



Geotechnical &
Environmental
Consultants

Hinckley West
Leicestershire

**Phase II Exploratory Investigation Report
For
Bloor Homes Midlands**



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Project No: D36147		Date: 16th June 2017	
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Comments			

EXECUTIVE SUMMARY

Ground Conditions	Reference should be made to the Ground Conditions Plan (Figure No. D36147/06), which is presented in Appendix XI of this report and summarises the ground conditions on a field by field basis.
Foundation Design	A Foundation Summary Plan (Figure No. D36147/07), which summarises the foundation recommendations on a field by field basis, is presented in Appendix XII.
Floor Slab Design	For the proposed low-rise residential properties, ground bearing floor slabs may be adopted provided that there is less than 0.60m of suitably compacted geotechnically competent sub-slab fill beneath proposed slabs and subject to NHBC Standards Chapter 4.2. Alternatively, a suspended slab may be adopted. For the proposed school buildings, ground bearing floor slabs may be adopted subject to confirmation by detailed Structural Engineer design, taking account of loading characteristics and settlement criteria etc. Alternatively, suspended floor slabs may be adopted.
Building Near Trees	Heave precautions required due to the presence shrinkable soils across the site. Foundation designs may require adjusting when building near existing, proposed or recently removed trees/hedgerows.
Ground Gas Precautions	On the basis of the ground gas monitoring undertaken to date, the site does not require any ground gas precautions in relation to methane and carbon dioxide.
Radon	No radon precautions are required at the site.
Water	Some foundation and service excavations are likely to require dewatering, involving minor sump pumping in the first instance. Excavations within cohesive soils may be susceptible to standing water following periods of wet weather.
Excavations / Stability	It is considered that during development, excavations within some areas of the site may require trench support. The assessment of excavations and provision of support will be the responsibility of the contractor on site.
Sulphate Classification	In accordance with BRE Special Digest 1:2005 the site falls into Design Sulfate Class DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-1.
Coal Mining	No coal mining precautions are required at the site.
CBRs	A CBR value of between 2% to 4% may be anticipated within the shallow Natural Strata, subject to confirmation by in-situ testing.
Surface Water Drainage	The site is considered unlikely to be suitable for the use of soakaways.
Contamination Assessment	On the basis of the chemical contamination assessment undertaken, the soils may be considered to be uncontaminated in the context of the proposed end-use (i.e. in relation to human health). However, we would note a very localised hotspot of arsenic contamination in the topsoil recovered from TP24.
Remediation Proposals	Following delineation and removal of the arsenic hotspot, the site may be considered to be uncontaminated with respect to the determinands tested, based on a conservative residential with plant uptake end-use.
Off-Site Disposal	If off-site disposal is required, a new contamination assessment may be required to include bespoke leachate analysis.
Construction Workers	A copy of this report should be included in the site health and safety file, and site workers should be made fully aware of the sites setting.
Utilities	Prior to development of the site, we would recommend that a copy of this report is supplied to utility companies, and that their recommendations relating to appropriate supply pipes are adhered to.
Unforeseen Circumstances	Should any areas of potentially contaminated soil, or anomalous ground conditions, be encountered during site construction works we would recommend consultation with GeoDyne Limited to ensure that our recommendations continue to apply.
Licenses, Permits, Plans, Registrations & Approvals	The Contractor/Developer is responsible for, and must ensure that, all necessary licenses, permits, plans, registrations and approvals are in place prior to commencing with the earthworks at the site.

1.0 INTRODUCTION

1.1 Introduction

GeoDyne Limited has been appointed by the Client, Bloor Homes Midlands, to undertake a Phase II Exploratory Investigation on a large parcel of land (approximately 45 hectares in area), located on agricultural land to the west of Hinckley, Leicestershire.

GeoDyne has been provided with the following report, which should be referred to for general background (Phase I Desk Study) information (including the environmental setting of the site and preliminary Conceptual Site Model etc):

- Nicholls Colton Geotechnical '*Interpretative Report on a Ground Investigation for a Proposed Residential Development on Land off Normandy Way, Hinckley, Leicestershire*', report reference No. G14240-IR, produced on the behalf of Bloor Homes Midlands and dated February 2015.

We would note that the site boundary has been altered and enlarged since the production of the foregoing report, and now includes a field to the immediate northwest of the former site area as well as fields to the immediate south.

Although we understand that the Client benefits from formal reliance on the foregoing report, it is the intention that the conclusions and recommendations made within our Phase II report should supersede those made previously by Nicholls Colton Geotechnical based on an investigation of the larger site area.

1.2 Scope of Works

Taking account of the findings and recommendations within the previous Nicholls Colton Geotechnical Desk Study information, the following scope of works was designed for the site.

- A sub-contracted sub-surface service avoidance scan of proposed exploratory hole locations.
- A comprehensive programme of trial pits across the site.
- A comprehensive programme of window sample boreholes across the site.
- Environmental and geotechnical soils testing.
- Production of a Conceptual Site Model for the site.
- An initial programme of ground gas and water monitoring.
- Production of a factual and interpretative report.

1.3 Project Understanding

It is understood that the Client proposes to develop the site for a predominantly residential end-use. The proposals include residential properties with associated gardens, public open space, attenuation ponds and a school with associated sports pitches.

Where the proposed site use is not consistent with our current understanding (for example if an industrial end-use was proposed) it would be necessary to review our assessment to ensure it continues to apply.

The Client has provided GeoDyne with a proposed development plan produced by Define Architects '*Draft Initial Land Draw Down*', drawing number DE155_005, Revision B, undated. However we understand that layouts/detailed design proposals are preliminary at this stage. A copy of the proposed development plan is included in Appendix IX of this report (Figure No. D36147/05).

Rather than target our intrusive works to specific areas within the proposed development, we have been asked by the Client to investigate the entire site area with an approximate equal density of exploratory holes to allow for potential future changes within the layout. It may become necessary to prepare bespoke, parcel specific reports in due course to satisfy the Clients development aspirations and attempt to discharge relevant planning conditions etc.

We further understand that it is the intention of the Client to remove soils from the area of the proposed sports pitches in the northwest of the site, in order to raise levels in the vicinity of the proposed access roads in the east of the site. To this effect GeoDyne has been commissioned to undertake a programme of trial pitting, to facilitate earthworks classification testing of the soils within the northwest of the site, and this will be reported under separate cover.

1.4 Limitations

Where comments are made based on information obtained from third parties, GeoDyne Limited assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties, unless specifically stated. This report has been prepared in accordance with our understanding of current good practice. However changes to good practice, guidance or legislation may necessitate revision of this report after the date of issue.

