose in core tube - a little sand may constitute matrix. Fill consists largely of rounded pebbles (<40mm), with occasional fragments of brick/tile (<15mm) and a little sand - ?ornamental pebble surface? More or less dry grass at 0.25m.	
					0		37.76		(0.45) 0.70	Just moist, light brown to mid grey (in shades of brown, grey and grey-brown), unconsolidated SAND. Brick/tile fragments (<8mm) at 0.43-0.45m.	
1					0		37.46		(0.30) 1.00	Just moist, light grey-brown, unconsolidated SAND. Abundant rounded pebbles (<45mm) throughout.	
							36.78	?	(0.68) 1.68	No Recovery.	
2					0		36.42		(0.36) 2.04	Just moist, light grey-brown, unconsolidated SAND, with some mid orange areas of ?iron pan/oxide. Abundant rounded pebbles (<45mm) throughout.	
					0		35.48		(0.94) 2.98	Moist, mid brown, very stiff (working plastic) CLAY.	
3					0		35.46		3.00	Just moist, light grey-brown, compacted SAND. Rounded pebbles (<20mm) common.	
										Borehole complete at 3.00m	
4											

Boring Progress and Water Observations				Casing		Chiselling			Water Added		General Remarks
Date	Time	Depth	Water Dpt	Depth	Dia. mm	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By:	Approved By:

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **A**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	30/07/07	33.29maOD	E364931 N352661

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									MINERAL RICH DEPOSIT	
1		SPT	N=0					(3.48)	1.61 - 1.63 Discontinuity of moist to wet, soft to unconsolidated, light grey, sand.	
2		SPT	N=0						2.35 - 2.65 Very granular appearance caused by presence of indurated clay lumps (<3 mm) within the matrix.	
3		SPT	N=0						3.20 - 3.48 Becoming slightly wetter and more sticky.	
						29.81		3.48		
		SPT	N=0					(0.42)	SAND	
						29.39		3.90		
4									Borehole complete at 3.90m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
AA

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	37.97maOD	E364730 N352391

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
		SPT	N=0			37.33		(0.64) 0.64	MADE GROUND/OVERBURDEN 0.35 - 0.54 Crushed brick and tile fragments present (<20mm).	
		SPT	N=0						SAND 0.64 - 0.74 Becomes dark greyish brown.	
1										
		SPT	N=0			35.37		(1.96) 2.60		
2										
		SPT	N=0			34.97		(0.40) 3.00	CLAY	
3									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH SPT File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 26-05-16

BOREHOLE LOG

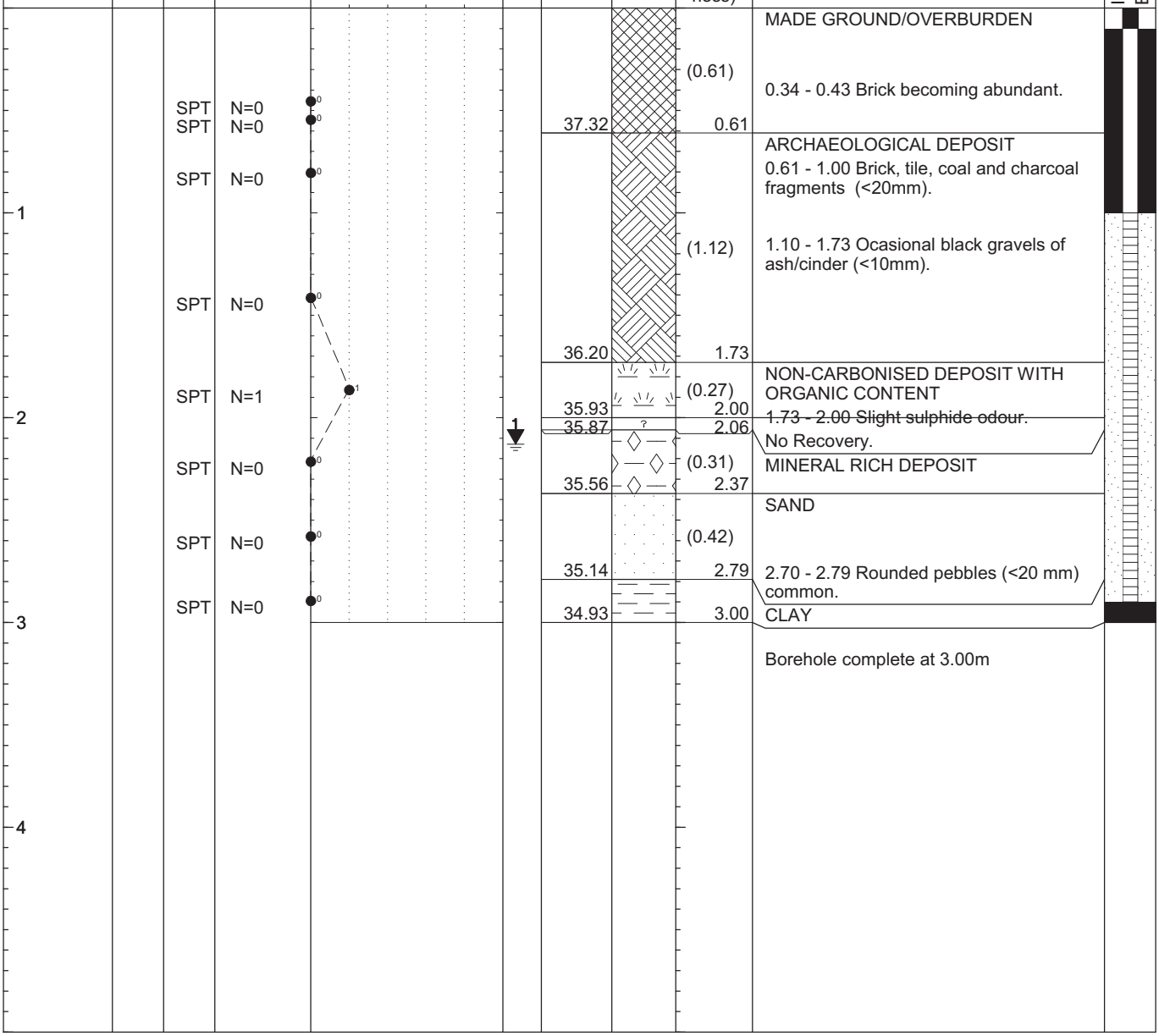
BOREHOLE No **AB**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	37.93maOD	E364740 N352370

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1



Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	Groundwater present at 2.13m bgl. Well headspace concentration 40ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH SPT File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 26-05-16

BOREHOLE LOG

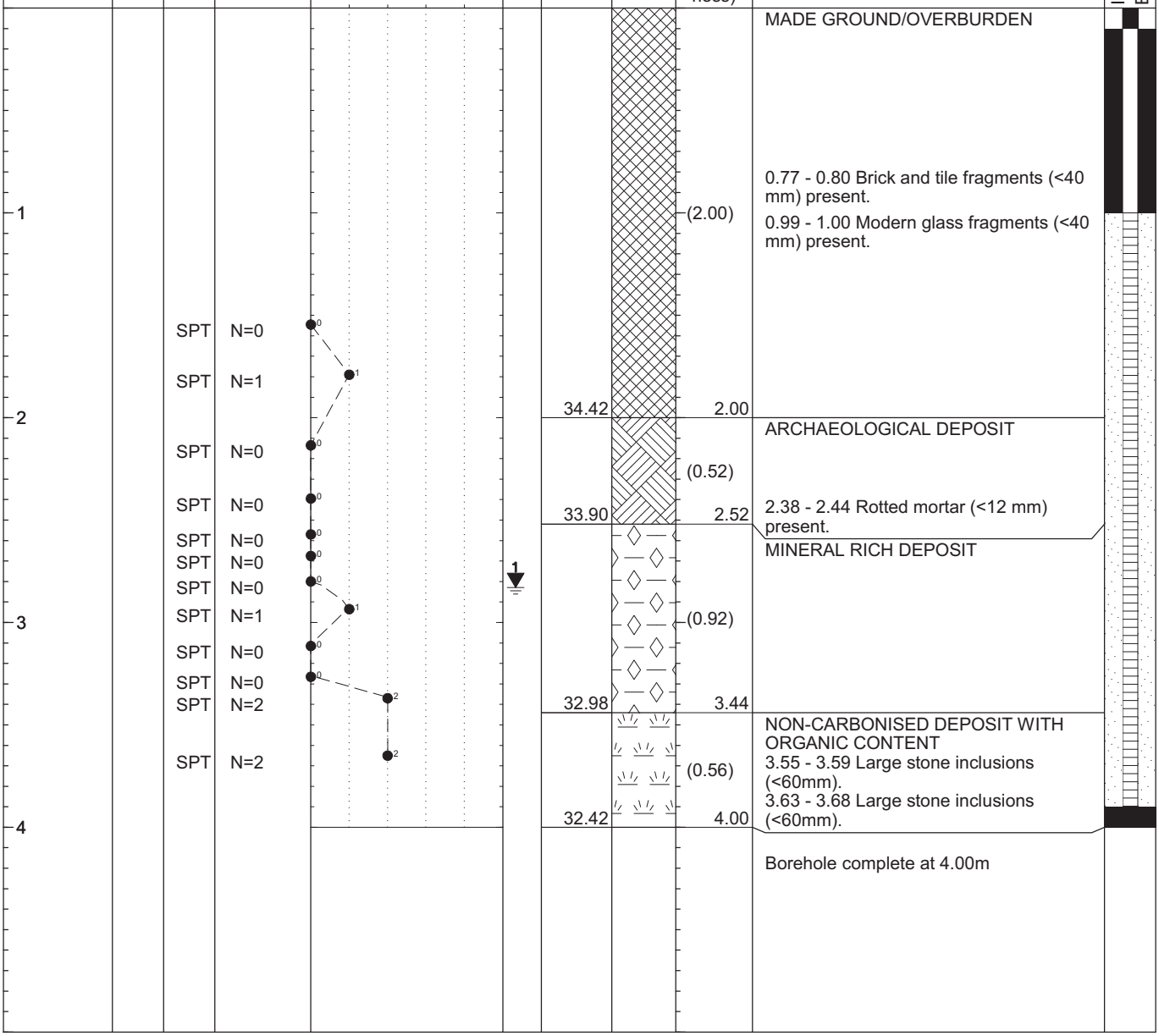
BOREHOLE No **AC**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	36.42maOD	E364963 N352517

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1



Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	Groundwater present at 2.83m bgl. Well headspace concentration 20 000ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH SPT File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 26-05-16

BOREHOLE LOG

BOREHOLE No **AE**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/01/11	35.19maOD	E364917.887 N352428.049

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
						34.40		(0.79) 0.79	MADE GROUND/OVERBURDEN	
						34.19		1.00	ARCHAEOLOGICAL DEPOSIT	
1		SPT	N=2	2					NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
2		SPT	N=2	2	1			(2.00)		
		SPT	N=2	2						
		SPT	N=3	3						
3		SPT	N=1	1		32.19		3.00		
						31.79		(0.40) 3.40	No Recovery.	
		SPT	N=1	1		31.19		(0.60) 4.00	SAND	
4									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

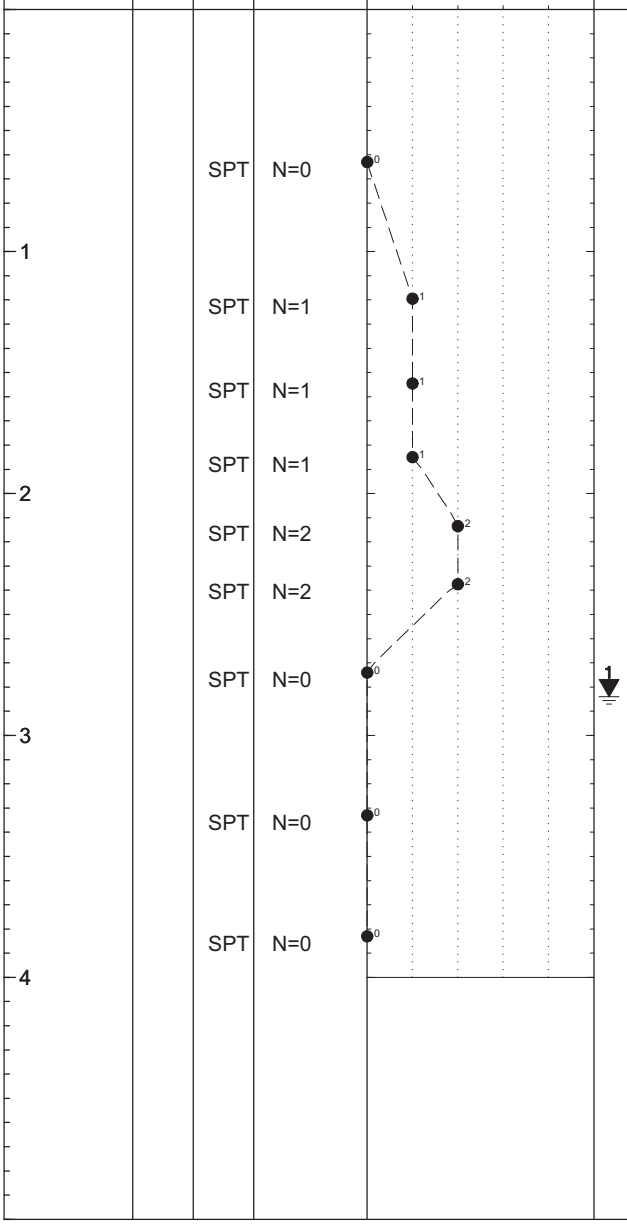
BOREHOLE No
AF

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/01/11	34.89maOD	E364899.123 N352463.451

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1



Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
AG

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/01/11	37.03maOD	E365007.316 N352313.389

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
						36.03		(1.00) 1.00	MADE GROUND/OVERBURDEN	
						35.13	?	(0.90) 1.90	No Recovery.	
2		SPT	N=3	3		34.53		(0.60) 2.50	ARCHAEOLOGICAL DEPOSIT	
		SPT	N=2	2	1				CLAY	
3		SPT	N=1	1				(1.50)		
4						33.03		4.00	Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **B**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	30/07/07	36.62maOD	E364925 N352582

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 2

SAMPLES & TESTS

Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4
1				
2				
		SPT	N=0	
		SPT	N=0	
3				
		SPT	N=0	
4				
		SPT	N=0	
		SPT	N=0	

Water

STRATA

Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		(2.44)	MADE GROUND/OVERBURDEN 0.06 - 0.08 Becoming mid to dark grey-brown.	
34.18		2.44		
		(1.56)	ARCHAEOLOGICAL DEPOSIT. Contains cinder and burnt material. 3.00 - 4.00 Slight sulphide odour.	
32.62		4.00	3.92 Rounded edge pot fragment (<11mm)	
			CLAY	

Boring Progress and Water Observations

Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling

From	To	Hours

Water Added

From	To

General Remarks

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **B**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	30/07/07	36.62maOD	E364925 N352582

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 2 of 2

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		SPT	N=0					(2.00)	CLAY *(continued)*	
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
6		SPT	N=0			30.62		6.00		
									Borehole complete at 6.00m	
7										
8										
9										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
C

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	34.87maOD	E364827 N352525

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									ARCHAEOLOGICAL DEPOSIT	
									0.35 - 1.00 Fine ash/cinder.	
		SPT	N=1					(1.90)		
1										
		SPT	N=2						1.47 - 1.52 Pocket of orange sand.	
									1.60 - 1.62 Pocket of light grey-brown sand.	
						32.97		1.90	1.72 - 1.78 Waterlogged wood fragments.	
2		SPT	N=2						NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
		SPT	N=1						1.90 - 1.95 Slight sulphide odour.	
		SPT	N=0						1.95 Waterlogged wood fragments.	
		SPT	N=2						2.19 - 3.00 Moderate sulphide odour.	
		SPT	N=2							
3								(2.10)		
		SPT	N=1							
						30.87		4.00		
4									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No **D**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	35.03maOD	E364925 N352423

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
								(0.70)	MADE GROUND/OVERBURDEN	
		SPT	N=0							
		SPT	N=0			34.33		0.70		
		SPT	N=0						ARCHAEOLOGICAL DEPOSIT. Contains fine ash/cinder and mortar.	
1										
		SPT	N=0					(1.39)		
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
2		SPT	N=0			32.94		2.09	2.00 - 2.09 Slight sulphide odour.	
		SPT	N=0						SAND	
		SPT	N=0			32.66		(0.28) 2.37		
									NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 2.47 - 2.50 Rotted wood.	
		SPT	N=2					(0.63)		
3						32.03		3.00		
									SAND	
		SPT	N=0					(1.00)		
4						31.03		4.00		
									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
E

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	35.34maOD	E364931 N352261

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						34.34		(1.00) 1.00	MADE GROUND/OVERBURDEN	
						33.84		(0.50) 1.50	ARCHAEOLOGICAL DEPOSIT. Contains brick, stones and slate.	
		SPT	N=0						MINERAL RICH DEPOSIT	
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=1							
		SPT	N=1					(0.91)		
		SPT	N=0			32.93		2.41	ARCHAEOLOGICAL DEPOSIT. Contains fragments of brick and ash.	
		SPT	N=0							
		SPT	N=0					(1.59)		
		SPT	N=0			31.34		4.00	Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
F

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	01/08/07	39.74maOD	E365191 N352264

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS

Depth	Type No	Test Type	Test Result	Preservation (1 2 3 4)
0.00		SPT	N=0	0
0.00		SPT	N=0	0
0.50		SPT	N=3	3
1.00		SPT	N=1	1
1.50		SPT	N=3	3
2.00		SPT	N=0	0
2.00		SPT	N=0	0
3.00		SPT	N=0	0

Water

STRATA

Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	Instrument/ Backfill
		(0.67)	MADE GROUND/OVERBURDEN	
39.07		0.67		
		(1.19)	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 0.76 - 0.81 Waterlogged wood fragments 0.76 - 0.96 Moderate sulphide odour. 1.00 - 1.86 Slight sulphide odour. 1.48 - 1.52 Light grey sand intrusions (at ~45 degrees to horizontal). 1.50 - 1.86 Becomes wet. 1.56 - 1.60 Light grey sand intrusions (at ~45 degrees to horizontal). 1.64 - 1.72 Light grey sand intrusions (at ~45 degrees to horizontal). 1.76 - 1.80 Fibrous organic content.	
37.88		1.86		
37.74		2.00	SAND 1.96 - 2.00 Slight sulphide odour.	
		(1.00)	CLAY	
36.74		3.00		
			Borehole complete at 3.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **F1**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/01/11	39.69maOD	E365188.877 N352269.226

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		SPT	N=0					(0.79)	MADE GROUND/OVERBURDEN	
		SPT	N=0			38.90		0.79		
		SPT	N=1						NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
1		SPT	N=0					(0.59)	0.79 ...Rootlet at strata interface. 0.80 - 0.82 …Traces of decayed mortar. 0.96 …Bone fragment.	
		SPT	N=3							
		SPT	N=2		1	38.31		1.38	1.32 - 1.38 …Occasional fragments of plant tissue.	
		SPT	N=0					(0.62)	SAND	
2		SPT	N=0			37.69		2.00		
									Borehole complete at 2.00m	
3										
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **F2**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/01/11	39.69maOD	E365188.877 N352269.226

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		SPT	N=0					(1.65)	MADE GROUND	
1		SPT	N=0		1					
		SPT	N=0							
		SPT	N=0			38.04		1.65		
		SPT	N=0					(0.35)	ARCHAEOLOGICAL DEPOSIT. Contains ash/cinder, brick, mortar and glass.	
2		SPT	N=0			37.69		2.00		
		SPT	N=0				?	(0.32)	No recovery	
		SPT	N=0			37.37		2.32		
		SPT	N=0					(0.34)	SAND	
		SPT	N=0			37.03		2.66		
3		SPT	N=0					(1.34)	CLAY	
		SPT	N=0							
4						35.69		4.00		
									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
G

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	01/08/07	39.60maOD	E365096 N352398

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						39.33		(0.27) 0.27	MADE GROUND/OVERBURDEN	
		SPT	N=0						ARCHAEOLOGICAL DEPOSIT. Contains ash/cinder, brick, tile fragments and rotted charcoal.	
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
1									0.87 Very rotted shell.	
								(1.72)		
		SPT	N=1							
		SPT	N=0							
		SPT	N=0							
2		SPT	N=0			37.61		1.99		
		SPT	N=0						SAND	
		SPT	N=0							
		SPT	N=0					(1.01)		
		SPT	N=0							
3						36.60		3.00		
									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **H**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	01/08/07	39.35maOD	E365233 N352471

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						38.99		(0.36) 0.36	MADE GROUND/OVERBURDEN	
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=0					(0.64)	ARCHAEOLOGICAL DEPOSIT. Contains ash/cinder, brick, mortar and glass.	
1						38.35		1.00		
						37.93	?	(0.42) 1.42	No Recovery.	
		SPT	N=0			37.83		1.52	SAND	
		SPT	N=0						CLAY	
2										
		SPT	N=0							
3								(2.48)		
		SPT	N=0							
4						35.35		4.00		
									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

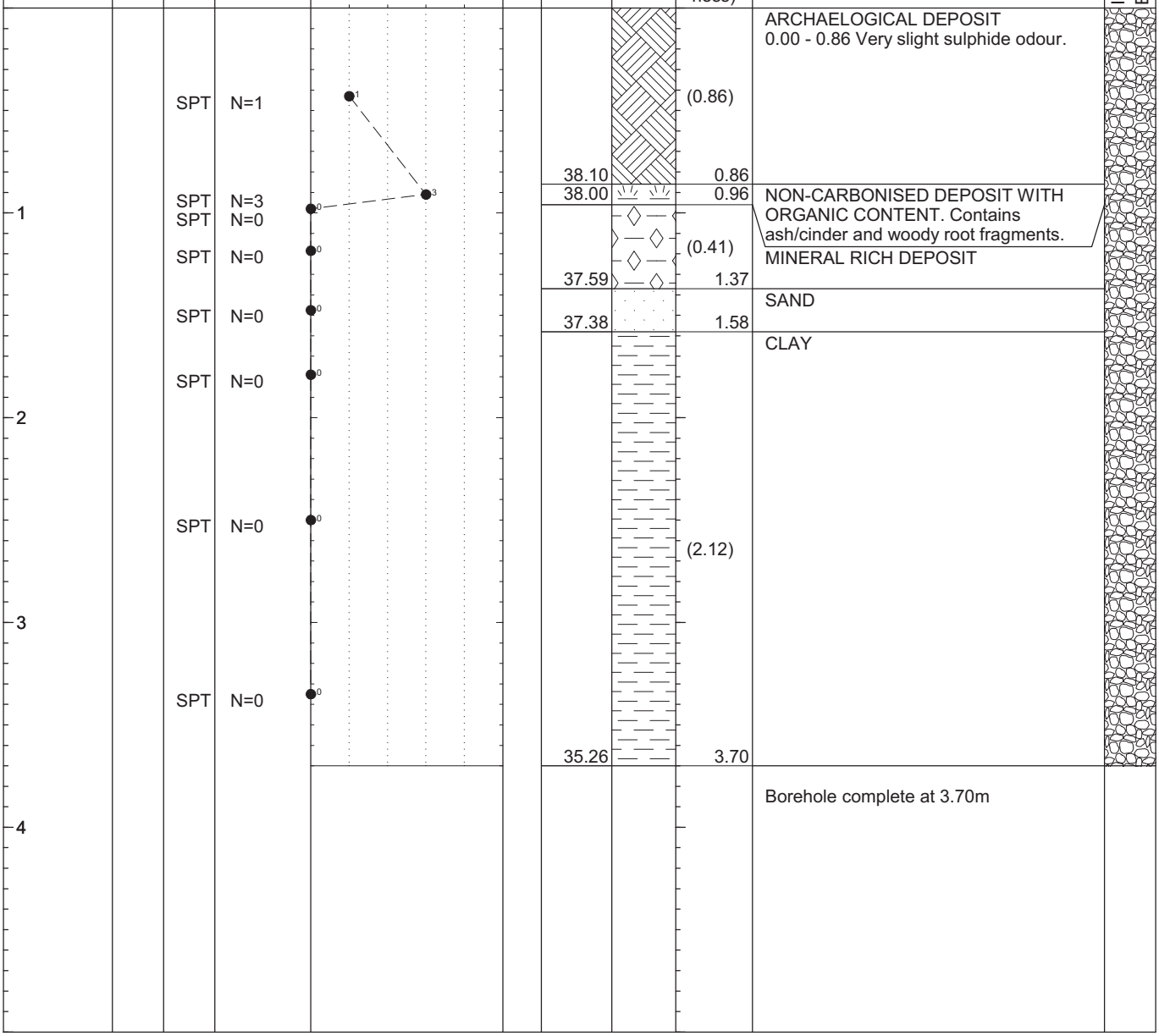
BOREHOLE No
I

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	38.96maOD	E365308 N352394

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1



Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH SPT File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 26-05-16

BOREHOLE LOG

BOREHOLE No
J

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	40.04maOD	E365284 N352296

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
		SPT	N=0	0		39.04		(1.00) 1.00	MADE GROUND/OVERBURDEN	
		SPT	N=0	0						
1		SPT	N=2	2						
		SPT	N=0	0		38.29		(0.75) 1.75	SAND	
		SPT	N=2	2						
		SPT	N=0	0		36.04		(2.25) 4.00	CLAY	
2										
		SPT	N=0	0						
3										
		SPT	N=0	0					Borehole complete at 4.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
K

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	31/07/07	37.14maOD	E365021 N352297

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									MADE GROUND/OVERBURDEN	
								(1.00)		
1						36.14		1.00		
									CLAY	
		SPT	N=0							
2								(2.00)		
		SPT	N=0							
		SPT	N=0							
3						34.14		3.00		
									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **L**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	38.71maOD	E365128 N352544

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						37.96		(0.75) 0.75	MADE GROUND/OVERBURDEN	
1		SPT	N=0			37.41		(0.55) 1.30	ARCHAEOLOGICAL DEPOSIT 0.97 Post medieval/modern pottery fragment (<35mm).	
		SPT	N=0						SAND	
2		SPT	N=0		1			(1.15)		
						36.26		2.45	CLAY	
3		SPT	N=0					(1.55)		
						34.71		4.00		
4									Borehole complete at 4.00m	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 2.28m bgl. Well headspace concentration 35ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **M**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	37.81maOD	E365015 N352549

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									MADE GROUND/OVERBURDEN	
		SPT	N=0							
		SPT	N=0							
		SPT	N=0					(1.23)		
		SPT	N=0							
		SPT	N=0							
1		SPT	N=0			36.58		1.23		
		SPT	N=1						NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains waterlogged organic material.	
		SPT	N=1		1				1.23 - 1.44 Slight sulphide odour.	
		SPT	N=1					(1.00)	1.44 - 1.60 Slight sulphide odour.	
2		SPT	N=1						1.60 - 2.00 Slight sulphide odour.	
		SPT	N=1						2.00 - 2.23 Very slight sulphide odour.	
						35.58		2.23		
		SPT	N=0						SAND	
								(0.77)		
3		SPT	N=0			34.81		3.00		
									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 1.58m bgl. Well headspace concentration 905ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **N**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	12/09/07	39.17maOD	E365016 N352449

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS

Depth	Type No	Test Type	Test Result	Preservation (1 2 3 4)
		SPT	N=0	
		SPT	N=0	
		SPT	N=0	
1		SPT	N=0	
		SPT	N=1	
		SPT	N=2	
		SPT	N=2	
		SPT	N=1	
		SPT	N=0	
		SPT	N=3	
		SPT	N=2	
		SPT	N=0	
2		SPT	N=0	
		SPT	N=4	
		SPT	N=4	
		SPT	N=0	
		SPT	N=3	
		SPT	N=2	
3		SPT	N=1	
		SPT	N=0	
		SPT	N=0	
4		SPT	N=0	

Water: 1

STRATA

Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
38.97		0.20	MADE GROUND/OVERBURDEN
		(0.87)	ARCHAEOLOGICAL DEPOSIT. Contains ash/cinder, brick, tile fragments, mortar and rotted charcoal.
38.10		1.07	
		(1.65)	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains waterlogged wood and herbaceous detritus. 1.74 Bone fragment (<11mm) 1.88 - 1.91 Slight sulphide odour. 1.91 Blue vivianite? (<12mm) 1.91 - 2.00 Overpowering sulphide odour. 1.93 Hazelnut fragment. 2.00 - 2.46 Overpowering sulphide odour.
36.45		2.72	2.61 - 2.72 Very slight sulphide odour. 2.62 - 2.70 Large round wood (wattle?) inclusions.
		(0.28)	
36.17		3.00	SAND
		(1.00)	CLAY
35.17		4.00	
			Borehole complete at 4.00m

Instrument/Backfill

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 1.37m bgl. Well headspace concentration 80ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH SPT File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 26-05-16

BOREHOLE LOG

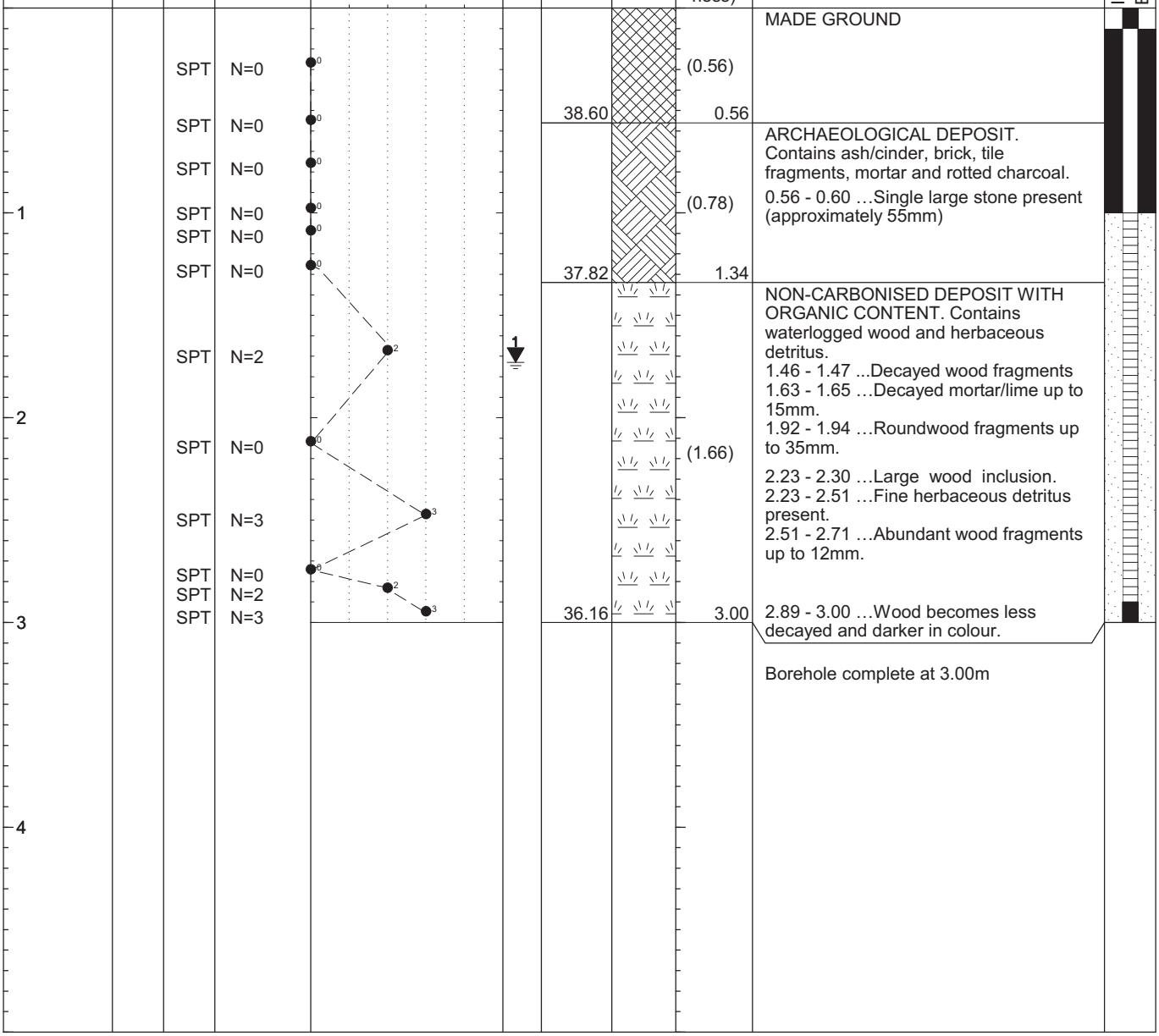
BOREHOLE No **N1**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/01/11	39.16maOD	E365016 N352449

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1



Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Form SLR AGS3 UK BH SPT File 406.0889.00003.005 NANTWICH INTERPRETATION LOGS.GPJ 26-05-16

BOREHOLE LOG

BOREHOLE No
O

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	39.64maOD	E365184 N352470

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									MADE GROUND/OVERBURDEN	
		SPT	N=0					(1.20)	0.50 - 0.54 Brick/tile which becomes the dominant component.	
		SPT	N=0							
		SPT	N=0							
1		SPT	N=0							
		SPT	N=0			38.44		1.20		
		SPT	N=2		1			(0.57)	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Contains brick, tile, coal fragments and waterlogged plant remains. 1.20 - 1.77 Slight sulphide odour.	
						37.87		1.77		
		SPT	N=0			37.64		2.00	ARCHAEOLOGICAL DEPOSIT	
2						37.25		(0.39) 2.39	No Recovery.	
		SPT	N=0			36.75		(0.50) 2.89	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT 2.39 - 2.89 Slight sulphide odour.	
3		SPT	N=0						CLAY	
		SPT	N=0					(1.00)		
4						35.64		4.00		
									Borehole complete at 4.00m	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks
Groundwater present at 1.44m bgl. Well headspace concentration 10ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
P

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/09/07	39.93maOD	E365098 N352374

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS

Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4
		SPT	N=0	
		SPT	N=0	
		SPT	N=0	
		SPT	N=0	
		SPT	N=0	
		SPT	N=2	
1		SPT	N=2	
		SPT	N=3	
		SPT	N=2	
		SPT	N=2	
		SPT	N=2	
		SPT	N=0	
2		SPT	N=2	
		SPT	N=0	
		SPT	N=0	
3		SPT	N=0	
		SPT	N=0	
4				

Water: 1

STRATA

Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
		(1.31)	ARCHAEOLOGICAL DEPOSIT. Contains brick, tile, coal fragments and charcoal.
38.62		1.31	1.30 Animal bone fragment (<20mm).
		(0.69)	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Very humified amorphous organic peat.
37.93		2.00	SAND
		(2.00)	2.67 - 3.00 Slight sulphide odour.
35.93		4.00	Borehole complete at 4.00m

Instrument/Backfill

Boring Progress and Water Observations

Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling

From	To	Hours

Water Added

From	To

General Remarks

Groundwater present at 3.33m bgl. Well headspace concentration 170ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No **P1**

Client: **CHESHIRE COUNTY COUNCIL**

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/01/11	39.93maOD	E365098 N352374

Project: **NANTWICH WATERLOGGED DEPOSITS**

Sheet: 1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		SPT	N=0	0					MADE GROUND	
								(0.74)		
		SPT	N=0	0						
		SPT	N=0	0						
		SPT	N=0	0						
		SPT	N=0	0						
		SPT	N=0			39.19		0.74		
1									NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT. Very humified amorphous organic peat.	
		SPT	N=0	0						
								(1.26)		
		SPT	N=0	0						
		SPT	N=3	3						
2		SPT	N=1	1		37.93		2.00		
									Borehole complete at 2.00m	
3										
4										

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks: Monitoring well is dry at 2.0m depth.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
Q

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/09/07	39.22maOD	E365196 N352383

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						38.74		(0.48) 0.48	MADE GROUND/OVERBURDEN	
1		SPT	N=0			37.72		(1.02) 1.50	ARCHAEOLOGICAL DEPOSIT. Contains brick, tile, cinder/coal and glass fragments.	
		SPT	N=0							
		SPT	N=0		1	37.39		(0.33) 1.83	MINERAL RICH DEPOSIT	
		SPT	N=0							
2		SPT	N=0			36.34		(1.05) 2.88	SAND	
		SPT	N=0							
		SPT	N=0							
3		SPT	N=0			35.42		(0.92) 3.80	CLAY	
		SPT	N=0							
		SPT	N=0							
4									Borehole complete at 3.80m	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 1.71m bgl. Well headspace concentration 170ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
R

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	10/09/07	39.18maOD	E365205 N352362

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						38.68		(0.50) 0.50	MADE GROUND/OVERBURDEN	
1		SPT	N=0			37.82		(0.86) 1.36	ARCHAEOLOGICAL DEPOSIT. Contains brick, tile, cinder/coal and mortar fragments.	
		SPT	N=0			37.31		(0.51) 1.87	MINERAL RICH DEPOSIT	
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
		SPT	N=0							
2		SPT	N=0			36.68		(0.63) 2.50	SAND	
		SPT	N=0			35.18		(1.50) 4.00	CLAY	
3										
		SPT	N=0							
4									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
S

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	11/09/07	39.77maOD	E365119 N352343

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		SPT	N=0						MADE GROUND/OVERBURDEN	
		SPT	N=0					(0.81)		
						38.96		0.81		
1		SPT	N=0						ARCHAEOLOGICAL DEPOSIT. Contains fragments of brick and tile.	
		SPT	N=0							
2								(2.47)		
		SPT	N=0							
		SPT	N=0						2.44 Brick surface (Large fragments <130mm)	
		SPT	N=0							
		SPT	N=0							
3		SPT	N=0		1					
						36.49		3.28		
									SAND	
		SPT	N=0					(0.72)		
4						35.77		4.00		
									Borehole complete at 4.00m	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 3.34m bgl. Well headspace concentration 130ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
T

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	14/09/07	39.50maOD	E365140 N352352

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS						STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									ARCHAEOLOGICAL DEPOSIT	
1		SPT	N=2	2				(1.80)	0.70 Human skull fragment.	
		SPT	N=0	0		37.70		1.80	1.59 Charred bone fragment (<20mm) 1.60 - 1.80 Very slight sulphide odour.	
2									SAND	
3		SPT	N=2	2	1			(1.90)		
						35.80		3.70		
		SPT	N=2	2		35.50		(0.30) 4.00	CLAY	
4									Borehole complete at 4.00m	

Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 3.16m bgl. Well headspace concentration 140ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

BOREHOLE LOG

BOREHOLE No
U

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	14/09/07	39.43maOD	E365160 N352349

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									ARCHAEOLOGICAL DEPOSIT. Contains brick, tile and coal fragments.	
		SPT	N=0	0					0.35 Animal bone fragment (<55mm)	
								(1.50)	0.60 - 0.65 Human skull fragments (<40mm)	
1									1.00 - 1.08 Large human skull fragment (<80mm)	
		SPT	N=0	0						
		SPT	N=0	0		37.93		1.50		
		SPT	N=0	0					MINERAL RICH DEPOSIT	
		SPT	N=1	1		37.66		(0.27)		
2		SPT	N=2	2				1.77	NON-CARBONISED DEPOSIT WITH ORGANIC CONTENT	
									1.77 - 1.96 Slight sulphide odour.	
									2.00 - 2.17 Slight sulphide odour.	
		SPT	N=2	2				(1.23)		
3						36.43		3.00		
									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

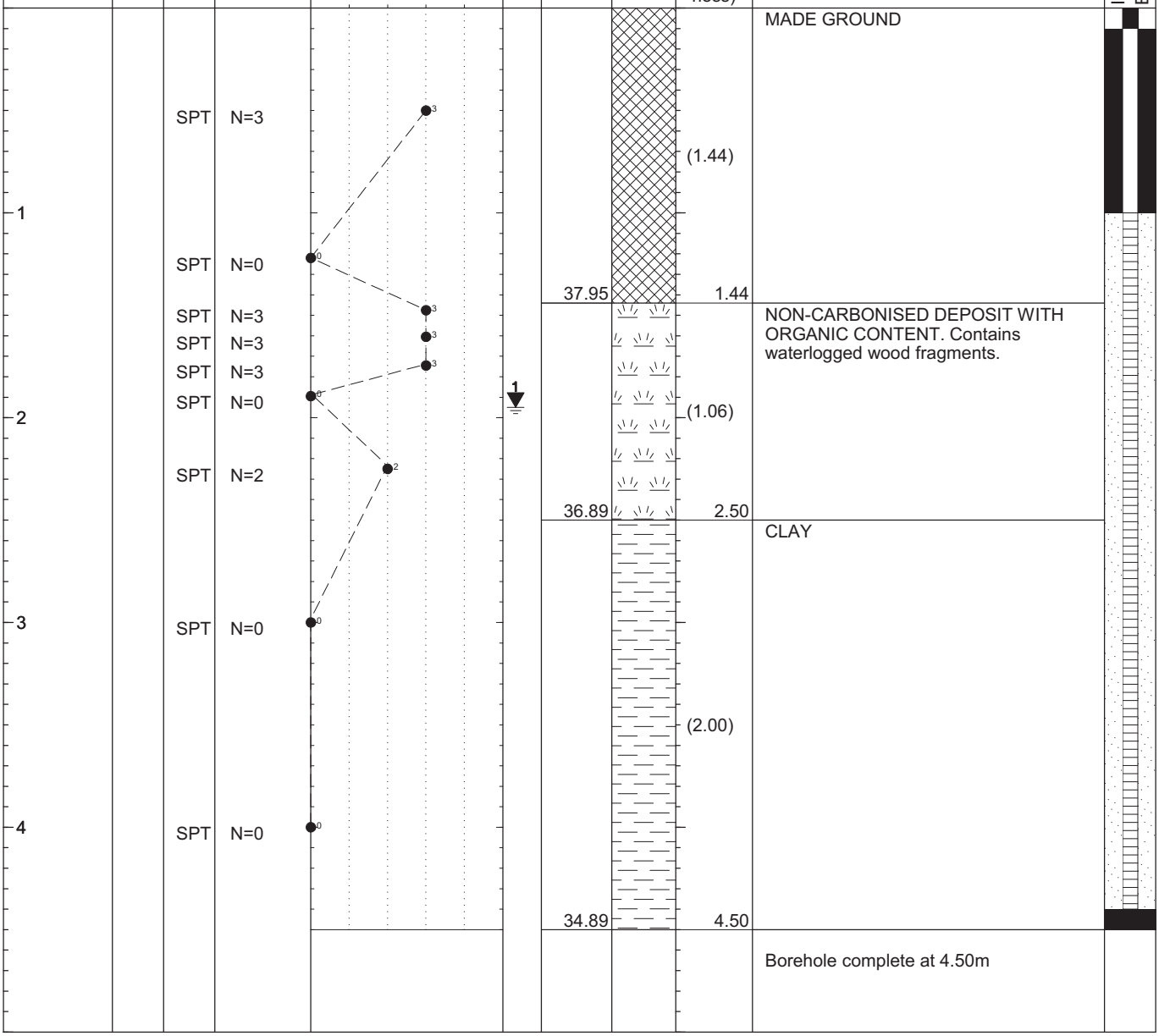
BOREHOLE No
V

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	14/09/07	39.39maOD	E365195 N352346

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1



Boring Progress and Water Observations					
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks

Groundwater present at 1.95m bgl. Well headspace concentration 60ppm.

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
W

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	40.03maOD	E365214 N352280

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						39.03		(1.00) 1.00	MADE GROUND/OVERBURDEN	
1		SPT	N=3	3		38.67		(0.36) 1.36	ARCHAEOLOGICAL DEPOSIT. Contains brick and tile fragments. 1.20 SIngle pot sherd	
		SPT	N=3	3					SAND	
2		SPT	N=0	0				(1.12)		
		SPT	N=0	0		37.55		2.48		
		SPT	N=0	0					CLAY	
		SPT	N=0	0		37.03		(0.52) 3.00		
3									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
X

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	37.62maOD	E365014 N352321

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
						37.02		(0.60) 0.60	MADE GROUND/OVERBURDEN	
1		SPT	N=2	2					ARCHAEOLOGICAL DEPOSIT. Possible castle mound construction material.	
		SPT	N=0	0		36.20		(0.82) 1.42		
		SPT	N=0	0					CLAY	
2								(1.58)		
		SPT	N=0	0						
3		SPT	N=0	0		34.62		3.00		
									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:31.25	Contractor : Sherwood Drilling Plant:Geotool	Method: Windowless Sampler Hole Size:	Logged By: JC & IP	Approved By: TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
Y

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	39.90maOD	E365057 N352322

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
									MADE GROUND/OVERBURDEN	
1		SPT	N=0					(2.06)		
		SPT	N=0							
2		SPT	N=0			37.84		2.06		
		SPT	N=0						SAND	
		SPT	N=0							
		SPT	N=0					(1.68)		
3		SPT	N=0							
						36.16		3.74		
								(0.26)	CLAY	
		SPT	N=0			35.90		4.00		
4									Borehole complete at 4.00m	

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

BOREHOLE LOG

BOREHOLE No
Z

Client:
CHESHIRE COUNTY COUNCIL

Project No:	Date:	Ground Level:	Co-ordinates:
406.0889.00003.005	13/09/07	38.46maOD	E365079 N352243

Project:
NANTWICH WATERLOGGED DEPOSITS

Sheet:
1 of 1

SAMPLES & TESTS					Water	STRATA				
Depth	Type No	Test Type	Test Result	Preservation 1 2 3 4		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument/ Backfill
		SPT	N=0			37.76		(0.70) 0.70	MADE GROUND/OVERBURDEN	
		SPT	N=0						SAND	
1								(1.34)		
		SPT	N=0			36.42		2.04		
2									CLAY	
		SPT	N=0					(0.96)		
3		SPT	N=0			35.46		3.00		
									Borehole complete at 3.00m	
4										

Boring Progress and Water Observations						Chiselling			Water Added		General Remarks
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor : Sherwood Drilling	Method: Windowless Sampler	Logged By:	Approved By:
Scale 1:31.25	Plant:Geotool	Hole Size:	JC & IP	TM

SLR Consulting Ltd., Hermes House, Holsworth Park, Oxon Business Park, Shrewsbury SY3 5HJ, Tel: 01743 239250, Fax: N/A

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
AB	364740	352370	37.93	2.13	35.80	20/11/07	0	105.4	7.08	1253	12.1
AB	364740	352370	37.93	1.77	36.16	01/02/2011	1.85	262.7	7.09	706	7.89
AB	364740	352370	37.93	2.08	35.85	12/05/2011	-	322	7.52	344	9.33
AB	364740	352370	37.93	2.24	35.69	18/08/2011	0.24	118.4	7.12	1086	12.4
AB	364740	352370	37.93	2.27	35.66	15/11/2011	2.22	281	6.73	443	11.15
AB	364740	352370	37.93	1.77	36.16	16/02/2012	3.94	397.4	7.19	412	8.6
AB	364740	352370	37.93	1.97	35.96	25/05/2012	1.88	161.5	7.14	908	7.89
AB	364740	352370	37.93	1.96	35.97	31/08/2012	1.06	305.7	7.07	898	10.68
AB	364740	352370	37.93	1.48	36.45	28/11/2012	1.44	251.3	7.47	1105	8.55
AB	364740	352370	37.93	1.49	36.44	26/02/2013	0.76	188.6	7.25	780	4.92
AB	364740	352370	37.93	1.83	36.1	12/06/2013	1.3	269.2	7.11	639	6.58
AB	364740	352370	37.93	1.91	36.02	20/08/2013	1.42	242.5	7.28	797	12.41
AB	364740	352370	37.93	1.8	36.13	26/11/2013	1.96	325.1	7.8	862	8.88
AB	364740	352370	37.93	1.49	36.44	26/02/2014	2.85	236.7	6.92	1859	4.85
AB	364740	352370	37.93	1.776	36.154	23/05/2014	3.26	138.1	9.85	1519	10.4
AB	364740	352370	37.93	2.026	35.904	21/08/2014	0.21	209	7.04	2336	12.8
AB	364740	352370	37.93	1.86	36.07	26/11/2014	2.44	71.9	7.11	1148	9.19
AB	364740	352370	37.93	1.754	36.18	23/02/2015	0.01	-137	7.5	1273	5.01
AB	364740	352370	37.93	1.859	36.07	29/05/2015	1.81	110.9	8.64	833	10.4
AB	364740	352370	37.93	2.164	35.77	26/08/2015	0.38	210	7.02	1350	12.6
AB	364740	352370	37.93	1.929	36.00	02/12/2015	0.99	355.2	8.09	680	11.9
AC	364963	352517	36.42	2.83	33.59	20/11/07	0	79.3	6.69	3505	14.5
AC	364963	352517	36.42	2.63	33.79	01/02/2011	0.77	156.4	6.37	2455	9.83
AC	364963	352517	36.42	2.98	33.44	12/05/2011	-	340.4	6.84	1489	10.85
AC	364963	352517	36.42	2.85	33.57	18/08/2011	0.32	157.1	6.7	2614	14.9
AC	364963	352517	36.42	2.79	33.63	15/11/2011	0.64	247.2	6.9	1343	13.69
AC	364963	352517	36.42	2.42	34.00	16/02/2012	1.12	408.7	7.2	3253	8
AC	364963	352517	36.42	2.53	33.89	25/05/2012	1.7	371.4	6.81	3013	9.09
AC	364963	352517	36.42	2.56	33.86	31/08/2012	0.79	110.2	7.17	2172	13.49
AC	364963	352517	36.42	2.24	34.18	28/11/2012	1.34	204	7.159	2929	11.31
AC	364963	352517	36.42	2.45	33.97	26/02/2013	0.49	168.8	7.09	1721	6.42
AC	364963	352517	36.42	2.69	33.73	12/06/2013	1.31	148.7	6.43	1356	8.87
AC	364963	352517	36.42	2.73	33.69	20/08/2013	1.02	115.1	7.02	1934	13.17
AC	364963	352517	36.42	2.69	33.73	26/11/2013	1.31	359.7	6.43	1356	8.87
AC	364963	352517	36.42	2.34	34.08	25/02/2014	1.48	117.9	6.73	4338	5.46
AC	364963	352517	36.42	2.54	33.88	23/05/2014	2.7	108.9	-	4425	12.1

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
AC	364963	352517	36.42	2.744	33.676	21/08/2014	0.73	77	7.17	5669	15.7
AC	364963	352517	36.42	2.62	33.80	26/11/2014	2.03	330	7.1	2944	11.91
AC	364963	352517	36.42	2.695	33.73	23/02/2015	0.17	-244.7	7.3	2785.0	-
AC	364963	352517	36.42	2.754	33.67	29/05/2015	0.12	59.5	8.23	2339	11.9
AC	364963	352517	36.42	2.808	33.61	26/08/2015	3.45	128.9	6.62	3061	15
AC	364963	352517	36.42	2.498	33.92	02/12/2015	0.69	362.2	7.65	1842	14.2
AE	364918	352428	35.19	2.58	32.61	01/02/2011	0.86	192.1	6.66	1405	10.87
AE	364918	352428	35.19	2.84	32.35	12/05/2011	-	272.4	7.11	950	11.22
AE	364918	352428	35.19	2.8	32.388	18/08/2011	0.28	140.6	6.91	2018	14.5
AE	364918	352428	35.19	2.77	32.418	15/11/2011	0.51	177.4	7	990	13.78
AE	364918	352428	35.19	2.58	32.61	17/02/2012	0.7	498.3	7.12	883	10.54
AE	364918	352428	35.19	2.65	32.54	25/05/2012	1.67	148.9	6.92	2114	10.3
AE	364918	352428	35.188	2.72	32.468	31/08/2012	0.89	139.7	7.14	1484	12.11
AE	364918	352428	35.188	2.24	32.948	28/11/2012	0.8	216.3	7.271	1693	11.9
AE	364918	352428	35.188	2.58	32.608	26/02/2013	0.47	185.6	7.03	1315	7.68
AE	364918	352428	35.188	2.62	32.568	12/06/2013	1.28	218.9	6.72	889	9.15
AE	364918	352428	35.188	2.72	32.468	20/08/2013	1.31	147.1	7.02	1032	12.26
AE	364918	352428	35.188	2.613	32.578	26/11/2013	2.18	343.2	6.65	1346	9.3
AE	364918	352428	35.188	2.54	32.648	26/02/2014	1.33	293.8	6.53	5369	7.91
AE	364918	352428	35.188	2.557	32.631	23/05/2014	3.23	145.4	9.89	2834	12.5
AE	364918	352428	35.188	2.64	32.548	21/08/2014	0.86	104	7.56	3067	15.1
AE	364918	352428	35.19	2.48	32.71	26/11/2014	1.63	90.8	7.17	2518	11.79
AE	364918	352428	35.19	2.5	32.69	23/02/2015	-	-213.5	7.2	2045	-
AE	364918	352428	35.19	2.547	32.64	29/05/2015	0.29	98.1	8.35	1593	12.4
AE	364918	352428	35.19	2.676	32.51	26/08/2015	0.64	154.7	6.64	1857	14.6
AE	364918	352428	35.19	2.556	32.63	02/12/2015	0.17	332.9	7.89	1139	14.8
AF	364899	352463	34.89	2.84	32.05	01/02/2011	0.82	168	6.55	2337	10.7
AF	364899	352463	34.89	2.99	31.90	12/05/2011	-	373.1	7.82	1319	11.07
AF	364899	352463	34.89	2.83	32.06	18/08/2011	0.36	126.5	6.86	2122	15.2
AF	364899	352463	34.89	2.89	32	15/11/2011	0.76	416.4	7.14	1117	13.55
AF	364899	352463	34.89	2.77	32.12	17/02/2012	0.65	499.6	7.14	1329	9.89
AF	364899	352463	34.89	2.92	31.97	25/05/2012	1.17	-3.1	7.02	2303	10.05
AF	364899	352463	34.89	2.92	31.97	31/08/2012	0.96	153.1	7.22	1709	12.42
AF	364899	352463	34.89	2.67	32.22	28/11/2012	0.7	178.9	7.065	2288	11.81
AF	364899	352463	34.89	2.84	32.05	26/02/2013	0.51	164.4	7.07	1445	7.07
AF	364899	352463	34.89	2.83	32.06	12/06/2013	1.09	123	6.83	1062	8.84
AF	364899	352463	34.89	2.88	32.01	20/08/2013	1.4	109.3	6.87	1496	13.13
AF	364899	352463	34.89	2.823	32.067	26/11/2013	1.57	363.7	7.17	1847	12.11

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
AF	364899	352463	34.89	2.74	32.15	26/02/2014	1.24	109.6	6.7	4142	-101.4
AF	364899	352463	34.89	2.793	32.097	23/05/2014	2.63	104.9	-	3014	12.2
AF	364899	352463	34.89	2.892	31.998	21/08/2014	0.58	66	7.71	4419	15.1
AF	364899	352463	34.89	2.83	32.06	26/11/2014	1.69	67.6	7.07	2586	12.29
AF	364899	352463	34.89	2.815	32.08	23/02/2015	-	-215.2	7.3	2856.0	6.84
AF	364899	352463	34.89	2.762	32.13	29/05/2015	0.26	85.6	8.17	2166	11.9
AF	364899	352463	34.89	2.887	32.00	26/08/2015	0.39	123.8	6.83	2660	14.9
AF	364899	352463	34.89	2.788	32.10	02/12/2015	0.14	303.1	7.71	1520	14.6
AG	365007	352313	37.03	2.61	34.42	01/02/2011	1.05	481.8	6.64	3336	9.4
AG	365007	352313	37.03	2.07	34.96	12/05/2011	-	279.7	7.55	3186	11.28
AG	365007	352313	37.03	1.54	35.4898	18/08/2011	0.46	156	6.61	4424	14.3
AG	365007	352313	37.03	1.57	35.4598	15/11/2011	0.85	223.4	6.68	2355	13.07
AG	365007	352313	37.03	1.53	35.50	17/02/2012	1.05	421.7	7.16	2832	8.03
AG	365007	352313	37.03	1.55	35.48	25/05/2012	1.64	124.1	6.86	7274	9.81
AG	365007	352313	37.0298	1.56	35.4698	31/08/2012	1.15	305.6	7.02	5348	14.18
AG	365007	352313	37.0298	1.47	35.5598	28/11/2012	0.88	270.3	7.038	6817	10.41
AG	365007	352313	37.0298	1.67	35.3598	26/02/2013	0.9	189.3	7.06	4517	7.18
AG	365007	352313	37.0298	1.58	35.4498	12/06/2013	1.21	283.4	6.55	3646	9.74
AG	365007	352313	37.0298	1.68	35.3498	20/08/2013	1.61	256.1	7.15	5186	14
AG	365007	352313	37.0298	1.208	35.8218	26/11/2013	1.43	339.4	7.75	4530	10.8
AG	365007	352313	37.0298	0.91	36.1198	26/02/2014	3.52	246.9	7.65	2262	6.73
AG	365007	352313	37.0298	1.35	35.6798	23/05/2014	1.44	-40	-	8762	12.2
AG	365007	352313	37.0298	1.247	35.7828	21/08/2014	0.27	125	6.59	7562	17.2
AG	365007	352313	37.03	0.91	36.12	26/11/2014	1.41	124.9	7.21	7216	10.87
AG	365007	352313	37.03	1.365	35.66	23/02/2015	-	-85.9	7.2	13098	-
AG	365007	352313	37.03	Destroyed	-	29/05/2015	-	-	-	-	-
AG	365007	352313	37.03	Destroyed	-	26/08/2015	-	-	-	-	-
AG	365007	352313	37.03	Destroyed	-	02/12/2015	-	-	-	-	-
F1	365189	352269	39.69	1.31	38.38	12/05/2011	-	326.1	7.33	700	12.33
F1	365189	352269	39.69	1.29	38.3988	18/08/2011	1.45	117.6	6.97	1076	16.5
F1	365189	352269	39.69	1.14	38.5488	15/11/2011	1.86	148.6	7.21	421	12.57
F1	365189	352269	39.69	0.98	38.71	17/02/2012	2.14	429	7.18	302	5.54
F1	365189	352269	39.69	1.02	38.67	25/05/2012	3.3	197.4	7.4	560	10.05
F1	365189	352269	39.6888	1.1	38.5888	31/08/2012	2.48	223.3	7.09	389	11.24
F1	365189	352269	39.6888	0.92	38.7688	28/11/2012	1.03	312.6	7.437	1252	9.72
F1	365189	352269	39.6888	0.94	38.7488	26/02/2013	1.63	181.3	7.21	476	4.51
F1	365189	352269	39.6888	1.02	38.6688	12/06/2013	1.06	256.2	7.42	241	9.65
F1	365189	352269	39.6888	1.14	38.5488	20/08/2013	0.82	206.9	7.64	293	14.28

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
F1	365189	352269	39.6888	1.6	38.08	26/11/2013	2.61	390.4	8.44	375	8.79
F1	365189	352269	39.6888	1.51	38.1788	26/02/2014	5.78	277.3	6.94	917	5.57
F1	365189	352269	39.6888	1.422	38.2668	23/05/2014	4.66	82.4	-	812	12.9
F1	365189	352269	39.6888	1.55	38.1388	21/08/2014	2.89	144	7.35	1121	15.43
F1	365189	352269	39.69	1.42	38.27	26/11/2014	4.61	85.7	7.07	431	9.46
F1	365189	352269	39.6888	1.307	38.38	23/02/2015	-	-90.9	-	1772	-
F1	365189	352269	39.69	1.6	38.09	29/05/2015	-	-	-	-	-
F1	365189	352269	39.69	1.628	38.06	26/08/2015	0.68	258.1	6.74	2323	14.9
F1	365189	352269	39.69	1.42	38.27	02/12/2015	2.79	363.5	8.36	294.2	12
F2	365189	352269	39.69	1.44	38.25	01/02/2011	0.94	590.4	6.55	1421	7.44
F2	365189	352269	39.69	1.34	38.35	12/05/2011	-	317.9	7.38	847	12.17
F2	365189	352269	39.69	1.32	38.3718	18/08/2011	0.24	138.8	6.8	1918	13.8
F2	365189	352269	39.69	1.16	38.5318	15/11/2011	0.76	169.4	7.32	354	11.72
F2	365189	352269	39.69	1.05	38.64	17/02/2012	1.08	473.6	7.12	415	7.56
F2	365189	352269	39.69	1.01	38.68	25/05/2012	0.99	40.9	7.13	1501	8.99
F2	365189	352269	39.6918	1.13	38.5618	31/08/2012	1.53	208.8	6.99	496	13.82
F2	365189	352269	39.6918	0.76	38.9318	28/11/2012	5.96	252.3	7.613	3.24	7.74
F2	365189	352269	39.6918	1.07	38.6218	26/02/2013	1.03	234.1	7.11	519	4.27
F2	365189	352269	39.6918	1.11	38.5818	12/06/2013	1.11	188.9	6.98	510	8.8
F2	365189	352269	39.6918	1.18	38.5118	20/08/2013	0.71	159.4	7.47	574	13.56
F2	365189	352269	39.6918	1.61	38.08	26/11/2013	1.64	325.7	8.24	1244	10.5
F2	365189	352269	39.6918	1.55	38.1418	26/02/2014	2.48	290.6	6.78	1349	6.52
F2	365189	352269	39.6918	1.535	38.1568	23/05/2014	1.87	-0.1	-	1939	11.6
F2	365189	352269	39.6918	1.615	38.0768	21/08/2014	2.11	187	7.06	1709	16.6
F2	365189	352269	39.69	1.65	38.04	26/11/2014	1.81	66.9	7.08	1857	10.44
F2	365189	352269	39.69	1.592	38.10	23/02/2015	-	-48.4	7.2	1756	-
F2	365189	352269	39.69	1.582	38.11	29/05/2015	1.98	174.7	8.06	1171	12.9
F2	365189	352269	39.69	1.605	38.09	26/08/2015	0.23	162.2	6.77	662	16.3
F2	365189	352269	39.69	1.575	38.12	02/12/2015	0.25	309.4	7.75	1231	13.3
L	365128	352544	38.71	2.28	36.43	20/11/07	0.95	87.3	7.6	1644	12.8
L	365128	352544	38.71	2.26	36.45	01/02/2011	1.21	266.6	6.7	1275	8.34
L	365128	352544	38.710	2.35	36.36	12/05/2011	-	351.6	6.99	260	9.88
L	365128	352544	38.710	2.28	36.43	18/08/2011	0.39	151.8	6.78	1807	13.3
L	365128	352544	38.710	2.21	36.5	15/11/2011	1.44	346.1	6.52	491	11.81
L	365128	352544	38.710	1.18	37.53	16/02/2012	1.12	382.2	7.24	821	7.97
L	365128	352544	38.710	2.13	36.58	25/05/2012	2.1	267.1	7.15	838	8.36
L	365128	352544	38.71	2.24	36.47	31/08/2012	1.35	243.4	7.22	762	11.84
L	365128	352544	38.71	2.09	36.62	28/11/2012	1.24	294.6	7.363	1267	9.15

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
L	365128	352544	38.71	2.16	36.55	26/02/2013	0.46	216.9	7.23	564	4.04
L	365128	352544	38.71	2.21	36.5	12/06/2013	0.48	277.3	6.92	470	7.59
L	365128	352544	38.71	2.23	36.48	20/08/2013	0.6	194.9	7.47	709	11.52
L	365128	352544	38.71	2.17	36.54	26/11/2013	4.19	422.5	7.9	1553	9.96
L	365128	352544	38.71	2.12	36.59	26/02/2014	6.14	368.8	6.85	822	4.56
L	365128	352544	38.71	2.131	36.579	23/05/2014	0.78	-74.1	-	1908	10.6
L	365128	352544	38.71	2.248	36.462	21/08/2014	0.66	78	7.77	4018	13.4
L	365128	352544	38.71	2.23	36.49	26/11/2014	1.77	404.5	6.49	1594	9.84
L	365128	352544	38.71	2.219	36.49	23/02/2015	-	-77.3	7.5	1488	-
L	365128	352544	38.71	2.155	36.56	29/05/2015	0.87	139.2	8.65	707	10.5
L	365128	352544	38.71	2.245	36.47	26/08/2015	0.68	254.4	6.88	1762	13.6
L	365128	352544	38.71	2.103	36.61	02/12/2015	0.54	394.5	7.9	787	12.3
M	365015	352549	37.81	1.58	36.23	20/11/07	0	236.4	6.56	1577	12.9
M	365015	352549	37.81	1.55	36.26	01/02/2011	1.17	257	6.71	1259	7.66
M	365015	352549	37.810	1.68	36.13	12/05/2011	-	341.2	7.2	865	10.74
M	365015	352549	37.810	1.63	36.18	18/08/2011	0.93	198.1	6.62	1464	13.2
M	365015	352549	37.810	1.53	36.28	15/11/2011	1.49	419.2	6.52	664	11.82
M	365015	352549	37.810	1.47	36.34	17/02/2012	1.25	430.9	7.18	693	9.14
M	365015	352549	37.810	1.45	36.36	25/05/2012	3.71	423.3	6.99	1230	8.91
M	365015	352549	37.81	1.54	36.27	31/08/2012	1.15	161.9	7.11	804	12.17
M	365015	352549	37.81	1.39	36.42	28/11/2012	0.99	247.3	7.297	1213	9.44
M	365015	352549	37.81	1.51	36.3	26/02/2013	1.24	191.5	7.24	650	3.55
M	365015	352549	37.81	1.57	36.24	12/06/2013	1.24	285.2	6.39	590	7.33
M	365015	352549	37.81	1.56	36.25	20/08/2013	0.98	199	7.22	785	11.82
M	365015	352549	37.81	1.32	36.49	26/11/2013	3.91	402.1	7.81	1088	9.89
M	365015	352549	37.81	1.47	36.34	26/02/2014	2.24	413.7	6.42	1771	3.78
M	365015	352549	37.81	1.477	36.333	23/05/2014	2.04	-42.8	-	2058	10.8
M	365015	352549	37.81	1.546	36.264	21/08/2014	0.63	194	6.98	2637	14.4
M	365015	352549	37.81	1.46	36.36	26/11/2014	2.38	342.8	6.49	1551	10.14
M	365015	352549	37.81	1.495	36.32	23/02/2015	3.00	-161.6	7.2	1313	3.51
M	365015	352549	37.81	1.482	36.33	29/05/2015	1.56	131.6	8.4	1077	11.1
M	365015	352549	37.81	1.485	36.33	26/08/2015	2.12	227.5	6.69	1479	14
M	365015	352549	37.81	1.415	36.40	02/12/2015	0.81	407.8	7.97	1001	12.5
N	365016	352449	39.17	1.37	37.80	20/11/07	1.08	52.7	6.94	731	13.4
N	365016	352449	39.16	1.71	37.45	01/02/2011	0.97	192.8	7.2	1204	9.59
N	365016	352449	39.165	1.8	37.37	12/05/2011	-	359.8	6.92	533	11.13
N	365016	352449	39.16	1.67	37.485	18/08/2011	0.3	164	6.98	7939	14.1
N	365016	352449	39.16	1.57	37.585	15/11/2011	0.75	370.4	6.52	286	12.8

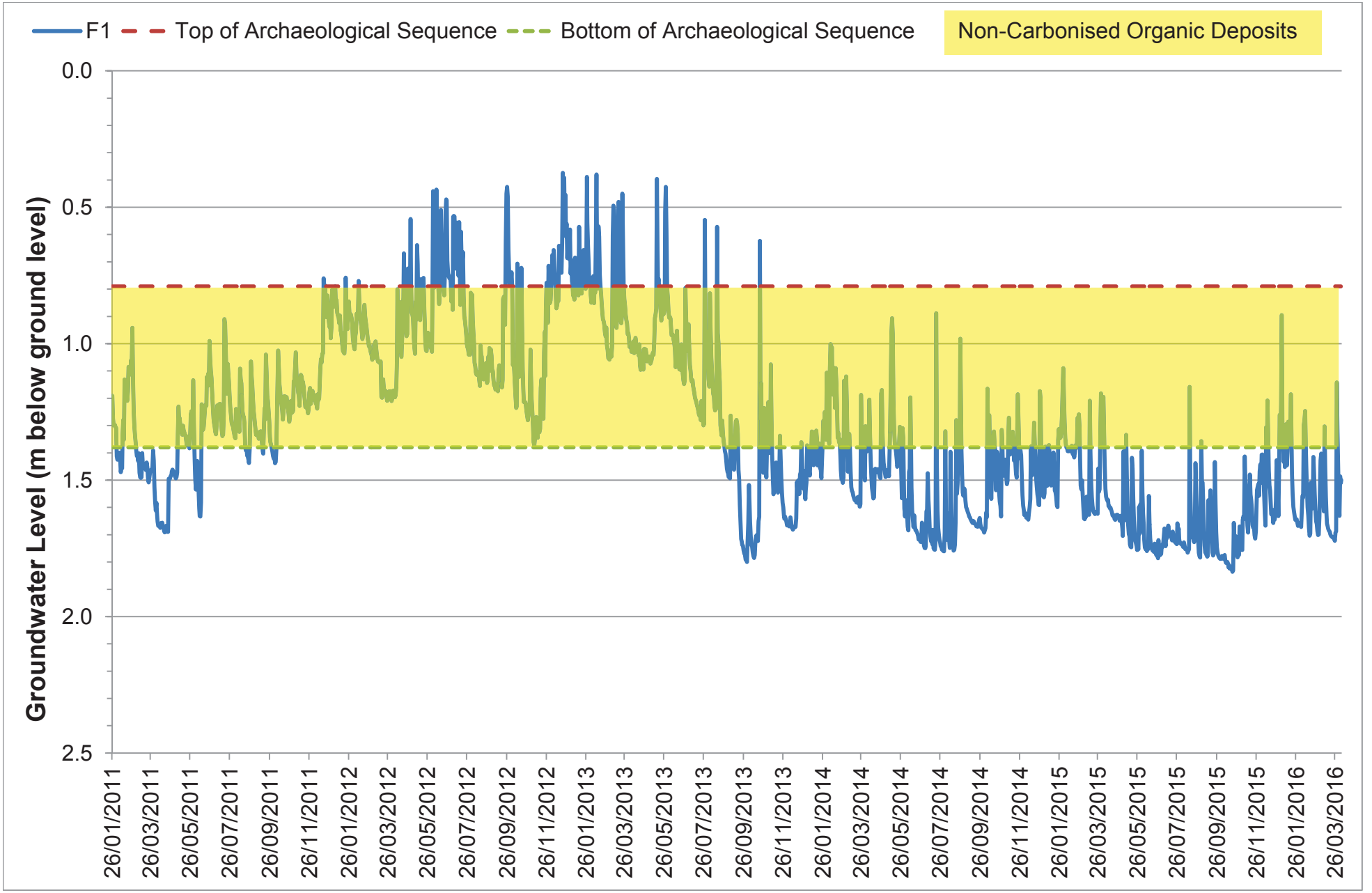
Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
N	365016	352449	39.16	1.55	37.61	17/02/2012	1.12	434.9	7.15	484	8.82
N	365016	352449	39.16	1.61	37.55	25/05/2012	1.54	329.6	7.03	797	9.8
N	365016	352449	39.155	1.27	37.885	31/08/2012	1.3	138.7	6.83	372	12.21
N	365016	352449	39.155	1.38	37.775	28/11/2012	4.28	299.9	8.05	427	9.8
N	365016	352449	39.165	1.47	37.695	26/02/2013	0.72	182.2	7.39	370	5.18
N	365016	352449	39.165	1.49	37.675	12/06/2013	0.45	111.3	7.11	343	9.14
N	365016	352449	39.165	1.57	37.595	20/08/2013	0.65	206.1	7.39	356	13.36
N	365016	352449	39.165	1.561	37.604	26/11/2013	2.32	394.9	7.23	518	10.23
N	365016	352449	39.165	1.57	37.595	25/02/2014	2.15	382	6.86	1085	8.14
N	365016	352449	39.165	1.534	37.631	23/05/2014	1.24	-69.4	-	1021	12.4
N	365016	352449	39.165	1.553	37.612	21/08/2014	1.65	289	6.86	754	15.2
N	365016	352449	39.17	1.33	37.83	26/11/2014	2.05	94.1	7.13	765	10.77
N	365016	352449	39.16	-	-	23/02/2015	0.83	-102.8	7.5	809	7.99
N	365016	352449	39.17	1.48	37.69	29/05/2015	1.53	229.4	8.73	662	11.6
N	365016	352449	39.17	1.491	37.67	26/08/2015	0.14	206	6.97	793	14.5
N	365016	352449	39.17	1.423	37.74	02/12/2015	3.21	373.5	8.48	280.3	13.2
N1	365016	352449	39.16	1.73	37.43	01/02/2011	1.22	215.4	7.05	1023	9.65
N1	365016	352449	39.16	1.81	37.35	12/05/2011	-	355.7	7.14	645	11.53
N1	365016	352449	39.165	1.71	37.455	18/08/2011	0.28	119.8	6.92	1183	14.9
N1	365016	352449	39.165	1.53	37.635	15/11/2011	2.34	396.1	6.51	355	11.54
N1	365016	352449	39.165	1.54	37.63	16/02/2012	1.36	431.9	7.16	490	9.21
N1	365016	352449	39.165	1.68	37.49	25/05/2012	1.56	461.1	7.21	1005	9.76
N1	365016	352449	39.165	1.28	37.885	31/08/2012	0.42	61.5	7.4	846	11.82
N1	365016	352449	39.165	1.4	37.765	28/11/2012	2.25	292.6	6.51	744	9.46
N1	365016	352449	39.155	1.48	37.675	26/02/2013	0.47	179	7.32	310	4.69
N1	365016	352449	39.155	1.48	37.675	12/06/2013	0.41	195.8	6.92	307	8.9
N1	365016	352449	39.155	1.66	37.495	20/08/2013	0.6	79.9	7.43	412	13.19
N1	365016	352449	39.155	1.63	37.595	26/11/2013	1.46	240	8.33	539	9.7
N1	365016	352449	39.155	1.64	37.515	25/02/2014	1.83	224.4	7	996	6.81
N1	365016	352449	39.155	1.471	37.684	23/05/2014	2.42	-48.6	-	1016	12.3
N1	365016	352449	39.155	1.625	37.53	21/08/2014	0.9	58	7	1732	15.5
N1	365016	352449	39.16	1.37	37.78	26/11/2014	1.64	87.1	7.32	665	9.94
N1	365016	352449	39.16	1.545	37.61	23/02/2015	0.07	-157.6	-	798	-
N1	365016	352449	39.16	1.615	37.64	29/05/2015	0.15	60.4	8.72	671	12
N1	365016	352449	39.16	1.547	37.61	26/08/2015	0.41	111.5	6.96	852	15
N1	365016	352449	39.16	1.485	37.67	02/12/2015	0.22	303.1	8.39	405.9	12.5
O	365184	352470	39.64	1.44	38.20	20/11/07	0.07	77	7.01	1981	13.5
O	365184	352470	39.64	1.49	38.15	01/02/2011	2.37	268.2	6.84	1026	9.39

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
O	365184	352470	39.642	1.57	38.07	12/05/2011	-	341.1	7.3	352	11.6
O	365184	352470	39.642	1.51	38.132	18/08/2011	0.35	140.6	6.89	1557	14
O	365184	352470	39.642	1.48	38.162	15/11/2011	1.19	261.2	6.6	348	12.51
O	365184	352470	39.642	1.49	38.15	16/02/2012	1.13	422.9	7.26	486	8.47
O	365184	352470	39.642	1.5	38.14	25/05/2012	1.62	427.1	7.12	572	9.9
O	365184	352470	39.642	1.55	38.092	31/08/2012	1.21	201.6	7.01	401	13.36
O	365184	352470	39.642	1.38	38.262	28/11/2012	1.65	249.6	7.305	1105	10.03
O	365184	352470	39.642	1.49	38.152	26/02/2013	0.73	185.1	7.06	738	7.16
O	365184	352470	39.642	1.5	38.142	12/06/2013	0.43	180.1	6.81	638	8.95
O	365184	352470	39.642	1.48	38.162	20/08/2013	1.14	139.9	7.5	363	13.06
O	365184	352470	39.642	1.4	38.242	26/11/2013	3.3	362.5	8.19	883	10.48
O	365184	352470	39.642	1.38	38.262	26/02/2014	1.56	318	6.85	734	6.24
O	365184	352470	39.642	1.447	38.195	23/05/2014	0.78	-155.1	-	1677	12.4
O	365184	352470	39.642	1.421	38.221	21/08/2014	0.54	81	7.22	1554	15.6
O	365184	352470	39.64	1.39	38.25	26/11/2014	1.57	357.4	7.05	1036	10.69
O	365184	352470	39.64	1.465	38.18	23/02/2015	-	-161	7.4	700	-
O	365184	352470	39.64	1.48	38.16	29/05/2015	0.9	139.5	8.81	429	12.2
O	365184	352470	39.64	1.39	38.25	26/08/2015	1.97	146.1	6.84	1245	14.7
O	365184	352470	39.64	1.334	38.31	02/12/2015	0.19	338	8.02	682	13.3
P	365098	352374	39.93	3.33	36.60	20/11/07	0.00	135	6.47	1284	14.17
P	365098	352374	39.93	3.29	36.64	01/02/2011	0.82	463.1	5.83	885	10.35
P	365098	352374	39.925	3.42	36.51	12/05/2011	-	346	7.01	698	12.12
P	365098	352374	39.925	3.38	36.545	18/08/2011	0.5	164.8	6.28	1055	14.4
P	365098	352374	39.925	3.27	36.655	15/11/2011	0.94	278.2	6.66	565	13.06
P	365098	352374	39.925	2.36	37.57	16/02/2012	0.84	387.4	7.27	574	10.7
P	365098	352374	39.925	3.24	36.69	25/05/2012	1.08	245.5	6.36	1401	11.02
P	365098	352374	39.925	3.26	36.665	31/08/2012	1.34	311.3	6.8	1030	11.99
P	365098	352374	39.925	3.16	36.765	28/11/2012	2.08	273.1	6.718	1153	11.08
P	365098	352374	39.925	3.18	36.745	26/02/2013	0.69	198.3	6.92	895	8.23
P	365098	352374	39.925	3.27	36.655	12/06/2013	1.22	266.7	5.42	724	9.52
P	365098	352374	39.925	3.31	36.615	20/08/2013	1.22	149.1	6.55	770	11.2
P	365098	352374	39.925	3.2	36.725	26/11/2013	1.83	296.5	6.56	711	11.44
P	365098	352374	39.925	3.16	36.765	26/02/2014	1.94	246.1	6.25	1623	7.37
P	365098	352374	39.925	3.204	36.721	23/05/2014	2.12	39.9	-	1260	12.6
P	365098	352374	39.925	3.287	36.638	21/08/2014	0.92	198.3	6.98	2184	14.5
P	365098	352374	39.93	3.23	36.70	26/11/2014	1.46	359.5	6.71	916	11.44
P	365098	352374	39.93	3.275	36.65	23/02/2015	0.94	-75.5	6.7	848	6.70
P	365098	352374	39.93	3.264	36.76	29/05/2015	0.35	149.6	8.04	1559	12.1

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
P	365098	352374	39.93	3.293	36.63	26/08/2015	1.66	152.9	6.14	1321	14.3
P	365098	352374	39.93	3.19	36.74	02/12/2015	0.19	279.9	8.23	448.8	14.2
Q	365196	352383	39.22	1.71	37.51	20/11/07	0.51	144.9	6.87	1030	13.21
Q	365196	352383	39.22	1.86	37.36	01/02/2011	1.14	226.7	6.5	2430	8.53
Q	365196	352383	39.215	1.88	37.34	12/05/2011	-	323.5	7.16	684	11.34
Q	365196	352383	39.215	1.85	37.365	18/08/2011	0.17	127.6	6.82	3246	15.5
Q	365196	352383	39.215	1.82	37.395	15/11/2011	0.77	270.7	6.63	653	13.48
Q	365196	352383	39.215	1.82	37.40	16/02/2012	2.1	414.7	7.21	1254	7.79
Q	365196	352383	39.215	1.82	37.40	25/05/2012	1.62	447.9	6.78	1533	9.71
Q	365196	352383	39.215	1.82	37.395	31/08/2012	1.48	155.1	6.94	548	13.91
Q	365196	352383	39.215	1.27	37.945	28/11/2012	1.84	228.9	7.214	2253	10.09
Q	365196	352383	39.215	1.82	37.395	26/02/2013	0.76	173.3	7.38	2662	5.14
Q	365196	352383	39.215	1.98	37.235	12/06/2013	0.32	174.1	6.68	1799	8.73
Q	365196	352383	39.215	1.97	37.245	20/08/2013	0.93	149.4	7.11	3143	13.27
Q	365196	352383	39.215	1.93	37.29	26/11/2013	2.54	370.5	7.79	1772	11.01
Q	365196	352383	39.215	1.95	37.265	25/02/2014	2.13	251.7	6.79	1978	6.34
Q	365196	352383	39.215	1.843	37.372	23/05/2014	0.58	-174.9	-	1453	12.2
Q	365196	352383	39.215	1.851	37.364	21/08/2014	0.42	193	7.21	2082	16.6
Q	365196	352383	39.22	1.63	37.59	26/11/2014	2.03	345	6.42	1498	11.08
Q	365196	352383	39.22	1.770	37.45	23/02/2015	-	-140.9	7.2	1294	-
Q	365196	352383	39.22	1.784	37.43	29/05/2015	0.35	135.6	8.39	1563	13.1
Q	365196	352383	39.22	1.375	37.84	26/08/2015	1.74	237.4	6.5	1297	16.3
Q	365196	352383	39.22	1.675	37.54	02/12/2015	0.36	390	8	717	13.6
S	365119	352343	39.77	3.34	36.43	20/11/07	0.00	207.9	6.76	828	13.02
S	365119	352343	39.77	3.35	36.42	01/02/2011	0.91	446.8	6.48	944	8.67
S	365119	352343	39.770	3.44	36.33	12/05/2011	-	355.5	6.77	781	10.27
S	365119	352343	39.770	3.42	36.35	18/08/2011	0.52	125.9	7.06	1372	14.2
S	365119	352343	39.770	3.36	36.41	15/11/2011	0.95	293	6.64	501	12.55
S	365119	352343	39.770	3.32	36.45	16/02/2012	1.27	404.5	7.27	886	8.52
S	365119	352343	39.770	3.26	36.51	25/05/2012	0.92	211.3	6.66	2386	7.26
S	365119	352343	39.77	3.32	36.45	31/08/2012	3.22	315.6	6.92	964	11.99
S	365119	352343	39.77	3.2	36.57	28/11/2012	0.96	255.2	6.931	1635	10.04
S	365119	352343	39.77	3.21	36.56	26/02/2013	0.88	191.2	6.99	920	7.29
S	365119	352343	39.77	3.29	36.48	12/06/2013	0.43	279.3	6.21	834	8.19
S	365119	352343	39.77	3.29	36.48	20/08/2013	1.11	233.8	6.84	1199	11.18
S	365119	352343	39.77	3.31	36.46	26/11/2013	2.16	453.7	7.34	1034	10.25
S	365119	352343	39.77	3.15	36.62	25/02/2014	2.14	287	6.62	2437	8.04
S	365119	352343	39.77	3.223	36.547	23/05/2014	2.62	8.9	12.88	2680	11.7

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
S	365119	352343	39.77	3.289	36.481	21/08/2014	0.4	157	6.91	2935	14.5
S	365119	352343	39.77	3.23	36.54	26/11/2014	1.72	351.7	6.74	1173	10.49
S	365119	352343	39.77	3.287	36.48	23/02/2015	-	-	7.3	-	-
S	365119	352343	39.77	Not accessible	-	29/05/2015	-	-	-	-	-
S	365119	352343	39.77	3.231	36.54	26/08/2015	1.1	239.5	6.58	856	14
S	365119	352343	39.77	3.225	36.55	02/12/2015	0.42	393.4	8.13	471.1	13
T	365140	352352	39.50	3.16	36.34	20/11/07	0.04	71.2	6.81	784	12.56
T	365140	352352	39.50	3.14	36.36	01/02/2011	0.9	465.2	6.38	548	8.38
T	365140	352352	39.495	3.22	36.28	12/05/2011	-	341.9	7.23	466	9.23
T	365140	352352	39.495	3.22	36.275	18/08/2011	0.74	150.2	6.85	853	12.3
T	365140	352352	39.495	3.13	36.365	15/11/2011	2.81	277.1	6.63	304	10.97
T	365140	352352	39.495	3.12	36.38	16/02/2012	1.38	430.4	7.25	321	7.89
T	365140	352352	39.495	3.06	36.44	25/05/2012	2	184.2	6.83	520	8.41
T	365140	352352	39.495	3.13	36.365	31/08/2012	1.65	281.6	6.87	357	10.67
T	365140	352352	39.495	3.04	36.455	28/11/2012	1.51	259.5	8.31	632	9.13
T	365140	352352	39.495	3.03	36.465	26/02/2013	1.4	200	7.07	325	6.25
T	365140	352352	39.495	3.09	36.405	12/06/2013	0.66	258.6	6.38	285	7.09
T	365140	352352	39.495	3.12	36.375	20/08/2013	1.57	195.9	7.16	369	9.25
T	365140	352352	39.495	3.03	36.465	26/11/2013	5.43	408.5	7.76	378	9.12
T	365140	352352	39.495	2.96	36.535	25/02/2014	4.95	280.8	6.77	689	5.34
T	365140	352352	39.495	3.051	36.444	23/05/2014	3.47	14	-	693	10.3
T	365140	352352	39.495	3.135	36.36	21/08/2014	0.43	117	7.27	1282	12.7
T	365140	352352	39.50	3.02	36.47	26/11/2014	5.55	301	6.88	394	9.32
T	365140	352352	39.50	3.075	36.42	23/02/2015	-	-	7.3	-	-
T	365140	352352	39.50	3.037	36.46	29/05/2015	0.97	152.3	8.21	914	10.5
T	365140	352352	39.50	3.136	36.36	26/08/2015	1.51	188.3	6.71	545	12.2
T	365140	352352	39.50	3.042	36.45	02/12/2015	3.47	416.3	8.43	233.3	11.9
V	365195	352346	39.39	1.95	37.44	20/11/07	0.00	102.3	6.52	471	12.68
V	365195	352346	39.39	1.75	37.64	01/02/2011	1.23	223.1	5.68	740	6.99
V	365195	352346	39.390	2.09	37.30	12/05/2011	-	309.3	6.54	274	9.75
V	365195	352346	39.390	2.25	37.14	18/08/2011	0.24	147.2	6.71	979	12.3
V	365195	352346	39.390	2.04	37.35	15/11/2011	1.16	263.9	6.62	335	11.59
V	365195	352346	39.390	1.66	37.73	16/02/2012	1.42	445.7	7.2	726	7.37
V	365195	352346	39.390	1.9	37.49	25/05/2012	1.12	98.8	6.47	1001	8.1
V	365195	352346	39.39	1.98	37.41	31/08/2012	1.38	175.5	6.79	587	11.27
V	365195	352346	39.39	1.43	37.96	28/11/2012	3.07	254.4	6.481	1473	8.68
V	365195	352346	39.39	1.55	37.84	26/02/2013	0.68	185.7	6.34	161	3.46
V	365195	352346	39.39	1.97	37.42	12/06/2013	0.54	193.9	5.83	253	6.74

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Groundwater Elevation (mOD)	Date	Dissolved Oxygen (mg/l)	REDOX (mV SHE)	pH	Conductivity (µS/CM)	Temperature (°C)
V	365195	352346	39.39	2.16	37.23	20/08/2013	1.3	125.7	6.81	392	10.34
V	365195	352346	39.39	1.85	38.14	26/11/2013	2.34	315.1	7.39	615	9.52
V	365195	352346	39.39	1.47	37.92	25/02/2014	2.78	291.1	6.06	421	6.55
V	365195	352346	39.39	1.931	37.459	23/05/2014	1.9	-29.1	-	1005	10.3
V	365195	352346	39.39	2.096	37.294	21/08/2014	0.3	88	7.52	1475	13.3
V	365195	352346	39.39	1.91	37.48	26/11/2014	1.72	258.3	6.33	779	9.8
V	365195	352346	39.39	1.816	37.57	23/02/2015	-	-165.3	6.5	799	3.70
V	365195	352346	39.39	2.015	37.38	29/05/2015	0.18	115.4	8.17	1070	10.7
V	365195	352346	39.39	2.081	37.31	26/08/2015	2.03	126	6.54	937	12.8
V	365195	352346	39.39	1.846	37.54	02/12/2015	0.24	317.7	8.26	514	12.4


F1
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater Level (m below ground level)
0.0
0.5
1.0
1.5
2.0
2.5
26/01/2011
26/03/2011
26/05/2011
26/07/2011
26/09/2011
26/11/2011
26/01/2012
26/03/2012
26/05/2012
26/07/2012
26/09/2012
26/11/2012
26/01/2013
26/03/2013
26/05/2013
26/07/2013
26/09/2013
26/11/2013
26/01/2014
26/03/2014
26/05/2014
26/07/2014
26/09/2014
26/11/2014
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26/03/2015
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26/07/2015
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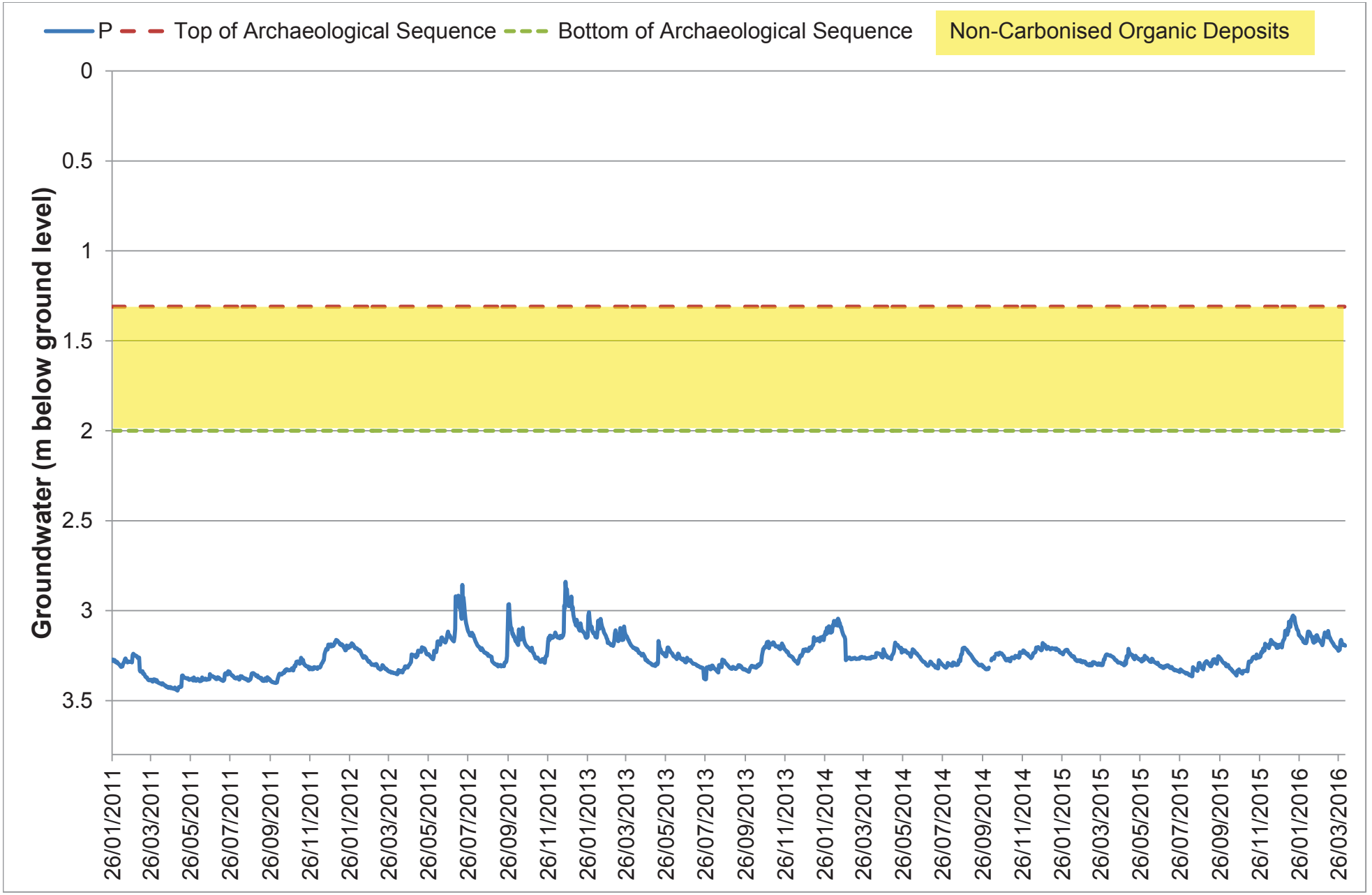
26/11/2015
26/01/2016
26/03/2016


P
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater (m below ground level)
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0.5
1
1.5
2
2.5
3
3.5
26/01/2011
26/03/2011
26/05/2011
26/07/2011
26/09/2011
26/11/2011
26/01/2012
26/03/2012
26/05/2012
26/07/2012
26/09/2012
26/11/2012
26/01/2013
26/03/2013
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26/07/2014
26/09/2014
26/11/2014
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26/09/2015
26/11/2015
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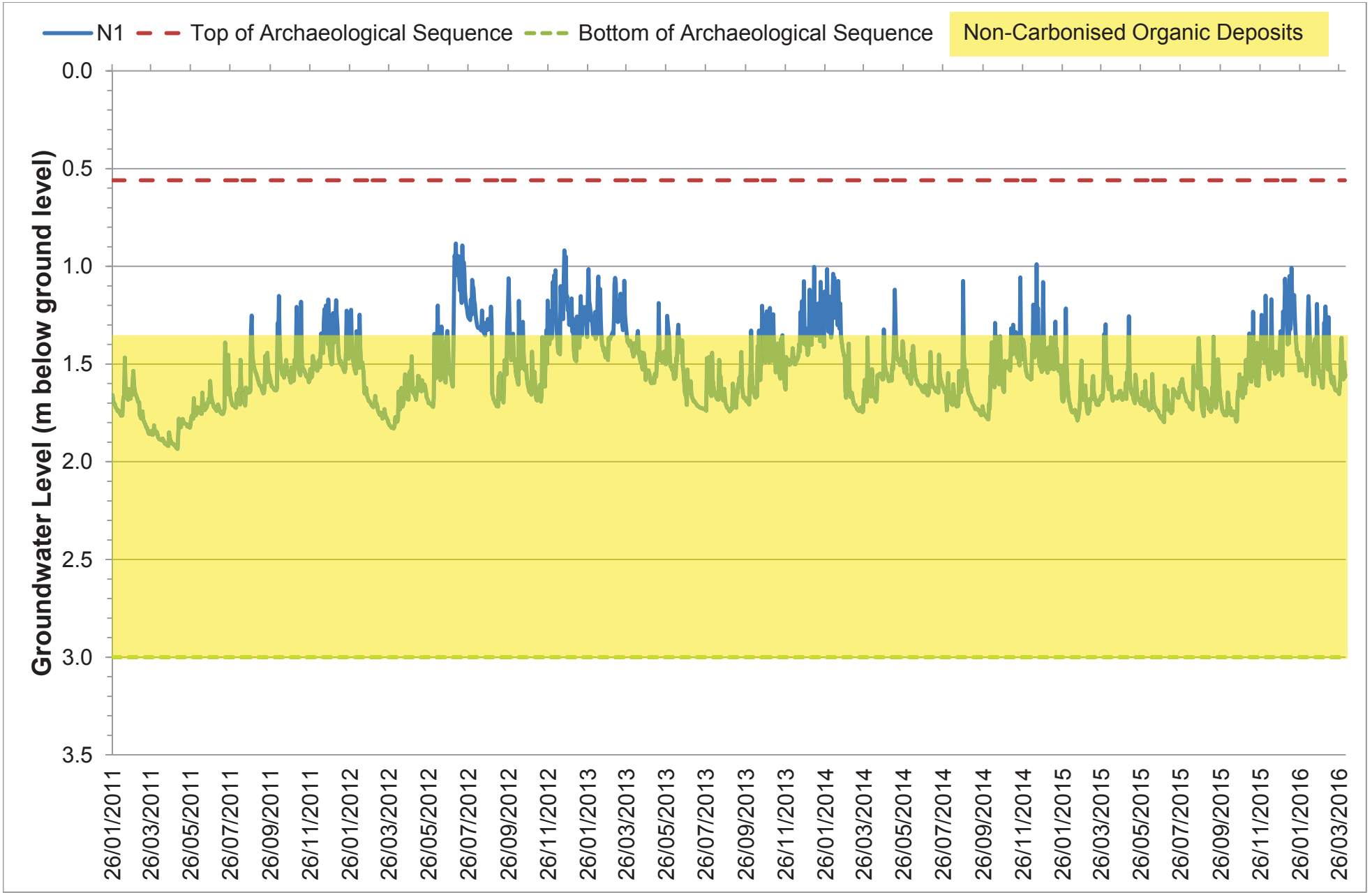
26/03/2016


N1
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater Level (m below ground level)
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1.0
1.5
2.0
2.5
3.0
3.5
26/01/2011
26/03/2011
26/05/2011
26/07/2011
26/09/2011
26/11/2011
26/01/2012
26/03/2012
26/05/2012
26/07/2012
26/09/2012
26/11/2012
26/01/2013
26/03/2013
26/05/2013
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26/09/2013
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26/07/2014
26/09/2014
26/11/2014
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26/03/2015
26/05/2015
26/07/2015
26/09/2015
26/11/2015
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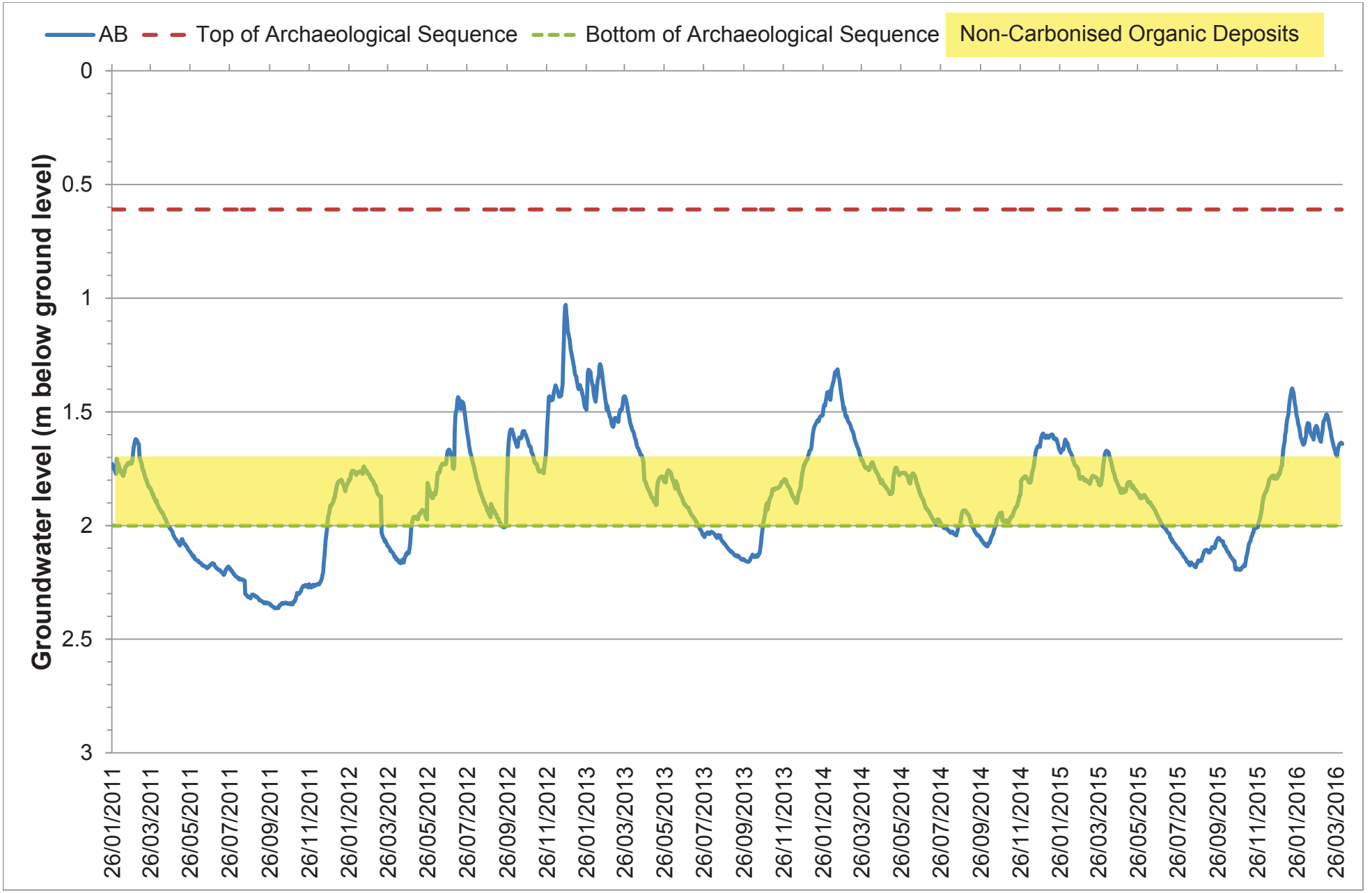
26/03/2016


AB
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater level (m below ground level)
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1
1.5
2
2.5
3
26/01/2011
26/03/2011
26/05/2011
26/07/2011
26/09/2011
26/11/2011
26/01/2012
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26/05/2012
26/07/2012
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26/07/2014
26/09/2014
26/11/2014
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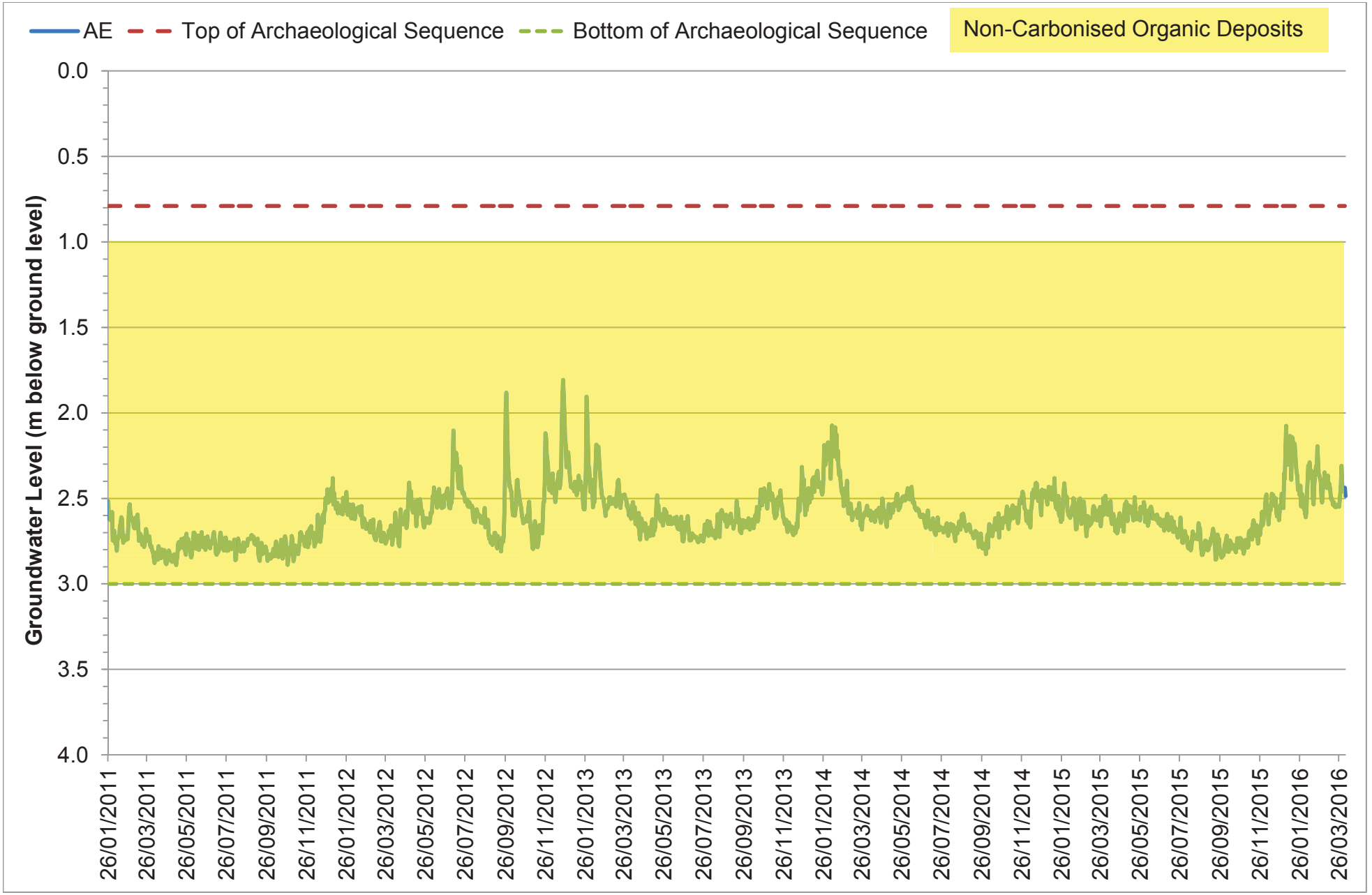
26/03/2015
26/05/2015
26/07/2015
26/09/2015
26/11/2015
26/01/2016
26/03/2016