We would note that the scope of laboratory testing and our assessment of the chemical soil test results have been primarily focussed on potential risks to human health. Our scope of chemical testing and assessment has not been specifically designed to fulfil any landfill or waste disposal company's requirements to suitably characterise any waste soil arising during future redevelopment of the site, or accurately determine disposal costs for any waste soil, although it will assist in such an assessment.

GeoDyne Limited has prepared this report for the sole use and reliance of the Client, Bloor Homes Midlands, in accordance with our Standard Conditions and Limitations (included in Appendix XIII). This report may not be used or relied upon by any unauthorised third party without the explicit written agreement of GeoDyne Limited.

1.5 Confidentiality

The risk assessment herein remains the intellectual property and trade secret of GeoDyne Limited. The information contained within this report must not be disclosed or divulged to any commercial Consultant or other third party without the prior written agreement of GeoDyne Limited.

2.0 SITE SETTING

2.1 Site Description

The site comprises an irregularly shaped parcel of land situated approximately 2km to the west of Hinckley town centre, Leicestershire. The site may be located centred on approximate Ordnance Survey National Grid Reference 440550E 294750N and comprises agricultural land to the immediate west of the A47. The site covers an area of approximately 45Ha. A site location plan (Figure No. D36147/01) is included in Appendix I of this report.

At the time of our initial site walkover (April 2017), the site was noted to principally comprise six large fields used for arable farming. The majority of the site sloped gently down towards the south, with southern areas of the site remaining sensibly level. Two of the fields (the southeastern and southwestern fields) were planted with a bean crop. The northwestern and northeastern fields were partially planted with a bean crop, whilst the remaining areas of the site remained fallow.

The fields were generally separated by hedgerows, with tracks running around some field boundaries. An open ditch ran through the site (between fields) in a general north to south direction. The ditch was typically overgrown, with a trickle of water flowing towards the south.

A public footpath ran through the northern half of the site in an approximate east to west direction. Overhead electricity cables ran across the fields in the southwest of the site. An earth bund, approximately 5m in height and which appeared to have been recently constructed, was located in the southwestern field close to the southwest corner of the site. An area of standing water was present in the southwest corner of the southern central field.

Trees were located locally within the hedgerows along some field boundaries. A further six large trees were located within the northwestern and central fields.

The site was bordered to the north and west by primarily agricultural land. A large pond was noted in the field to the immediate northwest of the site. A track ran through the fields to the north, connecting the site with the farm buildings to the sites northeast. The site boundary towards the southeast corner of the site was undefined and cut across the open field.

Commercial/Industrial premises were located to the south of the site, associated with Triumph Motorcycles. The A47 bordered the site to east, beyond which were residential properties and Wykin Community Park.

The annotated site plan (Figure No. D36147/02) presented in Appendix II of this report shows the main features of the site and immediate surrounding area. General views of the site are included on the plan presented in Appendix III (Figure No. D36147/03).

2.2 Site History

A detailed history of the site is documented within the Nicholls Colton Geotechnical report. In summary, the site is indicated to have generally remained undeveloped and in agricultural use since the earliest reviewed mapping (late 19th Century). Large excavations are shown from approximately 200m to the east of the site on the mapping circa 1950s, and these are later indicated as landfill features. At the time of our recent walkover, this area was occupied by public parkland (Wykin Community Park).

2.3 Site Geology

Geological References

In addition to the Nicholls Colton Geotechnical report, GeoDyne has reviewed the following geological publications:

- BGS 1:50,000 Map Series, Sheet 169, Solid & Drift Edition '*Coventry*' (1994).
- BGS 1:10,000 scale mapping, Sheets SP39NE and SP39SE (1992 and 1990).

Drift Deposits

The referenced geological map publications, and the reviewed Nicholls Colton Geotechnical report, reveal the majority of the site to be immediately underlain by Wolston Clay of Quaternary age. Some northern areas of the site are shown to be immediately underlain by Wolston Sand & Gravel, also of Quaternary age. A tongue of Alluvium is indicated to encroach across the southern site boundary towards the central area of the site. The map publications suggest that the Alluvium is likely to be underlain by Wolston Clay.

The Wolston Clay is described as '*Glaciolacustrine deposits; clay and silt*' on the reviewed mapping. The Wolston Sand & Gravel is described as '*yellow-brown to red sand*' and the Alluvium is described as '*Clay, silt and pebbly clay*'.

Drift deposits can vary rapidly in geotechnical competence and consistency both laterally and vertically over relatively short distances, whilst also having the potential to be water bearing and of low geotechnical strength. Furthermore, fluvial drift deposits may contain peat either as discrete lenses or discontinuous layers.

Bedrock Geology

The drift deposits are indicated to be underlain at depth by strata of the Mercia Mudstone Group. The Mercia Mudstone Group is Triassic in age and is described on the referenced geological map publications as '*red-brown silty mudstone with grey siltstone and sandstone beds*'. The mudstone may weather to clay in the near surface horizons.

Faults

No surface faults are indicated to cross the site or the immediate surrounding area on the reviewed publications.

2.4 Man-Made Deposits

There are no man-made deposits (i.e. Made Ground, Worked Ground or Landscaped Ground for example) indicated on the reviewed geological publications beneath the site. The geological publications indicate '*former sand workings*' beyond the A47 to the east of the site and within potentially influencing distance (i.e. <250m) of the site boundary. These former workings correspond with what are later identified as landfill features on the historical mapping and are considered to represent a potential source of hazardous ground gas (i.e. carbon dioxide and methane) that may, under the right circumstances, affect the proposed development site.

Further areas of Made Ground are identified from approximately 200m to the south and west of the site, in the vicinity of the Ashby de la Zouch Canal, associated with flood prevention measures. These features generally comprise ditches/embankments and are considered not to represent a significant source of ground gas with respect to the site.

2.5 Summary of Sites Environmental Setting

A detailed appraisal of the sites environmental setting is documented within the Nicholls Colton Geotechnical report. The salient points are summarised as follows:

- The drift deposits indicated to be underlying the site are shown to comprise both Unproductive Strata and a Secondary A Aquifer. The underlying bedrock geology (Mercia Mudstone Group) has been classified as a Secondary B Aquifer.
- The site does not lie in an area identified as being at risk from flooding.
- The site does not lie within a Source Protection Zone (SPZ) as designated by the EA.
- No radon precautions are required at the site.
- No specific investigation or mitigation in relation to historical coal mining issues is considered to be necessary at the site.

Based on the foregoing and our review of the Nicholls Colton Geotechnical report, the following key contaminants have been identified as being potentially present at the site.

- Metals or metalloids associated with any Made Ground.
- Polycyclic Aromatic Hydrocarbons (PAHs) from any ashy inclusions and/or carbonaceous inclusions in the near surface soils.
- Pesticides associated with the current and historical agricultural use of the site.
- Asbestos associated with any Made Ground.
- Potential ground gases (carbon dioxide and methane) from the former landfill to the east of the site.

We would reiterate that the site boundary has been altered and enlarged since the production of the Nicholls Colton Geotechnical report, as discussed in Section 1.1, and our review of the Nicholls Colton desk study information has been undertaken in the context of the revised boundary.

3.0 EXPLORATORY INVESTIGATION

3.1 Introduction

Sub-Surface Utility Avoidance Scan

Prior to the commencement of our intrusive works at the site, a sub-contracted sub-surface utility scan of proposed exploratory hole locations was undertaken to attempt to avoid buried services during the intrusive works and to ensure the health and safety of site operatives. Based on the results of the service scan, and taking account of the requirement to avoid buried services, the exploratory holes were positioned to maximise the amount of information obtained at the site.

At the request of the Client, exploratory holes were also positioned so as to avoid the two archaeologically sensitive zones in the central area of the site. These zones were marked out with survey pegs (by others) during our intrusive works.

Trial Pits

A total of thirty-six mechanically excavated trial pits (TP1 to TP36) were excavated at the site between the 24th and 27th April 2017. The trial pits were excavated to depths of between 3.05m and 3.35m below existing ground level (begl).

Window Sample Boreholes

A total of eighteen window sample boreholes (WS1 to WS18) were advanced at the site between the 21st and 27th April 2017. The boreholes were advanced to depths of either 4.00m or 5.00m begl. As part of our works, eight of the window sample boreholes (WS1, WS5, WS6, WS8, WS11, WS13, WS17 and WS18) were installed with combined ground gas and groundwater monitoring points to facilitate a programme of monitoring.

Exploratory Hole Locations/Logs

The approximate locations of the exploratory holes are shown on the plan presented in Appendix IV (Figure No. D36147/04). Exploratory hole locations were positioned using a hand held GeoExplorer 5T GPS, with a claimed sub-metre accuracy of approximately 1m; accuracy subject to satellite coverage, line of-sight conditions etc. The GPS coordinates are presented on a separate sheet in Appendix IV. The exploratory hole logs are presented in Appendix V of this report.

3.2 Ground Conditions

Topsoil

Ploughed topsoil was encountered in all of the exploratory holes advanced at the site, to depths of between 0.20m and 0.50m begl, with an approximate average thickness of 0.30m.

Based on the visually poor quality of the topsoil, we were asked by our Client to recover three samples of the topsoil from three locations across the site for laboratory analysis relating to a suite of contaminants as referenced by BS3882: 2015 '*Specification for Topsoil*'. This analysis is biased towards the nutritional content of the soil as opposed to the testing of determinands as a means of benchmarking the soils from a contamination perspective.

The laboratory test certificates relating to this element of the works are included in Appendix VII, with the three sampling locations indicated on the plan in Appendix IV (Figure No. D36147/04). Further comment with respect to the quality of the topsoil is included in Section 5.9.

Made Ground

Made Ground was not encountered in any of the exploratory holes advanced at the site.

Natural Strata (Drift)

The Natural Strata across the site typically comprised firm to stiff (locally very stiff) silty CLAY. The Clay was often sandy and/or gravelly, particularly near surface to depths of the order of 1.20m begl.

Firm clayey SILT was also encountered across the majority of the site, either as large pockets or discrete bands within the Clay strata. Thicker deposits of Silt were encountered underlying the Clay in some southwestern and eastern areas of the site from typical depths in excess 1.80m begl. Silt was encountered underlying the Clay at shallower depth in TP18 (from 0.65m begl) and was encountered immediately beneath the ploughed topsoil in three locations (TP34 to TP36) to depths in excess of 2.00m begl. In one trial pit (TP33) the Silt was recorded as soft between 2.30m and 3.05m begl.

Medium dense (locally loose) fine to medium grained SAND was encountered in some northern areas of the site at variable depths either above, below or as bands within the Clay/Silt strata. In three of the window sample boreholes (WS3, WS16 and WS17) the Sand was recorded as very loose between approximate depths of 2.00m and 3.00m begl. Sand was also encountered as large pockets within the Clay strata in some southern areas of the site.

Natural Strata (Solid)

Stiff to very stiff CLAY with mudstone lithorelicts was encountered in eleven of the exploratory holes, underlying the drift deposits from depths typically in excess of 2.30m begl. The Clay was encountered from shallower depths in two locations; TP6 (1.10m begl) and WS9 (1.70m begl). These strata are considered typical of the Mercia Mudstone Group which is indicated within the reviewed geological publications to underlie the drift deposits.

3.3 Water

Slight water seepages were recorded in sixteen (approximately one third) of the exploratory holes advanced at the site. The seepages were recorded at variable depths, generally in excess of 2.00m begl. In two of the exploratory holes (WS2 and WS5) water seepages were encountered at shallower depth (1.00m begl).

The seepages appeared to be indicative of perched water encountered within more permeable horizons in the natural drift deposits.

3.4 Stability & Excavations

The sides of the trial pits were noted to remain generally stable during their excavation and for the short period of time they remained open following completion.

The majority of the boreholes were cased to depths of up to 3.00m begl either as a precautionary measure or to prevent collapse upon encountering water seepages.

Collapsing of trial pit walls was only recorded in four locations, each time during excavations within the natural Silt strata. In TP18 and TP36 collapsing of the pit walls occurred after the pits had remained open for five minutes. Collapsing was recorded below a depth of 2.70m begl in TP18, and from between 1.50m and 2.80m begl in TP36. In TP18 the collapsing caused the undermining of shallower strata. In TP33 and TP35 collapsing occurred as the pits were being excavated; collapsing was recorded at depths in excess of 2.30m begl and in both cases caused the undermining of shallower strata. In TP18, TP33 and TP35, the collapsing appeared to be associated with groundwater seepages.