AE
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater Level (m below ground level)
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1.5
2.0
2.5
3.0
3.5
4.0
26/01/2011
26/03/2011
26/05/2011
26/07/2011
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26/01/2012
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26/05/2012
26/07/2012
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26/11/2012
26/01/2013
26/03/2013
26/05/2013
26/07/2013
26/09/2013
26/11/2013
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26/03/2014
26/05/2014
26/07/2014
26/09/2014
26/11/2014
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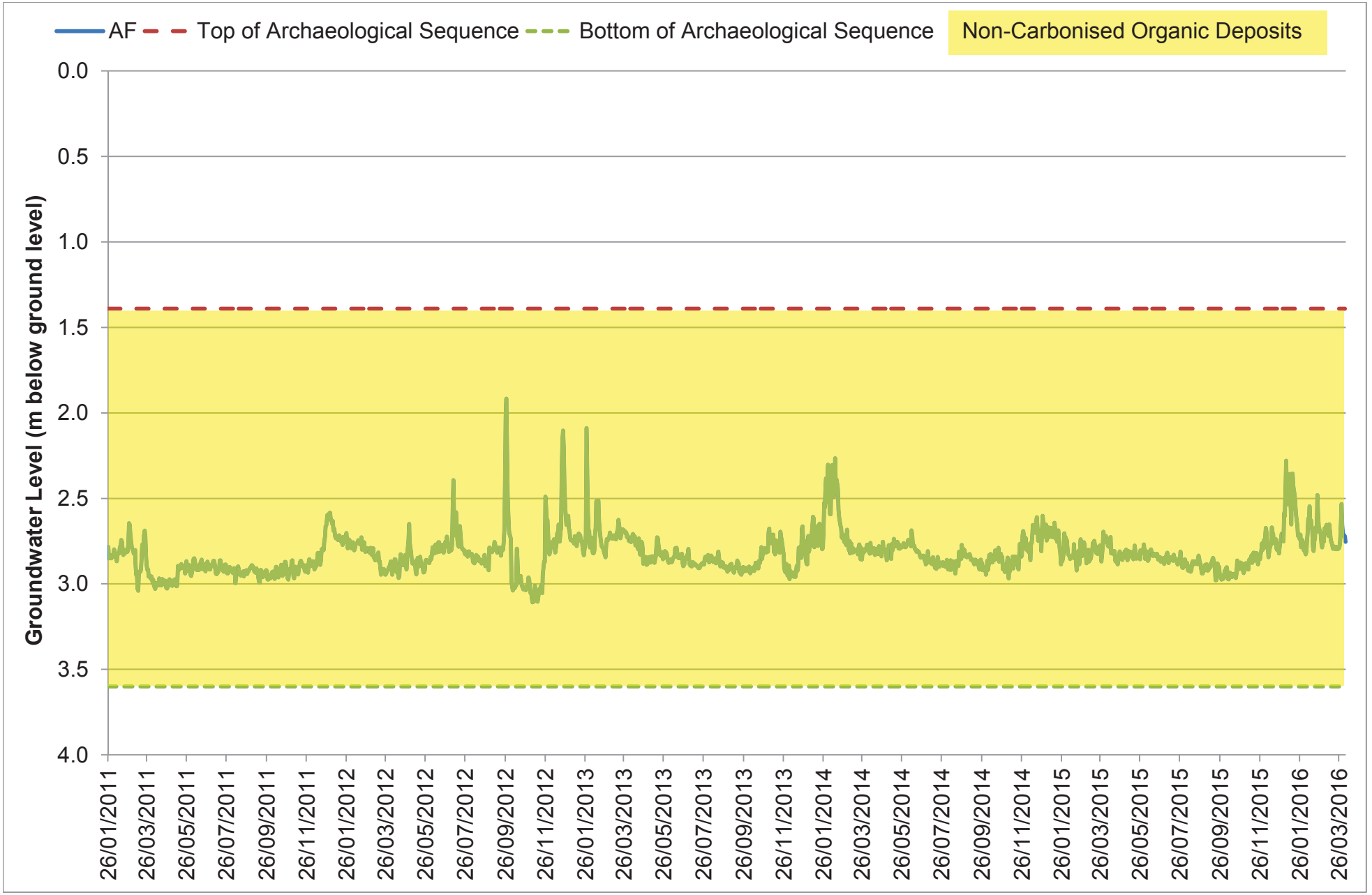
26/03/2015
26/05/2015
26/07/2015
26/09/2015
26/11/2015
26/01/2016
26/03/2016


AF
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater Level (m below ground level)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
26/01/2011
26/03/2011
26/05/2011
26/07/2011
26/09/2011
26/11/2011
26/01/2012
26/03/2012
26/05/2012
26/07/2012
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26/07/2014
26/09/2014
26/11/2014
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26/03/2015
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26/09/2015
26/11/2015
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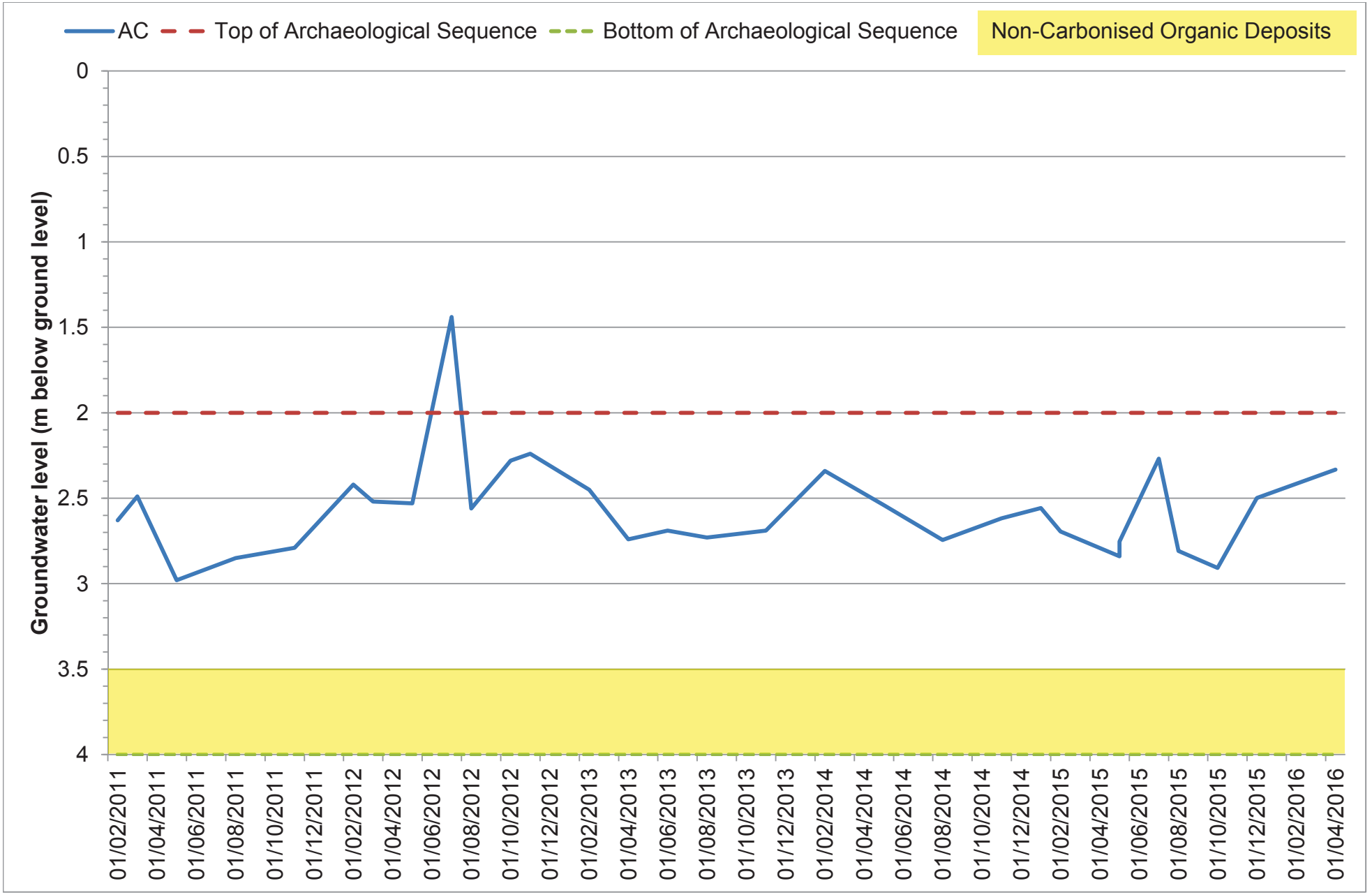
26/03/2016


AC
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater level (m below ground level)
0
0.5
1
1.5
2
2.5
3
3.5
4
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
01/02/2012
01/04/2012
01/06/2012
01/08/2012
01/10/2012
01/12/2012
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01/04/2013
01/06/2013
01/08/2013
01/10/2013
01/12/2013
01/02/2014
01/04/2014
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01/08/2014
01/10/2014
01/12/2014
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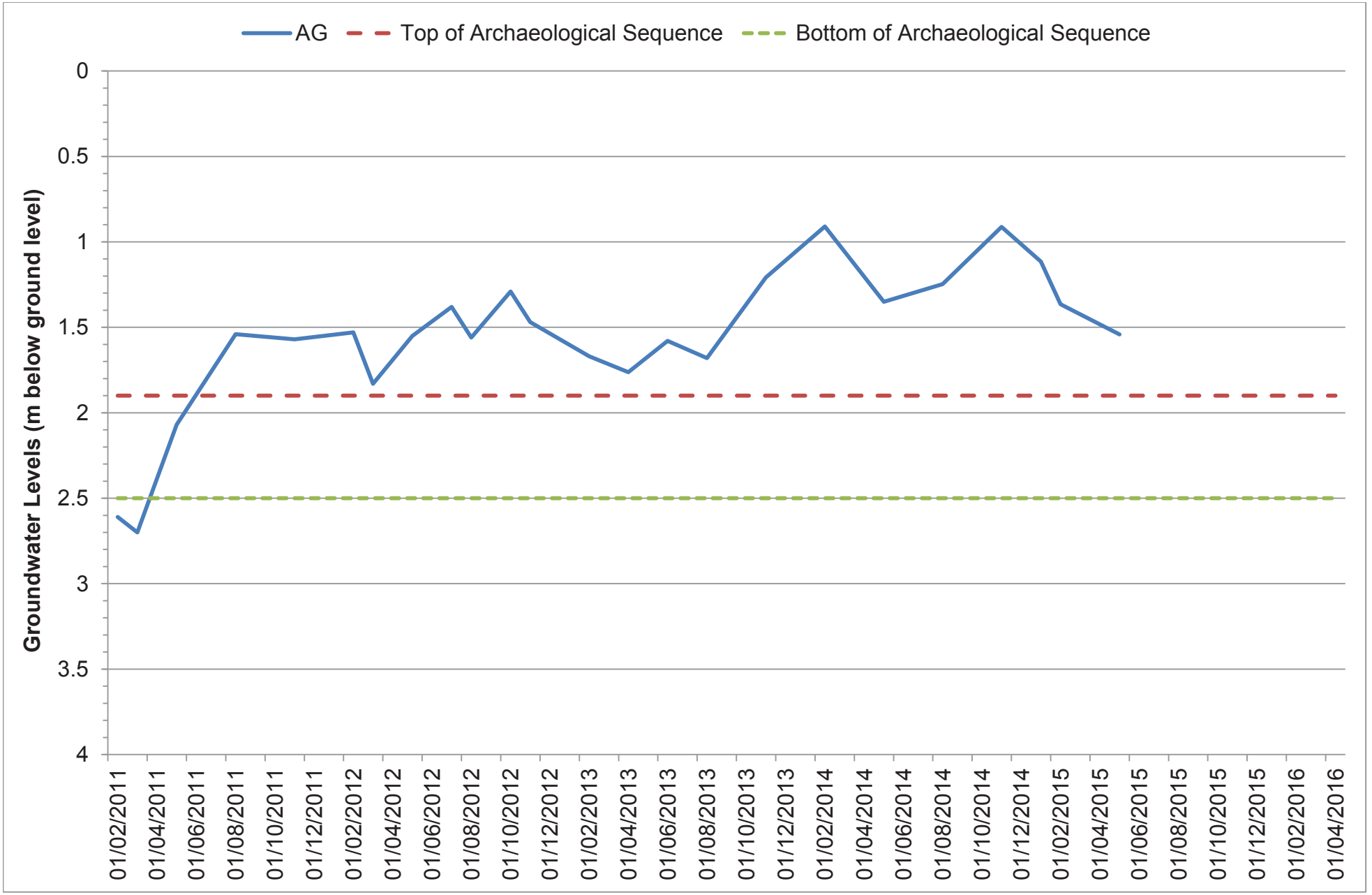
01/04/2016


AG
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Groundwater Levels (m below ground level)
0
0.5
1
1.5
2
2.5
3
3.5
4
01/02/2011
01/04/2011
01/06/2011
01/08/2011
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01/12/2011
01/02/2012
01/04/2012
01/06/2012
01/08/2012
01/10/2012
01/12/2012
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01/08/2014
01/10/2014
01/12/2014
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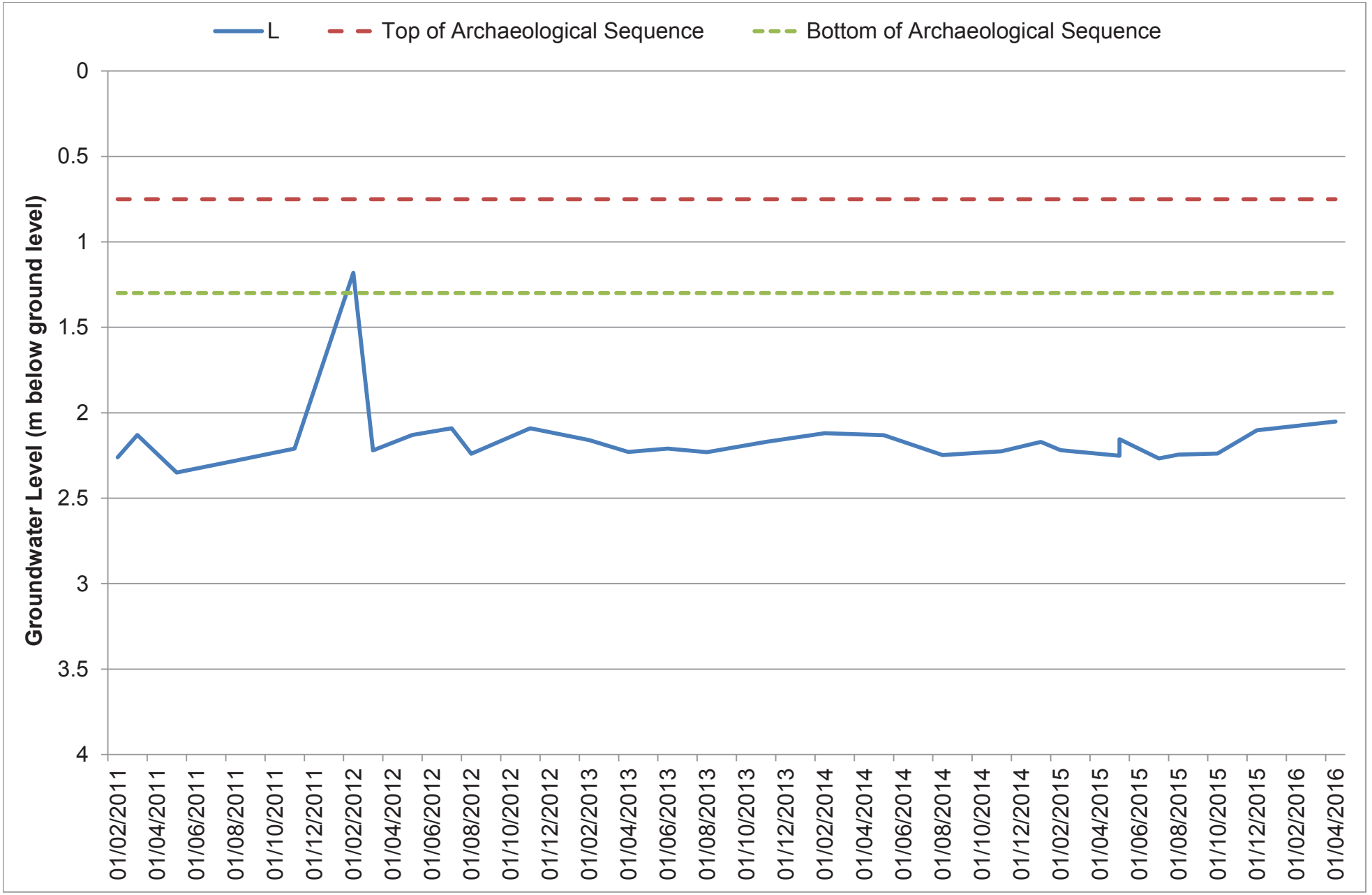
01/04/2015
01/06/2015
01/08/2015
01/10/2015
01/12/2015
01/02/2016
01/04/2016


L
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Groundwater Level (m below ground level)
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0.5
1
1.5
2
2.5
3
3.5
4
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
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01/04/2012
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01/08/2012
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01/06/2013
01/08/2013
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01/06/2014
01/08/2014
01/10/2014
01/12/2014
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01/04/2015
01/06/2015
01/08/2015
01/10/2015
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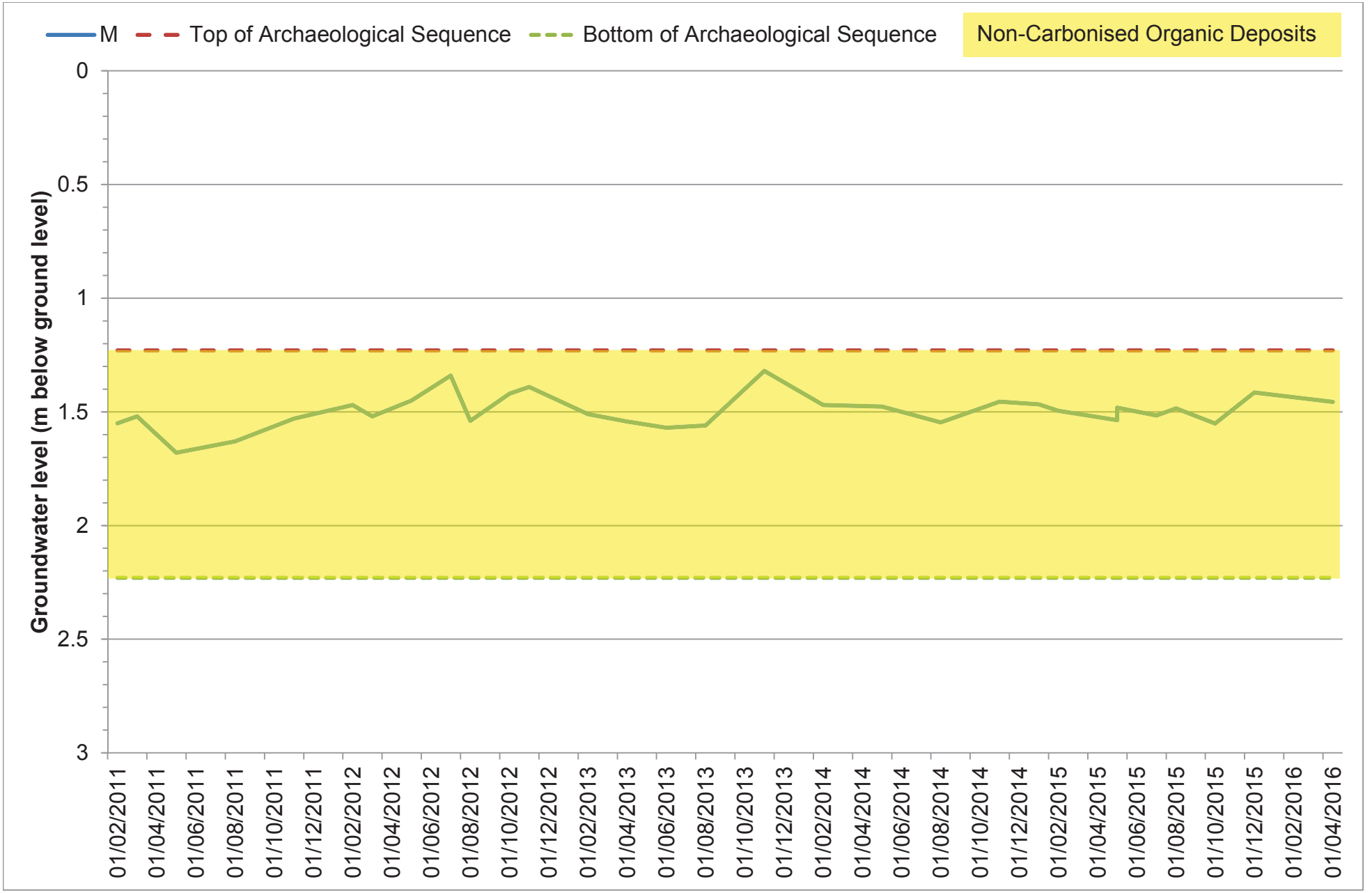
01/04/2016


M
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater level (m below ground level)
0
0.5
1
1.5
2
2.5
3
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
01/02/2012
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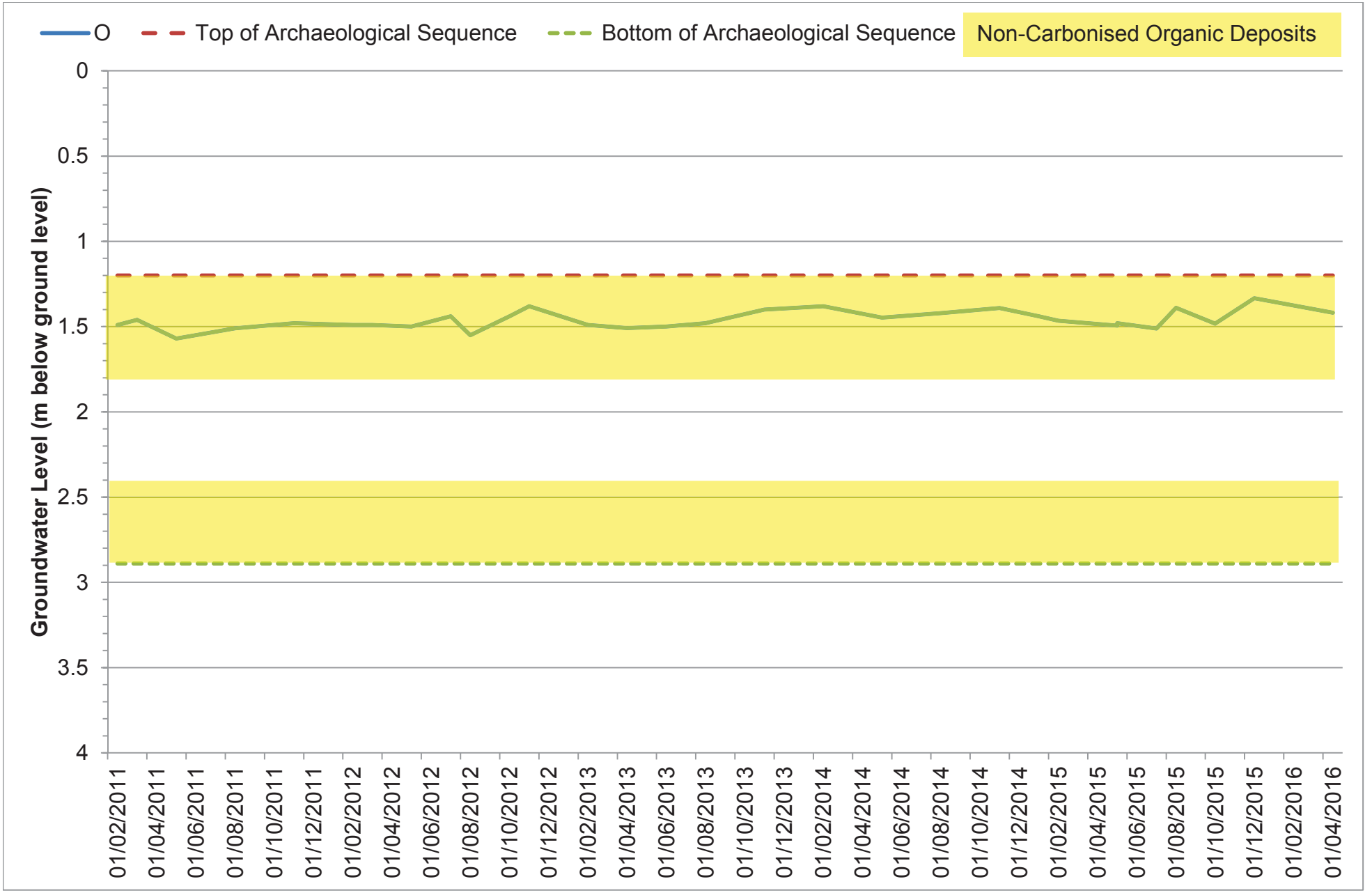
01/06/2014
01/08/2014
01/10/2014
01/12/2014
01/02/2015
01/04/2015
01/06/2015
01/08/2015
01/10/2015
01/12/2015
01/02/2016
01/04/2016


O
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater Level (m below ground level)
0
0.5
1
1.5
2
2.5
3
3.5
4
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
01/02/2012
01/04/2012
01/06/2012
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01/10/2012
01/12/2012
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01/06/2014
01/08/2014
01/10/2014
01/12/2014
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01/08/2015
01/10/2015
01/12/2015
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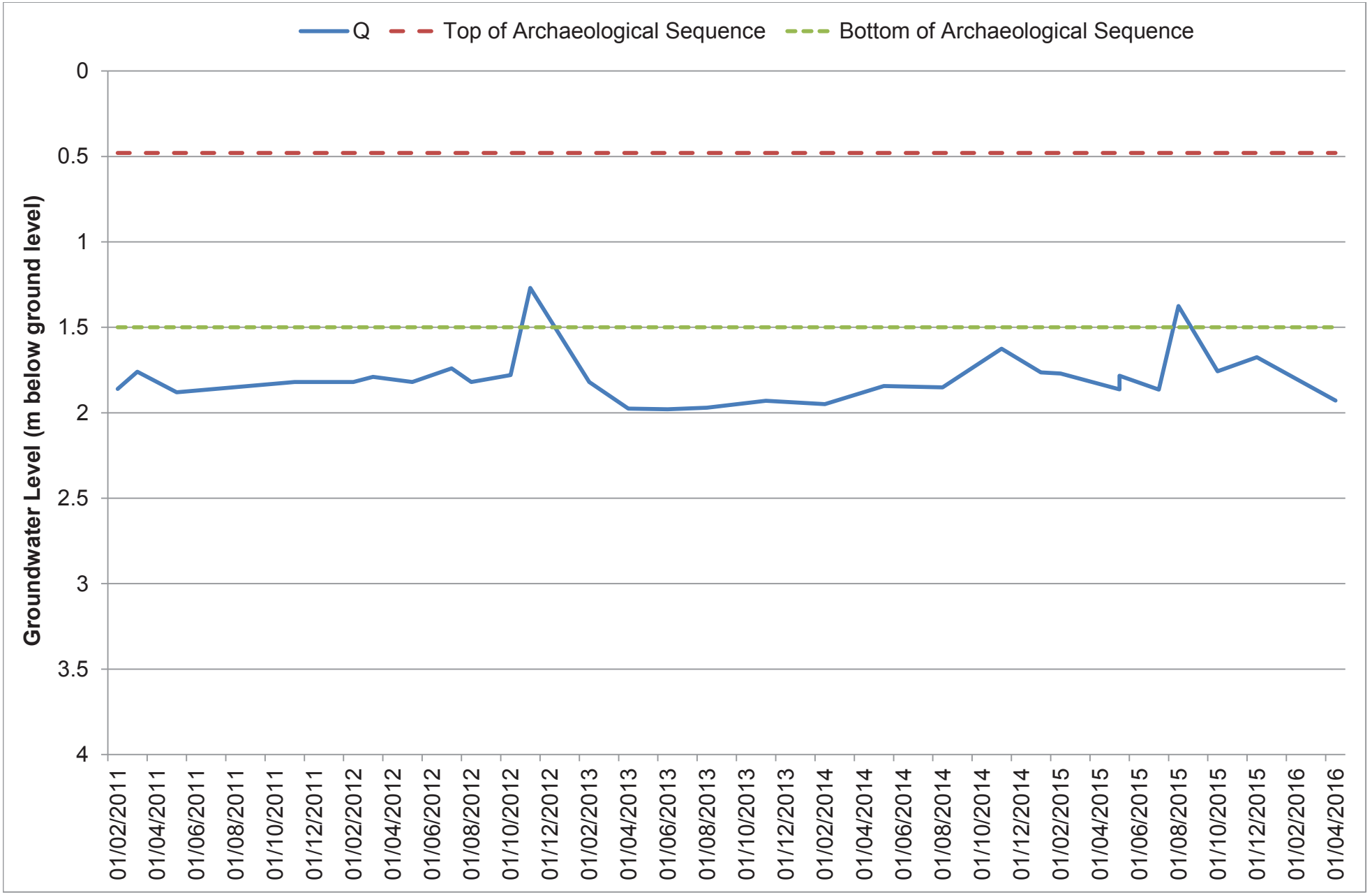
01/04/2016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Top of Archaeological Sequence
Bottom of Archaeological Sequence
Groundwater Level (m below ground level)
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0.5
1
1.5
2
2.5
3
3.5
4
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
01/02/2012
01/04/2012
01/06/2012
01/08/2012
01/10/2012
01/12/2012
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01/08/2014
01/10/2014
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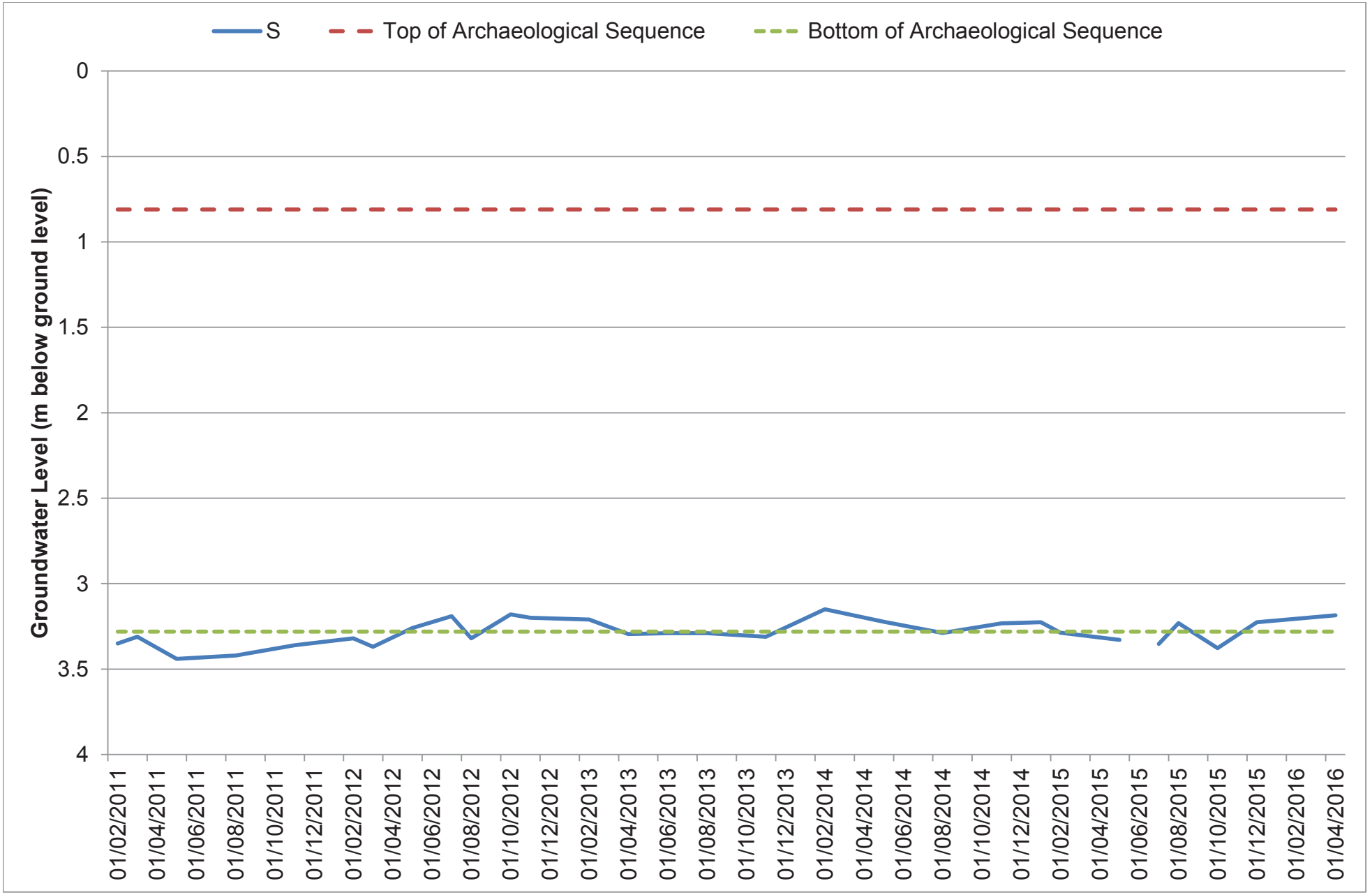
01/04/2016


S
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Groundwater Level (m below ground level)
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0.5
1
1.5
2
2.5
3
3.5
4
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
01/02/2012
01/04/2012
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01/12/2012
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01/08/2014
01/10/2014
01/12/2014
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01/08/2015
01/10/2015
01/12/2015
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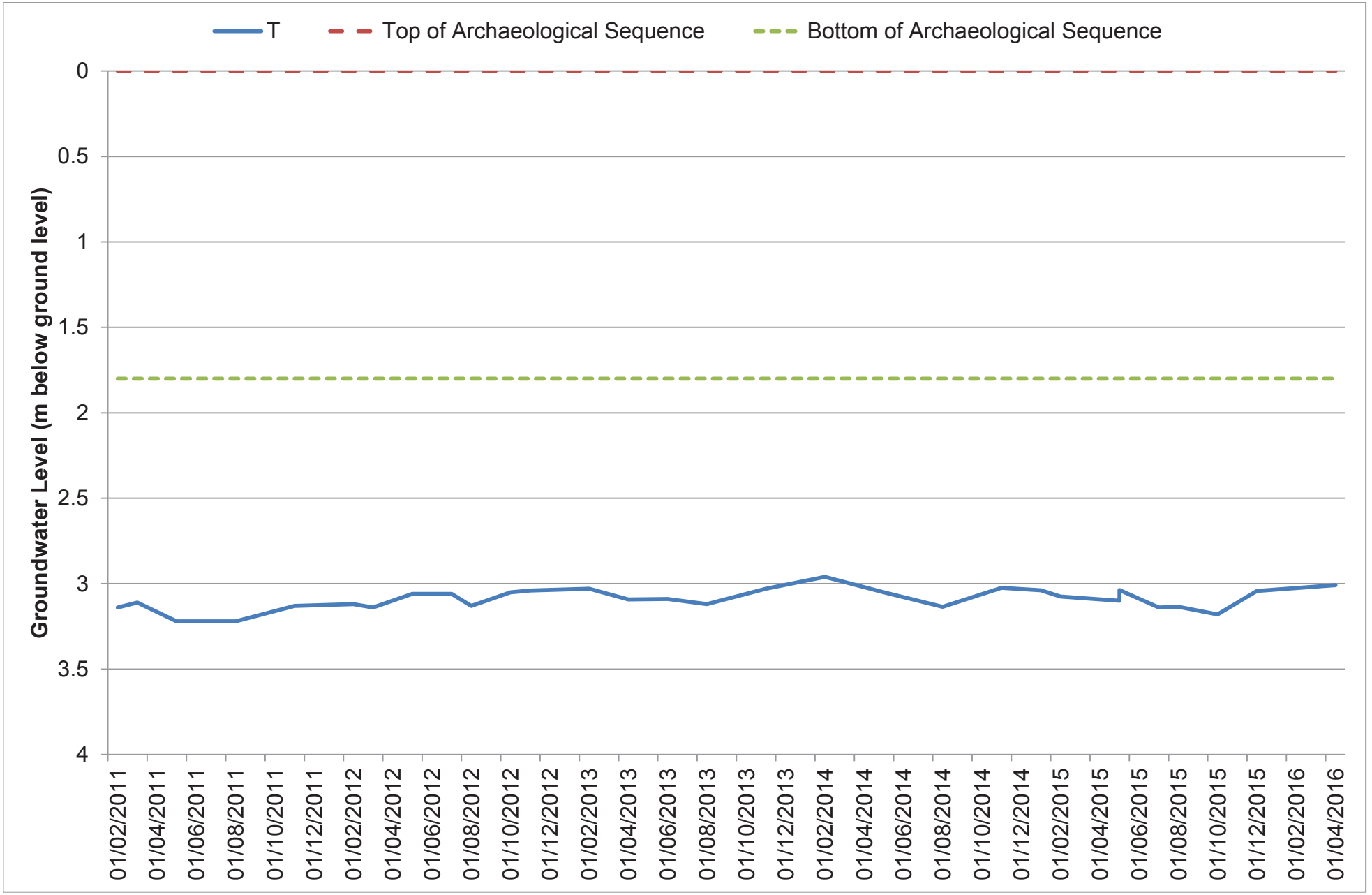
01/04/2016


T
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Groundwater Level (m below ground level)
0
0.5
1
1.5
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2.5
3
3.5
4
01/02/2011
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01/06/2011
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01/08/2014
01/10/2014
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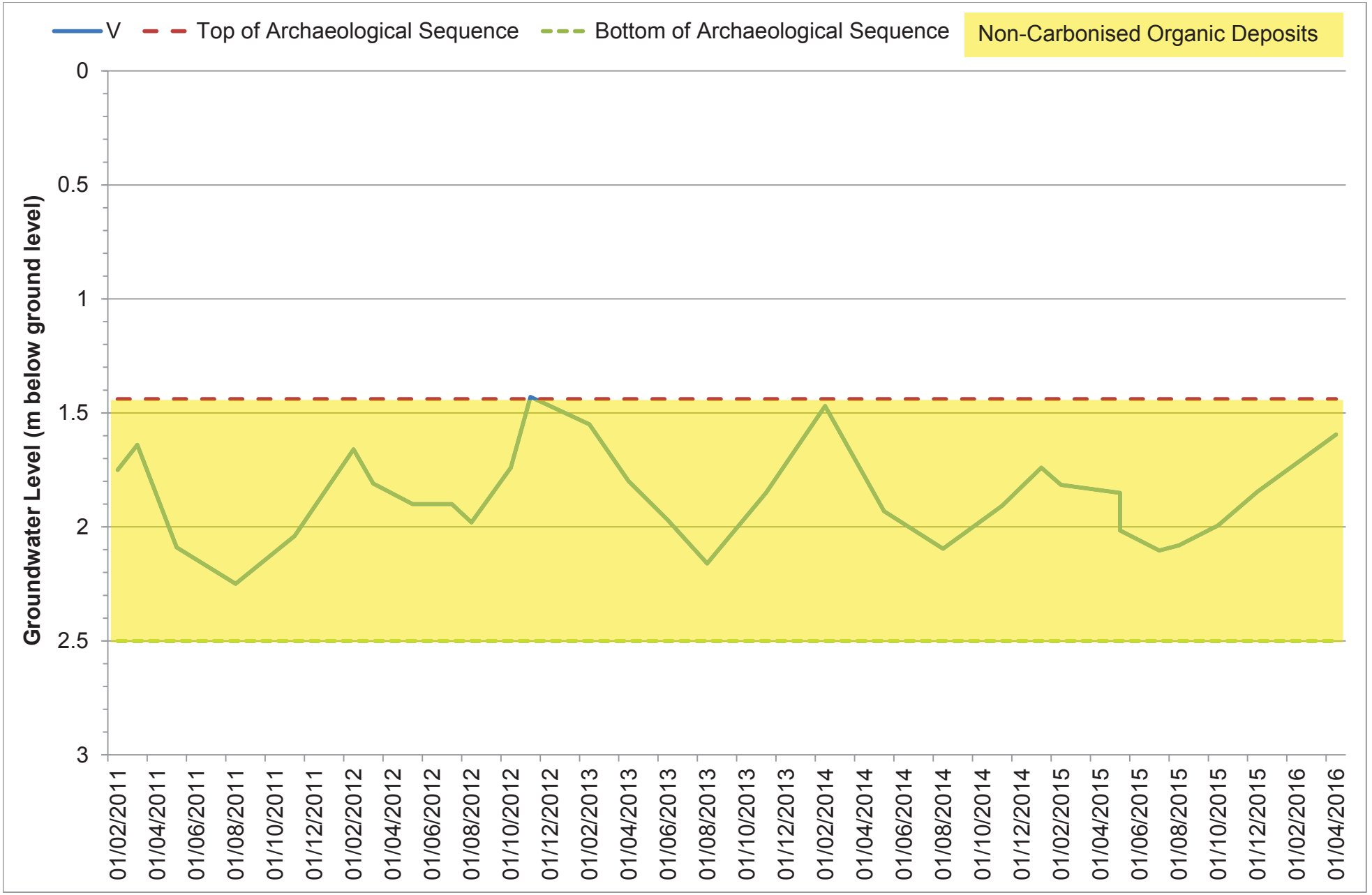
V
Top of Archaeological Sequence
Bottom of Archaeological Sequence
Non-Carbonised Organic Deposits
Groundwater Level (m below ground level)
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0.5
1
1.5
2
2.5
3
01/02/2011
01/04/2011
01/06/2011
01/08/2011
01/10/2011
01/12/2011
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01/08/2014
01/10/2014
01/12/2014
01/02/2015
01/04/2015
01/06/2015
01/08/2015
01/10/2015
01/12/2015
01/02/2016
01/04/2016