3.5 Plates

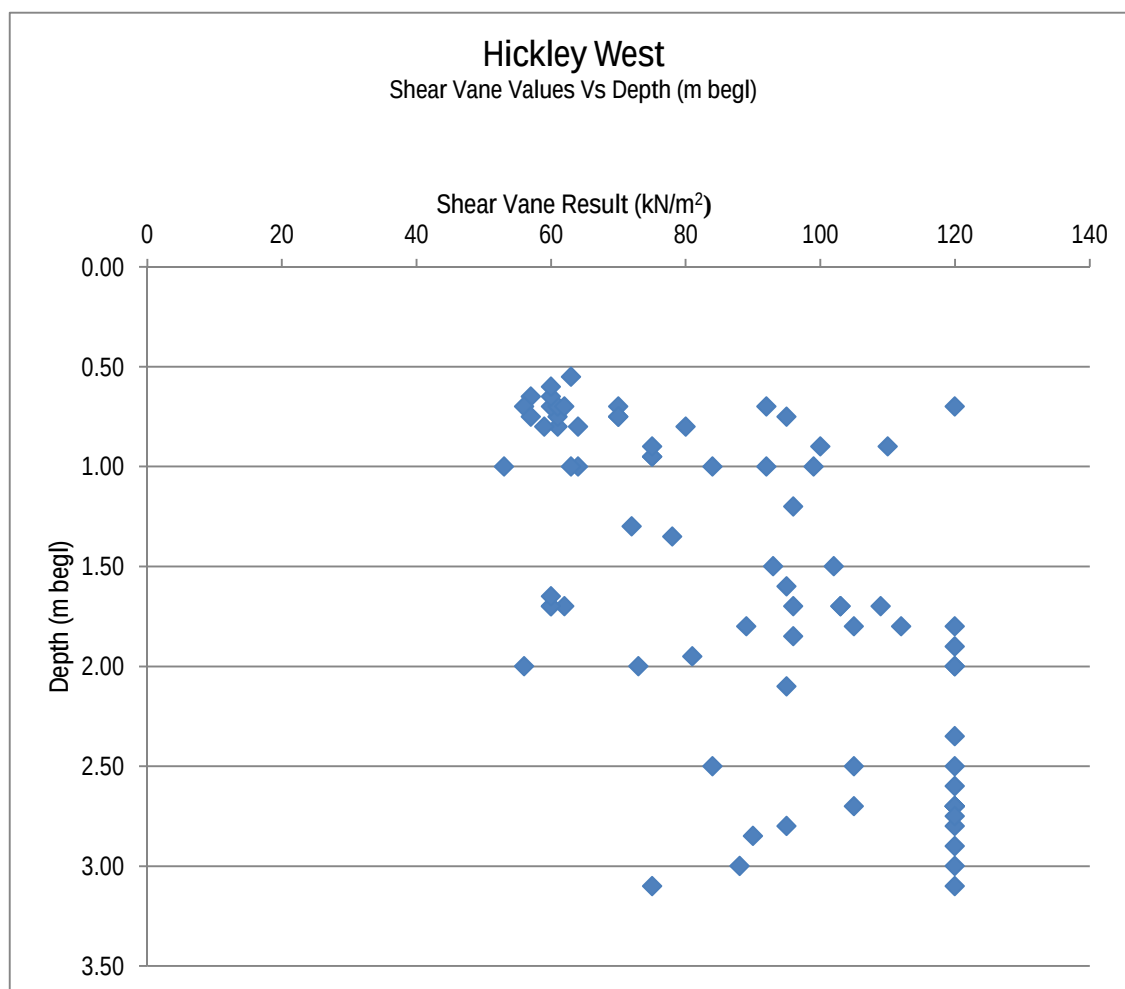
A photographic record of the exploratory investigation was obtained during the intrusive works. Selected photographs of the site works are presented on the Plates included in Appendix VIII of this report (Plate Nos. 1 to 14).

3.6 Shear Vane Values

Shear vane testing was undertaken within the visually cohesive soils encountered within selected exploratory holes. The results typically revealed soil shear strength values of between 57kN/m² and in excess of 120kN/m², at depths of between 0.60m and 3.10m begl. The results show the shear strength values to generally increase with greater depth and are recorded on the logs in Appendix V.

It should be noted that shear vane testing undertaken at depths greater than 1.00m was carried out ex-situ for health and safety reasons.

A graph showing shear vane results in relation to depth is presented on the next page.



3.7 Standard Penetration Test (SPT) Results

In order to establish a strength/depth profile of the strata beneath the site, SPT testing was undertaken within each of the eighteen window sample boreholes advanced at the site.

The uncorrected SPT 'N' values within the Natural Strata at a depth of 1.00m begl ranged between 5 and 12.

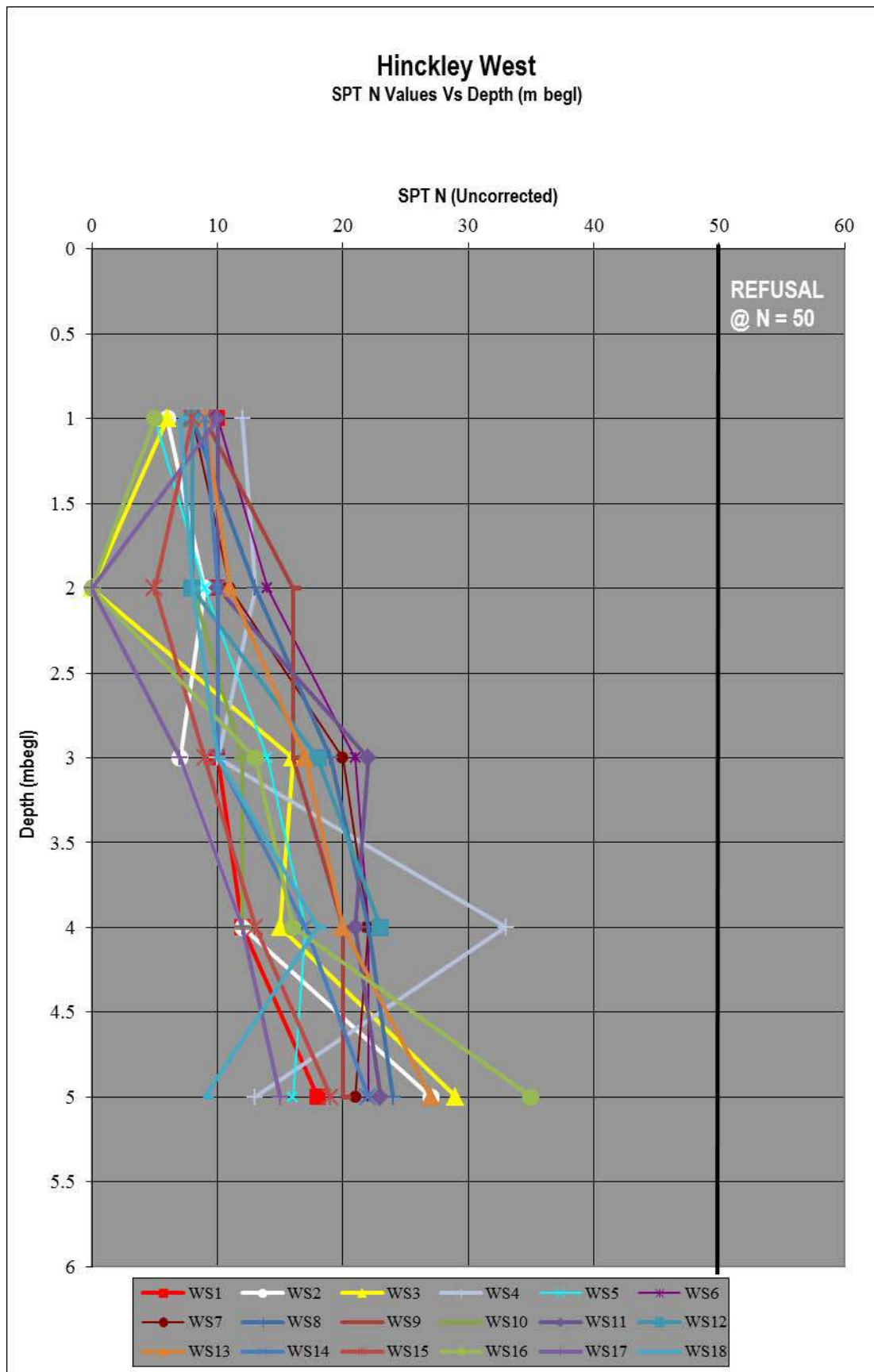
The uncorrected SPT 'N' values within the Natural Strata at a depth of 2.00m begl generally ranged between 5 and 16, however SPT 'N' values of 0 (i.e. the sampling rods falling under their own weight) were recorded at 2.00m begl in three locations (WS3, WS16 and WS17).

The uncorrected SPT 'N' values within the Natural Strata at a depth of 3.00m begl ranged between 7 and 22.

The uncorrected SPT 'N' values within the Natural Strata at a depths of 4.00m and 5.00m begl ranged between 9 and 35.

The results show the SPT 'N' values to generally increase with greater depth and are recorded on the logs in Appendix V

An SPT Vs Depth Chart of the data obtained from the boreholes advanced at the site is shown on the next page.



4.0 GROUND GAS & WATER MONITORING RESULTS

4.1 Introduction

Due to the presence of an off-site source of potentially hazardous ground gas (namely carbon dioxide and methane), it was considered necessary to install a series of monitoring points to facilitate an initial programme of ground gas monitoring.

4.2 Monitoring Installations

Upon completion, eight of the window sample boreholes (WS1, WS5, WS6, WS8, WS11, WS13, WS17 and WS18) were installed with combined ground gas and water monitoring standpipes to facilitate a programme of monitoring. Installations were positioned to provide general site coverage whilst also targeting specific areas of concern; principally the historical landfill to the east of the site.

The full set of ground gas and water monitoring data is presented in Appendix VI of this report.

4.3 Results of the Ground Gas Monitoring

An initial six monitoring visits over a six week period have been undertaken at the site as part of our works. The ground gas monitoring results are summarised in Table 1 below.

TABLE 1 – SUMMARY OF GROUND GAS MONITORING DATA		
Parameter	Minimum % by volume (v/v)	Maximum % by volume (v/v)
Methane	0.0	0.0
Carbon Dioxide	0.0	1.1
Oxygen	19.2	21.0
Flow (L/h)	0.0	0.0

- Atmospheric pressure was recorded as between 981mb and 1009mb during the monitoring programme and was below 1000mb on two occasions. It should be noted that five of the visits were undertaken during periods of falling atmospheric pressure.
- Water was recorded at various depths within the borehole installations during the course of the monitoring programme. Water depths were recorded between 0.57m and 4.36m begl. WS8 was dry during the first three monitoring visits and WS6 was dry during the first monitoring visit.

Based on the ground conditions encountered during the intrusive works, it is considered that the water recorded within the installations during the monitoring programme is likely to comprise both perched water within the Natural Strata and surface run-off, rather than true groundwater levels.

4.4 Appropriate Guidance

4.4.1 British Standard & CIRIA

The results of the gas monitoring have been reviewed with reference to the following documentation:

- British Standard BS 8485 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' (2015).
- CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' (2007).

BS 8485:2015 and CIRIA Report C665 recommend a risk-based methodology to ground gas assessment, which includes the calculation of a site-specific Gas Screening Value (GSV). The GSV of a particular ground gas regime equates to:

- $GSV (L/h) = (\text{maximum borehole flow rate (L/h)} \times \text{maximum gas concentration})/100$.

The GSV should be calculated for both methane and carbon dioxide to determine a site-specific Characteristic Situation for each gas. The higher the calculated GSV, the greater the risk posed by the presence of ground gas. The CIRIA guidance document notes that '*...the GSV is a guideline value and not an absolute threshold*'.

Table 2 of BS 8485:2015 (reproduced below) presents a total of six Characteristic Situations (CS) to assist in classification of the site, based on the calculated GSVs for methane and carbon dioxide.

Table 2 CS by site characteristic GSV

CS	Hazard potential	Site characteristic GSV ^{A)} L/h	Additional factors
CS1	Very low	<0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	0.07 to <0.7	Typical measured flow rate <70 L/h (otherwise consider an increase to CS3)
CS3	Moderate	0.7 to <3.5	–
CS4	Moderate to high	3.5 to <15	–
CS5	High	15 to <70	–
CS6	Very high	>70	–

^{A)} The figures used in this column are empirical.

NOTE The CS is equivalent to the characteristic GSV in CIRIA C665 [6].

In accordance with BS 8485:2015, the CS classification for the site should be considered in conjunction with the proposed Building Type to determine the appropriate level of ground gas protection measures that should be installed to mitigate the risk posed by ground gases, based on the gas protection score for the site.

BS 8485:2015 notes '*The Building Type is determined based the proposed construction and use of the building, together with the control of future structural changes to the building and its maintenance (the building's management) should be assessed, since potential risks posed by ground gases are strongly influenced by these factors*'. Subject to the development proposals, each building may be categorised as a whole, or for each different part of the building.

The Building Types are presented in Table 3 of BS 8485:2015, reproduced below.

Table 3 Building types

	Type A	Type B	Type C	Type D
Ownership	Private	Private or commercial/public, possible multiple	Commercial/public	Commercial/industrial
Control (change of use, structural alterations, ventilation)	None	Some but not all	Full	Full
Room sizes	Small	Small/medium	Small to large	Large industrial/retail park style

Summary of Building Types (taken from BS 8485:2015)

Type A Buildings	Examples include private housing and some retail premises.
Type B Buildings	Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.
Type C Buildings	Examples include offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres and parts of hotels).
Type D Buildings	Examples are retail park sales buildings, factory shop floor areas, warehouses. (Small rooms within these style buildings should be separately categorized as Type B or Type C).