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
AB	364740	352370	37.93	1.64	3.84	08/03/2011	-0.2	1012	-0.3	0	0	20	0	0
AB	364740	352370	37.93	2.08	3.84	12/05/2011	-0.2	1018	0.34	0	0.3	19.7	5	0
AB	364740	352370	37.93	2.24	3.84	18/08/2011	0.1	1013	0.12	0	0.3	20.2	0	0
AB	364740	352370	37.93	2.27	3.84	15/11/2011	0	1011	0	0	0.2	20.9	0	0
AB	364740	352370	37.93	1.87	3.84	15/03/2012	0	1019	0	0	0.1	20.7	0	0
AB	364740	352370	37.93	1.7	3.84	03/07/2012	0	1007	0	0	0.7	19.4	0	0
AB	364740	352370	37.93	1.59	3.84	04/10/2012	0	1002	0	0	0.3	20.7	0	0
AB	364740	352370	37.93	1.49	3.84	26/02/2013	0	1036	0.3	0	0.2	20.9	0	0
AB	364740	352370	37.93	1.721	3.81	24/04/2013	0	1019	0	0	0.3	20.2	1	0
AB	364740	352370	37.93	2.035	3.83	23/07/2013	-0.1	1007	0.05	0	0.5	19.7	3	0
AB	364740	352370	37.93	1.908	3.84	31/10/2013	0.2	1010	0	0	1.5	18.4	0	0
AB	364740	352370	37.93	1.47	3.85	28/01/2014	0.1	974	-0.21	0.2	1.2	20.3	0	0
AB	364740	352370	37.93	1.725	3.83	15/04/2014	0.2	1028	0.05	0	1.3	20.1	0	0
AB	364740	352370	37.93	-	3.83	31/07/2014	-0.1	1007	0	0.2	2.8	20.3	0	0
AB	364740	352370	37.93	1.945	3.83	28/10/2014	-0.2	1003	0.02	0	10.5	3.4	0	0
AB	364740	352370	37.93	1.638	3.83	23/01/2015	0.0	1015	0.00	0.4	1.2	21.3	0	0
AB	364740	352370	37.93	1.857	3.83	01/05/2015	0	999	-0.05	0.1	0.6	20.6	0	0
AB	364740	352370	37.93	2.025	3.84	14/07/2015	0.1	1016	-0.03	0	1.5	19.7	0	0
AB	364740	352370	37.93	2.156	3.84	22/10/2015	0	1014	0.03	0	0.7	21.2	0	0
AC	364963	352517	36.42	2.49	3.98	08/03/2011	0	1013	0	4	2.9	2.7	3	0
AC	364963	352517	36.42	2.98	3.98	12/05/2011	0	1017	-0.23	4.7	4.6	1.7	5	0
AC	364963	352517	36.42	2.85	3.98	18/08/2011	0	1011	-0.03	4.4	4.2	7.8	0	5
AC	364963	352517	36.42	2.79	3.98	15/11/2011	0	1011	0	1.8	1.6	14.7	0	0
AC	364963	352517	36.42	2.52	3.98	15/03/2012	0	1017	0	2.7	2.9	7.8	0	0
AC	364963	352517	36.42	1.44	3.98	03/07/2012	0	1007	0	3.7	3.5	8	0	0
AC	364963	352517	36.42	2.28	3.98	04/10/2012	0	1002	0	5.9	4.6	2.8	0	0
AC	364963	352517	36.42	2.45	3.98	26/02/2013	0	1035	-0.2	3.8	2.5	5.5	0	0
AC	364963	352517	36.42	2.741	3.97	24/04/2013	0.1	1018	0.02	3.9	3.5	0.2	3	0
AC	364963	352517	36.42	2.91	3.99	23/07/2013	0.1	1010	0.1	2.1	5.6	4.8	4	0
AC	364963	352517	36.42	2.216	3.97	31/10/2013	-0.1	1013	-0.05	6.5	5.5	0.4	0	0
AC	364963	352517	36.42	2.128	3.84	28/01/2014	0	972	-0.17	7.3	4.5	1.7	0	0
AC	364963	352517	36.42	2.576	3.99	15/04/2014	0	1028	-0.07	2.8	2.6	9.9	0	0
AC	364963	352517	36.42	-	3.99	31/07/2014	0	1007	0.02	5.4	6.2	1.9	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
AC	364963	352517	36.42	2.624	4	28/10/2014	0.1	1003	0	5.1	4.6	3.5	0	0
AC	364963	352517	36.42	2.558	4	23/01/2015	0.0	1018	0.05	5.4	3.3	4.1	0	0
AC	364963	352517	36.42	2.840	4.00	01/05/2015	0.1	999	0.03	2	2.9	8.4	0	0
AC	364963	352517	36.42	2.268	4.00	14/07/2015	0.1	1015	0.02	0	0	20.9	0	0
AC	364963	352517	36.42	2.908	3.99	22/10/2015	0	1014	-0.03	5.4	5.6	0.4	0	0
AE	364918	352428	35.19	2.94	3.93	08/03/2011	0	1014	0	0	4.4	14.9	0	0
AE	364918	352428	35.19	2.84	3.93	12/05/2011	-0.1	1019	-0.02	0.1	10.1	8.9	7	0
AE	364918	352428	35.19	2.8	3.93	18/08/2011	0	1012	0	0	11.7	7.4	0	0
AE	364918	352428	35.19	2.77	3.93	15/11/2011	0	1011	0	0	3.6	18	0	0
AE	364918	352428	35.19	2.68	3.93	15/03/2012	0	1019	0	0	0.1	20.7	0	0
AE	364918	352428	35.19	2.56	3.93	03/07/2012	0	1007	0	0.1	8.3	9.2	0	0
AE	364918	352428	35.19	2.45	3.93	04/10/2012	0	1002	0	0	10.2	6.9	0	0
AE	364918	352428	35.19	2.58	3.93	26/02/2013	0	1037	-0.1	0	6.7	14.8	0	0
AE	364918	352428	35.19	2.68	3.93	24/04/2013	0	1019	0.05	0	8.9	12.1	0	0
AE	364918	352428	35.19	2.712	3.95	23/07/2013	0.1	1007	0	0	11.4	7.3	3	0
AE	364918	352428	35.19	2.48	3.85	31/10/2013	0.1	1010	0	0	12.8	3.8	0	0
AE	364918	352428	35.19	2.205	3.95	28/01/2014	0.2	974	-0.12	0.2	10.2	7.6	0	0
AE	364918	352428	35.19	2.639	3.93	15/04/2014	0.2	1028	-0.02	0	11.3	10	0	0
AE	364918	352428	35.19	-	3.93	31/07/2014	0	1007	0.12	4.7	14.4	5.2	0	0
AE	364918	352428	35.19	2.61	3.93	28/10/2014	-0.1	1003	0.14	0.2	1.5	18.1	0	0
AE	364918	352428	35.19	2.600	3.93	23/01/2015	0.0	1016	0.03	0.4	9.1	10.9	0	0
AE	364918	352428	35.19	2.669	3.93	01/05/2015	0.1	999	0.15	0	7.4	13.2	0	1
AE	364918	352428	35.19	2.636	3.92	14/07/2015	0.1	1016	0.05	0	14.8	4	1	0
AE	364918	352428	35.19	2.735	3.90	22/10/2015	0.1	1016	0.05	0	8.7	9.9	0	0
AF	364899	352463	34.89	2.8	4	08/03/2011	0	1013	-0.17	0	0.9	17.2	1	0
AF	364899	352463	34.89	2.99	4	12/05/2011	0	1019	-0.02	0.1	3	16.4	4	0
AF	364899	352463	34.89	2.83	4	18/08/2011	0.1	1012	0	0	4.2	14.7	0	0
AF	364899	352463	34.89	2.89	4	15/11/2011	0	1011	0	0.8	7.4	11.9	0	0
AF	364899	352463	34.89	2.81	4	15/03/2012	0	1019	0	0	3	16.5	0	0
AF	364899	352463	34.89	2.81	4	03/07/2012	0	1007	0	0.4	2	16.8	0	0
AF	364899	352463	34.89	2.73	4	04/10/2012	0	1002	0	0	2.5	15.9	0	0
AF	364899	352463	34.89	2.84	4	26/02/2013	0	1037	-0.07	0.1	0.8	18.8	0	0
AF	364899	352463	34.89	2.792	3.96	24/04/2013	0	1019	0	0	4	12.1	2	0
AF	364899	352463	34.89	2.881	4.04	23/07/2013	0.3	1007	0.05	0	5.7	15.1	1	0
AF	364899	352463	34.89	2.8	4.06	31/10/2013	0	1010	0	0	8.9	10.2	0	0
AF	364899	352463	34.89	2.558	3.89	28/01/2014	5.3	974	0.06	6.1	3.6	14.6	0	0
AF	364899	352463	34.89	2.836	4.02	15/04/2014	0.1	1028	-1.75	0	2.3	19.2	0	0
AF	364899	352463	34.89	-	4.02	31/07/2014	-0.1	1007	0.07	0.8	11.9	18.7	0	0
AF	364899	352463	34.89	2.84	4.02	28/10/2014	0.1	1003	-0.07	0	9.7	8.4	0	0
AF	364899	352463	34.89	2.782	4.02	23/01/2015	0.0	1016	0.09	0.4	0.3	21.9	0	0
AF	364899	352463	34.89	2.844	4.02	01/05/2015	0.1	999	0.07	0	3.9	16.8	0	0
AF	364899	352463	34.89	2.862	4.05	14/07/2015	0.7	1016	1.32	0	1.7	18.5	0	0
AF	364899	352463	34.89	2.862	3.80	22/10/2015	0	1014	0.03	0	4.7	14.1	0	0
AG	365007	352313	37.03	2.7	4.03	08/03/2011	-0.2	1012	-0.3	0	4.3	15.3	0	0
AG	365007	352313	37.03	2.07	4.03	12/05/2011	0.3	1018	0.4	0	8	10.9	0	0
AG	365007	352313	37.03	1.54	4.03	18/08/2011	-0.3	1012	0.11	0	10.3	5.2	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
AG	365007	352313	37.03	1.57	4.03	15/11/2011	0	1011	0	0	7.4	9.6	0	0
AG	365007	352313	37.03	1.83	4.03	15/03/2012	0	1018	0	0	0.8	18.3	0	0
AG	365007	352313	37.03	1.38	4.03	03/07/2012	0	1007	0	0	2.7	15.3	0	0
AG	365007	352313	37.03	1.29	4.03	04/10/2012	0	1002	0	0	0	20.9	0	0
AG	365007	352313	37.03	1.67	4.03	26/02/2013	0	1033	-0.1	0	3.8	15.9	0	0
AG	365007	352313	37.03	1.763	4.02	24/04/2013	0	1018	0.11	0	4.3	15.6	2	0
AG	365007	352313	37.03	1.556	4.08	23/07/2013	-0.1	1007	0	0	11.1	4.3	2	0
AG	365007	352313	37.03	0.835	3.94	31/10/2013	0.1	1010	0.12	0	3.5	9.4	0	0
AG	365007	352313	37.03	0.555	3.87	28/01/2014	0.2	974	0.15	0.2	0.6	19.6	0	0
AG	365007	352313	37.03	1.585	3.56	15/04/2014	0.2	1028	0.02	0	4.7	14.3	0	0
AG	365007	352313	37.03	-	3.56	31/07/2014	0.4	1007	-0.09	0	1.7	20.5	0	0
AG	365007	352313	37.03	1.13	3.47	28/10/2014	-0.9	1003	-4.92	0.3	6.4	7.8	0	0
AG	365007	352313	37.03	1.115	3.47	23/01/2015	0.0	1016	0.10	0.8	1.5	18.3	3	0
AG	365007	352313	37.03	1.542	3.47	01/05/2015	0.1	999	0.09	0	2.9	17.1	1	0
F1	365189	352269	39.69	1.4	1.98	08/03/2011	-0.3	1014	0	0	2	17.7	0	0
F1	365189	352269	39.69	1.31	1.98	12/05/2011	0	1017	-0.01	0	2	18.3	0	0
F1	365189	352269	39.69	1.29	1.98	18/08/2011	-0.1	1012	-0.01	0	3.2	16.8	0	0
F1	365189	352269	39.69	1.14	1.98	15/11/2011	0	1011	0	0	0.6	20.5	0	0
F1	365189	352269	39.69	1.06	1.98	15/03/2012	0	1018	0	0	1	19.6	0	0
F1	365189	352269	39.69	0.76	1.98	03/07/2012	0	1007	0	0	1.6	18.9	0	0
F1	365189	352269	39.69	0.79	1.98	04/10/2012	0	1003	0	0	0.9	17.3	0	0
F1	365189	352269	39.69	0.94	1.98	26/02/2013	0	1035	-0.3	0	1.4	19.2	0	0
F1	365189	352269	39.69	1.208	1.97	23/07/2013	0.1	1008	0.05	0	2.9	16.6	3	0
F1	365189	352269	39.69	1.34	1.555	28/01/2014	0	974	0.03	0.2	0.7	20.8	0	0
F1	365189	352269	39.69	1.56	1.96	15/04/2014	0	1028	-1.82	0	1.8	16.8	0	0
F1	365189	352269	39.69	-	1.96	31/07/2014	0.2	1007	0.09	0	2	17.6	0	1
F1	365189	352269	39.69	1.634	1.98	28/10/2014	0.1	1003	0.1	0	0.1	20.6	0	0
F1	365189	352269	39.69	1.598	1.98	23/01/2015	0.0	1015	-0.09	0.4	1	21.1	0	0
F1	365189	352269	39.69	1.634	1.98	01/05/2015	0.1	999	0	0	1.4	19.9	0	0
F1	365189	352269	39.69	1.685	1.97	14/07/2015	0.1	1016	0.31	0	4.2	16.2	0	0
F1	365189	352269	39.69	1.651	1.96	22/10/2015	0	1015	0.29	0	4.5	13.6	0	0
F1	365189	352269	39.69	1.025	1.84	24/04/2013	0.1	1017	0.27	0	0	20.8	5	1
F1	365189	352269	39.69	1.358	1.97	31/10/2013	0	1013	0	0	2	16.2	0	0
F2	365189	352269	39.69	1.095	3.49	24/04/2013	-0.1	1017	0.27	0	0.5	20.1	7	0
F2	365189	352269	39.69	1.492	3.82	31/10/2013	0.1	1013	0	0	1.1	18.1	0	0
F2	365189	352269	39.69	1.4	3.96	08/03/2011	-0.1	1014	0	0	0	20	1	0
F2	365189	352269	39.69	1.34	3.96	12/05/2011	-0.1	1017	0	0.1	0.8	19.6	3	0
F2	365189	352269	39.69	1.32	3.96	18/08/2011	0	1012	0	0	1.9	18	0	0
F2	365189	352269	39.69	1.16	3.96	15/11/2011	0	1011	0	0	2.1	18.3	0	0
F2	365189	352269	39.69	1.16	3.96	15/03/2012	0	1018	0	0	0.1	20.6	0	0
F2	365189	352269	39.69	0.97	3.96	03/07/2012	0	1007	0	0.1	0.5	20.1	0	0
F2	365189	352269	39.69	0.96	3.96	04/10/2012	0	1003	0	0	0.6	18.8	0	0
F2	365189	352269	39.69	1.07	3.96	26/02/2013	0	1035	-0.3	0	1.2	19.1	0	0
F2	365189	352269	39.69	1.248	3.82	23/07/2013	0.1	1008	0.05	0	1.7	18.3	2	0
F2	365189	352269	39.69	1.31	1.999	28/01/2014	-0.2	974	-0.3	0.3	1.5	19	0	0
F2	365189	352269	39.69	1.601	3.74	15/04/2014	0.1	1028	-0.67	0	3	18.5	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
F2	365189	352269	39.69	-	3.74	31/07/2014	0.2	1007	0.7	0	2.5	17.1	0	1
F2	365189	352269	39.69	1.659	3.75	28/10/2014	0	1003	0.24	0	2	18.3	0	1
F2	365189	352269	39.69	1.652	3.96	01/05/2015	0.1	999	0	0	1.9	18.8	0	0
F2	365189	352269	39.69	1.660	3.79	14/07/2015	0.1	1016	0.12	0	2.8	18.1	0	0
F2	365189	352269	39.69	1.660	3.72	22/10/2015	0	1015	-0.09	0	1.5	19.58	0	0
L	365128	352544	38.71	2.13	3.9	08/03/2011	-0.2	1014	0.11	0	1	19.6	2	0
L	365128	352544	38.71	2.35	3.9	12/05/2011	-0.2	1018	0.03	0	0.7	20.2	5	0
L	365128	352544	38.71	2.28	3.9	18/08/2011	0	1011	0.01	0	0.05	19.8	0	1
L	365128	352544	38.71	2.21	3.9	15/11/2011	0	1013	0	0	0.7	20.3	0	0
L	365128	352544	38.71	2.22	3.9	15/03/2012	0	1017	0	0	0.9	19.9	0	0
L	365128	352544	38.71	2.09	3.9	03/07/2012	0	1007	0	0	0.8	20.1	0	0
L	365128	352544	38.71	2.14	3.9	04/10/2012	0	1003	0	0	0.8	20.4	0	0
L	365128	352544	38.71	2.16	3.9	26/02/2013	0	1037	-0.3	0	0	21.2	0	0
L	365128	352544	38.71	2.229	3.89	24/04/2013	0.2	1020	0.06	0	1	19.8	0	0
L	365128	352544	38.71	2.272	3.88	23/07/2013	0.1	1010	0.01	0	1.6	18.4	0	0
L	365128	352544	38.71	2.135	1.88	31/10/2013	0	1013	0	0	1.8	18.3	0	0
L	365128	352544	38.71	3.049	3.89	28/01/2014	0.1	974	0.09	0.2	1.6	20.9	0	0
L	365128	352544	38.71	2.174	3.88	15/04/2014	0.2	1028	0.02	0	1.2	20.5	0	0
L	365128	352544	38.71	-	3.88	31/07/2014	-0.1	1007	0.09	0	2.2	18.3	0	0
L	365128	352544	38.71	2.253	3.9	28/10/2014	0.2	1003	0.02	0	2.4	18.9	0	0
L	365128	352544	38.71	2.170	3.9	23/01/2015	0.1	1018	0.02	0.4	1.4	21.2	0	0
L	365128	352544	38.71	2.251	3.90	01/05/2015	0.1	999	0	0	1.3	19.8	0	0
L	365128	352544	38.71	2.267	3.90	14/07/2015	0	1013	0	0	0	18.8	0	0
L	365128	352544	38.71	2.238	3.88	22/10/2015	0	1013	0.09	0	2.7	18.7	0	0
M	365015	352549	37.81	1.52	3.84	08/03/2011	0	1013	0	0	0.4	20.3	0	0
M	365015	352549	37.81	1.68	3.84	12/05/2011	0	1017	-0.23	0.1	2.1	17.9	0	0
M	365015	352549	37.81	1.63	3.84	18/08/2011	0.2	1012	-0.08	0	1.4	20.4	0	0
M	365015	352549	37.81	1.53	3.84	15/11/2011	0	1014	0	0	1.3	19.8	0	0
M	365015	352549	37.81	1.52	3.84	15/03/2012	0	1017	0	0	0.3	20.8	0	0
M	365015	352549	37.81	1.34	3.84	03/07/2012	0	1007	0	0	3.2	17.6	0	0
M	365015	352549	37.81	1.42	3.84	04/10/2012	0	1002	0	0	1.4	18.5	0	0
M	365015	352549	37.81	1.51	3.84	26/02/2013	0	1034	-0.008	0	0.3	19.8	0	0
M	365015	352549	37.81	1.542	3.82	24/04/2013	-0.2	1020	0.06	0	0.7	19.1	0	0
M	365015	352549	37.81	1.59	3.81	23/07/2013	-0.1	1010	0.01	0	0.4	19.9	0	0
M	365015	352549	37.81	1.28	3.79	31/10/2013	-0.1	1013	-0.23	0	2.9	16.3	0	0
M	365015	352549	37.81	1.331	3.8	28/01/2014	0.1	975	0.1	0.2	0.9	21.1	0	0
M	365015	352549	37.81	1.504	3.81	15/04/2014	0	1028	-0.02	2	1.9	12.5	0	0
M	365015	352549	37.81	-	3.81	31/07/2014	0	1007	0.09	0	2.3	18.6	0	0
M	365015	352549	37.81	1.489	3.83	28/10/2014	0.1	1003	-0.03	4.4	4.8	14.1	0	0
M	365015	352549	37.81	1.467	3.83	23/01/2015	0.0	1018	-0.07	0.5	0.4	21.6	0	0
M	365015	352549	37.81	1.537	3.83	01/05/2015	0.1	999	0.02	0	2.3	18.9	0	0
M	365015	352549	37.81	1.516	3.81	14/07/2015	0.2	1015	0.09	0	2.3	18.9	0	0
M	365015	352549	37.81	1.551	3.81	22/10/2015	0	1011	-0.1	0	4.1	15	0	0
N	365016	352449	39.17	1.7	3.93	08/03/2011	0.4	1014	-0.2	0	4.8	10.5	0	0
N	365016	352449	39.17	1.8	3.93	12/05/2011	0.5	1017	0	0.1	4.9	12.7	3	0
N	365016	352449	39.17	1.53	3.93	15/11/2011	0	1013	0	0	2.2	18.2	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
N	365016	352449	39.17	1.71	3.93	15/03/2012	0	1017	0	0	2.5	17.4	0	0
N	365016	352449	39.17	1.49	3.93	03/07/2012	0	1007	0	0	2.3	17.8	0	0
N	365016	352449	39.17	1.43	3.93	04/10/2012	0	1002	0	0	0	20.6	0	0
N	365016	352449	39.17	1.47	3.93	26/02/2013	0	1037	-0.3	0	2.9	17.6	0	0
N	365016	352449	39.17	1.678	3.91	23/07/2013	-0.1	1007	0	0	3.9	14.2	3	0
N	365016	352449	39.17	1.276	3.91	28/01/2014	0	974	0.05	0.3	0.6	20.9	0	0
N	365016	352449	39.17	1.636	3.91	15/04/2014	0	1028	-0.02	0	0.2	19.2	0	0
N	365016	352449	39.17	-	3.91	31/07/2014	0	1007	0.17	0	2	19.9	0	0
N	365016	352449	39.17	-	3.91	28/10/2014	0.2	1003	0.03	0	2.2	19	0	0
N	365016	352449	39.17	1.555	3.91	23/01/2015	0.0	1018	0.00	0.4	0.2	22.1	0	0
N	365016	352449	39.17	1.649	3.91	01/05/2015	0.1	999	-0.02	0	1	19.2	0	0
N	365016	352449	39.17	1.596	3.91	14/07/2015	0	1015	-0.03	0.1	0.1	20.6	0	1
N	365016	352449	39.17	1.556	3.91	22/10/2015	0.1	1016	-0.03	0	0.6	20.5	0	0
N	365016	352449	39.17	1.71	3.93	18/08/2011	0.1	1012	0	0	3.6	16.4	0	0
N	365016	352449	39.16	1.504	3.91	24/04/2013	-0.2	1019	0.16	0	0.1	20.2	5	0
N	365016	352449	39.16	1.42	3.91	31/10/2013	0	1012	0.04	0	0.4	19.7	0	0
N1	365016	352449	39.16	1.67	3	18/08/2011	0	1012	-0.16	0	7.4	11.4	0	0
N1	365016	352449	39.17	1.548	2.72	24/04/2013	-0.1	1019	0.22	0	1.2	19.1	5	0
N1	365016	352449	39.17	1.43	2.65	31/10/2013	-0.1	1012	0.04	0	1.6	15	0	0
N1	365016	352449	39.16	1.69	3	08/03/2011	0	1014	-0.2	0	0.5	19.6	0	0
N1	365016	352449	39.16	1.81	3	12/05/2011	0	1017	-0.27	0.1	1.6	17.9	2	0
N1	365016	352449	39.16	1.57	3	15/11/2011	0	1013	0	0	7.6	9.3	0	0
N1	365016	352449	39.16	1.75	3	15/03/2012	0	1017	0	0	0	20.9	0	0
N1	365016	352449	39.16	1.5	3	03/07/2012	0	1007	0	0.1	0.9	19.2	0	0
N1	365016	352449	39.16	1.46	3	04/10/2012	0	1002	0	0	0.2	20.5	0	0
N1	365016	352449	39.16	1.48	3	26/02/2013	0	1037	-0.3	0	0.8	19.1	0	0
N1	365016	352449	39.16	1.725	2.67	23/07/2013	-0.1	1007	0.05	0	2.7	16.6	2	0
N1	365016	352449	39.16	1.294	2.65	28/01/2014	0	974	-0.12	0.2	1.6	20.7	0	0
N1	365016	352449	39.16	1.681	2.64	15/04/2014	0.1	1028	0.02	0.1	2	19	0	0
N1	365016	352449	39.16	-	2.64	31/07/2014	0	1007	-0.1	0	2.4	17.8	0	0
N1	365016	352449	39.16	1.64	2.63	28/10/2014	0.1	1003	-0.03	0	1.7	19.8	0	0
N1	365016	352449	39.16	1.638	2.63	23/01/2015	0.0	1018	-0.05	0.4	1	21.3	0	0
N1	365016	352449	39.16	1.676	2.63	01/05/2015	0.1	999	-0.14	0	5.6	14.6	0	1
N1	365016	352449	39.16	1.735	2.56	14/07/2015	0.1	1015	0.02	0.2	2.8	17.4	0	1
N1	365016	352449	39.16	1.663	2.58	22/10/2015	0.1	1016	-0.05	0	2.6	18.9	0	0
O	365184	352470	39.64	1.46	3.7	08/03/2011	-0.2	1014	0	0	0.2	20	0	0
O	365184	352470	39.64	1.57	3.7	12/05/2011	-0.1	1017	0.05	0.1	0.1	20.6	0	0
O	365184	352470	39.64	1.51	3.7	18/08/2011	-0.5	1011	0	0	0	20.6	0	0
O	365184	352470	39.64	1.48	3.7	15/11/2011	0	1012	0	0	0.2	20.8	0	0
O	365184	352470	39.64	1.49	3.7	15/03/2012	0	1017	0	0	0.3	20.7	0	0
O	365184	352470	39.64	1.44	3.7	03/07/2012	0	1007	0	0	0.1	20.6	0	0
O	365184	352470	39.64	1.44	3.7	04/10/2012	0	1003	0	0	0.4	20.2	0	0
O	365184	352470	39.64	1.49	3.7	26/02/2013	0	1032	-0.3	0	0.3	20.6	0	0
O	365184	352470	39.64	1.509	3.67	24/04/2013	-0.3	1020	0.08	0	0.3	20.2	0	0
O	365184	352470	39.64	1.509	3.66	23/07/2013	0	1010	0.01	0	0.6	19.3	4	0
O	365184	352470	39.64	1.308	3.68	31/10/2013	0.1	1013	0	0	0.6	19.6	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
O	365184	352470	39.64	1.305	3.67	28/01/2014	0.1	974	0.15	0.2	0.5	21.8	0	0
O	365184	352470	39.64	1.422	3.68	15/04/2014	0.2	1028	0.12	0	0.4	20.7	0	0
O	365184	352470	39.64	-	3.68	31/07/2014	0.1	1007	-0.02	0.1	0.2	20.1	0	1
O	365184	352470	39.64	1.384	3.69	28/10/2014	0	1003	-0.02	0	0.7	20.5	0	0
O	365184	352470	39.64	1.439	3.69	23/01/2015	0.0	1017	0.00	0.4	0.5	21.7	0	0
O	365184	352470	39.64	1.495	3.69	01/05/2015	0.2	999	0	0	1.2	20.4	0	0
O	365184	352470	39.64	1.512	3.66	14/07/2015	0.1	1015	0.05	0	0.4	21	0	0
O	365184	352470	39.64	1.483	3.66	22/10/2015	0.1	1013	0.14	0	0.3	20.9	0	0
P	365098	352374	39.93	3.26	3.92	08/03/2011	0.2	1013	-0.32	0	0	19.9	0	0
P	365098	352374	39.93	3.42	3.92	12/05/2011	0.2	1017	0.05	0	0.2	20.1	0	0
P	365098	352374	39.93	3.38	3.92	18/08/2011	0	1012	0.01	0	3.2	16.9	0	0
P	365098	352374	39.93	3.27	3.92	15/11/2011	0	1011	0	0	0.2	20.8	0	0
P	365098	352374	39.93	3.32	3.92	15/03/2012	0	1017	0	0	0	20.9	0	0
P	365098	352374	39.93	3.16	3.92	03/07/2012	0	1007	0	0	0	20.6	0	0
P	365098	352374	39.93	3.14	3.92	04/10/2012	0	1003	0	0	0	20.5	0	0
P	365098	352374	39.93	3.18	3.92	26/02/2013	0	1032	-0.3	0	0	20.8	0	0
P	365098	352374	39.93	3.26	3.84	24/04/2013	0.1	1017	0.12	0	4.5	16.1	6	0
P	365098	352374	39.93	3.321	3.91	23/07/2013	0	1008	0.05	0	2.7	18.7	3	0
P	365098	352374	39.93	3.175	3.91	31/10/2013	0	1012	0.05	0	0.3	19.6	0	0
P	365098	352374	39.93	3.235	3.91	15/04/2014	0.2	1028	-0.1	0	0.3	21.1	0	0
P	365098	352374	39.93	-	3.91	31/07/2014	0.1	1007	0	0	1.5	19.1	0	0
P	365098	352374	39.93	3.268	3.9	28/10/2014	0.1	1003	0	0	0.9	20	0	0
P	365098	352374	39.93	3.223	3.9	23/01/2015	0.1	1015	0.02	0.4	0.2	21.8	0	0
P	365098	352374	39.93	3.295	3.90	01/05/2015	0.1	999	0.03	0	2.8	18.5	0	0
P	365098	352374	39.93	3.311	3.39	14/07/2015	0	1015	0.24	0	0	21.3	0	0
P	365098	352374	39.93	3.328	3.88	22/10/2015	0	1015	0.07	0	0	20.5	0	0
P	365098	352374	39.93	3.095	3.77	28/01/2014	0	975	-0.05	0.2	0.2	22	0	0
P1	365098	352374	39.93	1.975	2.04	28/01/2014	0.2	975	0.05	0.2	3.7	17.6	0	0
P1	365098	352374	39.93	Dry	2.05	08/03/2011	0	1013	0.32	0	2.8	18	0	0
P1	365098	352374	39.93	Dry	2.05	12/05/2011	0	1017	0	0	3.3	16.2	5	0
P1	365098	352374	39.93	Dry	2.05	18/08/2011	0.2	1012	0	0	1.9	18.4	0	0
P1	365098	352374	39.93	Dry	2.05	15/11/2011	0	1011	0	0	2.2	18.3	0	0
P1	365098	352374	39.93	Dry	2.05	15/03/2012	0	1017	0	0	0.2	20.7	0	0
P1	365098	352374	39.93	Dry	2.05	03/07/2012	0	1007	0	0	0.1	20.6	0	0
P1	365098	352374	39.93	Dry	2.05	04/10/2012	0	1003	0	0	1.4	19.1	0	0
P1	365098	352374	39.93	Dry	2.05	26/02/2013	0	1032	-0.3	0	0.3	20.6	0	0
P1	365098	352374	39.93	Dry	2.04	24/04/2013	0.1	1017	0.08	0	0	20.8	3	0
P1	365098	352374	39.93	Dry	2.04	23/07/2013	-0.1	1008	0	0	7.5	13.2	2	0
P1	365098	352374	39.93	Dry	2.04	31/10/2013	0	1012	0.05	0	1.2	18.5	0	0
P1	365098	352374	39.93	Dry	2.03	15/04/2014	0.2	1028	0.07	0	2.2	18.5	0	0
P1	365098	352374	39.93	Dry	2.03	31/07/2014	0.1	1007	0.05	0	1.9	20.3	0	0
P1	365098	352374	39.93	Dry	2.03	28/10/2014	0.1	1003	-0.03	0	2.3	18.2	0	0
P1	365098	352374	39.93	Dry	2.03	23/01/2015	0.1	1015	-0.03	0.4	0.2	21.8	0	0
P1	365098	352374	39.93	Dry	2.03	01/05/2015	0.1	999	0.03	0	0.6	20.7	0	0
P1	365098	352374	39.93	DRY	2.05	14/07/2015	0	1015	0.1	0	4.1	10.2	0	0
P1	365098	352374	39.93	DRY	2.04	22/10/2015	0	1015	0.07	0	5.2	15.1	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
Q	365196	352383	39.22	1.76	3.62	08/03/2011	0	1015	2.35	0	0.5	19.5	0	0
Q	365196	352383	39.22	1.88	3.62	12/05/2011	-0.4	1017	0	0.1	0.1	20.7	0	0
Q	365196	352383	39.22	1.85	3.62	18/08/2011	0	1012	0	0.1	0.1	20.6	0	0
Q	365196	352383	39.22	1.82	3.62	15/11/2011	0	1012	0	0	0.2	20.8	0	0
Q	365196	352383	39.22	1.79	3.62	15/03/2012	0	1017	0	0	0.1	20.9	0	0
Q	365196	352383	39.22	1.74	3.62	03/07/2012	0	1007	0	0	0.2	20.5	0	0
Q	365196	352383	39.22	1.78	3.62	04/10/2012	0	1003	0	0	1.6	17.7	0	0
Q	365196	352383	39.22	1.82	3.62	26/02/2013	0	1034	-0.7	0	0.3	20.6	0	0
Q	365196	352383	39.22	1.975	3.58	24/04/2013	0	1019	0.25	0	1.4	18.8	1	0
Q	365196	352383	39.22	1.928	3.56	23/07/2013	0.1	1010	0.01	0	1.3	18.6	3	0
Q	365196	352383	39.22	1.841	3.55	31/10/2013	0.1	1013	0	0	3.3	12.8	0	0
Q	365196	352383	39.22	1.861	3.57	28/01/2014	0	974	0.02	0.2	5	16.9	0	0
Q	365196	352383	39.22	1.952	3.54	15/04/2014	0.1	1028	-0.13	0	0.7	20.4	0	0
Q	365196	352383	39.22	-	3.54	31/07/2014	0.1	1007	0.05	0	0.5	20.7	0	0
Q	365196	352383	39.22	1.808	3.55	28/10/2014	0	1003	0.29	0	3.3	15.8	0	0
Q	365196	352383	39.22	1.764	3.55	23/01/2015	0.0	1017	0.02	0.4	4	18.3	0	0
Q	365196	352383	39.22	1.863	3.55	01/05/2015	0.1	999	0.02	0	1.5	20.6	0	0
Q	365196	352383	39.22	1.865	3.54	14/07/2015	0.2	1015	0.09	0	3.8	15.2	0	0
Q	365196	352383	39.22	1.757	3.51	22/10/2015	0.1	1014	0.22	0	2.9	17	0	0
S	365119	352343	39.77	3.31	3.84	08/03/2011	0	1014	0	0	0	20	0	0
S	365119	352343	39.77	3.44	3.84	12/05/2011	0	1017	-0.02	0	4.3	16.4	3	0
S	365119	352343	39.77	3.42	3.84	18/08/2011	0.2	1012	0.03	0	2.5	17.8	0	0
S	365119	352343	39.77	3.36	3.84	15/11/2011	0	1012	0	0	3.6	18	0	0
S	365119	352343	39.77	3.37	3.84	15/03/2012	0	1018	0	0	0.2	20.6	0	0
S	365119	352343	39.77	3.19	3.84	03/07/2012	0	1007	0	0	2.9	17.6	0	0
S	365119	352343	39.77	3.18	3.84	04/10/2012	0	1003	0	0	4.7	14	0	0
S	365119	352343	39.77	3.21	3.84	26/02/2013	0	1032	-0.3	0	2.3	17.9	0	0
S	365119	352343	39.77	3.295	3.96	24/04/2013	0.2	1018	0.12	0	1.2	19.4	4	0
S	365119	352343	39.77	3.351	3.87	23/07/2013	-0.1	1008	0.05	0	1.8	17.9	1	0
S	365119	352343	39.77	3.204	3.86	31/10/2013	-0.3	1013	0.04	0	5.4	14.4	0	0
S	365119	352343	39.77	3.158	3.86	28/01/2014	0.1	975	0	0.2	3.8	17.8	0	0
S	365119	352343	39.77	3.25	3.86	15/04/2014	0.1	1028	-0.1	0	2	18.1	0	0
S	365119	352343	39.77	-	3.86	31/07/2014	0	1007	0.05	0	1.7	18.5	0	0
S	365119	352343	39.77	3.278	3.87	28/10/2014	0	1003	-0.1	0	2.8	18	0	0
S	365119	352343	39.77	3.226	3.87	23/01/2015	0.0	1017	0.07	0.4	3.9	17.7	0	0
S	365119	352343	39.77	3.329	3.87	01/05/2015	0.1	999	-0.14	0	2.9	18.3	0	0
S	365119	352343	39.77	3.353	3.68	14/07/2015	0	1015	-0.02	0	4.6	15.5	0	0
S	365119	352343	39.77	3.377	2.85	22/10/2015	0.1	1014	0.21	0	6.2	14.3	0	0
T	365140	352352	39.50	3.11	3.91	08/03/2011	0.6	1015	3.16	0	0.2	19.9	0	0
T	365140	352352	39.50	3.22	3.91	12/05/2011	-0.1	1017	0	0	0.2	20.4	3	0
T	365140	352352	39.50	3.22	3.91	18/08/2011	0.4	1012	0	0	0.4	20.2	0	0
T	365140	352352	39.50	3.13	3.91	15/11/2011	0	1012	0	0	0.1	21	0	0
T	365140	352352	39.50	3.14	3.91	15/03/2012	0	1018	0	0	1.1	19.9	0	0
T	365140	352352	39.50	3.06	3.91	03/07/2012	0	1007	0	0	0.5	20.2	0	0
T	365140	352352	39.50	3.05	3.91	04/10/2012	0	1003	0	0	1.6	18.8	0	0
T	365140	352352	39.50	3.03	3.91	26/02/2013	0	1032	-0.3	0	2.4	18.6	0	0

Location	Easting	Northing	Surface Elevation (mOD)	Groundwater Depth (m)	Hole Base (m)	Date	Flow Rate (l/min)	Atmospheric Pressure (mbar)	Relative Pressure (mbar)	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
T	365140	352352	39.50	3.092	3.88	24/04/2013	0.4	1018	0.23	0	0.8	19.8	2	0
T	365140	352352	39.50	3.145	3.87	23/07/2013	-0.1	1008	0.05	0	1.4	19.1	3	0
T	365140	352352	39.50	3.025	3.98	31/10/2013	0.1	1012	0.04	0	2.1	18.1	0	0
T	365140	352352	39.50	2.985	3.89	28/01/2014	0	975	0.02	0.2	1.7	20.6	0	0
T	365140	352352	39.50	3.052	3.88	15/04/2014	0.2	1028	-0.14	0	4	15.3	0	0
T	365140	352352	39.50	-	3.88	31/07/2014	0.1	1007	0.02	0	2.6	19.5	0	1
T	365140	352352	39.50	3.079	3.88	28/10/2014	0.2	1003	0.05	0	2.8	18.6	0	0
T	365140	352352	39.50	3.039	3.88	23/01/2015	0.0	1017	-0.05	0.4	1.9	20.4	0	0
T	365140	352352	39.50	3.100	3.88	01/05/2015	0.1	999	0.02	0	1.9	19.9	0	0
T	365140	352352	39.50	3.140	3.89	14/07/2015	0.1	1016	0.02	0	3	19.2	0	0
T	365140	352352	39.50	3.180	3.90	22/10/2015	0	1015	0.29	0	1.9	19.8	0	0
V	365195	352346	39.39	1.64	3.98	08/03/2011	0	1015	-0.22	0	2.2	18.5	0	0
V	365195	352346	39.39	2.09	3.98	12/05/2011	0	1017	0	0.1	1.8	18.9	0	0
V	365195	352346	39.39	2.25	3.98	18/08/2011	0	1012	0	0	0.4	20.2	0	0
V	365195	352346	39.39	2.04	3.98	15/11/2011	0	1012	0	0	2.7	18.6	0	0
V	365195	352346	39.39	1.81	3.98	15/03/2012	0	1018	0	0	1.8	19.4	0	0
V	365195	352346	39.39	1.9	3.98	03/07/2012	0	1007	0	0	1.7	19.2	0	0
V	365195	352346	39.39	1.74	3.98	04/10/2012	0	1003	0	0	1	19.5	0	0
V	365195	352346	39.39	1.55	3.98	26/02/2013	0	1036	-0.5	0	0	20.6	0	0
V	365195	352346	39.39	1.799	3.98	24/04/2013	-0.1	1018	0.02	0	0.5	19.8	0	0
V	365195	352346	39.39	2.155	3.98	23/07/2013	0.2	1010	0.17	0	1.7	15.7	2	0
V	365195	352346	39.39	1.92	3.9	31/10/2013	0	1013	0	0	4.3	16.6	0	0
V	365195	352346	39.39	1.392	3.992	28/01/2014	0	975	0	2.1	2	20.9	0	0
V	365195	352346	39.39	1.742	4.01	15/04/2014	0.1	1028	-0.03	0	3.5	17.8	0	0
V	365195	352346	39.39	-	4.01	31/07/2014	0	1007	0.05	0	2.7	18.1	0	1
V	365195	352346	39.39	1.979	3.98	28/10/2014	0	1003	0.24	0	3.5	18.1	0	0
V	365195	352346	39.39	1.740	3.98	23/01/2015	0.0	1017	0.02	0.4	3.1	19.8	0	0
V	365195	352346	39.39	1.851	3.98	01/05/2015	0.1	999	-0.07	0	1.4	20.4	0	0
V	365195	352346	39.39	2.104	4.00	14/07/2015	0.2	1015	0.15	0	3.2	18.9	0	0
V	365195	352346	39.39	1.994	3.94	22/10/2015	0	1014	-0.03	0	3.3	18.6	0	0

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: Nantwich deposit model

Location:

Contact: Mark Swain

JE Job No.: 11/2015

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7				LOD	Units	Method No.
Sample ID	BHAE/2	BHAE/4	BHAF/10	BHAF/13	BHAF/15	BHAE/17	BHAF/20						
Depth	2.17-2.26	2.55-2.78	2.70-3.00	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2						
COC No / misc													
Containers	T	T	T	T	T	T	T						
Sample Date	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011						
Sulphur	1.02	0.45	0.02	0.14	0.32	1.12	0.49				<0.01	%	TM63/PM15
Ammoniacal Nitrogen as N	11.2	5.7	1.3	4.8	4.9	5.0	12.8				<0.6	mg/kg	TM38/PM20
Chloride #M	428	78	108	134	197	743	81				<2	mg/kg	TM38/PM20
Nitrate as NO3 #M	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5				<2.5	mg/kg	TM38/PM20
Nitrite as NO2 #M	<0.05	0.07	0.13	<0.05	0.15	<0.05	0.11				<0.05	mg/kg	TM38/PM20
Ortho Phosphate as PO4	6.5	8.9	1.7	1.1	2.2	<0.3	19.5				<0.3	mg/kg	TM38/PM20
Sulphate as SO4 #M	468.8	52.8	42.0	30.7	88.5	139.7	<1.5				<1.5	mg/kg	TM38/PM20
Loss on Ignition #	27.6	2.5	2.0	5.4	12.8	23.5	2.2				<1.0	%	TM22/PM0
pH #M	7.37	7.99	8.21	7.60	6.93	7.30	8.12				<0.01	pH units	TM73/PM11
Sulphide*	<10	<10	<10	23	<10	55	<10				<10	mg/kg	TM0/PM0

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: Nantwich deposit model

Location:

Contact: Mark Swain

JE Job No.: 11/2015

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7					
Sample ID	BHAE/2	BHAE/4	BHAF/10	BHAF/13	BHAF/15	BHAE/17	BHAF/20					
Depth	2.17-2.26	2.55-2.78	2.70-3.00	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2					
COC No / misc												
Containers	T	T	T	T	T	T	T					
Sample Date	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1					
Date of Receipt	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011					

Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
Iron	14050	10260	28260	35470	17360	9550	15660				<20	mg/kg	TM30/PM15
Sodium	2411	165	394	288	1465	2356	255				<5	mg/kg	TM30/PM15
Electrical Conductivity @25C #	1300	100	775	<100	750	1800	525				<100	uS/cm	TM76/PM0

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: Nantwich deposit model

Location:

Contact: Mark Swain

JE Job No.: 11/2015

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7					
Sample ID	BHAE/2	BHAE/4	BHAF/10	BHAF/13	BHAF/15	BHAE/17	BHAF/20					
Depth	2.17-2.26	2.55-2.78	2.70-3.00	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2					
COC No / misc												
Containers	T	T	T	T	T	T	T					
Sample Date	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1					
Date of Receipt	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011					

Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
Iron	14050	10260	28260	35470	17360	9550	15660				<20	mg/kg	TM30/PM15
Sodium	2411	165	394	288	1465	2356	255				<5	mg/kg	TM30/PM15
Electrical Conductivity @25C #	1300	100	775	<100	750	1800	525				<100	uS/cm	TM76/PM0

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: Nantwich deposit model

Location:

Contact: Mark Swain

JE Job No.: 11/2015

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7				LOD	Units	Method No.
Sample ID	BHAE/2	BHAE/4	BHAF/10	BHAF/13	BHAF/15	BHAE/17	BHAF/20						
Depth	2.17-2.26	2.55-2.78	2.70-3.00	0.83-1.00	1.39-1.70	2.0-2.27	3.0-3.2						
COC No / misc													
Containers	T	T	T	T	T	T	T						
Sample Date	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011	19/01/2011						
Sulphur	1.02	0.45	0.02	0.14	0.32	1.12	0.49				<0.01	%	TM63/PM15
Ammoniacal Nitrogen as N	11.2	5.7	1.3	4.8	4.9	5.0	12.8				<0.6	mg/kg	TM38/PM20
Chloride #M	428	78	108	134	197	743	81				<2	mg/kg	TM38/PM20
Nitrate as NO3 #M	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5				<2.5	mg/kg	TM38/PM20
Nitrite as NO2 #M	<0.05	0.07	0.13	<0.05	0.15	<0.05	0.11				<0.05	mg/kg	TM38/PM20
Ortho Phosphate as PO4	6.5	8.9	1.7	1.1	2.2	<0.3	19.5				<0.3	mg/kg	TM38/PM20
Sulphate as SO4 #M	468.8	52.8	42.0	30.7	88.5	139.7	<1.5				<1.5	mg/kg	TM38/PM20
Loss on Ignition #	27.6	2.5	2.0	5.4	12.8	23.5	2.2				<1.0	%	TM22/PM0
pH #M	7.37	7.99	8.21	7.60	6.93	7.30	8.12				<0.01	pH units	TM73/PM11
Sulphide*	<10	<10	<10	23	<10	55	<10				<10	mg/kg	TM0/PM0

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Mark Swain

JE Job No.: 11/2257

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	LOD	Units	Method No.
Sample ID	AB	AC	AE	AF	AG	F2	L	M	N	O			
Depth	1.77	2.65	2.58	2.84	2.61	1.44	2.26	1.55	1.73	1.49			
COC No / misc													
Containers	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G	V H P G			
Sample Date	01/02/2011	01/02/2011	01/02/2011	01/02/2011	01/02/2011	01/02/2011	02/02/2011	02/02/2011	02/02/2011	02/02/2011			
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011			
Dissolved Iron #	<0.02	13.55	0.25	0.10	0.24	<0.02	<0.02	<0.02	0.07	<0.02	<0.02	mg/l	TM30/PM14
Dissolved Manganese #	0.007	3.516	1.663	0.920	0.543	1.353	0.643	0.148	0.476	1.365	<0.002	mg/l	TM30/PM14
Dissolved Sodium #	64.7	505.9	145.1	467.2	604.4	176.0	151.5	196.5	114.3	141.2	<0.1	mg/l	TM30/PM14
Sulphate #	44.94	171.73	62.12	12.39	311.67	222.30	153.71	104.96	86.18	41.96	<0.05	mg/l	TM38/PM0
Chloride #	90.6	1051.9	228.6	787.0	1488.6	325.3	298.5	368.1	176.5	201.6	<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	25.3	5.4	<0.2	<0.2	<0.2	<0.2	9.7	3.1	1.2	3.4	<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	9.91	<0.06	11.78	10.95	<0.06	0.82	0.89	7.79	0.41	1.24	<0.06	mg/l	TM38/PM0
Sulphide Aquakem	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.03	1.52	21.36	46.22	5.27	4.71	21.52	0.23	4.48	10.19	<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	<0.001	1.981	3.396	0.009	<0.001	0.032	<0.001	8.107	<0.001	<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3 #	434	480	708	868	552	476	476	352	466	592	<1	mg/l	TM75/PM0
pH #	8.10	7.43	7.82	7.73	7.49	7.70	7.93	7.54	7.93	7.78	<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise.

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Mark Swain

JE Job No.: 11/2257

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	51-55	56-60	61-65	66-70	71-75						LOD	Units	Method No.
Sample ID	P	Q	S	T	V								
Depth	3.29	1.86	3.35	3.14	1.75								
COC No / misc													
Containers	V H P G	V H P G	V H P G	V H P G	V H P G								
Sample Date	01/02/2011	01/02/2011	01/02/2011	01/02/2011	01/02/2011								
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	04/02/2011	04/02/2011	04/02/2011	04/02/2011	04/02/2011								
Dissolved Iron #	<0.02	<0.02	<0.02	<0.02	<0.02						<0.02	mg/l	TM30/PM14
Dissolved Manganese #	1.313	0.154	0.213	0.786	4.041						<0.002	mg/l	TM30/PM14
Dissolved Sodium #	14.9	661.9	104.8	31.0	18.3						<0.1	mg/l	TM30/PM14
Sulphate #	468.44	59.37	56.09	20.25	396.31						<0.05	mg/l	TM38/PM0
Chloride #	16.9	1075.0	202.1	68.6	15.5						<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	16.5	6.0	2.0	1.8	<0.2						<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	16.26	6.00	7.73	12.44	<0.06						<0.06	mg/l	TM38/PM0
Sulphide Aquakem	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4 #	0.12	0.15	0.29	3.99	1.24						<0.03	mg/l	TM38/PM0
Dissolved Methane	0.007	<0.001	0.017	2.970	0.094						<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3 #	246	282	342	304	78						<1	mg/l	TM75/PM0
pH #	6.98	7.45	7.31	7.36	6.36						<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Tim Malim

JE Job No.: 12/1723

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60	LOD	Units	Method No.
Sample ID	AB	AC	AE	AF	AG	F2	L	M	N1	O			
Depth	1.77	2.42	2.58	2.77	1.53	1.05	1.18	1.47	1.54	1.49			
COC No / misc													
Containers	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P			
Sample Date	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012			
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012			
Total Dissolved Iron	<0.0047	<0.0047	0.0105	0.0206	0.0211	0.0583	0.0268	0.0304	0.1682	0.0234	<0.0047	mg/l	TM30/PM14
Dissolved Manganese	<0.0015	2.0510	1.2410	0.9210	0.8265	0.4455	0.4951	0.2375	0.5999	1.2010	<0.0015	mg/l	TM30/PM14
Dissolved Sodium	66.2	2071.0	196.9	408.5	1705.0	90.7	141.4	207.9	64.0	73.2	<0.1	mg/l	TM30/PM14
Sulphate	55.76	186.08	9.89	12.18	271.66	38.04	119.21	133.55	74.66	28.48	<0.05	mg/l	TM38/PM0
Chloride	96.1	2803.6	307.4	592.9	3047.8	102.0	222.3	300.5	79.1	76.2	<0.3	mg/l	TM38/PM0
Nitrate as NO3	8.5	0.4	0.9	<0.2	2.5	<0.2	6.4	6.0	1.5	0.3	<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	9.99	<0.06	11.43	8.61	0.19	13.64	1.44	7.09	0.12	4.95	<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4	<0.03	2.63	24.23+	49.88+	1.52	1.85	20.91+	0.09	3.54	8.06	<0.03	mg/l	TM38/PM0
Dissolved Methane	0.006	0.364	5.273	3.765	0.012	0.943	<0.001	<0.001	6.777	<0.001	<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3	490	428	850	942	564	308	462	394	468	450	<1	mg/l	TM75/PM0
Sulphide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM106/PM0

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Tim Malim

JE Job No.: 12/1723

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	61-66	67-72	73-78	79-84	85-90							
Sample ID	P	Q	S	T	V							
Depth	2.36	1.82	3.32	3.12	1.66							
COC No / misc												
Containers	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P							
Sample Date	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012							
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid							
Batch Number	1	1	1	1	1							
Date of Receipt	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012							

Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
Total Dissolved Iron	<0.0047	0.0131	0.0156	0.0844	1.9220						<0.0047	mg/l	TM30/PM14
Dissolved Manganese	2.3170	0.0336	0.3080	1.0960	8.6010						<0.0015	mg/l	TM30/PM14
Dissolved Sodium	22.8	549.6	310.8	44.9	38.4						<0.1	mg/l	TM30/PM14
Sulphate	876.01	57.52	71.68	29.81	974.34						<0.05	mg/l	TM38/PM0
Chloride	23.2	750.0	577.0	75.9	34.5						<0.3	mg/l	TM38/PM0
Nitrate as NO3	32.0	23.7	15.9	<0.2	<0.2						<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	14.90	10.61	5.04	13.55	<0.06						<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4	0.40	<0.03	0.17	5.96	1.83						<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	<0.001	0.005	2.024	0.026						<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3	242	374	308	378	NDP						<1	mg/l	TM75/PM0
Sulphide	<0.01	<0.01	<0.01	<0.01	<0.01						<0.01	mg/l	TM106/PM0

All solid results are expressed on a dry weight basis unless stated otherwise.

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Tim Malim

JE Job No.: 12/1723

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	1-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60
Sample ID	AB	AC	AE	AF	AG	F2	L	M	N1	O
Depth	1.77	2.42	2.58	2.77	1.53	1.05	1.18	1.47	1.54	1.49
COC No / misc										
Containers	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P
Sample Date	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Batch Number	1	1	1	1	1	1	1	1	1	1
Date of Receipt	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012

Please see attached notes for all abbreviations and acronyms

LOD	Units	Method No.	
<0.01	pH units	TM73/PM0	pH[1]

All solid results are expressed on a dry weight basis unless stated otherwise

Jones Environmental Laboratory

Client Name:	SLR Consulting Ltd
Reference:	406.00889.00005
Location:	NANTWICH
Contact:	Tim Malim
JE Job No.:	12/1723

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	61-66	67-72	73-78	79-84	85-90						LOD	Units	Method No.
Sample ID	P	Q	S	T	V								
Depth	2.36	1.82	3.32	3.12	1.66								
COC No / misc													
Containers	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P	V H HCL Z P								
Sample Date	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012								
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	21/02/2012	21/02/2012	21/02/2012	21/02/2012	21/02/2012								
pH[1]	8.08	8.30	8.07	8.22	3.41						<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise

Jones Environmental Laboratory

Client Name:	SLR Consulting Ltd
Reference:	406.00889.00005
Location:	NANTWICH
Contact:	Mark Swain
JE Job No.:	13/2410

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	1-5	6-10	11-15	16-20	21-25	26-31	32-36	37-41	42-47	48-52	LOD	Units	Method No.
Sample ID	AB	AC	AE	AF	AG	F2	L	M	N1	O			
Depth	1.44	2.45	2.58	2.84	1.67	1.07	2.16	1.51	1.48	1.49			
COC No / misc													
Containers	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G			
Sample Date	27/02/2013	27/02/2013	27/02/2013	27/02/2013	27/02/2013	26/02/2013	27/02/2013	28/02/2013	26/02/2013	28/02/2013			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013			
Total Dissolved Iron #	<0.02	9.41	<0.02	0.03	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/l	TM30/PM14
Dissolved Manganese #	<0.002	3.028	2.098	1.088	1.184	0.769	0.033	0.178	1.071	1.310	<0.002	mg/l	TM30/PM14
Dissolved Sodium #	111.9	582.1	180.4	399.9	1595.0	138.7	29.5	170.2	22.0	119.5	<0.1	mg/l	TM30/PM14
Sulphate #	185.47	166.70	178.47	8.10	263.53	48.83	48.66	97.02	69.26	29.73	<0.05	mg/l	TM38/PM0
Chloride #	265.3	1094.1	521.9	683.2	3924.5	246.0	28.5	292.5	28.2	150.1	<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	99.8	<0.2	1.4	<0.2	0.8	0.3	11.8	10.9	<0.2	<0.2	<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	9.47	<0.06	9.90	14.03	0.74	9.80	6.49	5.66	0.48	2.98	<0.06	mg/l	TM38/PM0
Total Ammonia as NH4 #	<0.03	1.89	11.77++	40.34++	1.35	2.19	5.54	0.04	1.16	9.59	<0.03	mg/l	TM38/PM0
Dissolved Methane	0.007	<0.001	<0.001	4.019	<0.001	<0.001	0.012	<0.001	2.783	<0.001	<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3 #	498	528	828	860	640	300	114	312	392	436	<1	mg/l	TM75/PM0
pH #	7.30	6.76	6.98	7.09	6.84	7.04	6.79	7.04	7.10	7.14	<0.01	pH units	TM73/PM0
Sulphide	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM106/PM0

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: SLR Consulting Ltd

Reference: 406.00889.00005

Location: NANTWICH

Contact: Mark Swain

JE Job No.: 13/2410

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	53-57	58-62	63-67	68-72	73-77						LOD	Units	Method No.
Sample ID	P	Q	S	T	V								
Depth	3.18	1.82	3.21	3.03	1.55								
COC No / misc													
Containers	V H Z G	V H Z G	V H Z G	V H Z G	V H Z G								
Sample Date	28/02/2013	27/02/2013	28/02/2013	28/02/2013	27/02/2013								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water								
Batch Number	1	1	1	1	1								
Date of Receipt	02/03/2013	02/03/2013	02/03/2013	02/03/2013	02/03/2013								
Total Dissolved Iron #	0.03	<0.02	<0.02	<0.02	15.45						<0.02	mg/l	TM30/PM14
Dissolved Manganese #	3.746	0.058	0.305	0.504	1.169						<0.002	mg/l	TM30/PM14
Dissolved Sodium #	21.4	880.5	257.8	35.2	27.2						<0.1	mg/l	TM30/PM14
Sulphate #	1117.14	52.64	79.60	107.35	127.49						<0.05	mg/l	TM38/PM0
Chloride #	26.6	1379.8	427.9	51.8	22.2						<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	9.6	12.2	9.4	6.3	<0.2						<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4 #	7.88	6.71	6.19	9.77	17.99						<0.06	mg/l	TM38/PM0
Total Ammonia as NH4 #	0.22	0.15	0.29	2.71	0.18						<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	<0.001	0.011	<0.001	0.006						<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3 #	254	232	368	288	66						<1	mg/l	TM75/PM0
pH #	6.30	6.92	6.90	6.87	5.75						<0.01	pH units	TM73/PM0
Sulphide	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/l	TM106/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: SLR Consulting Ltd
Reference: 406.00889.00005
Location: Nantwich
Contact: Mark Swain
JE Job No.: 14/3458

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	1-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60	LOD	Units	Method No.
Sample ID	AB	AC	AE	AF	AG	F2	L	M	N1	O			
Depth	2.65	3.2	3.25	3.25	2.3	2.65	2.9	2.6	2.2	2.45			
COC No / misc													
Containers	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P			
Sample Date	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014	25/02/2014	26/02/2014			
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014			
Total Dissolved Iron	<0.02	19	0.18	5.8	0.037	0.04	<0.02	0.037	0.84	0.029	<0.02	mg/l	TM30/PM14
Dissolved Manganese	<0.002	3.2	3.9	1.7	0.044	0.35	0.03	0.12	0.92	0.75	<0.002	mg/l	TM30/PM14
Dissolved Potassium	15	51	65	57	5.2	30	14	24	11	17	<0.1	mg/l	TM30/PM14
Dissolved Sodium	110	510	270	350	390	91	21	150	24	29	<0.1	mg/l	TM30/PM14
Sulphate	95	170	320	6.3	31	44	41	110	51	32	<0.05	mg/l	TM38/PM0
Chloride	210	920	790	600	490	150	27	240	29	18	<0.3	mg/l	TM38/PM0
Nitrate as NO3	53	0.75	1.7	0.80	2.0	1.7	22	13	0.80	2.2	<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	9.4	<0.06	9.2	12	<0.06	6.3	6.3	2.5	0.55	4.6	<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4	<0.03	3.0	13	41	0.11	1.6	0.54	0.033	1.3	1.6	<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	<0.001	<0.001	0.11	<0.001	<0.001	<0.001	<0.001	2.2	<0.001	<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3	450	530	840	830	140	280	88	350	400	260	<1	mg/l	TM75/PM0
Manganese II	20	3.9	4.6	1.4	<0.02	0.36	0.023	0.11	0.97	0.75	<0.02	mg/l	TM62/PM0
pH	7.4	6.9	7.1	7.3	7.7	7.3	7.0	7.2	7.5	7.5	<0.01	pH units	TM73/PM0
Sulphide	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM106/PM0
Dissolved Iron II	0.30	0.03	0.05	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/l	TM48/PM0
Dissolved Iron III	<0.02	18.97	0.13	5.77	0.04	0.04	<0.02	0.04	0.84	0.03	<0.02	mg/l	TM30/TM48/PM0
Manganese IV (by calculation)	<0.40	<0.10	<0.10	0.30	0.22	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	mg/l	TM62/TM30/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: SLR Consulting Ltd
Reference: 406.00889.00005
Location: Nantwich
Contact: Mark Swain
JE Job No.: 14/3458