Table 4 of BS 8485:2015, reproduced below, should be used to derive the minimum level of gas protection applicable to the Building Type, based on the CS determined from the calculated GSV.

Table 4 Gas protection score by CS and type of building

CS	Minimum gas protection score (points)			
	High risk	Medium risk		Low risk
	Type A building	Type B building	Type C building	Type D building
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 ^{A)}	5.5 ^{A)}	4.5	3.5
5	— ^{B)}	6.5 ^{A)}	5.5	4.5
6	— ^{B)}	— ^{B)}	7.5	6.5

^{A)} Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

^{B)} The gas hazard is too high for this empirical method to be used to define the gas protection measures.

The appropriate level of precautions, to be designed in accordance with the point scoring system of BS 8485:2015 should therefore be applied for the proposed development. These should include a combination of the following three types of protection measures, which should be used to achieve the required score:

- The structural barrier of the floor slab, or of the basement slab and walls if a basement is present;
- Ventilation measures; and
- Gas resistant membrane.

The points achieved for each element of the ground gas precautions are summarised in Tables 5, 6 and 7 of the British Standard. These tables are reproduced below.

Table 5 Gas protection scores for the structural barrier

Floor and substructure design (see Annex A)	Score ^{A)}
Precast suspended segmental subfloor (i.e. beam and block)	0
Cast in situ ground-bearing floor slab (with only nominal mesh reinforcement)	0.5
Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations	1 or 1.5 ^{B)}
Basement floor and walls conforming to BS 8102:2009, Grade 2 waterproofing ^{C)}	2
Basement floor and walls conforming to BS 8102:2009, Grade 3 waterproofing ^{C)}	2.5

^{A)} The scores are conditional on breaches of floor slabs, etc., being effectively sealed.
^{B)} To achieve a score of 1.5 the raft or suspended slab should be well reinforced to control cracking and have minimal penetrations cast in (see A.2.2.2).
^{C)} The score is conditional on the waterproofing not being based on the use of a geosynthetic clay liner waterproofing product (see C.3, Note 4).

Table 6 Gas protection scores for ventilation protection measures

Protection element/system	Score	Comments
(a) Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building)	0.5	Whenever possible a pressure relief pathway (as a minimum) should be installed in all gas protection measures systems. If the layer has a low permeability and/or is not terminated in a venting trench (or similar), then the score is zero.
(b) Passive sub floor dispersal layer: Very good performance: Good performance: Media used to provide the dispersal layer are:	2.5 1.5	Performance criteria for methane and carbon dioxide are shown in Figure B.6 and Figure B.7, respectively. The ventilation effectiveness of different media depends on a number of different factors including the transmissivity of the medium, the width of the building, the side ventilation spacing and type and the thickness of the layer. The selected score should be assigned taking into account the recommendations in Annex B. Passive ventilation should be designed to meet at least "good performance", see Annex B.
(c) Active dispersal layer, usually comprising fans with active abstraction (suction) from a subfloor dilution layer, with roof level vents. The dilution layer may comprise a clear void or be formed of geocomposite or polystyrene void formers	1.5 to 2.5	This system relies on continued serviceability of the pumps, therefore alarm and response systems should be in place. There should be robust management systems in place to ensure the continued maintenance of the system, including pumps and vents. Active ventilation should always be designed to meet at least "good performance", as described in Annex B.
(d) Active positive pressurization by the creation of a blanket of external fresh air beneath the building floor slab by pumps supplying air to points across the central footprint of the building into a permeable layer, usually formed of a thin geocomposite blanket	1.5 to 2.5	This system relies on continued operation of the pumps, therefore alarm and response systems should be in place. The score assigned should be based on the efficient "coverage" of the building footprint and the redundancy of the system. Active ventilation should always be designed to meet at least "good performance".
(e) Ventilated car park (floor slab of occupied part of the building under consideration is underlain by a basement or undercroft car park)	4	Assumes that the car park is vented to deal with car exhaust fumes, designed to <i>Buildings Regulations 2000, Approved Document F</i> [9].

Table 7 Gas protection score for the gas resistant membrane

Protection element/system	Score	Comments
Gas resistant membrane meeting all of the following criteria: - sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method); - sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions; - sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab); - sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc); - capable, after installation, of providing a complete barrier to the entry of the relevant gas; and - verified in accordance with CIRIA C735 [N1]	2	The performance of membranes is heavily dependent on the quality and design of the installation, resistance to damage after installation and integrity of joints. For example, a minimum 0.4 mm thickness (equivalent to 370 g/m² for polyethelene) reinforced membrane (virgin polymer) meets the performance criteria in Table 7 (see C.3). If a membrane is installed that does not meet all the criteria in column 1 then the score is zero.

4.5 Ground Gas Analysis

4.5.1 Gas Screening Value & Site Classification

The ground gas monitoring undertaken to date has identified a maximum carbon dioxide concentration of 1.1% v/v and no methane above the level of detection. Measurable flow rates were not recorded during the monitoring visits. In the absence of a measurable flow rate, the limit of detection of the gas monitoring instrument (0.1 l/h) should be utilised.

The GSV for carbon dioxide at the site may be calculated as follows:

- $(0.1 \times 1.1)/100 = 0.0011 \text{ l/h}$

Therefore, with a GSV of 0.0011 l/h and a maximum carbon dioxide concentration of 1.1% v/v, the site may be classified as 'CS1' with respect to carbon dioxide, in accordance with Table 2 of BS 8485 and based on the visits undertaken.

On the basis of the foregoing GSV and CS assessment, a Characteristic Situation of '**CS1**' should be adopted for the site.

4.5.2 Building Type

We understand that it is proposed to develop the site for a mixed end-use, including (but not limited to) residential properties and a school. In accordance with Table 3 of BS 8485, Building Type A (private residential housing) and Building Types B and C (schools) are considered to be the most appropriate classifications for the proposed development.

4.5.3 Gas Protection Score

On the basis of Characteristic Situation CS1 and the development proposals that may be assumed at this stage as Building Types A, B and C in accordance with Table 4 of BS 8485:2015 the minimum gas protection score for the site is **0 points**.

4.5.4 Comments

On the basis of the ground gas monitoring undertaken to date, the site does not require any ground gas precautions in relation to methane and carbon dioxide. However, it may become necessary to prepare bespoke, parcel specific reports in due course to satisfy the Clients development aspirations and it is recommended that the gas regime is reassessed on a parcel by parcel basis at that time, if appropriate.