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

J E Sample No.	61-66	67-72	73-78	79-84	85-90						LOD	Units	Method No.
Sample ID	P	Q	S	T	V								
Depth	3.5	2.75	3.4	3.5	2.7								
COC No / misc													
Containers	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P	V H HN Z P								
Sample Date	26/02/2014	25/02/2014	25/02/2014	25/02/2014	25/02/2014								
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	01/03/2014	01/03/2014	01/03/2014	01/03/2014	01/03/2014								
Total Dissolved Iron	0.37	0.27	<0.02	0.077	0.83						<0.02	mg/l	TM30/PM14
Dissolved Manganese	0.47	0.026	0.20	0.084	0.31						<0.002	mg/l	TM30/PM14
Dissolved Potassium	32	11	29	11	0.46						<0.1	mg/l	TM30/PM14
Dissolved Sodium	17	250	240	34	29						<0.1	mg/l	TM30/PM14
Sulphate	520	25	70	45	66						<0.05	mg/l	TM38/PM0
Chloride	22	290	430	62	36						<0.3	mg/l	TM38/PM0
Nitrate as NO3	11	8.4	15	13	0.97						<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	7.8	11	4.7	5.6	19						<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4	0.15	0.04	0.41	0.18	0.093						<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	0.0056	<0.001	<0.001	<0.001						<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3	230	280	330	220	86						<1	mg/l	TM75/PM0
Manganese II	0.62	0.036	0.22	0.15	0.26						<0.02	mg/l	TM62/PM0
pH	6.7	7.0	7.1	7.1	6.2						<0.01	pH units	TM73/PM0
Sulphide	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/l	TM106/PM0
Dissolved Iron II	<0.02	<0.02	<0.02	<0.02	0.02						<0.02	mg/l	TM48/PM0
Dissolved Iron III	0.37	0.27	<0.02	0.08	0.81						<0.02	mg/l	TM30/TM48/PM0
Manganese IV (by calculation)	<0.02	<0.02	0.02	<0.02	0.06						<0.02	mg/l	TM62/TM30/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: SLR Consulting Ltd
Reference: 406.00889.00005
Location: Nantwich Town
Contact: Mark Swain
JE Job No.: 15/4279

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

J E Sample No.	1-7	8-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	LOD/LOR	Units	Method No.
Sample ID	AC	N1	AE	AF	AB	M	O	Q	S	V			
Depth	3.5	2.2	3.5	3.8	2.8	2.5	2.5	2.8	3.287	2.8			
COC No / misc													
Containers	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G			
Sample Date	23/02/2015	23/02/2015	23/02/2015	23/02/2015	23/02/2015	23/02/2015	24/02/2015	24/02/2015	24/02/2015	24/02/2015			
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015			
Total Dissolved Iron	17	0.39	0.78	5.4	<0.02	<0.02	0.66	0.12	<0.02	29	<0.02	mg/l	TM30/PM14
Dissolved Manganese	2.4	0.57	0.85	1.1	<0.002	0.22	1.3	0.017	0.16	5.0	<0.002	mg/l	TM30/PM14
Dissolved Sodium	470$_A$	25	180	420$_A$	110	180	46	200	200	28	<0.1	mg/l	TM30/PM14
Sulphate	180	86	69	0.94	96	110	12	21	65	420	<0.05	mg/l	TM38/PM0
Chloride	780	28	370	730	170	340	39	240	270	25	<0.3	mg/l	TM38/PM0
Nitrate as NO3	0.6	4.4	6.2	2.3	89	14	15	29	6.6	0.4	<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	4.3	1.3	10	15	9.8	7.6	8.8	14	5.6	0.14	<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4	1.34	1.48	14.21	41.04	<0.03	<0.03	2.71	0.03	0.07	1.54	<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	2.300	<0.001	1.000	<0.001	<0.001	<0.001	0.005	<0.001	0.010	<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3	520	430	660	820	450	320	330	310	350	110	<1	mg/l	TM75/PM0
Sulphide	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM106/PM0
Dissolved Iron II	15$_A$	0.42	0.87	5.5$_A$	<0.02	<0.02	0.31	<0.02	0.10	26$_D$	<0.02	mg/l	TM48/PM0
Dissolved Iron III	2.00$_A$	<0.02	<0.02	<0.10$_A$	<0.02	<0.02	0.35	0.12	<0.02	3.00$_D$	<0.02	mg/l	TM30/TM48/PM0
Manganese II	4.2$_A$	0.63	1.0$_A$	1.7$_A$	<0.02	0.22	1.4$_A$	0.03	1.2$_A$	8.0$_D$	<0.02	mg/l	TM62/PM0
Dissolved Manganese IV (by calculation)	<0.10$_A$	<0.02	<0.10$_A$	<0.10$_A$	<0.02	<0.02	<0.10$_A$	<0.02	<0.10$_A$	<0.20$_D$	<0.02	mg/l	TM62/TM30/PM0
pH	7.3	7.5	7.2	7.3	7.5	7.2	7.4	7.2	7.3	6.5	<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: SLR Consulting Ltd
Reference: 406.00889.00005
Location: Nantwich Town
Contact: Mark Swain
JE Job No.: 15/4279

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

J E Sample No.	71-77	78-84	85-91	92-98	99-105						LOD/LOR	Units	Method No.
Sample ID	T	L	AG	F1	P1								
Depth	3.075	3.2	2.4	2.6	3.75								
COC No / misc													
Containers	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G	V HN HCL Z P G								
Sample Date	24/02/2015	26/02/2015	26/02/2015	26/02/2015	26/02/2015								
Sample Type	Liquid	Liquid	Liquid	Liquid	Liquid								
Batch Number	1	1	1	1	1								
Date of Receipt	28/02/2015	28/02/2015	28/02/2015	28/02/2015	28/02/2015								
Total Dissolved Iron	0.10	0.07	0.04	<0.02	<0.02						<0.02	mg/l	TM30/PM14
Dissolved Manganese	0.12	0.74	2.9	0.73	0.43						<0.002	mg/l	TM30/PM14
Dissolved Sodium	31	170	5500$_E$	120	13						<0.1	mg/l	TM30/PM14
Sulphate	30	98	250	360	310						<0.05	mg/l	TM38/PM0
Chloride	42	200	9000	230	15						<0.3	mg/l	TM38/PM0
Nitrate as NO3	8.0	0.8	0.7	9.3	18						<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	5.4	1.8	<0.06	3.2	16						<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH4	0.52	16.66	4.95	1.98	0.04						<0.03	mg/l	TM38/PM0
Dissolved Methane	<0.001	0.047	0.970	0.003	<0.001						<0.001	mg/l	TM25/PM0
Total Alkalinity as CaCO3	230	390	400	320	200						<1	mg/l	TM75/PM0
Sulphide	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/l	TM106/PM0
Dissolved Iron II	0.05	0.04	2.2	1.6	2.0						<0.02	mg/l	TM48/PM0
Dissolved Iron III	0.05	0.03	<0.02	<0.02	<0.02						<0.02	mg/l	TM30/TM48/PM0
Manganese II	0.16	0.85	6.0$_D$	5.5$_D$	0.89						<0.02	mg/l	TM62/PM0
Dissolved Manganese IV (by calculation)	<0.02	<0.02	<0.20$_D$	<0.20$_D$	<0.02						<0.02	mg/l	TM62/TM30/PM0
pH	7.3	7.5	7.2	7.2	6.7						<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

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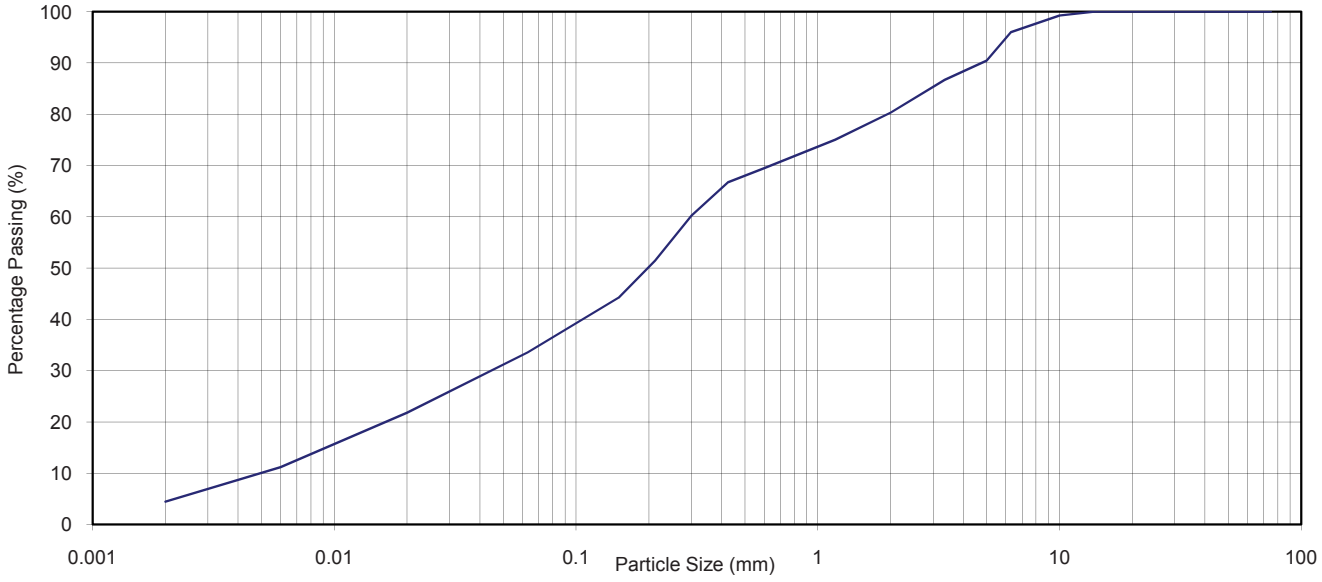
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**1**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	99
6.30	96
5.00	90
3.35	87
2.00	80
1.18	75
0.600	70
0.425	67
0.300	60
0.212	51
0.150	44
0.063	34
0.020	22
0.006	11
0.002	4

Sample Description
MADE GROUND (Dark grey slightly clayey silty gravelly SAND. Gravel is of brick, clinker and wood fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	19.7
Sand	46.7
Silt	29.1
Clay	4.4

Remarks

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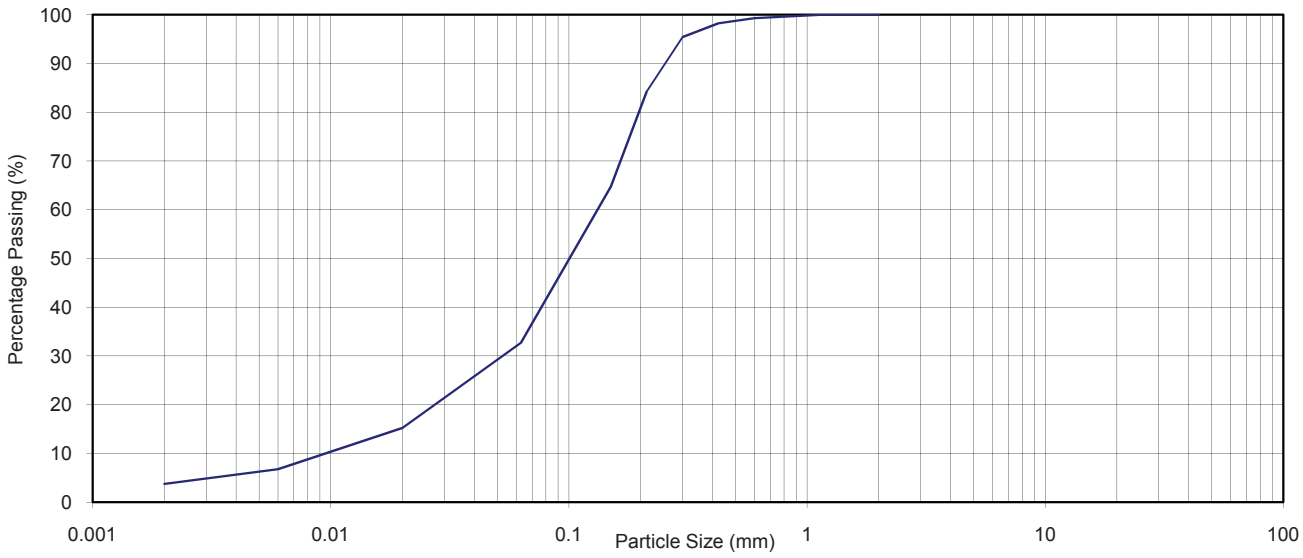
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**2**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.30	100
5.00	100
3.35	100
2.00	100
1.18	100
0.600	99
0.425	98
0.300	95
0.212	84
0.150	65
0.063	33
0.020	15
0.006	7
0.002	4

Sample Description
Dark grey slightly clayey silty SAND

Sample Proportions %	
Cobbles	0.0
Gravel	0.0
Sand	67.3
Silt	29.0
Clay	3.7

Remarks

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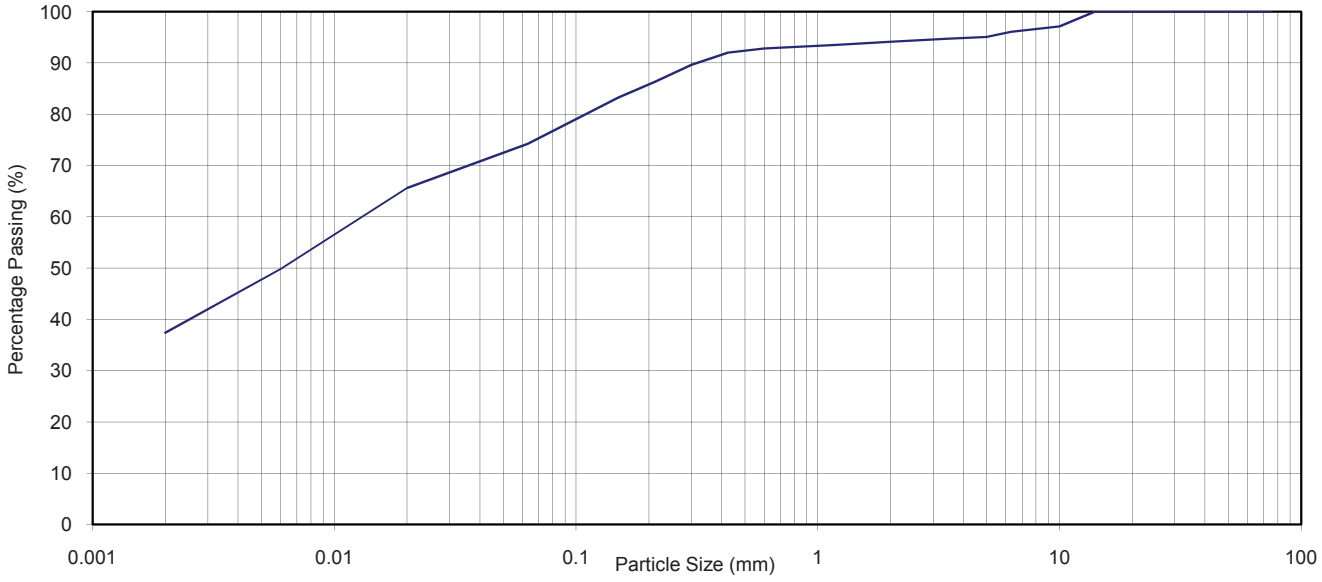
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**3**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	97
6.30	96
5.00	95
3.35	95
2.00	94
1.18	94
0.600	93
0.425	92
0.300	90
0.212	86
0.150	83
0.063	74
0.020	66
0.006	50
0.002	37

Sample Description
MADE GROUND (Reddish brown slightly gravelly slightly sandy silty CLAY. Gravel is of sandstone and occasional clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	5.9
Sand	19.9
Silt	36.9
Clay	37.4

Remarks

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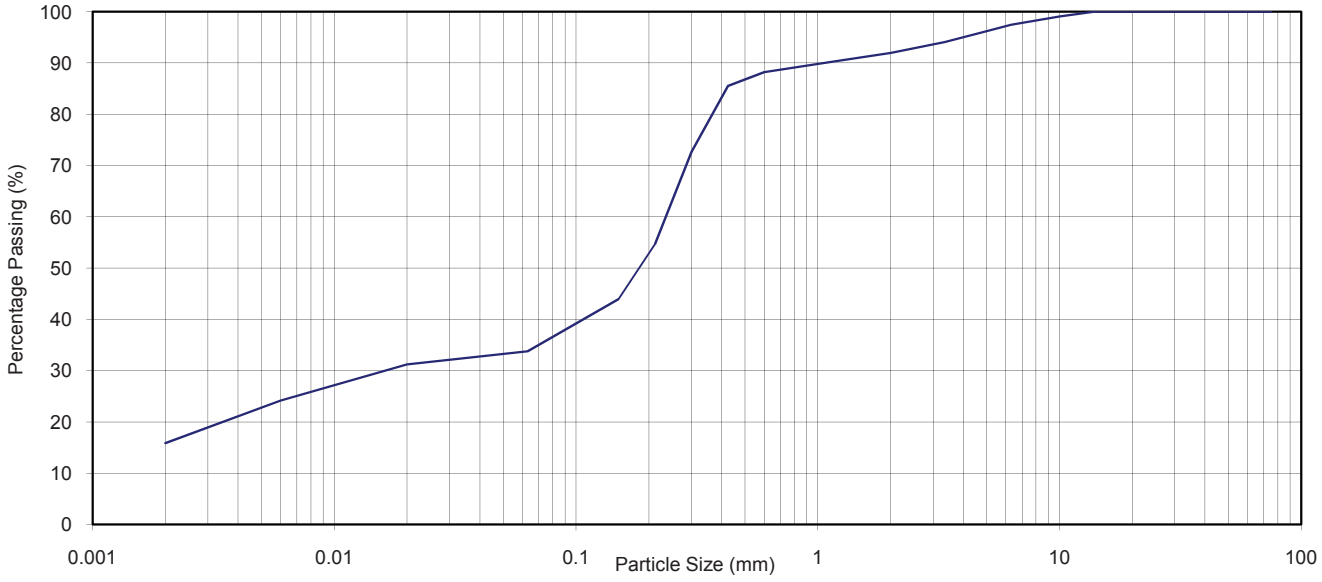
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**4**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	99
6.30	97
5.00	96
3.35	94
2.00	92
1.18	90
0.600	88
0.425	86
0.300	73
0.212	55
0.150	44
0.063	34
0.020	31
0.006	24
0.002	16

Sample Description
MADE GROUND (Dark grey clayey silty gravelly SAND. Gravel is of sandstone, brick and clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	8.0
Sand	58.2
Silt	17.9
Clay	15.9

Remarks

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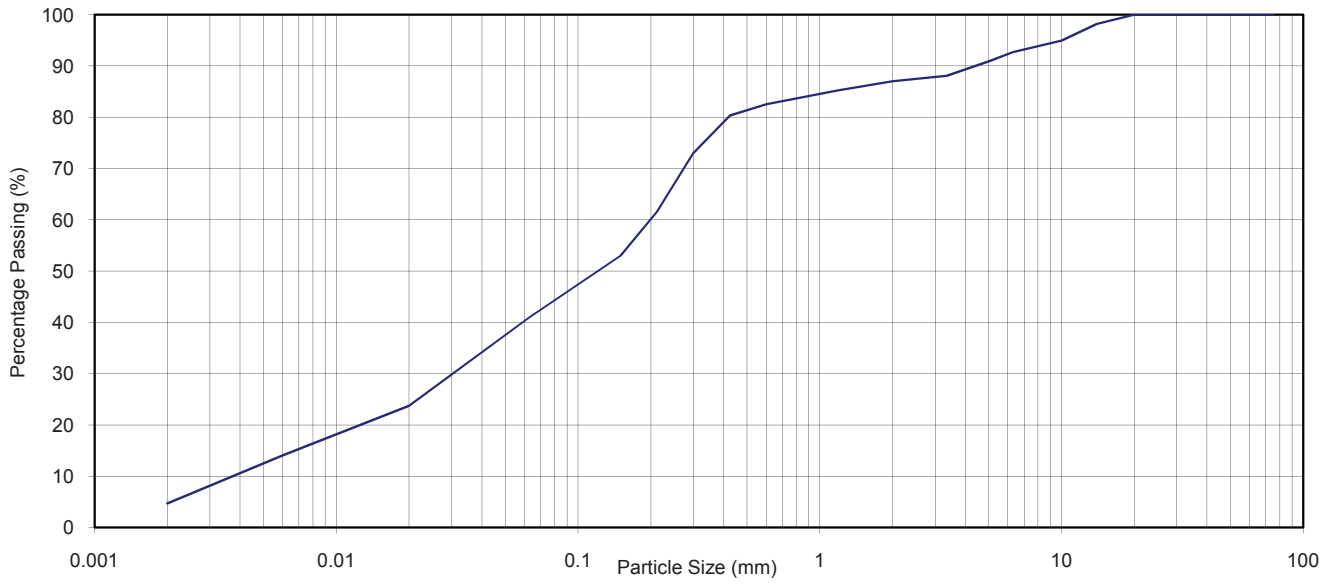
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**5**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	98
10.0	95
6.30	93
5.00	91
3.35	88
2.00	87
1.18	85
0.600	83
0.425	80
0.300	73
0.212	62
0.150	53
0.063	41
0.020	24
0.006	14
0.002	5

Sample Description
MADE GROUND (Dark grey slightly gravelly sandy clayey SILT. Gravel is of flint, brick and clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	13.0
Sand	46.0
Silt	36.3
Clay	4.7

Remarks

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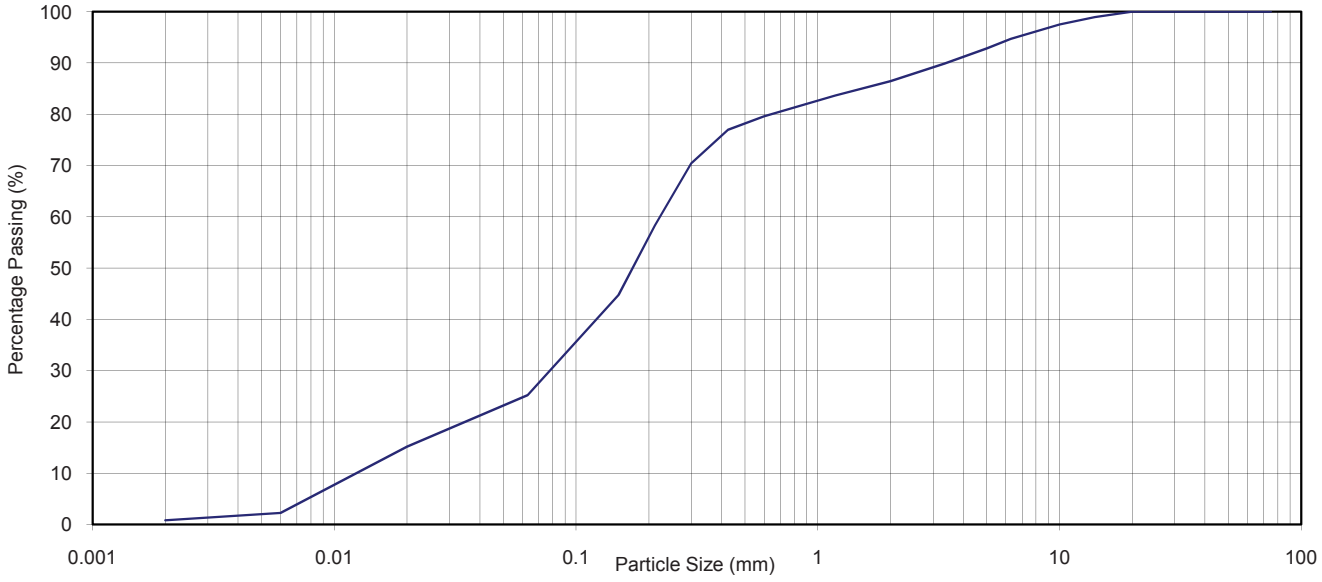
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**6**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	99
10.0	98
6.30	95
5.00	93
3.35	90
2.00	86
1.18	84
0.600	80
0.425	77
0.300	71
0.212	58
0.150	45
0.063	25
0.020	15
0.006	2
0.002	1

Sample Description
MADE GROUND (Dark brown slightly clayey silty gravelly SAND. Gravel is of wood and clinker fragments)

Sample Proportions %	
Cobbles	0.0
Gravel	13.5
Sand	61.3
Silt	24.4
Clay	0.8

Remarks

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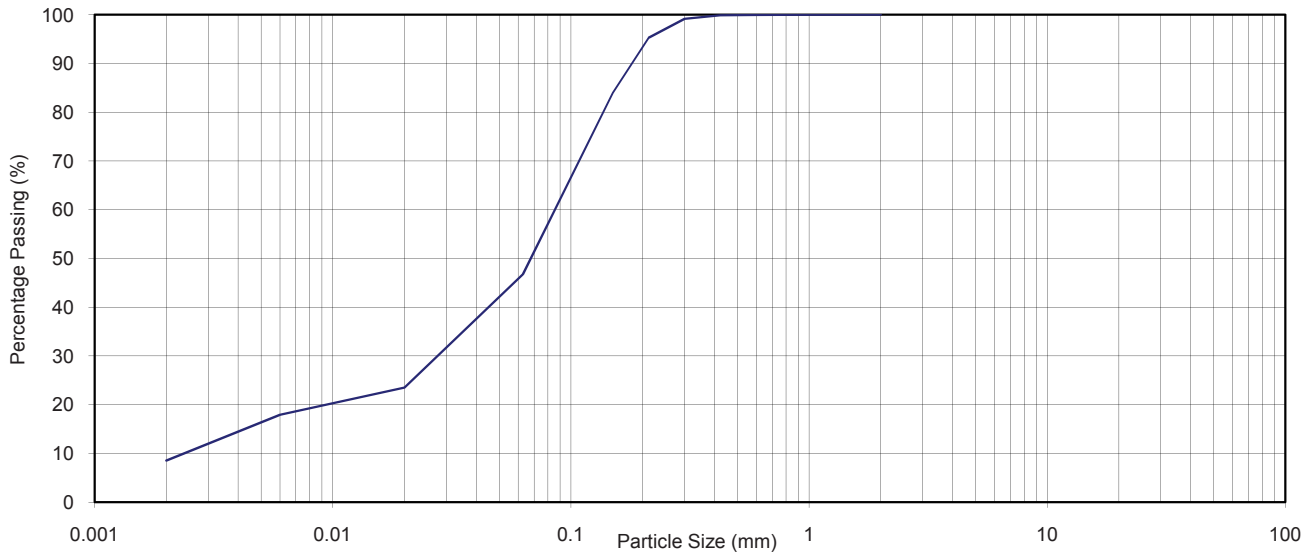
PROJECT NAME:	**2015**	**BH/TP No.:**	**N/A**
PROJECT NUMBER:	**L15646**	**Depth (m):**	**N/A**
CLIENT:	**Jones Environmental Laboratory**	**Sample No.:**	**7**
DATE OF ISSUE:	**16/02/2011**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING & BS1377 : PART 2 : 1990 : CLAUSE 9.4 - SEDIMENTATION BY PIPETTE



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	100
6.30	100
5.00	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.300	99
0.212	95
0.150	84
0.063	47
0.020	23
0.006	18
0.002	9

Sample Description
Dark grey sandy clayey SILT

Sample Proportions %	
Cobbles	0.0
Gravel	0.0
Sand	53.3
Silt	38.2
Clay	8.5

Remarks

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Date	Groundwater Depth (m below ground level)						Rainfall (mm)	Rainfall (mm) Data From Liverpool John Moores University
	F1	P	N1	AB	AE	AF		
26/01/2011	1.191	3.27147	1.658	1.72983	2.517	2.784	0	
27/01/2011	1.273	3.28025	1.689	1.74794	2.617	2.850	0.402	
28/01/2011	1.299	3.27382	1.699	1.74481	2.624	2.849	0	
29/01/2011	1.298	3.27454	1.704	1.75165	2.611	2.839	0	
30/01/2011	1.298	3.2794	1.712	1.75907	2.623	2.845	0	
31/01/2011	1.305	3.28611	1.721	1.76605	2.631	2.851	0	
01/02/2011	1.309	3.28742	1.726	1.77287	2.581	2.841	0	
02/02/2011	1.413	3.28416	1.732	1.70773	2.746	2.829	1.407	
03/02/2011	1.425	3.29351	1.741	1.72298	2.746	2.834	0	
04/02/2011	1.406	3.29413	1.737	1.72627	2.688	2.798	0	
05/02/2011	1.419	3.29734	1.742	1.73566	2.716	2.812	0.402	
06/02/2011	1.400	3.30278	1.751	1.75063	2.766	2.843	0.402	
07/02/2011	1.422	3.30351	1.755	1.75098	2.743	2.828	1.809	
08/02/2011	1.471	3.31245	1.764	1.76653	2.807	2.867	0	
09/02/2011	1.450	3.30596	1.761	1.76451	2.747	2.833	0	
10/02/2011	1.456	3.31055	1.763	1.77312	2.734	2.824	0.804	
11/02/2011	1.337	3.3001	1.704	1.77588	2.722	2.818	4.02	
12/02/2011	1.280	3.28985	1.669	1.78192	2.724	2.820	0.402	
13/02/2011	1.351	3.28717	1.659	1.77077	2.661	2.784	4.02	
14/02/2011	1.132	3.27127	1.467	1.76427	2.649	2.784	5.427	
15/02/2011	1.150	3.26598	1.610	1.74371	2.610	2.744	2.613	
16/02/2011	1.164	3.27391	1.628	1.73933	2.618	2.753	0	
17/02/2011	1.194	3.28095	1.651	1.73478	2.706	2.799	0.603	
18/02/2011	1.209	3.28757	1.676	1.73428	2.759	2.831	0	
19/02/2011	1.176	3.28321	1.683	1.72602	2.717	2.804	0	
20/02/2011	1.085	3.28242	1.629	1.72967	2.748	2.823	4.422	
21/02/2011	1.097	3.28383	1.660	1.72396	2.721	2.802	0	
22/02/2011	1.101	3.28463	1.670	1.72266	2.725	2.802	0.201	
23/02/2011	1.113	3.28604	1.678	1.72527	2.725	2.801	1.005	
24/02/2011	1.061	3.2836	1.626	1.72805	2.741	2.814	3.216	
25/02/2011	1.082	3.28825	1.658	1.72619	2.737	2.808	0	
26/02/2011	0.942	3.24676	1.595	1.71505	2.647	2.754	0	
27/02/2011	1.131	3.23903	1.536	1.68043	2.553	2.646	15.075	
28/02/2011	1.249	3.24495	1.604	1.65724	2.534	2.654	1.809	
01/03/2011	1.305	3.24954	1.633	1.64106	2.589	2.716	0.201	
02/03/2011	1.338	3.24852	1.651	1.62769	2.605	2.753	0	
03/03/2011	1.365	3.25071	1.658	1.61986	2.617	2.784	0	
04/03/2011	1.388	3.25444	1.670	1.62332	2.632	2.798	0	
05/03/2011	1.411	3.2546	1.677	1.6239	2.635	2.804	0	
06/03/2011	1.409	3.26296	1.688	1.63196	2.668	2.823	0.201	
07/03/2011	1.430	3.26254	1.696	1.63844	2.675	2.826	0	
08/03/2011	1.402	3.26041	1.695	1.642	2.641	2.802	0	
09/03/2011	1.4734	3.3329	1.7612	1.697	2.6124	2.8873	0.603	
10/03/2011	1.4897	3.3388	1.7678	1.7096	2.6087	2.9474	0.201	
11/03/2011	1.4918	3.3368	1.7785	1.7177	2.6404	2.9352	0.402	
12/03/2011	1.4897	3.3402	1.7702	1.7259	2.5947	3.0296	0.603	
13/03/2011	1.401	3.336	1.7428	1.7425	2.6659	3.0396	0	
14/03/2011	1.4451	3.3511	1.7827	1.7563	2.747	2.9292	4.824	
15/03/2011	1.442	3.3499	1.7915	1.7591	2.7107	2.9293	0	
16/03/2011	1.4469	3.3521	1.8011	1.7664	2.7068	2.9302	0	
17/03/2011	1.4549	3.3617	1.8043	1.7791	2.7159	2.9195	0	
18/03/2011	1.4585	3.3692	1.8132	1.7891	2.7473	2.852	0	
19/03/2011	1.463	3.3701	1.8251	1.7974	2.7725	2.7705	0	
20/03/2011	1.4358	3.3706	1.8245	1.8017	2.7356	2.7839	0	
21/03/2011	1.4516	3.3804	1.8382	1.814	2.7636	2.757	1.206	
22/03/2011	1.4927	3.3854	1.85	1.822	2.7844	2.712	0	
23/03/2011	1.5079	3.3868	1.857	1.8296	2.7681	2.6885	0	
24/03/2011	1.492	3.3868	1.8582	1.8307	2.7202	2.7267	0	
25/03/2011	1.4729	3.3846	1.8479	1.8359	2.6792	2.8401	0	
26/03/2011	1.4641	3.3837	1.8434	1.8372	2.7022	2.8947	0	
27/03/2011	1.4628	3.3876	1.8526	1.8457	2.7255	2.9166	0	
28/03/2011	1.4615	3.3918	1.8611	1.8534	2.7483	2.9157	0	
29/03/2011	1.453	3.3946	1.8621	1.8612	2.7302	2.9575	0	
30/03/2011	1.3912	3.3822	1.8588	1.861	2.7228	2.9555	0	
31/03/2011	1.4278	3.3869	1.814	1.8767	2.774	2.9534	2.814	
01/04/2011	1.5257	3.3828	1.8391	1.8791	2.7843	2.9699	3.015	
02/04/2011	1.5793	3.3901	1.8459	1.887	2.7789	2.956	0.201	
03/04/2011	1.6108	3.3948	1.8555	1.8944	2.8042	2.9709	0	
04/04/2011	1.5832	3.3859	1.8473	1.8899	2.8067	2.9885	1.407	
05/04/2011	1.6286	3.3978	1.8592	1.9036	2.8233	2.9762	1.608	
06/04/2011	1.6524	3.4001	1.8752	1.9111	2.8518	3.0071	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
07/04/2011	1.6677	3.4009	1.8805	1.9151	2.8775	3.0191	0	
08/04/2011	1.6675	3.4033	1.8849	1.9226	2.8438	3.0297	0	
09/04/2011	1.6653	3.4033	1.8856	1.9269	2.8185	3.0081	0	
10/04/2011	1.6745	3.4063	1.8875	1.9318	2.8222	2.9958	0	
11/04/2011	1.6577	3.4052	1.8857	1.9342	2.8146	2.9952	0	
12/04/2011	1.6602	3.411	1.8914	1.9423	2.859	3.0031	1.005	
13/04/2011	1.6558	3.404	1.8815	1.9414	2.7799	3.0084	1.005	
14/04/2011	1.6699	3.4081	1.8878	1.9473	2.7984	2.9676	0	
15/04/2011	1.6764	3.4113	1.8967	1.9553	2.8188	2.9817	0	
16/04/2011	1.6878	3.416	1.9045	1.9628	2.8437	2.994	0	
17/04/2011	1.6913	3.4189	1.9093	1.9681	2.8491	3.0085	0	
18/04/2011	1.6755	3.4168	1.9083	1.9715	2.7984	3.0071	0	
19/04/2011	1.6677	3.4234	1.9117	1.9784	2.8089	2.9725	0	
20/04/2011	1.6869	3.4251	1.9152	1.9858	2.8219	2.9857	0	
21/04/2011	1.6897	3.4249	1.9182	1.9915	2.8172	2.9928	0	
22/04/2011	1.6895	3.4296	1.9195	1.9986	2.8016	2.9834	0	
23/04/2011	1.4951	3.4241	1.8496	2.0018	2.8513	2.9814	0	
24/04/2011	1.497	3.4242	1.8723	2.0081	2.8794	3.0097	5.025	
25/04/2011	1.4938	3.4306	1.889	2.0138	2.8843	3.0242	0	
26/04/2011	1.4847	3.426	1.895	2.0147	2.8729	3.0274	0	
27/04/2011	1.4819	3.4306	1.9047	2.021	2.8565	3.0183	0	
28/04/2011	1.4684	3.432	1.9071	2.0253	2.8231	3.0099	0	
29/04/2011	1.4617	3.4333	1.9099	2.032	2.8046	2.9795	0	
30/04/2011	1.4662	3.4348	1.9091	2.0419	2.8164	2.9735	0	
01/05/2011	1.4716	3.4338	1.9115	2.0445	2.8302	2.9789	0	
02/05/2011	1.4789	3.4265	1.9181	2.0514	2.8477	2.9869	0	
03/05/2011	1.4875	3.4369	1.9229	2.0573	2.8679	2.9995	0	
04/05/2011	1.4931	3.44	1.9271	2.0601	2.8711	3.0107	0	
05/05/2011	1.4888	3.4415	1.9304	2.063	2.8472	3.0042	0	
06/05/2011	1.4719	3.444	1.9341	2.0698	2.8469	2.98	0	
07/05/2011	1.3277	3.4336	1.8656	2.0725	2.8268	2.985	1.407	
08/05/2011	1.2307	3.4248	1.7798	2.0777	2.8514	2.9731	6.834	
09/05/2011	1.27	3.4228	1.8102	2.084	2.8782	3.0015	5.226	
10/05/2011	1.2731	3.4222	1.8205	2.0875	2.89	3.0126	2.613	
11/05/2011	1.2994	3.4246	1.8231	2.084	2.8539	3.0137	1.005	
12/05/2011	1.3083	3.4216	1.8113	2.0807	2.8445	2.9927	0	
13/05/2011	1.3232	3.3607	1.7951	2.0603	2.7697	2.8951	0.201	
14/05/2011	1.3335	3.3596	1.7814	2.0604	2.7566	2.898	0	
15/05/2011	1.3004	3.366	1.7927	2.0678	2.7961	2.9168	1.206	
16/05/2011	1.3174	3.3719	1.8039	2.0759	2.7786	2.9061	2.412	
17/05/2011	1.3255	3.373	1.8036	2.079	2.7602	2.8964	0.603	
18/05/2011	1.3337	3.3741	1.8053	2.0838	2.7381	2.885	0.201	
19/05/2011	1.3348	3.3759	1.8058	2.0849	2.7745	2.9068	1.608	
20/05/2011	1.3512	3.3766	1.8115	2.092	2.7692	2.9057	0	
21/05/2011	1.3727	3.3775	1.8199	2.0938	2.7905	2.9052	0	
22/05/2011	1.3403	3.3751	1.811	2.0984	2.7313	2.8955	0	
23/05/2011	1.3499	3.3817	1.8212	2.1055	2.7997	2.9153	2.211	
24/05/2011	1.3513	3.3853	1.8153	2.1081	2.8085	2.9398	1.206	
25/05/2011	1.3832	3.3831	1.8254	2.1128	2.8296	2.9217	0	
26/05/2011	1.3467	3.3806	1.8124	2.1156	2.7068	2.8671	0	
27/05/2011	1.2597	3.3801	1.7738	2.1209	2.7921	2.9207	5.226	
28/05/2011	1.2473	3.3773	1.7639	2.124	2.7558	2.8921	2.01	
29/05/2011	1.2765	3.3854	1.7761	2.1299	2.739	2.889	0.201	
30/05/2011	1.3197	3.3885	1.7801	2.1355	2.7728	2.9069	0	
31/05/2011	1.1338	3.3717	1.6745	2.1326	2.7802	2.9248	6.231	
01/06/2011	1.2968	3.3793	1.7359	2.1369	2.8311	2.9456	3.417	
02/06/2011	1.4115	3.3889	1.7579	2.1456	2.8447	2.9535	0.201	
03/06/2011	1.4956	3.3883	1.7633	2.1472	2.8319	2.9369	0	
04/06/2011	1.5346	3.3895	1.757	2.1507	2.7857	2.9034	0	
05/06/2011	1.4962	3.3848	1.7451	2.1516	2.7463	2.8687	0	
06/06/2011	1.43	3.3792	1.7214	2.1544	2.7006	2.8537	2.412	
07/06/2011	1.5058	3.3813	1.7239	2.1549	2.7003	2.85	0.804	
08/06/2011	1.5391	3.3858	1.7268	2.1572	2.7136	2.8667	0	
09/06/2011	1.6045	3.3925	1.7437	2.1628	2.7801	2.9142	1.005	
10/06/2011	1.6316	3.3895	1.7513	2.1631	2.7946	2.9176	0	
11/06/2011	1.6334	3.3915	1.7521	2.1657	2.7896	2.9189	0.201	
12/06/2011	1.5821	3.3874	1.7554	2.1668	2.7892	2.8956	0	
13/06/2011	1.2225	3.3712	1.6461	2.1718	2.7172	2.8942	7.236	
14/06/2011	1.3075	3.3794	1.7092	2.1718	2.8015	2.9188	2.211	
15/06/2011	1.3152	3.3839	1.7286	2.1773	2.7598	2.888	0.201	
16/06/2011	1.3046	3.383	1.7325	2.1774	2.743	2.8821	0.603	
17/06/2011	1.2712	3.3814	1.736	2.1785	2.7481	2.8684	2.211	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
18/06/2011	1.2354	3.3774	1.7291	2.1791	2.6983	2.8588		1.2
19/06/2011	1.2241	3.3846	1.7245	2.1819	2.7707	2.9131		0.8
20/06/2011	1.2274	3.3839	1.7203	2.1828	2.7842	2.9054		0
21/06/2011	1.1222	3.3841	1.6965	2.1876	2.737	2.8856		4
22/06/2011	1.1353	3.3802	1.6989	2.1858	2.7304	2.8861		1.2
23/06/2011	1.1101	3.3801	1.6771	2.1841	2.7631	2.913		4
24/06/2011	1.1526	3.3816	1.6946	2.1794	2.8004	2.9257		0
25/06/2011	0.9898	3.3525	1.5875	2.1782	2.7363	2.8961		4.6
26/06/2011	1.0572	3.3625	1.643	2.1729	2.7629	2.8951		1.2
27/06/2011	1.0996	3.3633	1.6696	2.1721	2.723	2.8706		0
28/06/2011	1.1256	3.3642	1.6833	2.1689	2.7519	2.8883		0
29/06/2011	1.1799	3.3635	1.695	2.1664	2.7696	2.905		0
30/06/2011	1.2299	3.3669	1.7091	2.1661	2.7849	2.9156		0
01/07/2011	1.2738	3.37	1.7208	2.1711	2.7919	2.9163		0
02/07/2011	1.2896	3.3704	1.7227	2.1701	2.7631	2.8913		0
03/07/2011	1.3032	3.3767	1.7285	2.1779	2.75	2.8919		0
04/07/2011	1.3239	3.3801	1.736	2.1816	2.7624	2.8964		0
05/07/2011	1.3316	3.3817	1.7395	2.1862	2.7485	2.8833		0
06/07/2011	1.2954	3.3726	1.7323	2.1875	2.7129	2.8664		8
07/07/2011	1.2263	3.3704	1.7073	2.1884	2.6958	2.8649		4.4
08/07/2011	1.2502	3.3775	1.7138	2.1929	2.7387	2.8803		6
09/07/2011	1.2329	3.3741	1.7279	2.1955	2.7716	2.9149		2.6
10/07/2011	1.2217	3.3798	1.7389	2.1955	2.8229	2.9402		0
11/07/2011	1.2209	3.3812	1.7474	2.1962	2.8296	2.9438		0
12/07/2011	1.2518	3.3847	1.7515	2.201	2.8204	2.9361		0
13/07/2011	1.2835	3.3872	1.7546	2.2042	2.8161	2.9331		0
14/07/2011	1.3172	3.389	1.7556	2.2068	2.8093	2.9282		0
15/07/2011	1.3382	3.3912	1.7548	2.21	2.7993	2.9169		0
16/07/2011	1.3328	3.387	1.7438	2.2153	2.7301	2.8638		0.6
17/07/2011	1.2629	3.3851	1.7286	2.2168	2.7003	2.8619		4.8
18/07/2011	0.9101	3.3509	1.3904	2.2132	2.7197	2.884		5.6
19/07/2011	0.929	3.347	1.4402	2.2044	2.7394	2.9021		3
20/07/2011	1.0244	3.3471	1.5898	2.1936	2.7706	2.9137		1.2
21/07/2011	1.1199	3.3502	1.6292	2.1906	2.782	2.9242		1.2
22/07/2011	1.1828	3.355	1.654	2.19	2.8043	2.9287		0.2
23/07/2011	1.0747	3.3366	1.4535	2.1815	2.761	2.9009		0.4
24/07/2011	1.103	3.339	1.6005	2.1813	2.7319	2.8867		0.4
25/07/2011	1.1377	3.3404	1.6287	2.1824	2.7285	2.8869		0.4
26/07/2011	1.1876	3.3492	1.6585	2.1878	2.7639	2.9138		0.2
27/07/2011	1.232	3.3555	1.6811	2.1934	2.8058	2.9365		0.2
28/07/2011	1.2591	3.3569	1.695	2.1941	2.8017	2.9388		0
29/07/2011	1.2876	3.3613	1.7074	2.2001	2.8054	2.9367		0
30/07/2011	1.298	3.3616	1.7111	2.2012	2.7927	2.9243		0
31/07/2011	1.3014	3.3644	1.7102	2.206	2.7565	2.9011		0
01/08/2011	1.3178	3.3718	1.7153	2.2131	2.7601	2.9057		0
02/08/2011	1.3308	3.3748	1.7167	2.2141	2.7742	2.9189		2.2
03/08/2011	1.3417	3.3764	1.723	2.2193	2.7958	2.926		1.2
04/08/2011	1.3468	3.3774	1.7241	2.2229	2.7726	2.9126		0
05/08/2011	1.2392	3.3744	1.6502	2.2256	2.7867	2.9371		1.2
06/08/2011	1.2684	3.3695	1.6793	2.2264	2.766	2.9122		0.2
07/08/2011	1.2849	3.3755	1.6859	2.2278	2.7407	2.9079		0.6
08/08/2011	1.2597	3.3751	1.6288	2.2295	2.7726	2.9382		4.2
09/08/2011	1.2939	3.384	1.676	2.2354	2.8613	2.9955		0.2
10/08/2011	1.3228	3.3805	1.707	2.2321	2.8556	2.9641		0.2
11/08/2011	1.0916	3.3636	1.4788	2.2379	2.7542	2.9099		5.2
12/08/2011	1.1301	3.3674	1.6066	2.2367	2.7707	2.9187		1.8
13/08/2011	1.1451	3.3653	1.6345	2.2369	2.734	2.8971		1.4
14/08/2011	1.1897	3.3709	1.6512	2.2376	2.752	2.913		0
15/08/2011	1.2472	3.3751	1.672	2.238	2.8018	2.9427		1
16/08/2011	1.2632	3.3739	1.6921	2.242	2.7949	2.9394		1.8
17/08/2011	1.2684	3.379	1.703	2.2427	2.8119	2.9507		0.4
18/08/2011	1.2932	3.3802	1.7126	2.2425	2.8021	2.9376		0
19/08/2011	1.3791	3.3772	1.6201	2.2999	2.7801	2.9363		0
20/08/2011	1.3908	3.3822	1.6255	2.3045	2.7784	2.9316		0
21/08/2011	1.3842	3.3814	1.6273	2.3057	2.7579	2.9257		0
22/08/2011	1.41	3.3881	1.6393	2.3086	2.8098	2.9562		0.6
23/08/2011	1.4144	3.3895	1.6461	2.3142	2.793	2.9352		0
24/08/2011	1.4268	3.3891	1.6433	2.3146	2.7681	2.9273		0
25/08/2011	1.4369	3.3824	1.6436	2.3164	2.7681	2.9304		0.4
26/08/2011	1.3909	3.3819	1.6357	2.3168	2.7591	2.9201		1.2
27/08/2011	1.2814	3.3705	1.3241	2.3206	2.7763	2.9422		12.4
28/08/2011	1.065	3.3498	1.2518	2.3104	2.7374	2.9294		9.4

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
29/08/2011	1.1196	3.3477	1.4536	2.3053	2.7421	2.9251		0.2
30/08/2011	1.1532	3.3477	1.4854	2.3039	2.7403	2.9181		1.2
31/08/2011	1.2042	3.3481	1.507	2.3032	2.7343	2.9086		0.4
01/09/2011	1.2469	3.3523	1.522	2.3057	2.7369	2.9031		0
02/09/2011	1.268	3.3536	1.5301	2.3068	2.717	2.8964		0
03/09/2011	1.2961	3.3562	1.5428	2.3117	2.715	2.891		0
04/09/2011	1.3196	3.364	1.5476	2.3129	2.722	2.8928		6.8
05/09/2011	1.334	3.3619	1.559	2.3118	2.7207	2.9091		0.8
06/09/2011	1.3257	3.3598	1.5734	2.3139	2.7259	2.9073		3.2
07/09/2011	1.3333	3.3718	1.5841	2.3173	2.7641	2.9291		0.4
08/09/2011	1.3283	3.3685	1.5959	2.3199	2.7599	2.9255		1.2
09/09/2011	1.3477	3.374	1.6066	2.3257	2.7712	2.9351		0.2
10/09/2011	1.3233	3.3745	1.6122	2.3293	2.7533	2.9091		0
11/09/2011	1.3311	3.3783	1.6123	2.3284	2.7474	2.918		0.4
12/09/2011	1.3214	3.3733	1.6181	2.3309	2.7359	2.9224		1.4
13/09/2011	1.3423	3.3858	1.6321	2.3324	2.8283	2.9665		2.6
14/09/2011	1.3686	3.3901	1.6405	2.3326	2.8497	2.9868		1
15/09/2011	1.3951	3.3901	1.6494	2.3361	2.8654	2.9923		0
16/09/2011	1.4028	3.3909	1.6478	2.3385	2.832	2.9509		0
17/09/2011	1.308	3.3828	1.6052	2.3416	2.7692	2.9182		4.2
18/09/2011	1.2369	3.3759	1.4581	2.3377	2.7609	2.9253		1.4
19/09/2011	1.2773	3.3871	1.565	2.3431	2.8152	2.9527		1.4
20/09/2011	1.0396	3.3903	1.5925	2.3429	2.825	2.9606		0
21/09/2011	1.1054	3.3705	1.4426	2.3384	2.8111	2.9544	0	
22/09/2011	1.1892	3.3744	1.5168	2.3406	2.8096	2.9362	0.603	
23/09/2011	1.2102	3.3764	1.5475	2.3403	2.8117	2.9475	0	
24/09/2011	1.2449	3.3787	1.5544	2.342	2.7818	2.9256	0	
25/09/2011	1.2825	3.3828	1.5671	2.3441	2.7973	2.9201	0.201	
26/09/2011	1.3427	3.39	1.5844	2.3476	2.8175	2.9259	0.402	
27/09/2011	1.3599	3.3915	1.6046	2.3463	2.865	2.9734	0	
28/09/2011	1.3705	3.3963	1.616	2.3523	2.853	2.9741	0	
29/09/2011	1.3831	3.3965	1.6174	2.3539	2.8333	2.9575	0	
30/09/2011	1.3955	3.3991	1.6213	2.3565	2.8295	2.9524	0	
01/10/2011	1.4117	3.3997	1.6269	2.3581	2.8472	2.956	0	
02/10/2011	1.4204	3.4001	1.6328	2.3591	2.8522	2.9664	0	
03/10/2011	1.4077	3.401	1.6328	2.3623	2.8253	2.9498	0	
04/10/2011	1.438	3.4025	1.6346	2.3609	2.8429	2.9319	0.603	
05/10/2011	1.4331	3.4003	1.6333	2.3644	2.821	2.9503	0	
06/10/2011	1.3867	3.3993	1.624	2.3628	2.7957	2.927	0	
07/10/2011	1.239	3.3815	1.2906	2.3627	2.8339	2.9479	3.216	
08/10/2011	1.1508	3.3693	1.3664	2.3624	2.8381	2.9703	15.477	
09/10/2011	1.0249	3.3565	1.1511	2.3638	2.7806	2.9342	2.211	
10/10/2011	1.0877	3.3504	1.3792	2.3529	2.7529	2.9007	9.447	
11/10/2011	1.1504	3.3547	1.4658	2.354	2.7692	2.901	0	
12/10/2011	1.1736	3.3546	1.5045	2.349	2.7987	2.9214	0.804	
13/10/2011	1.2083	3.355	1.5355	2.3454	2.839	2.9433	0.603	
14/10/2011	1.2215	3.3521	1.5552	2.346	2.8427	2.9613	0	
15/10/2011	1.2419	3.3464	1.5552	2.3404	2.8111	2.9384	0	
16/10/2011	1.2776	3.3433	1.5586	2.3406	2.7885	2.9196	0	
17/10/2011	1.2448	3.3465	1.5696	2.3438	2.7882	2.9196	0	
18/10/2011	1.1931	3.3329	1.5134	2.3407	2.7422	2.8878	2.01	
19/10/2011	1.2217	3.3382	1.5512	2.3424	2.8007	2.9019	2.814	
20/10/2011	1.1933	3.3263	1.4797	2.339	2.8514	2.9522	4.623	
21/10/2011	1.1954	3.3252	1.5179	2.3408	2.8068	2.9459	1.206	
22/10/2011	1.1963	3.3277	1.5457	2.3412	2.785	2.9187	0	
23/10/2011	1.2252	3.3293	1.5502	2.3423	2.7416	2.882	0	
24/10/2011	1.2383	3.3324	1.5559	2.3449	2.7208	2.8717	0	
25/10/2011	1.2578	3.3319	1.5644	2.3437	2.7386	2.8709	0	
26/10/2011	1.2858	3.3313	1.5799	2.343	2.8008	2.9122	1.005	
27/10/2011	1.2667	3.3308	1.595	2.3438	2.8345	2.9386	0.201	
28/10/2011	1.2113	3.3269	1.5171	2.3462	2.8885	2.9676	3.417	
29/10/2011	1.2101	3.3204	1.5623	2.3403	2.8547	2.9744	1.407	
30/10/2011	1.2532	3.3299	1.5711	2.3433	2.8206	2.9351	0	
31/10/2011	1.2511	3.3323	1.5864	2.3464	2.8121	2.9358	0.201	
01/11/2011	1.2451	3.3182	1.5826	2.3412	2.7853	2.9075	0.201	
02/11/2011	1.1371	3.3056	1.4788	2.3334	2.7881	2.9185	7.236	
03/11/2011	1.1365	3.3103	1.5101	2.3336	2.7197	2.8656	0	
04/11/2011	1.0867	3.2977	1.4609	2.3272	2.7363	2.8622	3.417	
05/11/2011	1.0316	3.2844	1.2081	2.3211	2.8075	2.9111	0.603	
06/11/2011	1.1077	3.288	1.4546	2.3106	2.8679	2.9565	7.035	
07/11/2011	1.1461	3.2818	1.5093	2.2962	2.8508	2.9683	0	
08/11/2011	1.1536	3.2865	1.5264	2.3017	2.7831	2.9175	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
09/11/2011	1.1793	3.288	1.5342	2.2978	2.7764	2.9004	0.402	
10/11/2011	1.193	3.2955	1.5508	2.3001	2.8042	2.9128	0	
11/11/2011	1.2276	3.2923	1.5572	2.2945	2.7987	2.9202	0.201	
12/11/2011	1.1433	3.2615	1.1815	2.2924	2.8066	2.914	0	
13/11/2011	1.1146	3.2731	1.4619	2.2836	2.8263	2.9448	11.055	
14/11/2011	1.1204	3.2737	1.5091	2.2761	2.7887	2.9155	0	
15/11/2011	1.1412	3.2744	1.5321	2.2726	2.768	2.8926	0	
16/11/2011	1.1393	3.294	1.5259	2.2671	2.7014	2.871	0	
17/11/2011	1.1572	3.2951	1.5332	2.2653	2.6983	2.8643	0	
18/11/2011	1.1863	3.3024	1.5455	2.2667	2.7113	2.8736	0	
19/11/2011	1.21	3.3067	1.5543	2.2677	2.7231	2.8813	0	
20/11/2011	1.2317	3.3062	1.5633	2.2617	2.7439	2.8956	0	
21/11/2011	1.2328	3.3104	1.5661	2.2656	2.7232	2.8893	0	
22/11/2011	1.2276	3.3118	1.5683	2.2682	2.7348	2.8915	0.201	
23/11/2011	1.2384	3.3099	1.5758	2.2632	2.7774	2.9207	2.01	
24/11/2011	1.2549	3.3217	1.5929	2.2718	2.7798	2.9289	0	
25/11/2011	1.2381	3.3264	1.5836	2.2586	2.7368	2.9047	0	
26/11/2011	1.1791	3.3147	1.5262	2.2657	2.7713	2.9259	5.628	
27/11/2011	1.1629	3.3169	1.5391	2.2703	2.6982	2.8912	0	
28/11/2011	1.2206	3.3203	1.5682	2.2629	2.7855	2.9347	0	
29/11/2011	1.1881	3.3259	1.5576	2.2726	2.6891	2.8794	0	
30/11/2011	1.2059	3.3174	1.4589	2.2639	2.7647	2.8559	0.402	
01/12/2011	1.1733	3.3258	1.5017	2.2633	2.6741	2.8867	0.804	
02/12/2011	1.1896	3.3146	1.4858	2.2604	2.7279	2.8956	0.402	
03/12/2011	1.1861	3.3137	1.5032	2.267	2.6631	2.8681	0.201	
04/12/2011	1.1963	3.3167	1.5077	2.2619	2.7064	2.8701	0	
05/12/2011	1.2064	3.3177	1.5232	2.2602	2.7198	2.8675	0.201	
06/12/2011	1.2199	3.3194	1.5303	2.2622	2.7277	2.8898	0	
07/12/2011	1.2191	3.3242	1.534	2.26	2.7016	2.8805	0	
08/12/2011	1.2379	3.3141	1.5066	2.2593	2.7815	2.9152	0.201	
09/12/2011	1.1851	3.3158	1.4811	2.2592	2.7315	2.8701	0	
10/12/2011	1.2065	3.3144	1.5173	2.2559	2.76	2.8998	0	
11/12/2011	1.1995	3.3169	1.5162	2.2588	2.7268	2.8941	0	
12/12/2011	1.1562	3.3115	1.4353	2.2523	2.6949	2.8566	0.201	
13/12/2011	1.0923	3.3009	1.3431	2.2487	2.5963	2.8189	0	
14/12/2011	1.0567	3.2932	1.371	2.2405	2.65	2.8225	0	
15/12/2011	1.0685	3.2886	1.4209	2.2325	2.6481	2.8295	0.804	
16/12/2011	1.0377	3.2797	1.4428	2.217	2.6466	2.8207	5.025	
17/12/2011	1.0348	3.2752	1.2782	2.2036	2.7544	2.8878	15.276	
18/12/2011	0.7608	3.2421	1.2189	2.1614	2.7145	2.8628	5.829	
19/12/2011	0.8777	3.2296	1.2923	2.1313	2.6627	2.7982	8.442	
20/12/2011	0.7862	3.2223	1.201	2.1042	2.613	2.7996	1.407	
21/12/2011	0.8358	3.2121	1.2254	2.064	2.5951	2.7898	3.618	
22/12/2011	0.8614	3.2176	1.3364	2.0419	2.6428	2.8023	0	
23/12/2011	0.9025	3.2153	1.3982	2.0164	2.5772	2.7496	10.854	
24/12/2011	0.8231	3.1887	1.1694	1.9814	2.5715	2.7271	0.603	
25/12/2011	0.864	3.1891	1.3154	1.9564	2.4965	2.6636	0.804	
26/12/2011	0.9146	3.1974	1.4162	1.9472	2.5265	2.6579	0	
27/12/2011	0.9378	3.1986	1.4642	1.9323	2.5271	2.6341	0	
28/12/2011	0.9048	3.1875	1.4761	1.9126	2.4467	2.5971	0	
29/12/2011	0.9798	3.1982	1.5015	1.9126	2.5259	2.6132	1.809	
30/12/2011	0.9393	3.1974	1.4925	1.9094	2.5122	2.6034	5.226	
31/12/2011	0.803	3.1906	1.2399	1.9041	2.4582	2.5872	3.015	
01/01/2012	0.8488	3.1946	1.3918	1.9007	2.4542	2.5847	2.211	
02/01/2012	0.8653	3.1886	1.381	1.8913	2.4685	2.6259	2.613	
03/01/2012	0.8473	3.1767	1.3465	1.8783	2.4409	2.6274	9.849	
04/01/2012	0.8407	3.1772	1.2562	1.877	2.5171	2.6475	0.201	
05/01/2012	0.7898	3.1623	1.1738	1.8547	2.3818	2.6318	7.437	
06/01/2012	0.8644	3.1683	1.2544	1.8419	2.5354	2.688	0.402	
07/01/2012	0.8408	3.1664	1.3044	1.8256	2.4695	2.6769	1.407	
08/01/2012	0.8865	3.1722	1.4147	1.8171	2.5189	2.7027	1.206	
09/01/2012	0.8967	3.1758	1.4613	1.8089	2.534	2.7233	1.206	
10/01/2012	0.9028	3.1794	1.4817	1.8056	2.5617	2.7324	0	
11/01/2012	0.9249	3.1871	1.4956	1.8061	2.5574	2.731	1.809	
12/01/2012	0.8968	3.185	1.4844	1.8038	2.5259	2.7209	0.201	
13/01/2012	0.9518	3.1924	1.5067	1.8062	2.5869	2.744	0	
14/01/2012	0.9566	3.1873	1.5018	1.7987	2.5661	2.7243	0	
15/01/2012	0.9762	3.1916	1.5147	1.8035	2.5414	2.7161	0	
16/01/2012	1.0055	3.2	1.5263	1.8124	2.5629	2.7334	0	
17/01/2012	1.0277	3.2066	1.5336	1.8194	2.5864	2.7487	0	
18/01/2012	1.0305	3.2113	1.5408	1.8267	2.5672	2.752	0.603	
19/01/2012	1.0363	3.2213	1.5275	1.8378	2.5775	2.7574	3.015	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
20/01/2012	0.9887	3.2191	1.4353	1.8486	2.5932	2.7716	12.462	
21/01/2012	0.7584	3.1933	1.227	1.8328	2.4967	2.7257	0.804	
22/01/2012	0.8671	3.1975	1.3761	1.824	2.5053	2.7346	0.201	
23/01/2012	0.9238	3.2051	1.4354	1.8216	2.5491	2.7526	0	
24/01/2012	0.9457	3.2067	1.4722	1.8145	2.5712	2.7544	6.834	
25/01/2012	0.851	3.2002	1.3202	1.8083	2.5237	2.7304	0.201	
26/01/2012	0.8456	3.1936	1.3189	1.7968	2.4632	2.7035	3.819	
27/01/2012	0.8919	3.2007	1.3832	1.7997	2.5357	2.7541	1.407	
28/01/2012	0.892	3.1902	1.2219	1.7933	2.5957	2.7919	4.824	
29/01/2012	0.8933	3.1816	1.3859	1.7705	2.5729	2.7567	0	
30/01/2012	0.9047	3.1868	1.4532	1.7659	2.5431	2.7411	0	
31/01/2012	0.924	3.1871	1.478	1.7588	2.5357	2.7473	0	
01/02/2012	0.9769	3.1971	1.5048	1.7611	2.5989	2.7829	0	
02/02/2012	0.9992	3.1989	1.5239	1.7606	2.6134	2.7881	0	
03/02/2012	1.0152	3.2081	1.5364	1.7647	2.6173	2.7913	0	
04/02/2012	1.0202	3.2094	1.5476	1.7629	2.608	2.7691	0	
05/02/2012	0.9733	3.208	1.3324	1.7698	2.5355	2.7566	6.231	
06/02/2012	0.9564	3.2098	1.3363	1.7768	2.5945	2.786	4.824	
07/02/2012	0.8903	3.2138	1.4068	1.7714	2.619	2.8033	0.804	
08/02/2012	0.8961	3.2184	1.4776	1.7674	2.6211	2.7919	0	
09/02/2012	0.8976	3.2239	1.52	1.767	2.5882	2.7688	0.603	
10/02/2012	0.7705	3.2195	1.2481	1.7674	2.5636	2.7648	5.628	
11/02/2012	0.8476	3.2245	1.4129	1.7625	2.5574	2.7614	0	
12/02/2012	0.9007	3.2342	1.4888	1.7627	2.564	2.7611	0.201	
13/02/2012	0.9168	3.2408	1.4905	1.762	2.5536	2.7442	0.201	
14/02/2012	0.9356	3.2483	1.491	1.7649	2.5507	2.7513	0	
15/02/2012	0.955	3.2559	1.5212	1.7673	2.5547	2.7644	0	
16/02/2012	0.9827	3.262	1.5422	1.773	2.5813	2.7686	0	
17/02/2012	0.9633	3.2552	1.6445	1.7445	2.5998	2.7569	2.412	
18/02/2012	0.9023	3.2529	1.6525	1.7407	2.5444	2.7284	1.809	
19/02/2012	0.8579	3.2593	1.6396	1.7533	2.62	2.799	3.216	
20/02/2012	0.8986	3.2595	1.6213	1.7535	2.6672	2.7958	0.402	
21/02/2012	0.9192	3.2677	1.6533	1.7574	2.628	2.7839	0.402	
22/02/2012	0.9361	3.2738	1.6679	1.7582	2.6171	2.7561	0.402	
23/02/2012	0.9611	3.2801	1.6769	1.7693	2.6309	2.7941	0	
24/02/2012	0.9837	3.2837	1.6886	1.7722	2.6592	2.8123	0.603	
25/02/2012	0.9927	3.2799	1.6903	1.7717	2.6783	2.8087	0	
26/02/2012	1.0092	3.287	1.6956	1.7766	2.6705	2.8075	0	
27/02/2012	1.0057	3.2902	1.7017	1.7806	2.6494	2.79	0.201	
28/02/2012	1.021	3.2971	1.7086	1.7901	2.6584	2.8007	0.201	
29/02/2012	1.0332	3.3012	1.7141	1.7948	2.6694	2.8089	0	
01/03/2012	1.0409	3.2991	1.7114	1.7967	2.6751	2.8155	0	
02/03/2012	1.0592	3.3015	1.7205	1.8045	2.6977	2.8191	0	
03/03/2012	1.0287	3.2996	1.7086	1.8048	2.6328	2.7894	0.201	
04/03/2012	1.0521	3.304	1.7074	1.8136	2.6602	2.8061	4.623	
05/03/2012	1.0028	3.2979	1.6639	1.8207	2.696	2.8313	0.201	
06/03/2012	1.0226	3.3011	1.6963	1.8256	2.6999	2.8253	0	
07/03/2012	0.9922	3.2968	1.7015	1.8239	2.6227	2.7915	2.01	
08/03/2012	1.0115	3.3026	1.7146	1.8392	2.7112	2.846	0	
09/03/2012	1.035	3.3126	1.7361	1.8501	2.7289	2.8507	0	
10/03/2012	1.0555	3.3199	1.746	1.8604	2.7406	2.8624	0	
11/03/2012	1.0657	3.3214	1.7549	1.8632	2.745	2.8544	0	
12/03/2012	1.0644	3.3236	1.759	1.8663	2.7245	2.8412	0	
13/03/2012	1.0698	3.3271	1.7606	1.8713	2.7215	2.8463	0	
14/03/2012	1.0711	3.3252	1.7564	1.873	2.7093	2.8328	0	
15/03/2012	1.0653	3.321	1.7491	1.8719	2.6812	2.8168	0.402	
16/03/2012	1.1947	3.3031	1.7785	2.032	2.655	2.8705	0	
17/03/2012	1.1975	3.3052	1.7746	2.0404	2.6379	2.8675	2.211	
18/03/2012	1.178	3.3125	1.7713	2.0484	2.6656	2.9069	4.221	
19/03/2012	1.1311	3.3137	1.7306	2.0531	2.751	2.9459	0	
20/03/2012	1.1631	3.3197	1.7543	2.0598	2.7457	2.9406	0	
21/03/2012	1.1804	3.3258	1.7711	2.0694	2.7502	2.9391	0	
22/03/2012	1.1719	3.3228	1.7723	2.0659	2.7243	2.9203	0	
23/03/2012	1.1773	3.3285	1.7784	2.0757	2.701	2.9132	0	
24/03/2012	1.1947	3.3304	1.7843	2.0803	2.7167	2.9208	0	
25/03/2012	1.2095	3.3362	1.7981	2.0887	2.7482	2.9431	0	
26/03/2012	1.2053	3.3375	1.8067	2.0917	2.7642	2.9459	0	
27/03/2012	1.1894	3.3396	1.813	2.0951	2.7566	2.9412	0	
28/03/2012	1.1748	3.3377	1.8165	2.0985	2.7399	2.927	0	
29/03/2012	1.1758	3.3398	1.8192	2.1021	2.723	2.9203	0	
30/03/2012	1.1858	3.345	1.826	2.1118	2.7215	2.9139	0	
31/03/2012	1.1741	3.3442	1.8255	2.1135	2.6883	2.901	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
01/04/2012	1.2101	3.3429	1.8259	2.1144	2.7295	2.911	0	
02/04/2012	1.1997	3.346	1.829	2.1192	2.6846	2.8827	0.402	
03/04/2012	1.1845	3.347	1.8243	2.1244	2.6581	2.8685	3.417	
04/04/2012	1.1713	3.348	1.8119	2.1303	2.6876	2.9143	2.412	
05/04/2012	1.195	3.3493	1.7715	2.1388	2.7715	2.9461	0	
06/04/2012	1.1961	3.3472	1.785	2.1357	2.7352	2.912	0	
07/04/2012	1.1885	3.353	1.79	2.1448	2.6949	2.91	2.01	
08/04/2012	1.1574	3.3536	1.7945	2.1507	2.7175	2.9156	1.407	
09/04/2012	1.0581	3.3464	1.7786	2.1479	2.6543	2.8557	7.236	
10/04/2012	0.801	3.3304	1.6412	2.1492	2.5835	2.8574	0	
11/04/2012	0.9818	3.3365	1.7045	2.1547	2.6713	2.9082	1.608	
12/04/2012	1.0294	3.3428	1.7321	2.1615	2.7176	2.9313	3.819	
13/04/2012	0.9787	3.3344	1.6923	2.1593	2.7194	2.9262	0	
14/04/2012	0.848	3.3349	1.6228	2.1648	2.7206	2.9388	3.618	
15/04/2012	0.98	3.3398	1.682	2.1651	2.7657	2.965	0	
16/04/2012	1.0484	3.3433	1.7183	2.1643	2.7803	2.9539	0	
17/04/2012	0.9846	3.3324	1.7062	2.1506	2.6291	2.8645	3.216	
18/04/2012	0.8751	3.3253	1.683	2.1528	2.5643	2.8273	3.015	
19/04/2012	0.8307	3.3256	1.6218	2.1626	2.6116	2.8703	6.432	
20/04/2012	0.669	3.3105	1.5525	2.1525	2.6319	2.8853	7.437	
21/04/2012	0.8471	3.3092	1.631	2.14	2.6199	2.8815	1.608	
22/04/2012	0.9272	3.3122	1.6608	2.1344	2.6522	2.8915	0.201	
23/04/2012	0.9421	3.3107	1.6675	2.1255	2.6309	2.8664	1.005	
24/04/2012	0.9722	3.3171	1.6796	2.1279	2.6491	2.8822	0	
25/04/2012	0.9646	3.3086	1.6815	2.1171	2.6083	2.8315	0.804	
26/04/2012	0.7243	3.3025	1.5686	2.1201	2.5763	2.862	4.824	
27/04/2012	0.7408	3.2993	1.5402	2.1215	2.6732	2.916	4.623	
28/04/2012	0.76	3.2915	1.5359	2.104	2.6424	2.8405	1.809	
29/04/2012	0.8486	3.2865	1.6107	2.08	2.5708	2.7879	10.653	
30/04/2012	0.5431	3.2436	1.4596	2.0373	2.4753	2.7424	0.402	
01/05/2012	0.7737	3.2488	1.5978	2.0084	2.4084	2.6499	0	
02/05/2012	0.886	3.248	1.6426	1.9901	2.465	2.7502	0.201	
03/05/2012	0.8926	3.2464	1.6494	1.9755	2.4658	2.7865	0	
04/05/2012	0.9069	3.2469	1.6521	1.9659	2.4593	2.8117	0	
05/05/2012	0.9726	3.2517	1.6635	1.9626	2.531	2.8539	0	
06/05/2012	1.0119	3.2562	1.6728	1.9619	2.5628	2.879	0	
07/05/2012	1.0364	3.2591	1.683	1.9621	2.5832	2.8814	0.402	
08/05/2012	0.846	3.2414	1.6196	1.9634	2.54	2.8701	9.045	
09/05/2012	0.9118	3.2506	1.6385	1.971	2.5611	2.8856	0.201	
10/05/2012	0.6391	3.2217	1.5609	1.9707	2.5183	2.8703	8.04	
11/05/2012	0.7096	3.2299	1.5616	1.9718	2.5723	2.9236	6.231	
12/05/2012	0.8367	3.2248	1.5927	1.9606	2.6619	2.9446	0	
13/05/2012	0.8992	3.2252	1.619	1.949	2.6092	2.8857	0	
14/05/2012	0.8868	3.2285	1.6265	1.9465	2.5119	2.8482	0.402	
15/05/2012	0.913	3.2292	1.6393	1.9483	2.5394	2.8759	11.859	
16/05/2012	0.7639	3.2039	1.5838	1.941	2.5889	2.8985	0	
17/05/2012	0.8349	3.2079	1.6123	1.9334	2.5568	2.8615	1.206	
18/05/2012	0.8333	3.2074	1.6188	1.9323	2.505	2.842	0	
19/05/2012	0.8444	3.2082	1.6341	1.9359	2.5472	2.8733	2.814	
20/05/2012	0.7586	3.2111	1.6047	1.9348	2.578	2.8801	0	
21/05/2012	0.8545	3.2195	1.6208	1.9372	2.5718	2.8836	0	
22/05/2012	0.9316	3.2298	1.6398	1.9458	2.6103	2.9086	0	
23/05/2012	0.9889	3.239	1.669	1.9583	2.6593	2.9327	0	
24/05/2012	1.0237	3.2429	1.6783	1.9654	2.6707	2.9318	0	
25/05/2012	1.027	3.2447	1.6835	1.9729	2.6507	2.9189	0	
26/05/2012	0.969	3.2413	1.6998	1.8136	2.6272	2.8658	0	
27/05/2012	0.9602	3.2445	1.6989	1.8234	2.616	2.8603	0	
28/05/2012	0.9714	3.2512	1.7027	1.836	2.617	2.8608	0	
29/05/2012	0.9813	3.2562	1.7045	1.8452	2.6311	2.8654	0	
30/05/2012	0.9911	3.2593	1.7068	1.8543	2.6273	2.8657	0	
31/05/2012	1.0102	3.2646	1.7127	1.8637	2.6431	2.8753	1.809	
01/06/2012	1.0178	3.2682	1.7162	1.8719	2.6443	2.8783	0.201	
02/06/2012	1.029	3.2708	1.7192	1.8791	2.6368	2.8628	0.201	
03/06/2012	0.8298	3.2557	1.6771	1.8787	2.5838	2.8417	5.427	
04/06/2012	0.4413	3.2237	1.3459	1.8611	2.5913	2.8561	1.608	
05/06/2012	0.7469	3.2302	1.5439	1.8584	2.5831	2.8272	0	
06/06/2012	0.7937	3.2306	1.5735	1.8559	2.4882	2.7871	4.623	
07/06/2012	0.7855	3.2312	1.5494	1.8633	2.5267	2.7902	4.422	
08/06/2012	0.5554	3.2091	1.3619	1.8494	2.4369	2.7841	17.688	
09/06/2012	0.4351	3.1717	1.2003	1.8242	2.511	2.8217	6.03	
10/06/2012	0.5638	3.1695	1.41	1.7805	2.4865	2.7754	0	
11/06/2012	0.7067	3.1754	1.5077	1.7678	2.4647	2.7692	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
12/06/2012	0.8012	3.1831	1.5485	1.7673	2.5156	2.7991	0	
13/06/2012	0.8548	3.1901	1.5818	1.7678	2.5538	2.8148	3.819	
14/06/2012	0.8273	3.1694	1.4482	1.7558	2.5398	2.797	0.402	
15/06/2012	0.5337	3.1502	1.3078	1.7464	2.4608	2.7569	5.025	
16/06/2012	0.51	3.1487	1.3861	1.738	2.4454	2.7559	1.407	
17/06/2012	0.6467	3.1567	1.4241	1.7353	2.5265	2.8109	0.402	
18/06/2012	0.7709	3.1636	1.525	1.7274	2.5384	2.8071	0.402	
19/06/2012	0.7753	3.1705	1.558	1.7282	2.5458	2.808	0.201	
20/06/2012	0.8006	3.1755	1.5842	1.7296	2.5571	2.8027	0.201	
21/06/2012	0.8229	3.1779	1.5946	1.7286	2.5138	2.7717	0	
22/06/2012	0.7406	3.1684	1.4956	1.7303	2.4868	2.7855	0.402	
23/06/2012	0.5161	3.1544	1.3615	1.73	2.5519	2.8178	0.201	
24/06/2012	0.4712	3.1318	1.3313	1.7161	2.4839	2.7865	0.402	
25/06/2012	0.4757	3.1171	1.3944	1.6842	2.4779	2.7648	0.201	
26/06/2012	0.6956	3.1309	1.5055	1.6748	2.4833	2.7525	0	
27/06/2012	0.7397	3.1346	1.5331	1.6694	2.4842	2.7523	0.201	
28/06/2012	0.7533	3.1395	1.5501	1.666	2.4524	2.7237	0.201	
29/06/2012	0.7599	3.1471	1.5573	1.6682	2.4418	2.745	0	
30/06/2012	0.7537	3.1538	1.5715	1.6792	2.5055	2.7828	0	
01/07/2012	0.7758	3.1576	1.598	1.686	2.5454	2.8124	0	
02/07/2012	0.8453	3.164	1.6158	1.6952	2.5564	2.8092	0.201	
03/07/2012	0.759	3.1625	1.494	1.703	2.558	2.808	0.804	
04/07/2012	0.876	3.171	1.2019	1.745	2.519	2.791	1.005	
05/07/2012	0.535	3.1469	0.9454	1.751	2.528	2.802	9.447	
06/07/2012	0.532	3.1013	0.9608	1.736	2.491	2.772	37.386	
07/07/2012	0.534	2.9198	0.8833	1.586	2.303	2.555	0.402	
08/07/2012	0.634	2.9464	1.0372	1.518	2.104	2.393	0.201	
09/07/2012	0.600	2.9426	0.9762	1.496	2.252	2.620	4.02	
10/07/2012	0.725	2.9754	1.0471	1.491	2.331	2.717	11.658	
11/07/2012	0.556	2.9167	0.9478	1.448	2.271	2.622	0.804	
12/07/2012	0.676	2.9605	1.06	1.436	2.233	2.582	0	
13/07/2012	0.751	2.9858	1.1235	1.441	2.262	2.665	3.216	
14/07/2012	0.555	2.9555	0.9798	1.448	2.331	2.742	0.402	
15/07/2012	0.732	3.0107	1.1255	1.467	2.407	2.777	0	
16/07/2012	0.858	3.046	1.1874	1.487	2.442	2.783	8.241	
17/07/2012	0.590	2.8569	0.8929	1.473	2.424	2.772	5.628	
18/07/2012	0.700	2.9594	1.0698	1.454	2.314	2.662	0	
19/07/2012	0.703	2.9265	0.9783	1.458	2.322	2.712	0.804	
20/07/2012	0.665	2.9637	1.0249	1.460	2.399	2.770	0.804	
21/07/2012	0.823	3.0108	1.1344	1.476	2.448	2.790	0.201	
22/07/2012	0.900	3.047	1.1744	1.499	2.470	2.799	0.201	
23/07/2012	0.916	3.0706	1.2015	1.522	2.462	2.798	0	
24/07/2012	0.940	3.0861	1.2177	1.545	2.471	2.801	0.201	
25/07/2012	0.970	3.1017	1.2399	1.570	2.493	2.820	0.201	
26/07/2012	1.004	3.114	1.2583	1.592	2.521	2.827	0	
27/07/2012	1.013	3.1219	1.266	1.609	2.509	2.820	0	
28/07/2012	1.019	3.1271	1.2678	1.627	2.506	2.812	0.201	
29/07/2012	1.040	3.1376	1.275	1.646	2.513	2.826	0	
30/07/2012	1.029	3.1283	1.1694	1.662	2.542	2.840	0	
31/07/2012	1.040	3.1398	1.2487	1.679	2.549	2.835	0	
01/08/2012	0.814	3.1224	1.0698	1.688	2.521	2.810	0	
02/08/2012	0.880	3.1312	1.1002	1.702	2.527	2.827	0	
03/08/2012	0.820	3.1336	1.1132	1.715	2.552	2.832	0.201	
04/08/2012	0.914	3.1474	1.1731	1.727	2.542	2.825	0	
05/08/2012	0.961	3.1567	1.1942	1.736	2.543	2.824	0	
06/08/2012	1.006	3.1677	1.2268	1.748	2.552	2.840	0	
07/08/2012	1.070	3.1765	1.2636	1.764	2.611	2.871	0	
08/08/2012	1.083	3.1822	1.2874	1.774	2.630	2.877	0.201	
09/08/2012	1.106	3.1903	1.3043	1.787	2.638	2.880	0	
10/08/2012	1.114	3.1951	1.3149	1.799	2.639	2.873	0	
11/08/2012	1.113	3.1996	1.3152	1.808	2.609	2.849	0	
12/08/2012	1.109	3.2014	1.3132	1.817	2.566	2.831	0.201	
13/08/2012	1.105	3.2059	1.3169	1.828	2.565	2.835	0	
14/08/2012	1.132	3.2142	1.3246	1.839	2.590	2.855	0	
15/08/2012	1.154	3.2194	1.3288	1.850	2.604	2.841	0	
16/08/2012	1.007	3.2081	1.2262	1.856	2.595	2.865	0.201	
17/08/2012	1.048	3.2151	1.2914	1.866	2.598	2.857	0	
18/08/2012	1.047	3.2211	1.3279	1.873	2.605	2.865	0.201	
19/08/2012	1.095	3.2282	1.3398	1.881	2.642	2.873	0	
20/08/2012	1.107	3.2322	1.3454	1.887	2.642	2.880	0.201	
21/08/2012	1.131	3.2346	1.3527	1.896	2.644	2.869	0	
22/08/2012	1.074	3.2333	1.2889	1.900	2.614	2.860	0.201	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
23/08/2012	1.108	3.24	1.3201	1.910	2.623	2.863	0	
24/08/2012	1.113	3.2406	1.3268	1.913	2.585	2.834	0.201	
25/08/2012	1.071	3.2393	1.2694	1.922	2.557	2.831	0	
26/08/2012	1.144	3.2524	1.3031	1.935	2.669	2.896	0.201	
27/08/2012	1.135	3.2479	1.322	1.936	2.662	2.868	0	
28/08/2012	1.047	3.2509	1.2709	1.944	2.622	2.872	0.201	
29/08/2012	1.079	3.2549	1.3081	1.952	2.638	2.867	0	
30/08/2012	1.016	3.2539	1.2059	1.956	2.626	2.894	0.201	
31/08/2012	1.099	3.2572	1.2798	1.963	2.718	2.920	0	
01/09/2012	1.021	3.2807	1.654	1.906	2.739	2.788	0.201	
02/09/2012	1.044	3.2854	1.6625	1.916	2.720	2.790	0	
03/09/2012	1.099	3.289	1.6815	1.920	2.759	2.799	0	
04/09/2012	1.100	3.2928	1.6855	1.927	2.732	2.795	0	
05/09/2012	1.135	3.2966	1.6958	1.933	2.766	2.814	0	
06/09/2012	1.153	3.2971	1.7049	1.935	2.772	2.802	0	
07/09/2012	1.147	3.3012	1.7066	1.944	2.743	2.795	0	
08/09/2012	1.168	3.3033	1.7155	1.951	2.749	2.790	0	
09/09/2012	1.149	3.2997	1.713	1.953	2.702	2.755	0	
10/09/2012	1.162	3.3099	1.7173	1.963	2.701	2.770	0.201	
11/09/2012	1.169	3.3057	1.564	1.968	2.738	2.803	4.221	
12/09/2012	1.174	3.3035	1.6723	1.969	2.766	2.801	5.025	
13/09/2012	1.098	3.3039	1.5464	1.977	2.792	2.818	0	
14/09/2012	1.079	3.3014	1.6343	1.984	2.720	2.791	0.402	
15/09/2012	1.136	3.3105	1.6681	1.990	2.781	2.813	0	
16/09/2012	1.131	3.3064	1.68	1.994	2.747	2.788	0	
17/09/2012	1.146	3.3082	1.6865	1.997	2.756	2.799	0.402	
18/09/2012	1.160	3.3058	1.6972	2.003	2.752	2.810	1.608	
19/09/2012	1.134	3.3087	1.5885	2.007	2.810	2.836	9.045	
20/09/2012	0.837	3.291	1.4812	2.008	2.763	2.800	1.608	
21/09/2012	0.829	3.2863	1.5101	2.007	2.729	2.787	1.608	
22/09/2012	0.826	3.2866	1.4777	2.006	2.756	2.801	0.201	
23/09/2012	0.931	3.2818	1.5522	2.005	2.726	2.761	0.201	
24/09/2012	0.627	3.2532	1.2893	1.996	2.596	2.689	25.929	
25/09/2012	0.450	3.1129	1.2191	1.854	2.381	2.422	6.03	
26/09/2012	0.425	2.966	1.0611	1.773	1.984	2.028	8.844	
27/09/2012	0.461	2.9639	1.211	1.685	1.882	1.916	1.206	
28/09/2012	0.655	3.031	1.3788	1.634	2.028	2.201	1.206	
29/09/2012	0.736	3.0756	1.3859	1.605	2.227	2.491	0.402	
30/09/2012	0.787	3.1046	1.4806	1.588	2.332	2.596	0	
01/10/2012	0.788	3.0986	1.3516	1.578	2.380	2.687	2.01	
02/10/2012	0.777	3.1299	1.4536	1.578	2.429	2.708	2.01	
03/10/2012	0.738	3.1274	1.3446	1.578	2.4256	2.719	0.603	
04/10/2012	0.794	3.1443	1.4635	1.589	2.4561	2.7352	0	
05/10/2012	1.078	3.1417	1.474	1.5925	2.4611	2.9822	1.407	
06/10/2012	1.058	3.1552	1.4928	1.6077	2.5366	3.0165	0.804	
07/10/2012	1.099	3.1686	1.5369	1.621	2.5981	3.039	0	
08/10/2012	1.150	3.1693	1.5631	1.6241	2.5786	3.0107	0.201	
09/10/2012	1.197	3.1788	1.5711	1.637	2.5897	3.0265	0	
10/10/2012	1.236	3.1849	1.5946	1.6453	2.6005	3.0241	0	
11/10/2012	1.230	3.1909	1.6047	1.6546	2.5702	3.002	0.603	
12/10/2012	0.706	3.104	1.1769	1.6524	2.5409	3.0097	11.457	
13/10/2012	0.856	3.122	1.4075	1.6228	2.3967	2.7945	0.201	
14/10/2012	1.038	3.1455	1.4767	1.6127	2.3918	2.8622	0	
15/10/2012	1.121	3.1616	1.5223	1.6136	2.4678	2.9489	0	
16/10/2012	1.056	3.1512	1.3367	1.616	2.4527	2.9691	2.412	
17/10/2012	1.041	3.1575	1.4754	1.6168	2.5086	2.9835	1.407	
18/10/2012	0.722	3.0955	1.2842	1.6135	2.5137	2.9793	6.834	
19/10/2012	0.925	3.1445	1.4396	1.5955	2.5381	2.9542	0.201	
20/10/2012	1.094	3.1625	1.4993	1.586	2.5589	2.9926	0	
21/10/2012	1.174	3.1764	1.5313	1.5845	2.6062	3.013	0	
22/10/2012	1.213	3.1851	1.513	1.5846	2.6158	3.0206	0.603	
23/10/2012	1.214	3.1917	1.5075	1.5951	2.6453	3.0326	0	
24/10/2012	1.214	3.1962	1.5623	1.5992	2.6288	3.0194	0	
25/10/2012	1.224	3.2021	1.5886	1.6061	2.6207	3.0203	0	
26/10/2012	1.247	3.204	1.6118	1.6145	2.6268	3.0198	0	
27/10/2012	1.265	3.206	1.6257	1.6214	2.6356	3.0369	0	
28/10/2012	1.280	3.2101	1.6433	1.6294	2.6331	3.0151	0.402	
29/10/2012	1.256	3.2157	1.6207	1.6429	2.5989	3.0144	1.005	
30/10/2012	1.244	3.2223	1.6106	1.6509	2.6319	3.0161	0.402	
31/10/2012	1.206	3.2189	1.6569	1.6522	2.5567	2.9622	0.201	
01/11/2012	1.022	3.206	1.4372	1.6549	2.5199	2.9726	3.015	
02/11/2012	1.114	3.2286	1.5586	1.6738	2.6134	3.0225	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
03/11/2012	1.203	3.2346	1.6162	1.6825	2.6706	3.0528	0	
04/11/2012	1.247	3.2375	1.6026	1.6867	2.6823	3.046	0	
05/11/2012	1.297	3.2501	1.5405	1.6994	2.7227	3.0832	0	
06/11/2012	1.361	3.2542	1.6084	1.7083	2.7903	3.1083	0.201	
07/11/2012	1.373	3.2658	1.6639	1.7232	2.7951	3.1068	0	
08/11/2012	1.347	3.2657	1.6824	1.7262	2.7365	3.0764	0	
09/11/2012	1.336	3.2653	1.6867	1.7252	2.7008	3.0402	0	
10/11/2012	1.269	3.2601	1.6423	1.7286	2.6335	3.0131	1.206	
11/11/2012	1.311	3.2693	1.6762	1.7381	2.7087	3.0741	1.809	
12/11/2012	1.345	3.2743	1.6446	1.7483	2.7815	3.0956	1.005	
13/11/2012	1.297	3.2796	1.6075	1.7577	2.7768	3.1015	0	
14/11/2012	1.322	3.2844	1.6734	1.7627	2.7857	3.1036	0	
15/11/2012	1.324	3.2845	1.6918	1.7634	2.7619	3.0756	0	
16/11/2012	1.312	3.2827	1.6529	1.7608	2.7135	3.0451	0	
17/11/2012	1.162	3.2688	1.3627	1.7601	2.6555	3.0282	6.231	
18/11/2012	1.131	3.2697	1.5238	1.7593	2.692	3.0484	0	
19/11/2012	1.186	3.2749	1.5738	1.7575	2.6568	3.013	0	
20/11/2012	1.235	3.2866	1.603	1.766	2.6686	3.0289	0.201	
21/11/2012	1.275	3.2908	1.6157	1.7701	2.7038	3.053	12.261	
22/11/2012	1.032	3.2599	1.431	1.74	2.6264	2.9502	0	
23/11/2012	0.958	3.2515	1.3271	1.7216	2.5212	2.9061	5.427	
24/11/2012	1.117	3.2515	1.4974	1.6964	2.5211	2.8702	0	
25/11/2012	0.874	3.2184	1.1751	1.6557	2.4059	2.8723	16.482	
26/11/2012	0.777	3.1683	1.2796	1.5817	2.1189	2.4903	3.819	
27/11/2012	0.778	3.1492	1.2247	1.5298	2.1448	2.5503	4.824	
28/11/2012	0.923	3.164	1.3987	1.4834	2.2446	2.6707	0.402	
29/11/2012	0.715	3.1384	1.3157	1.4357	2.2735	2.6261	0	
30/11/2012	0.793	3.1393	1.3549	1.4317	2.3201	2.7125	0	
01/12/2012	0.852	3.1499	1.3701	1.438	2.4103	2.8039	2.211	
02/12/2012	0.842	3.1524	1.3586	1.4484	2.4539	2.8271	0	
03/12/2012	0.786	3.1462	1.0798	1.4497	2.4146	2.8095	6.432	
04/12/2012	0.720	3.1494	1.2877	1.4476	2.4001	2.7718	3.015	
05/12/2012	0.675	3.1387	1.0468	1.4459	2.4213	2.7834	4.824	
06/12/2012	0.751	3.142	1.265	1.4251	2.4673	2.7579	0	
07/12/2012	0.657	3.1221	1.0203	1.4093	2.3537	2.755	9.849	
08/12/2012	0.717	3.1326	1.2271	1.3985	2.4608	2.7679	0	
09/12/2012	0.767	3.1373	1.3236	1.3836	2.4234	2.74	0.201	
10/12/2012	0.805	3.1461	1.3674	1.3884	2.4561	2.7875	0	
11/12/2012	0.870	3.1504	1.423	1.3964	2.5209	2.816	0	
12/12/2012	0.861	3.1491	1.4444	1.4042	2.4828	2.7873	0	
13/12/2012	0.844	3.1516	1.4168	1.4124	2.4277	2.7614	0	
14/12/2012	0.843	3.1541	1.45	1.4256	2.4007	2.703	4.623	
15/12/2012	0.641	3.1398	1.1011	1.4339	2.3855	2.7491	6.432	
16/12/2012	0.684	3.1474	1.2208	1.4327	2.3506	2.6539	0.603	
17/12/2012	0.720	3.1502	1.2529	1.4226	2.3443	2.6869	3.417	
18/12/2012	0.689	3.1436	1.1146	1.428	2.4408	2.7523	5.025	
19/12/2012	0.740	3.1399	1.2704	1.4008	2.4111	2.7023	0.402	
20/12/2012	0.630	3.1199	1.0586	1.3794	2.3475	2.6708	14.07	
21/12/2012	0.374	2.9726	0.9186	1.3001	2.0839	2.3464	10.854	
22/12/2012	0.557	2.9859	1.1536	1.2092	1.9073	2.1576	12.06	
23/12/2012	0.392	2.8391	0.9497	1.1009	1.8075	2.1034	6.03	
24/12/2012	0.579	2.9078	1.1789	1.0375	1.8951	2.2029	4.02	
25/12/2012	0.455	2.8806	1.1522	1.0295	2.0054	2.4227	3.216	
26/12/2012	0.607	2.9337	1.2243	1.0699	2.1484	2.5333	3.618	
27/12/2012	0.560	2.9313	1.2051	1.0985	2.1835	2.6046	1.608	
28/12/2012	0.686	2.9744	1.2989	1.1441	2.3175	2.6548	2.814	
29/12/2012	0.619	2.9601	1.2841	1.1562	2.2291	2.619	4.422	
30/12/2012	0.589	2.9311	1.2071	1.1701	2.2481	2.6469	0	
31/12/2012	0.690	2.9629	1.3022	1.1856	2.2307	2.6029	2.412	
01/01/2013	0.582	2.9214	1.1638	1.2048	2.2784	2.6747	3.618	
02/01/2013	0.743	2.995	1.3338	1.2311	2.348	2.6908	3.618	
03/01/2013	0.693	2.9795	1.2685	1.2424	2.3917	2.7325	0	
04/01/2013	0.771	3.0232	1.4073	1.2595	2.4323	2.7453	0	
05/01/2013	0.791	3.0422	1.4537	1.2736	2.428	2.746	0	
06/01/2013	0.823	3.0605	1.4762	1.2917	2.4388	2.7476	0	
07/01/2013	0.827	3.0695	1.4808	1.3069	2.4256	2.7427	0	
08/01/2013	0.838	3.0831	1.4851	1.3313	2.4388	2.7581	3.015	
09/01/2013	0.685	3.0502	1.2562	1.3401	2.4584	2.7641	3.216	
10/01/2013	0.761	3.0738	1.3704	1.3436	2.4023	2.7217	0	
11/01/2013	0.809	3.0918	1.4001	1.3663	2.4386	2.7513	2.814	
12/01/2013	0.756	3.0904	1.3415	1.3745	2.4211	2.749	0.402	
13/01/2013	0.807	3.1062	1.4162	1.3911	2.4816	2.7791	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
14/01/2013	0.822	3.1112	1.2884	1.4005	2.4613	2.7446	8.643	
15/01/2013	0.572	3.0708	1.1529	1.3906	2.4101	2.739	0.804	
16/01/2013	0.720	3.0927	1.2976	1.383	2.3674	2.7051	0	
17/01/2013	0.807	3.1133	1.3519	1.3993	2.429	2.7369	0	
18/01/2013	0.814	3.1128	1.2896	1.4003	2.4029	2.7145	0	
19/01/2013	0.816	3.116	1.2086	1.4136	2.4027	2.738	0	
20/01/2013	0.714	3.1228	1.2489	1.4271	2.451	2.753	0.201	
21/01/2013	0.692	3.1276	1.2492	1.4376	2.4322	2.7544	0.804	
22/01/2013	0.657	3.1365	1.2083	1.4574	2.4953	2.7986	0.402	
23/01/2013	0.768	3.1472	1.2719	1.4723	2.5556	2.8183	2.211	
24/01/2013	0.724	3.151	1.2823	1.482	2.5633	2.8321	1.407	
25/01/2013	0.799	3.15	1.362	1.485	2.5646	2.7967	0.201	
26/01/2013	0.736	3.1457	1.1389	1.4902	2.4627	2.7732	11.658	
27/01/2013	0.389	3.0272	1.0142	1.4272	2.3435	2.7096	10.452	
28/01/2013	0.557	3.0079	1.1771	1.3295	1.9051	2.0895	0.201	
29/01/2013	0.643	3.0529	1.2002	1.3151	1.9996	2.3356	0.402	
30/01/2013	0.705	3.0827	1.2336	1.3174	2.1604	2.5802	0.201	
31/01/2013	0.785	3.1002	1.2777	1.3241	2.3082	2.6826	3.216	
01/02/2013	0.760	3.0896	1.2794	1.325	2.3237	2.6921	0	
02/02/2013	0.819	3.1151	1.2904	1.354	2.4171	2.7863	0.603	
03/02/2013	0.850	3.1169	1.3492	1.3619	2.463	2.772	0	
04/02/2013	0.830	3.1266	1.3515	1.3797	2.4119	2.7634	0	
05/02/2013	0.824	3.1223	1.3527	1.3823	2.3915	2.7321	0.402	
06/02/2013	0.753	3.1309	1.2344	1.4138	2.4409	2.8056	2.211	
07/02/2013	0.851	3.1459	1.3707	1.4343	2.5518	2.8205	1.005	
08/02/2013	0.791	3.1474	1.2914	1.4455	2.5257	2.8208	0.402	
09/02/2013	0.813	3.1502	1.3291	1.455	2.5226	2.8044	3.417	
10/02/2013	0.626	3.1152	1.1319	1.4297	2.3932	2.7108	3.618	
11/02/2013	0.380	3.0555	1.0522	1.3917	2.2898	2.6715	1.608	
12/02/2013	0.717	3.0839	1.2664	1.362	2.1862	2.5167	0	
13/02/2013	0.798	3.1005	1.3484	1.3512	2.313	2.6511	0	
14/02/2013	0.570	3.0631	1.1163	1.3399	2.2924	2.6779	7.437	
15/02/2013	0.608	3.0457	1.2794	1.3043	2.1974	2.5141	0	
16/02/2013	0.749	3.0694	1.3638	1.29	2.2622	2.6315	0	
17/02/2013	0.790	3.0864	1.4048	1.2966	2.3327	2.6859	0	
18/02/2013	0.823	3.097	1.4099	1.3107	2.3773	2.7232	0	
19/02/2013	0.849	3.1059	1.4316	1.3318	2.4197	2.744	0	
20/02/2013	0.884	3.1204	1.4291	1.3593	2.4616	2.777	0	
21/02/2013	0.911	3.1276	1.4461	1.3808	2.4963	2.7852	0	
22/02/2013	0.918	3.1342	1.4663	1.4017	2.4952	2.7891	0	
23/02/2013	0.932	3.1419	1.4428	1.4225	2.5054	2.799	0	
24/02/2013	0.960	3.1534	1.4195	1.4471	2.5422	2.8196	0	
25/02/2013	0.973	3.1593	1.4231	1.465	2.5624	2.8301	0	
26/02/2013	0.9412	3.1805	1.48	1.4896	2.6029	2.8438	0	
27/02/2013	1.0075	3.1747	1.3676	1.472	2.5632	2.772	0	
28/02/2013	1.0228	3.1788	1.3655	1.487	2.5421	2.7382	0	
01/03/2013	1.0531	3.1847	1.3735	1.498	2.5596	2.7398	0	
02/03/2013	1.0504	3.1879	1.3629	1.5101	2.5402	2.7431	0	
03/03/2013	1.0578	3.1918	1.3534	1.5217	2.5398	2.7294	0	
04/03/2013	1.03	3.1868	1.3461	1.5262	2.4942	2.7257	0	
05/03/2013	1.0244	3.194	1.3364	1.5412	2.4932	2.7007	0	
06/03/2013	1.047	3.1957	1.3484	1.5558	2.5228	2.7162	0	
07/03/2013	1.0087	3.1848	1.2601	1.5634	2.5099	2.7293	1.206	
08/03/2013	0.602	3.156	1.0918	1.566	2.5323	2.7211	5.628	
09/03/2013	0.4945	3.1251	1.0587	1.5587	2.5149	2.736	3.417	
10/03/2013	0.5088	3.1095	1.0842	1.5416	2.5033	2.7188	1.206	
11/03/2013	0.8139	3.1362	1.2412	1.5268	2.5097	2.7154	0	
12/03/2013	0.8794	3.1468	1.242	1.5267	2.5162	2.7204	0	
13/03/2013	0.9194	3.1638	1.2848	1.5346	2.5297	2.7209	0	
14/03/2013	0.9421	3.1701	1.2661	1.5376	2.5475	2.7395	0	
15/03/2013	0.8875	3.1651	1.278	1.5356	2.4712	2.7226	1.206	
16/03/2013	0.5701	3.1543	1.2004	1.5446	2.4577	2.6932	2.814	
17/03/2013	0.4806	3.0968	1.1401	1.5152	2.4	2.6835	6.633	
18/03/2013	0.7736	3.1335	1.2343	1.501	2.3923	2.6254	0	
19/03/2013	0.845	3.1476	1.2647	1.4904	2.4474	2.6583	0.201	
20/03/2013	0.9117	3.1635	1.2988	1.4956	2.5346	2.6886	0	
21/03/2013	0.9246	3.163	1.3259	1.4919	2.5556	2.7324	0	
22/03/2013	0.8994	3.1609	1.3108	1.4869	2.5113	2.7115	4.422	
23/03/2013	0.4497	3.0879	1.0736	1.461	2.4843	2.6954	1.206	
24/03/2013	0.6208	3.1174	1.2447	1.4376	2.4804	2.6827	0	
25/03/2013	0.7917	3.132	1.2906	1.4315	2.4863	2.6825	0	
26/03/2013	0.8375	3.1392	1.3226	1.4316	2.4857	2.6933	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
27/03/2013	0.8613	3.1424	1.3631	1.4378	2.4773	2.6905	0	
28/03/2013	0.8946	3.1519	1.387	1.4497	2.4947	2.6935	0	
29/03/2013	0.9137	3.1609	1.3924	1.4638	2.5052	2.7041	0	
30/03/2013	0.9268	3.1645	1.3919	1.4789	2.509	2.7003	0	
31/03/2013	0.9645	3.1738	1.406	1.4956	2.5491	2.7265	0	
01/04/2013	0.9606	3.1801	1.3813	1.5091	2.5368	2.7175	0	
02/04/2013	0.9828	3.1875	1.3879	1.526	2.5673	2.732	0	
03/04/2013	1.0111	3.1939	1.4047	1.543	2.6006	2.7483	0	
04/04/2013	1.0074	3.1972	1.4306	1.5542	2.584	2.7436	0	
05/04/2013	0.9987	3.2007	1.443	1.5638	2.5807	2.7379	0	
06/04/2013	1.0292	3.2074	1.4618	1.5755	2.6197	2.7554	0	
07/04/2013	1.0243	3.2075	1.4423	1.5813	2.5999	2.7499	0	
08/04/2013	0.9997	3.2094	1.3925	1.5872	2.5378	2.7193	0	
09/04/2013	0.9918	3.208	1.4151	1.5943	2.5214	2.7076	0	
10/04/2013	1.0345	3.2169	1.4372	1.6106	2.5874	2.7383	0	
11/04/2013	1.0143	3.2182	1.4413	1.6174	2.5601	2.7279	0.402	
12/04/2013	0.9784	3.2127	1.3554	1.623	2.5514	2.7227	4.221	
13/04/2013	1.0016	3.2175	1.3308	1.6387	2.6493	2.7748	0.402	
14/04/2013	1.0119	3.2298	1.4081	1.6523	2.6265	2.7684	0.201	
15/04/2013	1.0314	3.236	1.4515	1.6579	2.6465	2.7719	0	
16/04/2013	1.0096	3.2332	1.4731	1.6609	2.6147	2.7565	0.201	
17/04/2013	1.0423	3.2384	1.49	1.6699	2.6667	2.7965	0	
18/04/2013	1.0025	3.2408	1.4407	1.676	2.5853	2.7338	0	
19/04/2013	1.078	3.249	1.5124	1.6887	2.7103	2.8021	0.201	
20/04/2013	1.0953	3.2442	1.5272	1.6897	2.7412	2.8282	0	
21/04/2013	1.0544	3.24	1.5111	1.6912	2.6542	2.7797	0.201	
22/04/2013	1.0385	3.2443	1.4439	1.6983	2.6176	2.7538	0.201	
23/04/2013	1.0653	3.2504	1.4721	1.7098	2.643	2.7624	0	
24/04/2013	1.0951	3.2576	1.5038	1.7253	2.684	2.7917	0	
25/04/2013	1.0213	3.274	1.5809	1.796	2.6772	2.882	0	
26/04/2013	1.0189	3.2723	1.5604	1.8043	2.6593	2.8635	0	
27/04/2013	1.0406	3.2789	1.565	1.8096	2.6926	2.8436	0.201	
28/04/2013	1.0209	3.2784	1.5556	1.8158	2.6453	2.8655	0	
29/04/2013	1.0392	3.2854	1.5321	1.8283	2.7032	2.8432	1.809	
30/04/2013	1.0642	3.2883	1.5463	1.8342	2.7372	2.8879	0	
01/05/2013	1.0513	3.2891	1.5594	1.8404	2.7069	2.8855	0	
02/05/2013	1.0546	3.2918	1.5861	1.8454	2.7035	2.8724	0	
03/05/2013	1.0472	3.2935	1.5955	1.8515	2.6714	2.8628	0	
04/05/2013	1.0531	3.2952	1.5984	1.8556	2.6795	2.8427	0.402	
05/05/2013	1.0724	3.3019	1.5953	1.8664	2.7193	2.8723	0	
06/05/2013	1.0675	3.3027	1.5737	1.8725	2.6994	2.8754	0	
07/05/2013	1.0596	3.3036	1.5802	1.8785	2.6839	2.8683	0	
08/05/2013	1.0406	3.3057	1.5962	1.8808	2.6365	2.8392	0	
09/05/2013	1.0338	3.2987	1.5503	1.8802	2.6225	2.8539	1.005	
10/05/2013	1.0406	3.3074	1.5467	1.8955	2.7165	2.8385	1.206	
11/05/2013	0.9915	3.2966	1.5644	1.8941	2.6887	2.8691	2.814	
12/05/2013	0.9057	3.292	1.4787	1.8992	2.6885	2.8761	2.613	
13/05/2013	0.8928	3.2993	1.4407	1.9092	2.6734	2.8582	2.01	
14/05/2013	0.8729	3.2908	1.48	1.9069	2.6207	2.8404	1.206	
15/05/2013	0.3964	3.1686	1.1886	1.8323	2.5379	2.7786	34.17	
16/05/2013	0.6621	3.1908	1.4022	1.8126	2.4822	2.7277	0	
17/05/2013	0.7774	3.212	1.4483	1.8028	2.5516	2.7311	0.603	
18/05/2013	0.7628	3.2136	1.46	1.7939	2.5416	2.7712	0.603	
19/05/2013	0.8123	3.2263	1.4842	1.7919	2.598	2.7879	0	
20/05/2013	0.8365	3.2317	1.4859	1.7883	2.6027	2.8184	0.201	
21/05/2013	0.8842	3.237	1.4823	1.7845	2.6273	2.8318	0	
22/05/2013	0.9152	3.2407	1.4907	1.7851	2.6357	2.8365	0	
23/05/2013	0.8048	3.2354	1.4371	1.7852	2.5939	2.8218	1.809	
24/05/2013	0.8564	3.2454	1.4738	1.7908	2.6147	2.8153	0.804	
25/05/2013	0.8928	3.2527	1.4853	1.8024	2.6588	2.8551	0	
26/05/2013	0.887	3.2544	1.5018	1.8068	2.6255	2.8477	0	
27/05/2013	0.8679	3.2548	1.4951	1.8079	2.5614	2.8213	1.005	
28/05/2013	0.5159	3.229	1.2528	1.81	2.5661	2.8087	8.241	
29/05/2013	0.4259	3.2042	1.2899	1.7879	2.5753	2.8112	8.04	
30/05/2013	0.5887	3.2053	1.3298	1.7712	2.5786	2.8165	2.814	
31/05/2013	0.7974	3.2128	1.3685	1.7649	2.6074	2.8291	0.201	
01/06/2013	0.829	3.2183	1.4781	1.7569	2.6282	2.8546	0	
02/06/2013	0.8806	3.2265	1.5111	1.7581	2.65	2.8677	0	
03/06/2013	0.9041	3.2322	1.5137	1.7619	2.6495	2.8766	0	
04/06/2013	0.9017	3.236	1.5257	1.7666	2.6263	2.8732	0	
05/06/2013	0.9079	3.2384	1.534	1.7694	2.6064	2.8584	0	
06/06/2013	0.948	3.2451	1.5075	1.78	2.6337	2.8572	0	