5.0 LABORATORY TESTING & CONTAMINATION ASSESSMENT

5.1 Introduction

The following environmental soil testing was carried out on visually representative samples recovered from the exploratory holes:

- 30No. Standard contamination suites (including metals, speciated PAH and TOC).
- 15No. Asbestos screens.
- 8No. Pesticide screens (OCP).
- 7No. Pesticide screens (OPP).

Geotechnical soil testing comprised the following:

- 14No. Water soluble sulphate tests.
- 30No. pH tests.
- 12No. Plasticity Index (PI) tests.
- 6No. Particle Size Distribution (PSD) tests.

All laboratory soil test results are included in Appendix VII of this report.

5.2 Geotechnical Soil Test Results

Water Soluble Sulphate/pH

Water soluble sulphate testing was undertaken on 14No. soil samples obtained during the site works (all from the Natural Strata). The results revealed water soluble sulphate concentrations of between <0.01g/l SO₄ and 0.08g/l SO₄. The pH values of the soils analysed (Natural Strata) ranged between 6.0 and 7.5.

In accordance with the Building Research Establishment publication Special Digest 1 '*Concrete in Aggressive Ground*' (2005) the mean of the highest 20% of the sulphate concentrations should be used to indicate the Design Sulphate Class (i.e. 0.06 g/l SO₄), together with the mean of the lowest 20% of the pH results (6.3). Therefore, in accordance with Special Digest 1:2005 the site falls into Design Sulphate Class DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-1.

This classification has been made based on the assumption of natural ground conditions and the presence of potentially mobile groundwater conditions beneath some areas of the site.

Plasticity Index (PI) Testing

A total of 12No. Plasticity Index tests have been undertaken on selected samples of the visually cohesive near surface Natural Strata obtained during the site works from across the entire site. In accordance with NHBC standards Chapter 4.2 '*Building Near Trees*' and BRE Digest 240 '*Low-rise buildings on shrinkable clay soils: Part 1*' (1993), the reported PI values may be modified based on the portion of the sample passing the 425µm sieve.

The results of the PI analysis are summarised in Table 2.

TABLE 2 – SUMMARY OF PLASTICITY INDEX (PI) DATA				
Sample Reference	Reported PI Value (%)	Portion Passing 425µm Sieve (%)	Modified PI Value (%)	Volume Change Potential
TP1, 0.75m (Clay)	42	97	41	High
TP3, 1.50m (Clay)	36	100	36	Medium
TP5, 2.25m (Clay)	37	100	37	Medium
TP9, 1.75m (Clay)	34	100	34	Medium
TP12, 2.35m (Silt)	Non-Plastic	NA	NA	Non-Plastic
TP14, 1.70m (Clay)	34	100	34	Medium
TP18, 1.30m (Silt)	Non-Plastic	NA	NA	Non-Plastic
TP22, 0.90m (Clay)	26	100	26	Medium
TP24, 1.40m (Clay)	27	100	27	Medium
TP28, 2.40m (Clay)	30	100	30	Medium
TP32, 1.95m (Clay)	31	100	31	Medium
TP34, 2.45m (Clay)	31	100	31	Medium

In accordance with NHBC and BRE Guidance, Table 2 reveals that the visually cohesive soils analysed (i.e. Clay) may be generally regarded as being of medium volume change potential. The one sample analysed which reported a high volume change potential relates to an exploratory hole location within the field towards the southwest corner of the site. We would recommend that soils of high volume change potential are assumed for design purposes in this field, and that soils of medium volume change potential are assumed for design purposes across the wider site area. The analysis of the two Silt samples confirmed these soils to be non-plastic (i.e. they exhibit no significant volume change potential).

Particle Size Distribution Analysis

Particle Size Distribution (PSD) analysis was undertaken on six samples of the variable Natural Strata from across the site. All results confirm the descriptions given on the respective exploratory hole logs. The three predominantly Sand samples analysed are each shown to have a Clay fraction of less than 35%, thereby also confirming that these soils are unlikely to behave as cohesive soils based on the test results.

5.3 Contamination Assessment Rationale

We understand that it is proposed to develop the site with a mixed end-use, primarily (but not exclusively) comprising low-rise residential properties incorporating private gardens and soft landscape. Therefore, we have adopted a conservative residential with plant uptake end-use scenario for the purposes of the contamination assessment.

5.4 Appropriate Guidance

Reference has been made to documents reflecting current good practice, including (but not limited to) the following:

- Environment Agency Contaminated Land Report 11 ‘*Model Procedures for the Management of Land Contamination*’, September 2004, ISBN: 1844322955.
- British Standard BS10175:2011+A1:2013, ‘*Investigation of potentially contaminated sites. Code of practice*’, March 2011.
- Nathanail, C.P., McCaffrey, C. Gillett, A.G. Ogden, R.C. and Nathanail, J.F 2015. ‘*The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. “Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3026. All rights reserved.”*’

- DEFRA publication '*SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*', Final Project Report (Revision 2), dated 24th September 2014 and Erratum dated December 2014.
- DEFRA publication '*SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*' – Policy Companion Document, dated December 2014.
- EIC/AGS/CL:AIRE publication '*Soil Generic Assessment Criteria for Human Health Risk Assessment*', January 2010, ISBN 978-1-905046-20-1.
- Department of Environment, Food and Rural Affairs (DEFRA) and the Environment Agency publication – '*Contaminated Land Exposure Assessment (CLEA) model*' (March 2002).
- Environment Agency Science Report, '*Using Soil Guideline Values*', SC050021/SGV, March 2009.
- R & D Draft Technical Report P5-079/TR1 '*Review of the Fate and Transport of Selected Contaminants in the Soil Environment*' dated 2003.
- CL:AIRE/CIEH '*Guidance on Comparing Soil Contamination Data with a Critical Concentration*' (May 2008).
- Environment Agency Science Report SC050021/SR7 '*Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values*', dated November 2008, ISBN 978-84432-964-9.
- Environment Agency Science Report Final SC050021/SR2 '*Human health toxicological assessment of contaminants in soil*', dated January 2009, ISBN 978-84432-858-1.
- Environment Agency Science Report SC050021/SR3 '*Updated technical background to the CLEA model*', dated January 2009, ISBN 978-84432-856-7.
- Environment Agency Science Report SC050021/SR4 '*CLEA Software (Version 1.05) Handbook*', dated September 2009, ISBN 978-1-84911-105-8.

5.4.1 Selection of Appropriate Tier 1 Screening Values

Generic Assessment Criteria (GAC)

The assessment of contaminated land in the UK was historically undertaken with reference to ICRL Guidance Note 59/83 together with successive versions of the CLEA model (inc. CLEA2002 (2002), CLEA UK (2005), CLEA V1.03 beta (2008), CLEA V1.04 (January 2009), CLEA V1.05 (September 2009) and CLEA V1.06 (October 2009)).