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07/06/2013	0.9689	3.2529	1.5628	1.792	2.6505	2.8739	0	
08/06/2013	0.9649	3.2539	1.577	1.7996	2.6345	2.8711	0	
09/06/2013	0.9682	3.2571	1.5674	1.8086	2.6196	2.8547	0	
10/06/2013	0.9859	3.2607	1.5671	1.8168	2.6249	2.8462	0	
11/06/2013	0.9986	3.2622	1.4684	1.8258	2.6143	2.8407	0	
12/06/2013	1.0214	3.269	1.4841	1.838	2.6218	2.834	0	
13/06/2013	1.0859	3.2497	1.3462	1.8052	2.6476	2.7919	4.02	
14/06/2013	1.0307	3.2378	1.2989	1.8136	2.6349	2.8389	3.015	
15/06/2013	0.9528	3.2417	1.3817	1.8215	2.6077	2.7887	1.206	
16/06/2013	1.0355	3.2551	1.4171	1.8359	2.6648	2.8168	0.201	
17/06/2013	1.0631	3.2605	1.421	1.844	2.678	2.8459	0	
18/06/2013	1.073	3.2652	1.4305	1.8521	2.6628	2.8495	0	
19/06/2013	1.0938	3.2688	1.4442	1.8616	2.6827	2.8496	0.201	
20/06/2013	1.0731	3.2666	1.3789	1.8643	2.6375	2.8485	0.603	
21/06/2013	1.0962	3.2739	1.5125	1.8723	2.6571	2.8288	0.201	
22/06/2013	1.0026	3.2668	1.5354	1.8764	2.6081	2.8324	2.211	
23/06/2013	1.0124	3.2739	1.5955	1.8845	2.6921	2.8238	1.608	
24/06/2013	1.1091	3.2819	1.6426	1.894	2.7493	2.878	0	
25/06/2013	1.1349	3.2862	1.6589	1.9023	2.7508	2.8961	0	
26/06/2013	1.1482	3.2874	1.6649	1.9077	2.7422	2.8941	0	
27/06/2013	1.1333	3.2818	1.7092	1.9071	2.6979	2.8839	3.216	
28/06/2013	0.796	3.2621	1.5283	1.9113	2.6397	2.8474	3.618	
29/06/2013	0.8772	3.2713	1.6143	1.917	2.6783	2.8461	0.603	
30/06/2013	0.9523	3.2749	1.6444	1.919	2.6497	2.8515	0	
01/07/2013	1.0236	3.2773	1.6419	1.9223	2.6544	2.8303	0.603	
02/07/2013	1.0273	3.2761	1.6459	1.9213	2.6041	2.8387	2.613	
03/07/2013	0.9287	3.2749	1.5882	1.93	2.6658	2.7962	2.814	
04/07/2013	1.0143	3.2835	1.6465	1.9372	2.7037	2.8545	0	
05/07/2013	1.0787	3.2873	1.6696	1.9429	2.7455	2.8888	0	
06/07/2013	1.0999	3.2907	1.6766	1.9492	2.7223	2.8865	0	
07/07/2013	1.1331	3.2949	1.6877	1.9539	2.7447	2.8958	0	
08/07/2013	1.1397	3.296	1.6923	1.9568	2.7333	2.8978	0	
09/07/2013	1.1336	3.295	1.6908	1.9593	2.7043	2.8853	0	
10/07/2013	1.1539	3.2972	1.696	1.9644	2.7116	2.8725	0	
11/07/2013	1.1668	3.2984	1.701	1.9676	2.7156	2.8851	0	
12/07/2013	1.1814	3.3002	1.7054	1.9733	2.7181	2.8818	0	
13/07/2013	1.199	3.3054	1.7117	1.9792	2.7287	2.8823	0	
14/07/2013	1.2061	3.3053	1.7147	1.9817	2.727	2.8927	0	
15/07/2013	1.2138	3.3093	1.7168	1.9883	2.7258	2.8896	0	
16/07/2013	1.2262	3.3097	1.7187	1.9933	2.7343	2.8929	0	
17/07/2013	1.2341	3.3121	1.7219	1.9998	2.7507	2.8974	0	
18/07/2013	1.247	3.3147	1.7242	2.0067	2.7563	2.9063	0	
19/07/2013	1.2618	3.3158	1.725	2.0111	2.7488	2.9074	0	
20/07/2013	1.2612	3.3175	1.725	2.0159	2.748	2.9073	0	
21/07/2013	1.2661	3.3162	1.7263	2.0183	2.7303	2.9005	0	
22/07/2013	1.2803	3.3178	1.7292	2.0238	2.7178	2.8911	0	
23/07/2013	1.2096	3.3247	1.7273	2.0302	2.719	2.8848	2.613	
24/07/2013	1.2719	3.378	1.7312	2.0396	2.737	2.8788	0	
25/07/2013	1.2808	3.3789	1.7289	2.0425	2.7313	2.8826	0.402	
26/07/2013	1.2992	3.3821	1.7358	2.0475	2.7515	2.8867	0	
27/07/2013	1.2932	3.3812	1.7384	2.0504	2.7237	2.8872	0	
28/07/2013	0.5474	3.3147	1.4704	2.0378	2.6533	2.8529	33.768	
29/07/2013	0.9499	3.318	1.6103	2.0372	2.6674	2.8415	0.402	
30/07/2013	1.047	3.3195	1.6368	2.0352	2.6778	2.8608	0.201	
31/07/2013	0.955	3.3147	1.4651	2.0308	2.6888	2.86	6.231	
01/08/2013	0.9586	3.3103	1.6037	2.0298	2.6329	2.8478	0.201	
02/08/2013	1.0369	3.3192	1.6249	2.0322	2.6576	2.8315	0	
03/08/2013	1.1292	3.326	1.6523	2.0373	2.7183	2.8425	0	
04/08/2013	1.1565	3.3246	1.6639	2.0367	2.706	2.8739	0	
05/08/2013	0.8156	3.3058	1.4429	2.0298	2.6382	2.855	9.045	
06/08/2013	0.9546	3.3048	1.579	2.0276	2.6697	2.8499	0.402	
07/08/2013	1.051	3.3115	1.6109	2.0279	2.673	2.8344	0	
08/08/2013	1.1023	3.3179	1.633	2.0307	2.6901	2.8541	0	
09/08/2013	1.1537	3.3222	1.6437	2.0317	2.7157	2.8458	0.201	
10/08/2013	1.1848	3.3257	1.6611	2.0346	2.713	2.8719	0	
11/08/2013	1.1945	3.3264	1.6666	2.0375	2.6902	2.8538	0	
12/08/2013	1.2291	3.3318	1.6752	2.0403	2.7019	2.8569	0	
13/08/2013	1.2445	3.3366	1.6792	2.0452	2.7326	2.8703	0	
14/08/2013	1.2403	3.3396	1.6813	2.0495	2.7202	2.8796	0	
15/08/2013	1.2355	3.3442	1.6822	2.054	2.6984	2.8607	0.402	
16/08/2013	0.5717	3.3034	1.4798	2.0524	2.6627	2.8469	19.899	
17/08/2013	0.9608	3.3022	1.5708	2.0416	2.5928	2.841	0.201	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
18/08/2013	0.9951	3.3021	1.5647	2.0441	2.6437	2.8118	2.613	
19/08/2013	1.0879	3.3125	1.6208	2.0458	2.722	2.8446	0	
20/08/2013	1.1386	3.3144	1.658	2.0436	2.7247	2.8821	0	
21/08/2013	1.2991	3.2723	1.6759	2.0606	2.5859	2.8976	0	
22/08/2013	1.3198	3.278	1.686	2.0646	2.5772	2.882	0	
23/08/2013	1.3357	3.2804	1.6868	2.068	2.5684	2.8801	0	
24/08/2013	1.2816	3.2774	1.6266	2.0683	2.5811	2.8744	4.02	
25/08/2013	1.3282	3.2851	1.6789	2.0754	2.6063	2.8785	0.201	
26/08/2013	1.3545	3.2903	1.7046	2.0794	2.6177	2.9042	0	
27/08/2013	1.3726	3.2941	1.7123	2.0798	2.6146	2.8966	0	
28/08/2013	1.3941	3.2993	1.7238	2.084	2.634	2.9084	0	
29/08/2013	1.4037	3.3019	1.7249	2.0887	2.6085	2.902	0	
30/08/2013	1.4279	3.3062	1.7289	2.0934	2.5961	2.8978	0	
31/08/2013	1.4575	3.312	1.7382	2.0961	2.6667	2.9153	0	
01/09/2013	1.4705	3.3157	1.7421	2.1002	2.659	2.929	0	
02/09/2013	1.4728	3.3194	1.7387	2.1043	2.6444	2.912	0	
03/09/2013	1.4888	3.3209	1.7325	2.1077	2.6462	2.9179	0	
04/09/2013	1.4838	3.3212	1.7286	2.1095	2.6088	2.91	0	
05/09/2013	1.4937	3.3238	1.7292	2.113	2.6011	2.8869	0	
06/09/2013	1.2639	3.3127	1.6002	2.1131	2.5893	2.8906	5.829	
07/09/2013	1.3795	3.3133	1.6464	2.1177	2.6282	2.8838	1.407	
08/09/2013	1.4052	3.3165	1.6798	2.1189	2.6396	2.9173	0	
09/09/2013	1.425	3.3192	1.6974	2.1221	2.6446	2.912	0.603	
10/09/2013	1.4504	3.3239	1.7165	2.1272	2.6771	2.9308	0.603	
11/09/2013	1.4617	3.3235	1.7239	2.1288	2.6587	2.9341	1.005	
12/09/2013	1.3719	3.3162	1.6377	2.133	2.631	2.9128	2.211	
13/09/2013	1.3436	3.3165	1.6486	2.1345	2.6409	2.9062	1.005	
14/09/2013	1.2862	3.3128	1.6019	2.1336	2.6331	2.8973	2.01	
15/09/2013	1.2798	3.303	1.6178	2.1307	2.5155	2.9059	2.01	
16/09/2013	1.2945	3.3095	1.5696	2.1369	2.5716	2.8633	1.206	
17/09/2013	1.3304	3.3046	1.6038	2.1327	2.5574	2.8817	0.603	
18/09/2013	1.4626	3.3135	1.5546	2.1382	2.6436	2.8791	1.407	
19/09/2013	1.4964	3.3091	1.4384	2.1403	2.618	2.9298	2.613	
20/09/2013	1.5923	3.3168	1.6148	2.145	2.6919	2.9286	0	
21/09/2013	1.6544	3.3214	1.6432	2.1473	2.6851	2.9419	0	
22/09/2013	1.7157	3.327	1.6693	2.1503	2.7035	2.9465	0	
23/09/2013	1.7265	3.3238	1.6753	2.1467	2.6621	2.9386	0	
24/09/2013	1.7376	3.3269	1.6727	2.1502	2.6286	2.9153	0	
25/09/2013	1.7403	3.3248	1.6725	2.1487	2.6267	2.9021	1.608	
26/09/2013	1.7586	3.3292	1.6862	2.1492	2.6715	2.9191	0	
27/09/2013	1.7687	3.3323	1.6909	2.1529	2.6554	2.9259	0	
28/09/2013	1.7735	3.3333	1.6887	2.155	2.6336	2.9137	0	
29/09/2013	1.791	3.3344	1.6949	2.1564	2.6432	2.9064	0	
30/09/2013	1.7921	3.3384	1.7008	2.1583	2.652	2.9113	0	
01/10/2013	1.7995	3.3404	1.7066	2.1597	2.6698	2.9238	0	
02/10/2013	1.7237	3.3291	1.5658	2.1606	2.6633	2.9206	4.02	
03/10/2013	1.6564	3.3181	1.5551	2.1587	2.6171	2.9207	3.618	
04/10/2013	1.5184	3.3125	1.3291	2.1564	2.6367	2.8991	4.02	
05/10/2013	1.5741	3.3072	1.5335	2.1517	2.6826	2.9194	0	
06/10/2013	1.6542	3.3071	1.6064	2.1439	2.6707	2.9377	0	
07/10/2013	1.7054	3.3113	1.6266	2.1401	2.6595	2.9256	0	
08/10/2013	1.7381	3.3142	1.6469	2.1386	2.6653	2.9156	0	
09/10/2013	1.7438	3.309	1.6476	2.1284	2.6227	2.9223	1.005	
10/10/2013	1.7655	3.3125	1.6677	2.1348	2.6701	2.9038	0	
11/10/2013	1.7787	3.3164	1.6711	2.1363	2.6743	2.917	0	
12/10/2013	1.785	3.318	1.6573	2.1384	2.6496	2.9231	0	
13/10/2013	1.7745	3.3137	1.6654	2.1336	2.6051	2.9042	1.206	
14/10/2013	1.7218	3.3034	1.4094	2.1359	2.5961	2.8763	4.02	
15/10/2013	1.7044	3.3087	1.5857	2.1374	2.6249	2.8824	0.201	
16/10/2013	1.7093	3.2977	1.3283	2.1291	2.5501	2.9035	1.608	
17/10/2013	1.7003	3.3044	1.5261	2.1362	2.6356	2.8815	1.005	
18/10/2013	1.7229	3.3009	1.5809	2.1304	2.6142	2.9092	0.201	
19/10/2013	1.6504	3.2928	1.4654	2.1274	2.559	2.8675	3.015	
20/10/2013	1.6347	3.2876	1.503	2.1203	2.5651	2.8684	4.824	
21/10/2013	0.624	3.2501	1.2015	2.0982	2.5187	2.876	8.844	
22/10/2013	1.2735	3.2319	1.3079	2.075	2.4477	2.8321	1.809	
23/10/2013	1.1466	3.2127	1.2467	2.0467	2.5034	2.7847	6.03	
24/10/2013	1.4275	3.2124	1.4553	2.0218	2.5391	2.853	0	
25/10/2013	1.4682	3.2012	1.3676	1.9975	2.4515	2.8227	1.608	
26/10/2013	1.4732	3.2038	1.4885	1.9803	2.4726	2.8156	0	
27/10/2013	1.4579	3.2036	1.4731	1.9649	2.4418	2.798	1.407	
28/10/2013	1.2362	3.1837	1.231	1.9515	2.4783	2.7924	5.025	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
29/10/2013	1.2961	3.175	1.3045	1.935	2.5203	2.8118	3.216	
30/10/2013	1.4211	3.1731	1.4454	1.9135	2.4839	2.8172	0.201	
31/10/2013	1.4903	3.172	1.4218	1.9025	2.4843	2.8051	1.005	
01/11/2013	1.3731	3.2082	1.4883	1.9297	2.5587	2.8118	4.221	
02/11/2013	1.2477	3.1853	1.2134	1.9153	2.5013	2.8109	2.613	
03/11/2013	1.2139	3.1876	1.386	1.8999	2.4551	2.6971	1.407	
04/11/2013	1.2717	3.1837	1.4311	1.8843	2.4152	2.6763	0	
05/11/2013	1.4001	3.1889	1.4843	1.8786	2.4784	2.7605	3.216	
06/11/2013	1.359	3.1881	1.4213	1.8717	2.508	2.7615	0.402	
07/11/2013	1.076	3.1759	1.2448	1.8662	2.5098	2.738	2.613	
08/11/2013	1.2753	3.1779	1.4285	1.8507	2.4706	2.7145	0	
09/11/2013	1.407	3.1842	1.4728	1.8417	2.4845	2.7367	0.201	
10/11/2013	1.4912	3.1901	1.4463	1.8391	2.5216	2.7116	1.005	
11/11/2013	1.5516	3.1986	1.5426	1.8399	2.586	2.8143	1.608	
12/11/2013	1.4909	3.1976	1.4114	1.8429	2.5896	2.7952	0.603	
13/11/2013	1.4991	3.2002	1.5255	1.8369	2.6159	2.8271	0	
14/11/2013	1.4943	3.2005	1.3952	1.8356	2.5167	2.7441	3.618	
15/11/2013	1.4352	3.1976	1.4485	1.8351	2.6019	2.8126	0	
16/11/2013	1.4879	3.2079	1.519	1.8369	2.57	2.8049	0	
17/11/2013	1.5268	3.2107	1.5607	1.8339	2.5482	2.7971	0.201	
18/11/2013	1.5456	3.215	1.574	1.8327	2.4918	2.7778	0.603	
19/11/2013	1.5384	3.2091	1.3723	1.8313	2.5137	2.7471	2.814	
20/11/2013	1.4755	3.1985	1.4779	1.8288	2.5038	2.8177	4.221	
21/11/2013	1.3374	3.1822	1.3527	1.822	2.4532	2.6946	1.005	
22/11/2013	1.4145	3.1952	1.4713	1.8191	2.5245	2.7256	0.201	
23/11/2013	1.4918	3.1961	1.5317	1.8083	2.5388	2.7489	0	
24/11/2013	1.5461	3.2067	1.5713	1.806	2.5703	2.7751	0	
25/11/2013	1.5833	3.2161	1.6153	1.8071	2.6102	2.8077	0	
26/11/2013	1.6	3.219	1.6305	1.806	2.6102	2.8218	0	
27/11/2013	1.6305	3.2226	1.4648	1.7967	2.634	2.906	0	
28/11/2013	1.6412	3.2301	1.4816	1.8023	2.6512	2.9252	0	
29/11/2013	1.6344	3.2266	1.4804	1.7998	2.6295	2.9334	0.201	
30/11/2013	1.642	3.2318	1.4776	1.8063	2.6261	2.8832	0	
01/12/2013	1.6525	3.2396	1.4918	1.8152	2.6725	2.9261	0	
02/12/2013	1.6658	3.2476	1.5039	1.822	2.696	2.9515	0	
03/12/2013	1.6601	3.2491	1.4983	1.8265	2.6634	2.9401	0	
04/12/2013	1.6591	3.2526	1.4892	1.8298	2.6419	2.8923	0.201	
05/12/2013	1.6688	3.253	1.4955	1.8356	2.6688	2.9715	0.402	
06/12/2013	1.6643	3.2572	1.4869	1.842	2.6827	2.9233	1.407	
07/12/2013	1.6368	3.2578	1.4194	1.8524	2.6829	2.9445	1.809	
08/12/2013	1.6514	3.2643	1.4624	1.8572	2.664	2.9311	0	
09/12/2013	1.6728	3.2729	1.4946	1.8678	2.6948	2.9344	0	
10/12/2013	1.6757	3.2751	1.5014	1.8714	2.7065	2.942	0	
11/12/2013	1.6815	3.2802	1.5012	1.8768	2.7143	2.9571	0	
12/12/2013	1.6719	3.2799	1.4867	1.8781	2.6746	2.9325	0	
13/12/2013	1.6721	3.2847	1.4832	1.8873	2.6717	2.9425	1.206	
14/12/2013	1.6735	3.2864	1.4656	1.8918	2.7035	2.959	0.201	
15/12/2013	1.6705	3.2956	1.4704	1.8984	2.6855	2.9309	0	
16/12/2013	1.6407	3.2891	1.4554	1.9002	2.6446	2.8948	10.854	
17/12/2013	1.5073	3.2701	1.3974	1.8904	2.6718	2.924	0.201	
18/12/2013	1.5419	3.2635	1.4358	1.8722	2.5777	2.9047	0	
19/12/2013	1.5012	3.2495	1.2337	1.8586	2.5004	2.7889	2.814	
20/12/2013	1.5287	3.2533	1.3965	1.8469	2.5754	2.7916	0.804	
21/12/2013	1.5503	3.2515	1.1793	1.8415	2.5411	2.8313	2.613	
22/12/2013	1.4792	3.241	1.2779	1.8258	2.4987	2.7831	3.216	
23/12/2013	1.4711	3.2371	1.3708	1.8093	2.4989	2.8477	0	
24/12/2013	1.361	3.2175	1.0767	1.785	2.3166	2.6769	2.412	
25/12/2013	1.4186	3.217	1.3275	1.7657	2.3895	2.6642	0.603	
26/12/2013	1.5081	3.2244	1.3991	1.7543	2.4818	2.7485	0	
27/12/2013	1.5314	3.2142	1.3529	1.736	2.3894	2.7449	2.01	
28/12/2013	1.4669	3.2148	1.319	1.7356	2.5051	2.7646	0.603	
29/12/2013	1.5334	3.2218	1.4185	1.7243	2.5972	2.8196	0.402	
30/12/2013	1.5698	3.2244	1.4535	1.7202	2.5552	2.8593	0	
31/12/2013	1.5345	3.2241	1.4409	1.7132	2.5696	2.8823	0.201	
01/01/2014	1.508	3.2223	1.3349	1.7098	2.5441	2.8861	0.603	
02/01/2014	1.3725	3.205	1.1194	1.7058	2.4841	2.7685	4.221	
03/01/2014	1.3787	3.2066	1.3252	1.6891	2.4401	2.7205	0.201	
04/01/2014	1.4596	3.206	1.3333	1.6834	2.5176	2.8108	0.201	
05/01/2014	1.4658	3.2091	1.4008	1.6713	2.5234	2.7813	0.201	
06/01/2014	1.4828	3.1995	1.1439	1.6691	2.4642	2.7793	2.613	
07/01/2014	1.4032	3.195	1.2129	1.6646	2.4859	2.726	2.613	
08/01/2014	1.4184	3.1901	1.267	1.6489	2.499	2.7096	2.211	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
09/01/2014	1.3217	3.1482	1.0031	1.6215	2.3903	2.6631	9.447	
10/01/2014	1.3225	3.1601	1.2809	1.5942	2.3824	2.608	0	
11/01/2014	1.4108	3.1689	1.3499	1.579	2.3761	2.6164	1.608	
12/01/2014	1.4453	3.1648	1.3548	1.5656	2.4619	2.7849	0.201	
13/01/2014	1.3993	3.1627	1.2074	1.56	2.4072	2.7535	1.809	
14/01/2014	1.3945	3.1649	1.2864	1.5551	2.4174	2.7201	1.809	
15/01/2014	1.3834	3.1549	1.1909	1.551	2.3856	2.7165	3.015	
16/01/2014	1.3184	3.1583	1.2258	1.5443	2.349	2.6908	0.804	
17/01/2014	1.3493	3.164	1.3126	1.5378	2.3392	2.6628	0	
18/01/2014	1.4459	3.1712	1.3822	1.5414	2.4321	2.7769	1.809	
19/01/2014	1.4381	3.1492	1.08	1.5416	2.4335	2.7486	7.437	
20/01/2014	1.3648	3.1489	1.2815	1.5276	2.4219	2.6478	0	
21/01/2014	1.4432	3.1569	1.3668	1.5218	2.4334	2.7355	0	
22/01/2014	1.456	3.1448	1.1568	1.5192	2.4067	2.7404	3.015	
23/01/2014	1.4618	3.1619	1.3698	1.5178	2.4618	2.7485	0.201	
24/01/2014	1.4926	3.1636	1.4123	1.517	2.4766	2.7973	0.201	
25/01/2014	1.4204	3.1362	1.1283	1.5142	2.4593	2.791	9.045	
26/01/2014	1.3563	3.1335	1.2486	1.4955	2.3589	2.6901	2.814	
27/01/2014	1.2817	3.1164	1.2096	1.4741	2.1878	2.5251	0.402	
28/01/2014	1.3406	3.1312	1.2937	1.4671	2.2092	2.553	3.618	
29/01/2014	1.2508	3.0956	1.0149	1.472	2.305	2.461	3.417	
30/01/2014	1.263	3.1137	1.2591	1.4491	2.2487	2.3831	0	
31/01/2014	1.3516	3.1232	1.3343	1.4359	2.2773	2.5203	3.819	
01/02/2014	1.1061	3.0864	1.1537	1.4154	2.1856	2.4194	0.402	
02/02/2014	1.201	3.102	1.1975	1.4218	2.1726	2.3033	2.01	
03/02/2014	1.2824	3.1176	1.3312	1.4125	2.2647	2.4858	0	
04/02/2014	1.3435	3.1233	1.3646	1.4111	2.2749	2.5319	0	
05/02/2014	1.3672	3.1116	1.3382	1.409	2.2578	2.5919	2.211	
06/02/2014	1.0905	3.1182	1.1794	1.4472	2.3853	2.5918	1.407	
07/02/2014	1.0019	3.0818	1.0385	1.4232	2.2158	2.3719	5.628	
08/02/2014	1.0704	3.0799	1.1567	1.3937	2.0731	2.3055	1.005	
09/02/2014	1.0127	3.0567	1.0564	1.387	2.1242	2.3113	3.216	
10/02/2014	1.1864	3.0816	1.2637	1.373	2.1743	2.3372	3.216	
11/02/2014	1.1246	3.0749	1.2351	1.3642	2.2547	2.4901	6.231	
12/02/2014	1.106	3.0589	1.196	1.3456	2.1924	2.3935	1.206	
13/02/2014	1.0893	3.0549	1.1995	1.3259	2.084	2.2659	0	
14/02/2014	1.2351	3.0827	1.3008	1.3328	2.1869	2.4419	0.804	
15/02/2014	1.09	3.044	1.0745	1.3213	2.1262	2.3894	6.03	
16/02/2014	1.1428	3.0532	1.2118	1.3331	2.2726	2.4114	0	
17/02/2014	1.2298	3.0672	1.3195	1.3131	2.2208	2.4393	0.201	
18/02/2014	1.3439	3.0697	1.191	1.3313	2.3147	2.5675	1.407	
19/02/2014	1.3279	3.0911	1.3542	1.3486	2.3648	2.6111	0	
20/02/2014	1.3612	3.0906	1.3875	1.3579	2.3365	2.636	0.804	
21/02/2014	1.3499	3.1086	1.3981	1.3814	2.393	2.6605	0	
22/02/2014	1.4114	3.1218	1.4267	1.4072	2.4366	2.6756	0.402	
23/02/2014	1.4626	3.1327	1.4392	1.4258	2.4582	2.727	0	
24/02/2014	1.4962	3.1404	1.4586	1.4478	2.4736	2.7319	0.402	
25/02/2014	1.499	3.1457	1.458	1.4609	2.4475	2.7116	0.402	
26/02/2014	1.5097	3.1584	1.6406	1.4896	2.5443	2.7413	1.005	
27/02/2014	1.4899	3.2752	1.6726	1.4801	2.4832	2.7556	3.417	
28/02/2014	1.1353	3.2711	1.5794	1.4897	2.442	2.7199	0	
01/03/2014	1.3169	3.2665	1.6378	1.5123	2.4985	2.7644	0	
02/03/2014	1.4071	3.2664	1.6472	1.5232	2.4711	2.7731	1.608	
03/03/2014	1.1204	3.263	1.3964	1.5177	2.3969	2.6832	4.623	
04/03/2014	1.2189	3.2606	1.5948	1.5286	2.5131	2.7431	0.201	
05/03/2014	1.3834	3.2611	1.6474	1.5399	2.587	2.7754	0	
06/03/2014	1.4693	3.2673	1.6694	1.5451	2.5895	2.8038	2.01	
07/03/2014	1.3822	3.2703	1.659	1.548	2.5309	2.7505	1.608	
08/03/2014	1.3306	3.2673	1.6477	1.5541	2.579	2.8216	0	
09/03/2014	1.384	3.2671	1.6696	1.5615	2.5315	2.7623	0	
10/03/2014	1.4663	3.2675	1.6887	1.5732	2.5822	2.766	0	
11/03/2014	1.5252	3.2638	1.7047	1.5773	2.6267	2.8157	0	
12/03/2014	1.5396	3.2647	1.7097	1.5837	2.6059	2.8171	0.201	
13/03/2014	1.5441	3.2621	1.7096	1.5903	2.5823	2.7932	0	
14/03/2014	1.5573	3.2653	1.7174	1.6005	2.5901	2.8117	0	
15/03/2014	1.5653	3.2692	1.723	1.6172	2.5891	2.8032	0	
16/03/2014	1.573	3.2683	1.7307	1.6253	2.5854	2.805	0	
17/03/2014	1.5742	3.2686	1.7354	1.6356	2.5852	2.8097	0	
18/03/2014	1.5731	3.2669	1.7327	1.6412	2.5655	2.8069	0.804	
19/03/2014	1.5815	3.2658	1.7401	1.6522	2.6136	2.816	0	
20/03/2014	1.5828	3.2681	1.7373	1.6573	2.5636	2.8271	0.201	
21/03/2014	1.5623	3.2599	1.7271	1.6651	2.562	2.787	1.407	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
22/03/2014	1.5609	3.2613	1.7205	1.6708	2.5278	2.7697	1.005	
23/03/2014	1.5773	3.2586	1.7325	1.6842	2.593	2.7824	1.206	
24/03/2014	1.5972	3.2573	1.7454	1.6934	2.6604	2.8558	0	
25/03/2014	1.5876	3.261	1.7422	1.701	2.5936	2.7918	3.015	
26/03/2014	1.1876	3.2619	1.6297	1.7142	2.6824	2.8571	1.206	
27/03/2014	1.3478	3.2621	1.6825	1.7109	2.5976	2.8029	0.402	
28/03/2014	1.3713	3.2592	1.5814	1.7192	2.616	2.811	2.01	
29/03/2014	1.3767	3.2631	1.6142	1.7288	2.6008	2.8154	0.804	
30/03/2014	1.3968	3.2665	1.6752	1.737	2.583	2.7971	0	
31/03/2014	1.4825	3.267	1.6925	1.7425	2.5963	2.8021	0	
01/04/2014	1.5011	3.2645	1.3643	1.7461	2.593	2.8035	5.628	
02/04/2014	1.302	3.2661	1.6415	1.7427	2.559	2.796	0.603	
03/04/2014	1.3408	3.265	1.6481	1.7464	2.5433	2.7712	0	
04/04/2014	1.3946	3.2624	1.5585	1.7489	2.5773	2.7782	2.211	
05/04/2014	1.3135	3.2623	1.6507	1.7519	2.6012	2.8067	1.005	
06/04/2014	1.3626	3.2666	1.6662	1.7565	2.5845	2.801	1.206	
07/04/2014	1.3547	3.2636	1.6646	1.7548	2.6003	2.8228	8.442	
08/04/2014	1.2053	3.2561	1.5262	1.7409	2.5718	2.7605	0.402	
09/04/2014	1.3303	3.2579	1.6141	1.7372	2.6289	2.8197	0	
10/04/2014	1.4237	3.2601	1.644	1.7268	2.5992	2.8021	0	
11/04/2014	1.4867	3.257	1.659	1.7232	2.5988	2.7887	0	
12/04/2014	1.5291	3.2598	1.6716	1.7228	2.5841	2.7984	0	
13/04/2014	1.5485	3.2569	1.6796	1.7301	2.6154	2.7935	0	
14/04/2014	1.5671	3.258	1.6918	1.7389	2.6204	2.7928	0	
15/04/2014	1.5632	3.2355	1.681	1.7476	2.6382	2.8311	0.201	
16/04/2014	1.4614	3.2362	1.558	1.7536	2.6093	2.8166	0	
17/04/2014	1.458	3.2357	1.556	1.7606	2.573	2.8024	0	
18/04/2014	1.4654	3.2377	1.5561	1.7651	2.5937	2.796	0	
19/04/2014	1.4698	3.2394	1.5607	1.771	2.5987	2.8116	0	
20/04/2014	1.469	3.2393	1.5496	1.7748	2.5821	2.8263	0.201	
21/04/2014	1.4597	3.2441	1.5521	1.7822	2.5552	2.7797	0.201	
22/04/2014	1.4727	3.25	1.5652	1.7914	2.5766	2.7971	1.407	
23/04/2014	1.4763	3.2564	1.5717	1.7998	2.6244	2.8141	0	
24/04/2014	1.4894	3.2573	1.5786	1.8046	2.6435	2.833	0.201	
25/04/2014	1.4926	3.2601	1.5783	1.8133	2.6186	2.8391	3.819	
26/04/2014	1.1827	3.2151	1.3235	1.7984	2.5011	2.7865	7.638	
27/04/2014	1.1699	3.2254	1.4769	1.8065	2.5155	2.7537	0	
28/04/2014	1.3204	3.2357	1.5139	1.812	2.5783	2.791	0	
29/04/2014	1.401	3.2431	1.5306	1.8186	2.5891	2.8063	0	
30/04/2014	1.4361	3.2501	1.5436	1.8235	2.5859	2.8104	0	
01/05/2014	1.4531	3.251	1.5474	1.8246	2.5736	2.7991	0.804	
02/05/2014	1.4728	3.2588	1.5624	1.8299	2.6485	2.82	0	
03/05/2014	1.4884	3.2607	1.5782	1.8339	2.6664	2.8621	0	
04/05/2014	1.4845	3.2618	1.5878	1.841	2.6185	2.842	0	
05/05/2014	1.4737	3.262	1.5815	1.8411	2.5741	2.825	0	
06/05/2014	1.4634	3.2602	1.5753	1.845	2.5333	2.7737	2.211	
07/05/2014	1.4621	3.2632	1.5734	1.85	2.5676	2.787	0.201	
08/05/2014	1.4852	3.2699	1.5851	1.8602	2.6143	2.8458	2.412	
09/05/2014	1.3878	3.2513	1.5062	1.8584	2.5882	2.8038	6.432	
10/05/2014	1.3203	3.2444	1.5247	1.8601	2.5778	2.8535	3.618	
11/05/2014	1.1455	3.2391	1.4807	1.8602	2.5355	2.7663	5.628	
12/05/2014	0.962	3.228	1.3622	1.8577	2.5835	2.8031	4.623	
13/05/2014	0.907	3.1999	1.1194	1.8403	2.5711	2.7858	9.648	
14/05/2014	0.9632	3.1778	1.2749	1.7947	2.5305	2.7375	0	
15/05/2014	1.2033	3.1884	1.4179	1.7724	2.5436	2.7605	0	
16/05/2014	1.3107	3.188	1.4591	1.7588	2.5379	2.7794	0	
17/05/2014	1.3606	3.1914	1.4758	1.7497	2.5106	2.7709	0	
18/05/2014	1.381	3.1915	1.4824	1.7451	2.4777	2.7658	0	
19/05/2014	1.3999	3.1973	1.4828	1.7466	2.4735	2.7536	0	
20/05/2014	1.4261	3.2041	1.4917	1.757	2.5131	2.7588	0.603	
21/05/2014	1.4508	3.2092	1.5057	1.765	2.5688	2.7927	0.402	
22/05/2014	1.4456	3.2087	1.5014	1.769	2.5219	2.774	2.01	
23/05/2014	1.4221	3.2056	1.4721	1.7791	2.5562	2.7943	2.412	
24/05/2014	1.3582	3.2338	1.4708	1.7724	2.5378	2.7881	2.211	
25/05/2014	1.3047	3.2233	1.3835	1.7718	2.5201	2.776	2.613	
26/05/2014	1.3397	3.2169	1.4076	1.7703	2.5191	2.787	3.216	
27/05/2014	1.4674	3.2212	1.5239	1.7691	2.4942	2.7779	0	
28/05/2014	1.5662	3.2266	1.543	1.7698	2.4904	2.777	3.015	
29/05/2014	1.3099	3.2209	1.4855	1.7677	2.4875	2.7623	1.809	
30/05/2014	1.3448	3.2214	1.4958	1.7682	2.5128	2.7713	0	
31/05/2014	1.5138	3.2269	1.5426	1.7679	2.5124	2.7855	0	
01/06/2014	1.6037	3.2308	1.5579	1.7678	2.5028	2.785	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
02/06/2014	1.6334	3.2359	1.5703	1.7748	2.4845	2.7745	1.608	
03/06/2014	1.5736	3.2344	1.5601	1.7765	2.4677	2.7652	1.206	
04/06/2014	1.6315	3.2369	1.5695	1.7789	2.4403	2.757	0.201	
05/06/2014	1.6213	3.2416	1.573	1.784	2.4739	2.743	0.804	
06/06/2014	1.671	3.2492	1.5928	1.7959	2.5033	2.7678	0	
07/06/2014	1.6837	3.2568	1.6017	1.8082	2.4929	2.7633	6.633	
08/06/2014	1.4697	3.238	1.4467	1.8104	2.5073	2.7674	1.407	
09/06/2014	1.459	3.2378	1.488	1.8155	2.5007	2.7796	7.236	
10/06/2014	1.1967	3.2147	1.408	1.7942	2.4322	2.6873	1.005	
11/06/2014	1.369	3.2181	1.4585	1.7822	2.4746	2.7137	0.804	
12/06/2014	1.5263	3.221	1.5169	1.7749	2.5248	2.7767	0	
13/06/2014	1.6084	3.2256	1.5472	1.7705	2.5173	2.7794	0	
14/06/2014	1.6424	3.2319	1.5635	1.7716	2.5259	2.7767	0	
15/06/2014	1.672	3.2383	1.5803	1.7801	2.5553	2.7941	2.01	
16/06/2014	1.6295	3.2373	1.5838	1.7818	2.5603	2.8012	0	
17/06/2014	1.6665	3.2419	1.5959	1.7907	2.5695	2.8074	0	
18/06/2014	1.6829	3.248	1.6049	1.8024	2.5685	2.8127	0	
19/06/2014	1.6836	3.2513	1.6077	1.8114	2.5578	2.8054	0	
20/06/2014	1.6907	3.2548	1.6126	1.8191	2.5691	2.8139	0	
21/06/2014	1.696	3.2581	1.6099	1.8275	2.5662	2.811	0	
22/06/2014	1.7051	3.2657	1.6194	1.8376	2.5865	2.8224	0	
23/06/2014	1.717	3.2711	1.6286	1.8485	2.6056	2.8368	0	
24/06/2014	1.7182	3.2755	1.6355	1.8582	2.6093	2.847	0	
25/06/2014	1.7206	3.2798	1.6395	1.864	2.607	2.8448	0	
26/06/2014	1.7267	3.2848	1.6411	1.8716	2.5977	2.8412	0	
27/06/2014	1.7262	3.286	1.6436	1.8781	2.594	2.8402	0.402	
28/06/2014	1.6563	3.2854	1.6126	1.8831	2.5974	2.8354	3.015	
29/06/2014	1.7071	3.2893	1.6076	1.8881	2.6162	2.8392	0.402	
30/06/2014	1.7208	3.2956	1.6344	1.895	2.6421	2.86	0	
01/07/2014	1.7394	3.3005	1.6503	1.9057	2.6548	2.8595	0	
02/07/2014	1.7488	3.3026	1.6593	1.913	2.6713	2.8854	0	
03/07/2014	1.7491	3.3072	1.6597	1.9211	2.6517	2.8787	0.201	
04/07/2014	1.7427	3.3061	1.6491	1.926	2.6151	2.877	0.201	
05/07/2014	1.6151	3.3004	1.6113	1.9281	2.571	2.8092	7.035	
06/07/2014	1.6078	3.2938	1.5773	1.9337	2.6191	2.8493	2.01	
07/07/2014	1.4749	3.2826	1.4388	1.9347	2.6423	2.8513	9.849	
08/07/2014	1.5707	3.2857	1.5599	1.9405	2.6592	2.8747	0.201	
09/07/2014	1.6151	3.292	1.5926	1.9472	2.6808	2.8772	0.201	
10/07/2014	1.6836	3.2955	1.6078	1.9516	2.6701	2.8802	0	
11/07/2014	1.7064	3.3014	1.617	1.9577	2.6695	2.8807	0	
12/07/2014	1.724	3.3047	1.6212	1.9626	2.6579	2.8859	0.201	
13/07/2014	1.7243	3.3032	1.6213	1.9673	2.6164	2.8434	0.201	
14/07/2014	1.7353	3.3086	1.6302	1.9717	2.6683	2.8768	0	
15/07/2014	1.682	3.3168	1.639	1.9779	2.691	2.8758	0.402	
16/07/2014	1.7489	3.3139	1.6402	1.9814	2.7071	2.9066	0	
17/07/2014	1.754	3.3182	1.6247	1.9878	2.7129	2.9044	0	
18/07/2014	1.7551	3.3207	1.6402	1.9922	2.6848	2.9113	0	
19/07/2014	1.7253	3.3218	1.6468	1.9973	2.671	2.8888	13.668	
20/07/2014	0.889	3.2753	1.4517	1.9775	2.611	2.8431	0.402	
21/07/2014	1.4514	3.28	1.5473	1.9727	2.6583	2.863	0	
22/07/2014	1.6143	3.2858	1.5716	1.9729	2.6875	2.8869	0	
23/07/2014	1.6759	3.2896	1.5843	1.9753	2.6848	2.8983	0	
24/07/2014	1.7013	3.2935	1.5952	1.9784	2.6666	2.8799	0	
25/07/2014	1.7199	3.2977	1.6085	1.9846	2.6749	2.8857	0	
26/07/2014	1.7257	3.3017	1.6154	1.9894	2.6744	2.8817	0	
27/07/2014	1.7416	3.3054	1.6246	1.9945	2.6798	2.8815	0.201	
28/07/2014	1.7449	3.3069	1.6338	1.9981	2.6739	2.8728	0	
29/07/2014	1.7551	3.3126	1.6438	2.0034	2.6987	2.8954	0	
30/07/2014	1.7562	3.3157	1.6487	2.0072	2.6916	2.8943	0	
31/07/2014	1.7597	3.3173	1.6532	2.0109	2.6862	2.8947	0.201	
01/08/2014	1.7605	3.3145	1.7369	2.0071	2.6763	2.8995	1.608	
02/08/2014	1.6938	3.3079	1.61	2.0119	2.6551	2.8897	14.472	
03/08/2014	1.3214	3.2904	1.5467	2.0073	2.645	2.86	1.407	
04/08/2014	1.6703	3.2982	1.648	2.013	2.6993	2.8861	0	
05/08/2014	1.7192	3.3016	1.6798	2.0157	2.7188	2.9158	0	
06/08/2014	1.6788	3.2963	1.6916	2.0171	2.6666	2.8843	3.417	
07/08/2014	1.6227	3.3027	1.69	2.0232	2.6954	2.8865	0	
08/08/2014	1.7013	3.3037	1.7034	2.0251	2.692	2.9165	0	
09/08/2014	1.7181	3.3068	1.7018	2.0276	2.65	2.8625	0	
10/08/2014	1.7484	3.3072	1.7093	2.0316	2.6636	2.9165	7.638	
11/08/2014	1.3961	3.2885	1.6025	2.0266	2.6527	2.8689	0	
12/08/2014	1.5784	3.2891	1.6486	2.0276	2.6644	2.8864	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
13/08/2014	1.6672	3.2905	1.6664	2.0273	2.6571	2.8692	0.402	
14/08/2014	1.7203	3.2952	1.6867	2.0305	2.7001	2.9004	1.206	
15/08/2014	1.7388	3.3004	1.7029	2.0354	2.7278	2.9034	0	
16/08/2014	1.758	3.3031	1.7171	2.038	2.7495	2.9398	0	
17/08/2014	1.7551	3.3007	1.7153	2.0394	2.6775	2.8995	2.613	
18/08/2014	1.7365	3.3021	1.7145	2.04	2.6714	2.8652	3.618	
19/08/2014	1.6549	3.2976	1.6622	2.0436	2.7039	2.8954	10.452	
20/08/2014	1.2806	3.2752	1.5353	2.032	2.6851	2.8943	0.402	
21/08/2014	1.5502	3.2725	1.6039	2.0216	2.6656	2.895	0	
22/08/2014	1.515	3.2804	1.6341	2.0038	2.6351	2.8107	3.216	
23/08/2014	1.4581	3.2492	1.6426	2.0011	2.6716	2.8344	5.025	
24/08/2014	1.3121	3.241	1.549	2.0004	2.6828	2.8522	0	
25/08/2014	1.4488	3.2403	1.6124	1.9964	2.6417	2.8539	3.015	
26/08/2014	0.9819	3.2103	1.0745	1.9796	2.5943	2.7723	4.824	
27/08/2014	1.1423	3.2068	1.4441	1.9592	2.651	2.8395	0	
28/08/2014	1.3853	3.206	1.5099	1.9443	2.589	2.7941	0.603	
29/08/2014	1.4796	3.2065	1.5531	1.937	2.6078	2.8007	0	
30/08/2014	1.5458	3.2118	1.5787	1.9335	2.6377	2.8019	1.608	
31/08/2014	1.5576	3.2144	1.5315	1.9344	2.6689	2.8272	3.216	
01/09/2014	1.5305	3.2172	1.5896	1.9352	2.6662	2.8278	0.804	
02/09/2014	1.5349	3.2224	1.6181	1.9337	2.6897	2.8426	0	
03/09/2014	1.5756	3.2281	1.642	1.9395	2.6832	2.8441	0	
04/09/2014	1.5985	3.2344	1.6544	1.9431	2.6728	2.8432	0	
05/09/2014	1.6049	3.2358	1.6571	1.9461	2.6594	2.8335	0	
06/09/2014	1.6125	3.2408	1.6654	1.9515	2.6525	2.829	0.201	
07/09/2014	1.6175	3.2435	1.6723	1.9523	2.6542	2.8263	0	
08/09/2014	1.6242	3.2492	1.686	1.9586	2.68	2.8392	0	
09/09/2014	1.633	3.2543	1.6954	1.9692	2.6987	2.8596	0	
10/09/2014	1.6365	3.2606	1.7035	1.978	2.6977	2.8591	0	
11/09/2014	1.6434	3.2687	1.7085	1.9883	2.7041	2.856	0	
12/09/2014	1.648	3.271	1.7131	1.9946	2.7185	2.8622	0	
13/09/2014	1.6531	3.2794	1.7208	2.0047	2.7331	2.8752	0	
14/09/2014	1.6568	3.2818	1.7304	2.0121	2.7273	2.8854	0	
15/09/2014	1.6497	3.2834	1.7289	2.0141	2.6995	2.8719	0	
16/09/2014	1.6521	3.2887	1.7285	2.0221	2.6915	2.8583	0.402	
17/09/2014	1.6588	3.2907	1.7322	2.0282	2.7033	2.8665	0	
18/09/2014	1.6602	3.2951	1.7326	2.0322	2.6995	2.8631	0	
19/09/2014	1.663	3.2998	1.7384	2.036	2.7189	2.8736	0	
20/09/2014	1.6689	3.3041	1.7421	2.0413	2.7415	2.8772	0.603	
21/09/2014	1.6694	3.3042	1.7525	2.0434	2.7835	2.9012	0.201	
22/09/2014	1.6707	3.3018	1.7594	2.0427	2.7792	2.9156	0	
23/09/2014	1.6686	3.3033	1.7615	2.0476	2.7459	2.9002	0	
24/09/2014	1.6475	3.3001	1.7474	2.0505	2.7062	2.8578	4.02	
25/09/2014	1.6393	3.304	1.716	2.0537	2.751	2.8927	0	
26/09/2014	1.6611	3.3124	1.7416	2.0618	2.7591	2.8796	0	
27/09/2014	1.6725	3.3106	1.7515	2.0619	2.7931	2.9195	0	
28/09/2014	1.6754	3.3155	1.7595	2.0683	2.7661	2.9164	0	
29/09/2014	1.6784	3.32	1.7639	2.0713	2.7676	2.9087	0	
30/09/2014	1.6796	3.3241	1.7681	2.0758	2.7764	2.9075	0	
01/10/2014	1.6837	3.3264	1.7717	2.0813	2.7833	2.9026	0	
02/10/2014	1.6921	3.3245	1.778	2.0798	2.8254	2.9457	0.201	
03/10/2014	1.6836	3.3257	1.7829	2.0847	2.7664	2.9149	0	
04/10/2014	1.6755	3.3256	1.7827	2.0897	2.7135	2.8643	5.628	
05/10/2014	1.6194	3.317	1.704	2.0884	2.7903	2.9182	0	
06/10/2014	1.6359		1.7277	2.0915	2.6996	2.8914	8.643	
07/10/2014	1.1652		1.5612	2.0793	2.6505	2.831	2.01	
08/10/2014	1.3717		1.5568	2.08	2.689	2.8762	2.01	
09/10/2014	1.4407	3.2772	1.3898	2.0767	2.66	2.8251	7.638	
10/10/2014	1.2619	3.265	1.4449	2.074	2.7183	2.8551	1.608	
11/10/2014	1.4122		1.5078	2.0613	2.714	2.8675	0	
12/10/2014	1.4981	3.2637	1.5883	2.0529	2.7216	2.8738	0	
13/10/2014	1.5686	3.268	1.6192	2.0468	2.6878	2.862	0	
14/10/2014	1.4771	3.2547	1.2899	2.0411	2.6877	2.8449	6.03	
15/10/2014	1.356		1.5372	2.0337	2.6703	2.8606	0	
16/10/2014	1.3466	3.2394	1.3562	2.0213	2.617	2.8051	2.814	
17/10/2014	1.3215	3.2395	1.4015	2.0134	2.638	2.8049	2.01	
18/10/2014	1.3709	3.2386	1.4559	2.0042	2.6226	2.8047	1.206	
19/10/2014	1.3957	3.24	1.5554	1.994	2.6487	2.8272	0	
20/10/2014	1.5364	3.2454	1.6034	1.9834	2.6859	2.8528	1.206	
21/10/2014	1.535	3.2359	1.6026	1.9705	2.5876	2.7887	2.412	
22/10/2014	1.396	3.2336	1.358	1.9667	2.7286	2.8701	2.412	
23/10/2014	1.4053		1.5387	1.9593	2.664	2.8538	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
24/10/2014	1.4911	3.2374	1.5826	1.9538	2.6387	2.8255	0.603	
25/10/2014	1.5443	3.238	1.5921	1.9455	2.6551	2.8244	0.201	
26/10/2014	1.5793	3.2458	1.6154	1.9453	2.6743	2.8426	0	
27/10/2014	1.5952	3.248	1.6363	1.9455	2.6738	2.843	0.201	
28/10/2014	1.6336	3.2525	1.6428	1.9432	2.6144	2.9142	0.603	
29/10/2014	1.316	3.2615	1.4841	1.9774	2.643	2.9082	2.211	
30/10/2014	1.3759	3.2657	1.5061	1.9788	2.6358	2.9177	0.603	
31/10/2014	1.4631	3.273	1.5145	1.983	2.6375	2.9298	0	
01/11/2014	1.4839	3.2762	1.5199	1.9837	2.6272	2.9122	0.201	
02/11/2014	1.4624	3.2736	1.5139	1.9803	2.5813	2.8877	0.804	
03/11/2014	1.4721	3.2709	1.51	1.9793	2.5481	2.8875	1.407	
04/11/2014	1.4249	3.2669	1.4833	1.9772	2.5675	2.8468	0.201	
05/11/2014	1.4872	3.2784	1.5205	1.9867	2.6625	2.9095	0	
06/11/2014	1.5144	3.2766	1.5334	1.9869	2.679	2.9681	0	
07/11/2014	1.5027	3.282	1.5118	1.9896	2.5668	2.8798	6.633	
08/11/2014	1.3566	3.2638	1.3173	1.9848	2.631	2.9249	3.216	
09/11/2014	1.2713	3.2604	1.3689	1.9767	2.5856	2.8644	0	
10/11/2014	1.3588	3.2599	1.4513	1.9684	2.5791	2.8794	0.402	
11/11/2014	1.406	3.2617	1.2987	1.9642	2.5526	2.8627	1.608	
12/11/2014	1.3678	3.2602	1.3678	1.9592	2.5411	2.8407	1.407	
13/11/2014	1.3336	3.2651	1.4018	1.9614	2.6152	2.9097	0	
14/11/2014	1.4027	3.2636	1.4365	1.9578	2.569	2.8697	4.824	
15/11/2014	1.3224	3.2508	1.3364	1.944	2.5666	2.859	0.201	
16/11/2014	1.3683	3.2539	1.4236	1.9374	2.5543	2.8404	0	
17/11/2014	1.4279	3.2555	1.467	1.931	2.5572	2.849	3.015	
18/11/2014	1.3922	3.2523	1.3911	1.9234	2.5992	2.8613	0	
19/11/2014	1.4371	3.252	1.46	1.9182	2.6095	2.862	0	
20/11/2014	1.4778	3.2617	1.4974	1.917	2.6436	2.894	0	
21/11/2014	1.4907	3.258	1.5065	1.9115	2.6188	2.9157	0.402	
22/11/2014	1.3408	3.2311	1.0567	1.9005	2.5325	2.8348	8.04	
23/11/2014	1.1858	3.2381	1.3852	1.891	2.5079	2.7655	0.603	
24/11/2014	1.2759	3.2334	1.4397	1.876	2.5101	2.78	0	
25/11/2014	1.3791	3.2341	1.4764	1.8682	2.5266	2.841	0	
26/11/2014	1.4202	3.2341	1.376	1.8632	2.4885	2.8328	4.02	
27/11/2014	1.3913	3.2205	1.3892	1.8031	2.4614	2.7171	0.804	
28/11/2014	1.4092	3.2236	1.42	1.7977	2.4713	2.6916	0	
29/11/2014	1.4888	3.2277	1.4838	1.7932	2.5167	2.7147	0.201	
30/11/2014	1.5552	3.2358	1.5127	1.7938	2.5525	2.7436	0	
01/12/2014	1.5931	3.2349	1.5368	1.7884	2.5628	2.7588	0	
02/12/2014	1.6102	3.2418	1.5499	1.7878	2.571	2.7314	0.201	
03/12/2014	1.6274	3.2411	1.5636	1.784	2.6306	2.7996	0	
04/12/2014	1.6204	3.2401	1.5632	1.7837	2.5774	2.7888	0	
05/12/2014	1.6235	3.2501	1.5694	1.7893	2.5853	2.7679	0.201	
06/12/2014	1.6371	3.2515	1.567	1.7911	2.6473	2.813	0.201	
07/12/2014	1.6381	3.2554	1.5677	1.7989	2.5771	2.7893	0.402	
08/12/2014	1.639	3.2591	1.5784	1.8018	2.5963	2.781	1.005	
09/12/2014	1.6444	3.2638	1.5771	1.8107	2.6709	2.861	0	
10/12/2014	1.6202	3.2597	1.3962	1.8113	2.5676	2.7592	3.618	
11/12/2014	1.6001	3.255	1.4652	1.8114	2.547	2.7608	1.407	
12/12/2014	1.5696	3.2397	1.1965	1.8036	2.4658	2.7076	9.447	
13/12/2014	1.3769	3.2348	1.3857	1.7801	2.5024	2.6563	0.402	
14/12/2014	1.4483	3.2342	1.4657	1.767	2.4487	2.6749	0.201	
15/12/2014	1.482	3.2334	1.3376	1.7586	2.4628	2.6754	4.02	
16/12/2014	1.4639	3.2291	1.4247	1.7468	2.4898	2.7005	0.603	
17/12/2014	1.39	3.205	0.9895	1.7311	2.4135	2.6606	5.829	
18/12/2014	1.2892	3.2105	1.3494	1.7076	2.4092	2.6333	0.201	
19/12/2014	1.3627	3.2081	1.2134	1.6839	2.416	2.6103	2.211	
20/12/2014	1.41	3.2018	1.4317	1.6693	2.4851	2.6747	0.201	
21/12/2014	1.4908	3.2082	1.4904	1.6622	2.5147	2.7475	0	
22/12/2014	1.5244	3.2106	1.5106	1.6538	2.4593	2.7124	0	
23/12/2014	1.5526	3.2156	1.5149	1.653	2.4921	2.7272	0	
24/12/2014	1.569	3.2168	1.5255	1.648	2.4996	2.6913	0.804	
25/12/2014	1.5899	3.2206	1.5401	1.6528	2.5789	2.7449	1.407	
26/12/2014	1.5912	3.2171	1.4548	1.6547	2.5979	2.8084	1.206	
27/12/2014	1.1744	3.1794	1.0807	1.6308	2.4502	2.694	4.02	
28/12/2014	1.1992	3.1849	1.3525	1.6123	2.476	2.6024	0	
29/12/2014	1.3954	3.188	1.4758	1.6045	2.4877	2.6401	0	
30/12/2014	1.4973	3.1904	1.5129	1.597	2.4776	2.6816	0	
31/12/2014	1.537	3.1936	1.5288	1.595	2.4546	2.6861	0	
01/01/2015	1.56	3.2062	1.5189	1.6049	2.4692	2.7233	0.201	
02/01/2015	1.5632	3.2138	1.4723	1.6125	2.4727	2.6535	0.804	
03/01/2015	1.5482	3.2072	1.5446	1.6144	2.5068	2.7465	4.824	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
04/01/2015	1.3776	3.2006	1.416	1.6136	2.536	2.7194	0	
05/01/2015	1.4294	3.2065	1.5136	1.6089	2.489	2.7176	0	
06/01/2015	1.4908	3.2074	1.526	1.6047	2.4328	2.6708	1.005	
07/01/2015	1.521	3.2104	1.5031	1.6106	2.4953	2.726	1.005	
08/01/2015	1.4946	3.2162	1.3643	1.6145	2.4713	2.6779	2.412	
09/01/2015	1.3736	3.2092	1.3809	1.6127	2.4527	2.6957	0.804	
10/01/2015	1.3719	3.207	1.4423	1.6051	2.4377	2.6729	0.603	
11/01/2015	1.4129	3.2097	1.5011	1.6028	2.5073	2.6994	0	
12/01/2015	1.4885	3.2096	1.5267	1.6014	2.4669	2.7266	0.402	
13/01/2015	1.5194	3.2117	1.5233	1.5998	2.4446	2.6882	0.402	
14/01/2015	1.5183	3.2097	1.5238	1.6005	2.4815	2.6974	0	
15/01/2015	1.5184	3.2104	1.2827	1.6032	2.3818	2.6431	2.211	
16/01/2015	1.4499	3.2178	1.4792	1.618	2.5143	2.6783	1.407	
17/01/2015	1.3986	3.2092	1.4207	1.6184	2.5539	2.7366	0.201	
18/01/2015	1.4508	3.2138	1.4888	1.6148	2.528	2.707	0.603	
19/01/2015	1.5374	3.218	1.5208	1.6218	2.5657	2.7539	0	
20/01/2015	1.5445	3.2188	1.535	1.6194	2.5201	2.7267	0.201	
21/01/2015	1.5607	3.2202	1.5335	1.6226	2.4866	2.6878	0.201	
22/01/2015	1.5913	3.2303	1.5111	1.6371	2.5924	2.7371	0.402	
23/01/2015	1.5991	3.2336	1.553	1.6454	2.6052	2.7895	0.201	
24/01/2015	1.3533	3.234	1.513	1.6603	2.5987	2.8194	1.809	
25/01/2015	1.3127	3.2335	1.6632	1.6675	2.6382	2.886	0	
26/01/2015	1.3295	3.2394	1.6884	1.6707	2.5709	2.8261	0.402	
27/01/2015	1.3468	3.2438	1.6916	1.6793	2.6244	2.8679	0	
28/01/2015	1.3433	3.233	1.6776	1.6712	2.5118	2.8499	1.206	
29/01/2015	1.3202	3.2293	1.6462	1.6681	2.4581	2.8129	0.804	
30/01/2015	1.2657	3.2252	1.4264	1.6633	2.4114	2.7043	1.809	
31/01/2015	1.1721	3.2192	1.2161	1.6659	2.4611	2.7318	3.417	
01/02/2015	1.0901	3.2192	1.497	1.6531	2.5018	2.7296	0	
02/02/2015	1.1984	3.2176	1.5929	1.6334	2.5009	2.7542	0	
03/02/2015	1.2871	3.2187	1.6275	1.6224	2.4914	2.743	0	
04/02/2015	1.3472	3.2287	1.665	1.6289	2.5661	2.7901	0	
05/02/2015	1.3717	3.2335	1.6865	1.6385	2.5854	2.8272	0	
06/02/2015	1.3798	3.2366	1.7004	1.6369	2.6013	2.8338	0	
07/02/2015	1.3832	3.2388	1.7133	1.6434	2.6005	2.8369	0	
08/02/2015	1.3941	3.2456	1.7316	1.6552	2.6142	2.8548	0	
09/02/2015	1.3913	3.2487	1.7411	1.6629	2.5849	2.8463	0	
10/02/2015	1.3936	3.2543	1.7469	1.6727	2.5791	2.8457	0	
11/02/2015	1.3902	3.2518	1.7456	1.6767	2.5495	2.8366	0	
12/02/2015	1.39	3.2585	1.7474	1.6851	2.5466	2.8326	0	
13/02/2015	1.388	3.2548	1.7398	1.6896	2.4992	2.8483	0.201	
14/02/2015	1.3745	3.2647	1.7342	1.6982	2.5078	2.7683	1.206	
15/02/2015	1.4011	3.2727	1.7598	1.7145	2.6016	2.8393	0	
16/02/2015	1.4064	3.2715	1.7688	1.7183	2.5909	2.8475	1.407	
17/02/2015	1.396	3.2788	1.7731	1.7293	2.6809	2.8618	0	
18/02/2015	1.4167	3.2807	1.7896	1.7354	2.6775	2.9215	0	
19/02/2015	1.3994	3.2801	1.7748	1.7373	2.5831	2.8858	1.407	
20/02/2015	1.3727	3.2765	1.753	1.74	2.5392	2.8406	0	
21/02/2015	1.3723	3.2761	1.7271	1.741	2.515	2.8055	1.206	
22/02/2015	1.3811	3.281	1.6722	1.7518	2.5873	2.8842	1.005	
23/02/2015	1.272	3.2751	1.557	1.7511	2.5002	2.8096	0.603	
24/02/2015	1.2722	3.2854	1.4829	1.7798	2.5663	2.7389	2.412	
25/02/2015	1.2589	3.2842	1.6494	1.7901	2.6496	2.8287	0.402	
26/02/2015	1.3072	3.2882	1.683	1.7942	2.6204	2.8377	2.412	
27/02/2015	1.4471	3.2799	1.6212	1.7894	2.6355	2.8221	0	
28/02/2015	1.5199	3.2834	1.6712	1.7926	2.5774	2.834	0	
01/03/2015	1.5336	3.2865	1.6632	1.7865	2.5191	2.7565	1.005	
02/03/2015	1.5005	3.2825	1.61	1.7874	2.5695	2.7656	2.01	
03/03/2015	1.5515	3.2865	1.6849	1.7906	2.621	2.8098	0.201	
04/03/2015	1.5989	3.2964	1.7154	1.7981	2.6671	2.8059	0	
05/03/2015	1.6402	3.2974	1.7442	1.8017	2.7216	2.8799	0	
06/03/2015	1.6433	3.3016	1.7538	1.8038	2.6749	2.8708	0	
07/03/2015	1.6318	3.2995	1.7425	1.799	2.6043	2.8236	0	
08/03/2015	1.634	3.3038	1.7398	1.8048	2.6118	2.8015	3.618	
09/03/2015	1.5606	3.2958	1.6783	1.8041	2.6606	2.8694	0	
10/03/2015	1.5891	3.3047	1.6803	1.8091	2.6556	2.8129	0.201	
11/03/2015	1.6215	3.3021	1.6818	1.8092	2.6532	2.8556	0.201	
12/03/2015	1.6255	3.3023	1.6803	1.8121	2.6484	2.8491	0	
13/03/2015	1.6265	3.3045	1.5838	1.8163	2.6423	2.8151	7.638	
14/03/2015	1.2088	3.2873	1.562	1.808	2.6268	2.8048	0	
15/03/2015	1.4015	3.2852	1.6424	1.7957	2.5639	2.7601	0	
16/03/2015	1.5053	3.287	1.6629	1.7872	2.5444	2.766	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
17/03/2015	1.5611	3.29	1.6737	1.7826	2.5526	2.7482	0.603	
18/03/2015	1.5931	3.291	1.6916	1.782	2.6069	2.7716	0	
19/03/2015	1.612	3.2954	1.706	1.7838	2.6249	2.8021	0	
20/03/2015	1.6188	3.297	1.7093	1.7856	2.6089	2.8186	0	
21/03/2015	1.6165	3.3018	1.7032	1.7867	2.5954	2.7851	0	
22/03/2015	1.6243	3.2943	1.7092	1.7886	2.6304	2.8246	0	
23/03/2015	1.6179	3.2924	1.687	1.791	2.569	2.7886	0.201	
24/03/2015	1.6182	3.2955	1.6821	1.7936	2.572	2.7825	1.005	
25/03/2015	1.6202	3.3014	1.6872	1.8032	2.6031	2.7903	0.402	
26/03/2015	1.6232	3.2939	1.6645	1.8026	2.5505	2.775	3.618	
27/03/2015	1.4575	3.3032	1.6646	1.8195	2.6623	2.8226	0	
28/03/2015	1.5426	3.3016	1.6784	1.8216	2.6233	2.8682	1.407	
29/03/2015	1.5332	3.3026	1.6498	1.8226	2.5816	2.8283	4.623	
30/03/2015	1.3397	3.2906	1.5555	1.818	2.5962	2.7795	1.206	
31/03/2015	1.1824	3.271	1.3454	1.8001	2.4975	2.695	6.633	
01/04/2015	1.2333	3.2716	1.533	1.7794	2.5945	2.7546	0.804	
02/04/2015	1.3224	3.2556	1.2963	1.7497	2.5358	2.7295	3.216	
03/04/2015	1.2287	3.2469	1.5194	1.722	2.4855	2.7183	1.608	
04/04/2015	1.1956	3.2436	1.5063	1.7047	2.5274	2.7227	0.201	
05/04/2015	1.3262	3.2433	1.5624	1.6892	2.5422	2.738	0	
06/04/2015	1.4472	3.2449	1.605	1.6778	2.5681	2.7469	0	
07/04/2015	1.532	3.2474	1.6286	1.6727	2.5953	2.7769	0	
08/04/2015	1.5603	3.2478	1.628	1.6714	2.5819	2.7816	0.201	
09/04/2015	1.5694	3.2495	1.5995	1.6741	2.5599	2.7826	0	
10/04/2015	1.5748	3.2482	1.5654	1.6763	2.543	2.7847	0	
11/04/2015	1.5731	3.2519	1.6305	1.681	2.5163	2.7263	0.603	
12/04/2015	1.5948	3.2548	1.6651	1.6968	2.6235	2.8215	0.603	
13/04/2015	1.5956	3.2556	1.6879	1.7027	2.6492	2.8179	0.402	
14/04/2015	1.6031	3.2581	1.6802	1.7164	2.6144	2.8191	0	
15/04/2015	1.601	3.2611	1.6741	1.7243	2.59	2.8077	0	
16/04/2015	1.6098	3.2654	1.6728	1.7358	2.6146	2.8268	0	
17/04/2015	1.6175	3.2711	1.6654	1.7483	2.6258	2.809	0	
18/04/2015	1.6293	3.2757	1.6723	1.7622	2.6924	2.8635	0	
19/04/2015	1.6316	3.2752	1.6675	1.7678	2.6694	2.8692	0	
20/04/2015	1.629	3.2783	1.6757	1.7767	2.6698	2.8386	0	
21/04/2015	1.6425	3.2857	1.6648	1.7916	2.704	2.8739	0	
22/04/2015	1.6456	3.289	1.6591	1.8004	2.6955	2.8859	0	
23/04/2015	1.6338	3.2876	1.6395	1.8051	2.6368	2.8608	0	
24/04/2015	1.6279	3.2885	1.6405	1.8125	2.6025	2.8338	0	
25/04/2015	1.6267	3.2907	1.6369	1.8213	2.5864	2.8098	2.412	
26/04/2015	1.6277	3.2902	1.6509	1.8271	2.6452	2.8335	0	
27/04/2015	1.6328	3.2919	1.6776	1.8313	2.6598	2.8502	0	
28/04/2015	1.6378	3.2962	1.683	1.8387	2.664	2.8384	0	
29/04/2015	1.6487	3.2964	1.6749	1.8492	2.6536	2.8595	1.608	
30/04/2015	1.632	3.2974	1.6641	1.8562	2.654	2.841	1.005	
01/05/2015	1.6306	3.3044	1.6528	1.8517	2.6941	2.8437	0	
02/05/2015	1.6525	3.3034	1.6646	1.8384	2.5791	2.821	0.603	
03/05/2015	1.6764	3.281	1.5966	1.8412	2.5345	2.8082	4.623	
04/05/2015	1.7042	3.2955	1.6781	1.8541	2.569	2.8207	0.402	
05/05/2015	1.3947	3.2538	1.542	1.8421	2.5185	2.7998	4.824	
06/05/2015	1.5689	3.2627	1.6217	1.8449	2.6003	2.849	0.402	
07/05/2015	1.6467	3.2562	1.5003	1.8493	2.6323	2.862	3.618	
08/05/2015	1.5763	3.2123	1.2553	1.8396	2.5384	2.807	2.814	
09/05/2015	1.3338	3.2274	1.525	1.8284	2.5861	2.8453	5.226	
10/05/2015	1.4834	3.2371	1.6021	1.8162	2.5446	2.8157	0	
11/05/2015	1.5911	3.2402	1.6271	1.8106	2.5458	2.812	0	
12/05/2015	1.6645	3.2437	1.6474	1.8097	2.5839	2.8314	0	
13/05/2015	1.6978	3.2485	1.6558	1.8108	2.5633	2.8168	0	
14/05/2015	1.7063	3.2467	1.6579	1.8087	2.5613	2.8175	0	
15/05/2015	1.7355	3.2608	1.6812	1.8228	2.5963	2.8381	0	
16/05/2015	1.7441	3.2617	1.6897	1.8262	2.6283	2.8558	0.201	
17/05/2015	1.7457	3.271	1.6999	1.8335	2.5802	2.8248	0	
18/05/2015	1.4182	3.2536	1.5553	1.8244	2.4932	2.7759	6.03	
19/05/2015	1.4582	3.2513	1.5767	1.8289	2.5491	2.809	3.015	
20/05/2015	1.569	3.2573	1.6332	1.8384	2.6214	2.8516	1.206	
21/05/2015	1.6451	3.262	1.6646	1.8399	2.6224	2.8519	0	
22/05/2015	1.6946	3.2629	1.6722	1.8413	2.6037	2.8391	0	
23/05/2015	1.7226	3.2687	1.6825	1.8485	2.5921	2.8302	0	
24/05/2015	1.7313	3.2678	1.6829	1.8497	2.5876	2.8287	0.603	
25/05/2015	1.7415	3.2725	1.6931	1.8562	2.597	2.8351	0.201	
26/05/2015	1.7559	3.2749	1.7033	1.8604	2.6285	2.8551	0	
27/05/2015	1.7472	3.2756	1.6963	1.8612	2.5504	2.8041	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
28/05/2015	1.7535	3.2827	1.6987	1.8715	2.5734	2.8187	0	
29/05/2015	1.5984	3.2666	1.6426	1.8681	2.5589	2.8027	4.623	
30/05/2015	1.6957	3.2797	1.709	1.8803	2.5809	2.8127	0.804	
31/05/2015	1.588	3.2696	1.6957	1.8758	2.5754	2.8092	2.01	
01/06/2015	1.6355	3.273	1.7153	1.8796	2.5217	2.77	1.206	
02/06/2015	1.3924	3.2505	1.5867	1.8706	2.5435	2.8019	6.231	
03/06/2015	1.5449	3.2614	1.6651	1.8733	2.6374	2.853	0.603	
04/06/2015	1.6228	3.2636	1.6818	1.8671	2.5759	2.8114	0	
05/06/2015	1.6637	3.2601	1.6861	1.8664	2.5716	2.8096	0	
06/06/2015	1.7181	3.2658	1.7081	1.8715	2.6278	2.8422	0	
07/06/2015	1.7464	3.2718	1.7267	1.8775	2.6597	2.8653	0	
08/06/2015	1.7523	3.276	1.7352	1.8806	2.643	2.8578	0	
09/06/2015	1.7531	3.278	1.7105	1.8839	2.6243	2.8469	0.201	
10/06/2015	1.7595	3.2826	1.7214	1.8908	2.5958	2.8281	0	
11/06/2015	1.7538	3.2843	1.7227	1.8951	2.5544	2.8045	0	
12/06/2015	1.7529	3.2859	1.7247	1.8995	2.5485	2.7978	0	
13/06/2015	1.558	3.2673	1.552	1.8972	2.5615	2.8127	8.844	
14/06/2015	1.6627	3.2699	1.6494	1.8982	2.5919	2.8273	0.402	
15/06/2015	1.7139	3.2792	1.6885	1.9055	2.6178	2.8359	0	
16/06/2015	1.7386	3.2842	1.711	1.9117	2.6166	2.8341	0	
17/06/2015	1.7456	3.2872	1.7176	1.9144	2.5992	2.8246	0.201	
18/06/2015	1.7537	3.2885	1.7254	1.918	2.6147	2.8305	0	
19/06/2015	1.7584	3.2918	1.737	1.924	2.6231	2.8374	0	
20/06/2015	1.7599	3.2932	1.7347	1.9281	2.6011	2.8278	0.201	
21/06/2015	1.7635	3.2962	1.7439	1.9331	2.5943	2.8244	0	
22/06/2015	1.733	3.2891	1.7401	1.9348	2.6047	2.8328	1.809	
23/06/2015	1.7599	3.2996	1.7576	1.9448	2.6415	2.8572	0	
24/06/2015	1.772	3.3031	1.7634	1.9494	2.6466	2.8581	0	
25/06/2015	1.7763	3.3079	1.7707	1.9578	2.6421	2.8557	0	
26/06/2015	1.7734	3.3062	1.768	1.9592	2.6189	2.8441	0.201	
27/06/2015	1.786	3.3132	1.7806	1.9703	2.6597	2.8698	0	
28/06/2015	1.7199	3.3089	1.7714	1.9717	2.6492	2.8634	2.613	
29/06/2015	1.7642	3.3149	1.7841	1.9792	2.6618	2.8699	0	
30/06/2015	1.775	3.319	1.7933	1.987	2.6342	2.8531	0	
01/07/2015	1.7709	3.3188	1.7976	1.9893	2.626	2.8486	0	
02/07/2015	1.7703	3.3095	1.6104	1.9936	2.6885	2.8833	7.437	
03/07/2015	1.738	3.3128	1.7125	2.0033	2.6548	2.8604	1.005	
04/07/2015	1.7451	3.3126	1.7322	2.0054	2.6562	2.8635	0.201	
05/07/2015	1.7337	3.3066	1.6824	2.006	2.625	2.8417	3.618	
06/07/2015	1.7058	3.3046	1.6352	2.0106	2.6123	2.8285	2.211	
07/07/2015	1.6772	3.3048	1.6878	2.0136	2.5909	2.8179	0	
08/07/2015	1.7163	3.304	1.7113	2.0148	2.6692	2.8683	1.407	
09/07/2015	1.7416	3.3125	1.7384	2.0225	2.6859	2.8775	0	
10/07/2015	1.7007	3.3119	1.7362	2.0265	2.6243	2.8428	0	
11/07/2015	1.7123	3.3186	1.7416	2.0309	2.6572	2.8628	0	
12/07/2015	1.7015	3.3186	1.7514	2.0334	2.6359	2.8617	0.402	
13/07/2015	1.6668	3.3133	1.7342	2.0348	2.6096	2.8445	2.613	
14/07/2015	1.6882	3.3148	1.7408	2.0373	2.6415	2.8601	0.402	
15/07/2015	1.6924	3.3232	1.6285	2.0532	2.6871	2.862	0	
16/07/2015	1.7044	3.3258	1.6324	2.0557	2.6961	2.8651	0	
17/07/2015	1.7027	3.3299	1.6385	2.0641	2.6356	2.8298	0	
18/07/2015	1.7144	3.3274	1.642	2.0634	2.6823	2.8574	0	
19/07/2015	1.7209	3.3332	1.6541	2.073	2.6715	2.8494	2.211	
20/07/2015	1.6889	3.3318	1.6594	2.0736	2.6869	2.8589	1.206	
21/07/2015	1.7043	3.3309	1.6614	2.0778	2.6797	2.8561	0	
22/07/2015	1.7224	3.3348	1.6717	2.0822	2.7147	2.88	0.804	
23/07/2015	1.7248	3.3354	1.6728	2.0855	2.7286	2.8874	0.201	
24/07/2015	1.7288	3.3374	1.6427	2.0906	2.7121	2.8774	0.402	
25/07/2015	1.7251	3.3336	1.6188	2.0925	2.6903	2.8652	0.603	
26/07/2015	1.7349	3.3413	1.6434	2.0999	2.7188	2.8778	2.211	
27/07/2015	1.6588	3.3259	1.5925	2.0988	2.6122	2.8118	1.206	
28/07/2015	1.6916	3.3315	1.5917	2.1026	2.6784	2.8537	1.407	
29/07/2015	1.6783	3.3324	1.5769	2.1066	2.72	2.8784	0.201	
30/07/2015	1.7164	3.337	1.613	2.1109	2.7577	2.9035	0	
31/07/2015	1.7303	3.3383	1.638	2.1158	2.7606	2.9063	0	
01/08/2015	1.7324	3.3415	1.6461	2.1203	2.7197	2.8794	0.402	
02/08/2015	1.7348	3.3431	1.6562	2.1234	2.7435	2.893	0.201	
03/08/2015	1.734	3.3444	1.6689	2.1291	2.6909	2.8576	0	
04/08/2015	1.7396	3.3495	1.6805	2.1346	2.7181	2.8738	0	
05/08/2015	1.7454	3.3484	1.6909	2.1379	2.7502	2.8929	0	
06/08/2015	1.7283	3.3469	1.6905	2.1397	2.7249	2.8763	2.412	
07/08/2015	1.7396	3.3491	1.6967	2.1433	2.7798	2.914	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
08/08/2015	1.7523	3.351	1.7002	2.1481	2.7912	2.9219	0	
09/08/2015	1.7498	3.3575	1.7055	2.1549	2.7737	2.9092	0	
10/08/2015	1.7543	3.3599	1.7191	2.1606	2.7552	2.897	1.407	
11/08/2015	1.7547	3.3557	1.7167	2.1611	2.7733	2.9076	0.201	
12/08/2015	1.7657	3.3585	1.7216	2.1616	2.8038	2.9292	0	
13/08/2015	1.7592	3.3644	1.7299	2.172	2.7851	2.9186	0	
14/08/2015	1.7536	3.365	1.7324	2.1752	2.73	2.8776	14.271	
15/08/2015	1.1587	3.3138	1.5123	2.1648	2.6934	2.8681	0	
16/08/2015	1.5373	3.3176	1.5646	2.1624	2.7202	2.8754	0	
17/08/2015	1.6547	3.3219	1.5821	2.1669	2.7364	2.8842	0	
18/08/2015	1.7004	3.3257	1.5937	2.1686	2.7208	2.8704	0	
19/08/2015	1.7102	3.3291	1.5995	2.1717	2.7166	2.867	1.005	
20/08/2015	1.706	3.3273	1.59	2.1729	2.7321	2.8794	1.608	
21/08/2015	1.718	3.332	1.6092	2.1791	2.7366	2.8821	0	
22/08/2015	1.7275	3.3351	1.6232	2.1816	2.7388	2.8848	1.005	
23/08/2015	1.6816	3.3186	1.3679	2.184	2.6908	2.8514	13.266	
24/08/2015	1.4377	3.2921	1.4186	2.1729	2.646	2.8347	2.814	
25/08/2015	1.5476	3.2908	1.5127	2.1657	2.6789	2.8532	0.201	
26/08/2015	1.6311	3.2993	1.5438	2.1641	2.6729	2.8876	2.814	
27/08/2015	1.6779	3.3094	1.6643	2.1541	2.7462	2.8832	0.201	
28/08/2015	1.7179	3.3133	1.7109	2.1535	2.7967	2.9157	0	
29/08/2015	1.7664	3.3202	1.734	2.1558	2.8308	2.9396	0	
30/08/2015	1.7786	3.3228	1.7527	2.1547	2.829	2.9393	0	
31/08/2015	1.7834	3.3265	1.7659	2.1567	2.8134	2.9285	2.814	
01/09/2015	1.5952	3.3091	1.6246	2.1507	2.8046	2.9248	6.633	
02/09/2015	1.3567	3.2917	1.6291	2.1431	2.7705	2.9073	0.804	
03/09/2015	1.5029	3.2897	1.6549	2.133	2.7477	2.8882	2.211	
04/09/2015	1.5095	3.2829	1.6363	2.1242	2.7498	2.8885	1.005	
05/09/2015	1.5887	3.2806	1.6521	2.1153	2.7515	2.8863	0.201	
06/09/2015	1.6856	3.2839	1.6756	2.1096	2.7918	2.9137	0	
07/09/2015	1.7397	3.292	1.7141	2.1103	2.8038	2.9217	0	
08/09/2015	1.765	3.2959	1.7309	2.1094	2.7992	2.9193	0	
09/09/2015	1.7689	3.2964	1.7327	2.1064	2.77	2.901	0	
10/09/2015	1.7753	3.3028	1.7324	2.1111	2.7732	2.9065	0	
11/09/2015	1.7804	3.3085	1.7445	2.1136	2.7645	2.901	0	
12/09/2015	1.7776	3.3096	1.7375	2.1178	2.7299	2.8764	5.226	
13/09/2015	1.5732	3.2867	1.6205	2.1106	2.7386	2.8853	0	
14/09/2015	1.6434	3.295	1.6755	2.1168	2.7028	2.8571	0	
15/09/2015	1.6347	3.2714	1.3607	2.1079	2.6782	2.8482	7.437	
16/09/2015	1.5379	3.2707	1.5842	2.1045	2.7112	2.8682	0	
17/09/2015	1.6196	3.2688	1.6403	2.0952	2.7072	2.8778	0	
18/09/2015	1.7175	3.276	1.686	2.0944	2.7873	2.9281	0	
19/09/2015	1.7653	3.2851	1.724	2.0956	2.8585	2.9789	0	
20/09/2015	1.7758	3.2911	1.6961	2.0973	2.854	2.9783	0	
21/09/2015	1.7711	3.2952	1.6592	2.0992	2.7921	2.9351	3.618	
22/09/2015	1.6582	3.2698	1.476	2.0914	2.7121	2.8801	5.226	
23/09/2015	1.434	3.2527	1.5431	2.0769	2.7474	2.9084	1.407	
24/09/2015	1.5861	3.2562	1.6159	2.069	2.734	2.8983	0	
25/09/2015	1.69	3.2609	1.6592	2.0631	2.7894	2.9352	0	
26/09/2015	1.7456	3.2648	1.6813	2.0586	2.8266	2.9603	0	
27/09/2015	1.7628	3.2693	1.6963	2.0546	2.8297	2.9636	0	
28/09/2015	1.7754	3.2753	1.7309	2.0555	2.8462	2.9742	0	
29/09/2015	1.7818	3.2814	1.7431	2.0601	2.8375	2.9706	0	
30/09/2015	1.7859	3.2859	1.7401	2.0625	2.836	2.9702	0	
01/10/2015	1.7883	3.2897	1.7554	2.0664	2.8304	2.9692	0	
02/10/2015	1.7873	3.2935	1.7614	2.0679	2.8097	2.9527	0	
03/10/2015	1.7812	3.2953	1.7567	2.0715	2.7701	2.9231	0	
04/10/2015	1.7781	3.2925	1.7442	2.0687	2.7638	2.9193	0	
05/10/2015	1.7873	3.3082	1.7632	2.0842	2.7416	2.9079	0	
06/10/2015	1.7849	3.3108	1.7384	2.0911	2.7183	2.9027	2.412	
07/10/2015	1.7809	3.3031	1.6456	2.0911	2.7528	2.9328	1.206	
08/10/2015	1.7746	3.3014	1.6781	2.0948	2.8124	2.9722	0.402	
09/10/2015	1.7958	3.3109	1.7338	2.1044	2.813	2.9739	0	
10/10/2015	1.8034	3.3154	1.7256	2.1079	2.7872	2.9616	0	
11/10/2015	1.8032	3.3209	1.7247	2.1142	2.746	2.9354	0	
12/10/2015	1.8	3.3224	1.7568	2.1162	2.7561	2.9393	0	
13/10/2015	1.8058	3.3243	1.7617	2.1195	2.7733	2.9482	0	
14/10/2015	1.8194	3.3323	1.7478	2.1272	2.7947	2.9599	0	
15/10/2015	1.8124	3.3339	1.7424	2.1311	2.7712	2.9428	0	
16/10/2015	1.8247	3.3401	1.7521	2.1378	2.7869	2.9531	0	
17/10/2015	1.8205	3.3434	1.745	2.1408	2.7879	2.9493	0	
18/10/2015	1.8221	3.3462	1.7515	2.144	2.7766	2.9412	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
19/10/2015	1.8276	3.3512	1.7818	2.1489	2.8049	2.9595	0	
20/10/2015	1.8361	3.3565	1.7954	2.1549	2.8154	2.9659	0	
21/10/2015	1.8311	3.3611	1.7882	2.1573	2.7795	2.9386	2.814	
22/10/2015	1.6566	3.337	1.6618	2.1556	2.7336	2.8632	2.412	
23/10/2015	1.75	3.3329	1.6397	2.1869	2.7767	2.9029	0	
24/10/2015	1.7714	3.3415	1.6628	2.1937	2.7333	2.875	0.201	
25/10/2015	1.7051	3.3267	1.5522	2.1856	2.7871	2.9128	0.603	
26/10/2015	1.7614	3.3365	1.6383	2.1923	2.7553	2.8881	0	
27/10/2015	1.7733	3.338	1.6445	2.1909	2.7323	2.8751	0	
28/10/2015	1.7827	3.3455	1.655	2.1938	2.7386	2.8784	0.201	
29/10/2015	1.7672	3.3412	1.6509	2.193	2.7422	2.8792	0	
30/10/2015	1.7746	3.35	1.6722	2.1951	2.7954	2.9173	0	
31/10/2015	1.6699	3.3352	1.5693	2.1946	2.8002	2.9234	0	
01/11/2015	1.675	3.3349	1.6194	2.1922	2.8227	2.9363	0.201	
02/11/2015	1.7264	3.3362	1.6421	2.1857	2.803	2.921	0	
03/11/2015	1.7557	3.3368	1.6496	2.1834	2.7559	2.8887	0	
04/11/2015	1.7557	3.3356	1.48	2.1819	2.742	2.8788	0	
05/11/2015	1.646	3.3346	1.6052	2.1773	2.7532	2.8855	0	
06/11/2015	1.633	3.3289	1.498	2.1724	2.746	2.8849	0.201	
07/11/2015	1.6425	3.3373	1.5635	2.1776	2.7874	2.91	8.241	
08/11/2015	1.4138	3.3061	1.4958	2.1594	2.7778	2.9152	14.271	
09/11/2015	1.5058	3.2831	1.3431	2.1378	2.7031	2.8678	2.412	
10/11/2015	1.537	3.2833	1.508	2.1285	2.6902	2.8559	1.206	
11/11/2015	1.5993	3.2859	1.5686	2.1143	2.6981	2.8543	0	
12/11/2015	1.667	3.2845	1.5905	2.0956	2.7166	2.8628	0	
13/11/2015	1.692	3.2776	1.5249	2.0844	2.6765	2.8333	1.407	
14/11/2015	1.6011	3.2737	1.5515	2.0757	2.741	2.8761	1.206	
15/11/2015	1.5592	3.2604	1.2324	2.0711	2.6481	2.8315	0.804	
16/11/2015	1.4799	3.2583	1.5063	2.0628	2.6279	2.8173	0.201	
17/11/2015	1.553	3.2555	1.5518	2.0495	2.6456	2.8174	0.603	
18/11/2015	1.5717	3.2605	1.48	2.0457	2.7118	2.8641	0.603	
19/11/2015	1.6037	3.2567	1.5726	2.032	2.6961	2.8503	0.603	
20/11/2015	1.6644	3.2673	1.6091	2.0313	2.7209	2.8623	0	
21/11/2015	1.6742	3.2435	1.3915	2.0109	2.6571	2.8206	0	
22/11/2015	1.6652	3.2537	1.5553	2.0126	2.705	2.8477	0.201	
23/11/2015	1.7018	3.2608	1.6111	2.0104	2.7642	2.8853	0	
24/11/2015	1.7138	3.2603	1.5031	2.0114	2.6784	2.8311	0.201	
25/11/2015	1.6881	3.2612	1.5141	2.0087	2.6821	2.8335	11.859	
26/11/2015	1.5918	3.2507	1.4121	2.0067	2.715	2.8563	4.221	
27/11/2015	1.5368	3.256	1.4712	2.0069	2.6789	2.8255	0	
28/11/2015	1.5242	3.2327	1.2489	1.9884	2.642	2.8038	4.824	
29/11/2015	1.5149	3.2274	1.3435	1.9799	2.5785	2.7628	3.216	
30/11/2015	1.5571	3.2315	1.4641	1.9715	2.6578	2.8012	3.618	
01/12/2015	1.4682	3.2108	1.2554	1.9549	2.639	2.7898	3.618	
02/12/2015	1.4428	3.2154	1.4097	1.9417	2.5971	2.743	0	
03/12/2015	1.5095	3.2222	1.4942	1.9226	2.59	2.7482	3.618	
04/12/2015	1.4066	3.1839	1.1504	1.8979	2.5428	2.7261	6.834	
05/12/2015	1.4062	3.1944	1.4145	1.8852	2.4937	2.6729	0.603	
06/12/2015	1.5042	3.199	1.4812	1.8742	2.4774	2.6962	0.201	
07/12/2015	1.5138	3.1928	1.4963	1.865	2.5896	2.7907	2.814	
08/12/2015	1.5523	3.1974	1.5316	1.8584	2.5561	2.7856	0	
09/12/2015	1.6225	3.2024	1.5662	1.8502	2.6522	2.8439	0.201	
10/12/2015	1.6671	3.2089	1.5781	1.849	2.6014	2.8136	1.809	
11/12/2015	1.3062	3.1852	1.4245	1.8366	2.558	2.7875	5.226	
12/12/2015	1.4735	3.1901	1.5254	1.8297	2.571	2.7769	1.206	
13/12/2015	1.2084	3.1627	1.1684	1.8167	2.5337	2.7588	2.814	
14/12/2015	1.332	3.1691	1.3977	1.8016	2.4731	2.6709	2.814	
15/12/2015	1.4657	3.1725	1.4672	1.7952	2.4876	2.6972	2.412	
16/12/2015	1.5194	3.1764	1.4505	1.7919	2.4794	2.7125	0.804	
17/12/2015	1.5387	3.185	1.5261	1.7909	2.5324	2.7503	0.201	
18/12/2015	1.5768	3.1828	1.4799	1.7852	2.5419	2.762	0.402	
19/12/2015	1.6252	3.1899	1.549	1.7853	2.5324	2.7561	0	
20/12/2015	1.6193	3.1846	1.4378	1.7811	2.4986	2.7378	0.201	
21/12/2015	1.6242	3.1903	1.5406	1.7816	2.5786	2.7887	0.402	
22/12/2015	1.6568	3.2071	1.5393	1.7932	2.6049	2.8009	2.814	
23/12/2015	1.6099	3.1902	1.4669	1.7817	2.5693	2.7851	0.603	
24/12/2015	1.6447	3.2054	1.527	1.7883	2.5671	2.7804	0.603	
25/12/2015	1.6314	3.1947	1.4554	1.7891	2.6271	2.8221	3.216	
26/12/2015	1.5759	3.2011	1.4292	1.7931	2.5749	2.7841	2.211	
27/12/2015	1.4273	3.1891	1.3326	1.7866	2.539	2.7473	1.407	
28/12/2015	1.4448	3.1947	1.4615	1.785	2.5493	2.736	1.608	
29/12/2015	1.5195	3.1888	1.5032	1.771	2.4732	2.7065	0	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
30/12/2015	1.6315	3.2047	1.557	1.7758	2.5149	2.7419	0.402	
31/12/2015	1.4671	3.1804	1.2328	1.7654	2.5009	2.7424	2.211	
01/01/2016	1.2608	3.1662	1.2405	1.7554	2.5566	2.7512	1.206	
02/01/2016	1.3712	3.1617	1.2678	1.7406	2.3549	2.587	1.608	
03/01/2016	1.2214	3.1531	1.0635	1.7362	2.3853	2.6043	1.407	
04/01/2016	0.8951	3.1121	1.1363	1.6947	2.2145	2.4548	1.608	
05/01/2016	1.2898	3.1172	1.2719	1.6664	2.0761	2.2805	2.01	
06/01/2016	1.3671	3.1169	1.3152	1.6447	2.2269	2.4527	2.814	
07/01/2016	1.4331	3.1335	1.3999	1.6325	2.2542	2.5348	2.412	
08/01/2016	1.3606	3.1005	1.2938	1.601	2.3021	2.5315	2.01	
09/01/2016	1.4517	3.1156	1.3927	1.591	2.2009	2.4452	2.211	
10/01/2016	1.31	3.0618	1.0496	1.558	2.186	2.5191	2.211	
11/01/2016	1.2946	3.0846	1.3226	1.5344	2.1349	2.3563	1.809	
12/01/2016	1.4458	3.0907	1.2977	1.5233	2.2569	2.5369	1.608	
13/01/2016	1.3956	3.0504	1.0076	1.5087	2.3908	2.6523	1.809	
14/01/2016	1.2862	3.0484	1.1692	1.4735	2.1414	2.3573	1.206	
15/01/2016	1.3058	3.0327	1.2438	1.4482	2.1468	2.3555	1.005	
16/01/2016	1.3267	3.0274	1.1603	1.4308	2.1957	2.4277	6.432	
17/01/2016	1.3562	3.0399	1.1471	1.4149	2.1956	2.456	22.512	
18/01/2016	1.1855	3.0352	1.2583	1.4007	2.1808	2.4795	0	
19/01/2016	1.3547	3.0569	1.337	1.3971	2.2369	2.5326	0	
20/01/2016	1.4774	3.0764	1.3902	1.4076	2.3076	2.5919	0	
21/01/2016	1.5525	3.0863	1.427	1.4164	2.349	2.626	0.201	
22/01/2016	1.5972	3.1046	1.4534	1.4407	2.3689	2.6555	2.01	
23/01/2016	1.6156	3.1068	1.4399	1.4658	2.4505	2.7184	0	
24/01/2016	1.6313	3.1144	1.4714	1.4796	2.4373	2.7099	0.402	
25/01/2016	1.6458	3.1365	1.5332	1.5073	2.4589	2.7246	0	
26/01/2016	1.6461	3.1379	1.4957	1.5217	2.4829	2.74	0.402	
27/01/2016	1.6435	3.1439	1.4771	1.5328	2.4267	2.7123	0.402	
28/01/2016	1.6557	3.1469	1.4961	1.5546	2.5461	2.7848	0.201	
29/01/2016	1.6673	3.1546	1.5307	1.564	2.5008	2.7561	0.201	
30/01/2016	1.6658	3.1525	1.5158	1.5731	2.4776	2.7439	0.603	
31/01/2016	1.658	3.1577	1.5285	1.5892	2.5189	2.7726	0.603	
01/02/2016	1.663	3.1739	1.5276	1.613	2.5589	2.8024	1.809	
02/02/2016	1.6554	3.1738	1.5191	1.6177	2.5604	2.8006	0	
03/02/2016	1.6713	3.1799	1.526	1.6275	2.5914	2.8153	0.402	
04/02/2016	1.6125	3.1762	1.5366	1.64	2.6105	2.8265	1.005	
05/02/2016	1.5579	3.1816	1.5619	1.6447	2.5742	2.8046	0.804	
06/02/2016	1.5641	3.1723	1.5144	1.6417	2.4891	2.7528	0.603	
07/02/2016	1.2975	3.1383	1.2771	1.6348	2.4003	2.7064	0.603	
08/02/2016	1.2795	3.1163	1.1533	1.6186	2.3082	2.6187	0.402	
09/02/2016	1.2464	3.1165	1.248	1.6039	2.3682	2.6235	0.603	
10/02/2016	1.3776	3.1176	1.3805	1.5712	2.2887	2.5459	0.402	
11/02/2016	1.4467	3.1225	1.3979	1.5627	2.3772	2.6467	0.402	
12/02/2016	1.5306	3.1326	1.4756	1.5498	2.3352	2.6288	0.402	
13/02/2016	1.6	3.1444	1.4977	1.5517	2.3554	2.6628	0.201	
14/02/2016	1.6288	3.1442	1.5102	1.5529	2.3642	2.6867	0.402	
15/02/2016	1.6746	3.1593	1.5652	1.5793	2.5052	2.7834	0.201	
16/02/2016	1.7032	3.1732	1.6027	1.5939	2.5351	2.8078	0.402	
17/02/2016	1.6949	3.1783	1.6029	1.599	2.4241	2.7495	20.502	
18/02/2016	1.5087	3.1479	1.3731	1.6046	2.3721	2.7346	1.206	
19/02/2016	1.5642	3.1627	1.5258	1.6111	2.3458	2.6742	0	
20/02/2016	1.6037	3.1709	1.5434	1.6146	2.3102	2.6679	1.809	
21/02/2016	1.5356	3.1373	1.1926	1.6218	2.3353	2.6934	6.432	
22/02/2016	1.4154	3.1362	1.3703	1.5922	2.1946	2.4807	1.206	
23/02/2016	1.4752	3.1464	1.4869	1.5728	2.2787	2.5933	0.402	
24/02/2016	1.5522	3.157	1.5337	1.5674	2.3637	2.6647	0	
25/02/2016	1.6097	3.1603	1.5569	1.5625	2.3665	2.6804	0	
26/02/2016	1.6502	3.1683	1.5682	1.5672	2.385	2.6935	0	
27/02/2016	1.66	3.1686	1.5406	1.5755	2.3994	2.7094	0	
28/02/2016	1.6872	3.1786	1.5926	1.5968	2.4899	2.763	0	
29/02/2016	1.7011	3.1835	1.6198	1.6103	2.5235	2.7863	0	
01/03/2016	1.6992	3.1927	1.6214	1.618	2.4564	2.7486	5.628	
02/03/2016	1.634	3.1781	1.521	1.6272	2.4087	2.731	3.216	
03/03/2016	1.5091	3.1488	1.2902	1.6321	2.4356	2.7528	3.216	
04/03/2016	1.4285	3.1435	1.3037	1.6082	2.3482	2.6759	4.02	
05/03/2016	1.4026	3.1213	1.2053	1.5982	2.3792	2.6834	3.216	
06/03/2016	1.418	3.1256	1.2546	1.5741	2.3934	2.6681	2.412	
07/03/2016	1.4724	3.131	1.4292	1.5427	2.3767	2.6544	0	
08/03/2016	1.5738	3.1457	1.4986	1.5391	2.4396	2.7018	0	
09/03/2016	1.6147	3.1488	1.5271	1.5313	2.367	2.6647	6.834	
10/03/2016	1.3027	3.113	1.2606	1.5301	2.4387	2.7188	0.201	

Date	F1	P	N1	AB	AE	AF	Rainfall (mm)	Liverpool John Moores University
11/03/2016	1.4524	3.1346	1.4542	1.513	2.4146	2.6526	0	
12/03/2016	1.5603	3.1468	1.519	1.5114	2.4349	2.6927	0	
13/03/2016	1.6293	3.1526	1.5486	1.5176	2.4747	2.7316	0	
14/03/2016	1.6595	3.1628	1.5835	1.5283	2.5055	2.757	0	
15/03/2016	1.6693	3.168	1.597	1.5396	2.4995	2.7592	0	
16/03/2016	1.6794	3.173	1.5828	1.5557	2.5147	2.7775	0	
17/03/2016	1.6857	3.1803	1.6055	1.5719	2.5375	2.7939	0	
18/03/2016	1.689	3.1825	1.5663	1.5819	2.522	2.7795	0	
19/03/2016	1.6982	3.1917	1.6159	1.6026	2.5434	2.793	0	
20/03/2016	1.7046	3.1973	1.6291	1.6194	2.5484	2.7956	0	
21/03/2016	1.7068	3.201	1.6349	1.6303	2.5512	2.794	0	
22/03/2016	1.7096	3.2027	1.6328	1.6411	2.5373	2.7844	0	
23/03/2016	1.7105	3.2087	1.6367	1.6556	2.5463	2.7965	0	
24/03/2016	1.7133	3.2122	1.6401	1.6646	2.5435	2.793	0.603	
25/03/2016	1.7097	3.2113	1.6302	1.6734	2.545	2.794	0.603	
26/03/2016	1.7223	3.2237	1.653	1.6858	2.549	2.7902	0	
27/03/2016	1.6925	3.2131	1.6172	1.6887	2.5111	2.7746	3.216	
28/03/2016	1.6872	3.2174	1.5742	1.6954	2.4781	2.7436	14.472	
29/03/2016	1.1419	3.1709	1.4469	1.6727	2.4215	2.6506	1.005	
30/03/2016	1.32	3.1623	1.3664	1.6554	2.3097	2.5331	4.422	
31/03/2016	1.449	3.1775	1.5083	1.6488	2.4183	2.6554	0.402	
01/04/2016	1.5735	3.1857	1.5556	1.6405	2.4591	2.7032	0	
02/04/2016	1.6308	3.1919	1.5777	1.6373	2.4428	2.7109	2.01	
03/04/2016	1.4858	3.1882	1.4912	1.6354	2.4386	2.7225	2.01	
04/04/2016	1.5106	3.1896	1.565	1.6377	2.4381	2.7216	1.005	
05/04/2016	1.5	3.1948	1.5564	1.6409	2.4859	2.7541		

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