The CLEA V1.06 model is a deterministic quantitative risk assessment (QRA) model, which has historically been utilised by the Environment Agency to produce Soil Guideline Values (SGVs) for several contaminants, and has been used and modified by the authors of the LQM/CIEH S4UL publication and the authors of the DEFRA SP1010 series of documents in the derivation of their respective human health screening values.

Of key importance is the basis on which these two differing sets of commercially available screening criteria have been created, with the SP1010 values reflective of a '*Low Level of Toxicological Concern*' (LLTC) and the S4UL values based on a '*Minimal Risk Level*' (MRL).

Based on our understanding of current good practice within the contaminated land field, we have adopted the S4UL values (representing a compatible approach to risk assessments undertaken since the initial derivation of the CLEA model, and based on an established and fully justifiable methodology) as our initial Generic Assessment Criteria (GAC) values for human health. In the absence of a suitable S4UL value (such as lead), reference has been made to the relevant C4SL, and these have been adopted where considered justifiable and as appropriate (further consideration of their use is provided below).

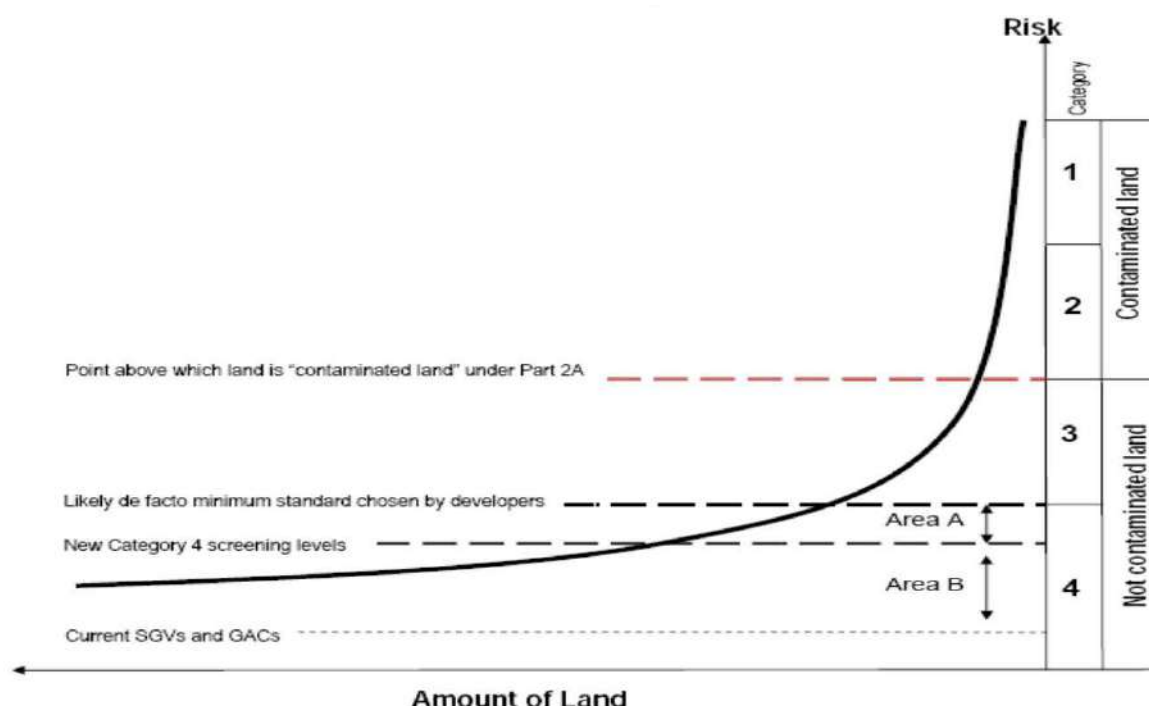
We would additionally note that other GAC values are commercially available, such as the Atkins ATRISKSOIL values (to which GeoDyne subscribe) and the EIC/AGS/CL:AIRE values for organic substances; and these have been referred to where relevant to the site.

Category 4 Screening Levels

Revised Statutory guidance for the assessment of land under Part 2A of the Environmental Protection Act 1990 was published by the Department for Environment, Food and Rural Affairs (Defra) in April 2012. The guidance introduced a new four-part category system for classifying land under Part 2A; Section 4.17 of the Guidance states:

'In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health, the local authority should use the categorisations described in paragraphs 4.19 – 4.30...Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on the grounds of significant possibility of harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds'.

The foregoing categories are depicted in diagrammatical form in the following graph (taken from Defra publication SP1010):



Defra has subsequently commissioned the production of Category 4 Screening Levels (C4SLs) for a total of six substances (cadmium, benzo(a)pyrene, benzene, arsenic, lead and chromium VI), which are detailed within the SP1010 document titled *'Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document'*, dated March 2014. The C4SL values represent a level below which a contaminant concentration is considered to have a 'Low' risk to human health. The C4SL values are stated within the SP1010 document (page 7) as still remaining *'strongly precautionary'* and represent a more pragmatic approach to contaminated land risk assessment than the minimal risk values represented by the SGV/GAC levels.

In addition to the use of C4SLs in contaminated land risk assessment, the SP1010 document states the following with respect to background levels of contaminants:

'The outputs of Defra-funded research to determine 'normal' background concentrations of various contaminants in England and Wales and the outputs of this research project to develop new screening levels for contaminants in soil, are both designed as tools to be used by contaminated land risk assessors to inform decisions about whether or not it is necessary to proceed to a Detailed Quantitative Risk Assessment (DQRA) on a particular site taking into account the broad aims of the regime as set out in Section 1 of the Statutory Guidance. Questions have been raised about how these tools relate and interact.

41. Ultimately, it is up to individual risk assessors to make the most appropriate decisions on a site-by-site basis and to use the most appropriate tools in each case. However, with reference to the Part 2A Statutory Guidance, which states that 'normal' background concentrations should not be considered to cause a site to be determined as contaminated under Part 2A unless there is a reason to consider otherwise, it is envisaged that, where available, Category 4 Screening Levels should be the initial value against which site concentrations can be compared. Where a value on a particular site exceeds the Category 4 Screening Level for that substance, reference can then be made to the normal background concentration for that contaminant in that area.

If concentrations are higher than the relevant Category 4 Screening Level but within 'normal' background concentrations for that area, it is not envisaged that a site would be determined as contaminated under Part 2A (unless there was a reason to consider otherwise).

*42. The British Geological Survey has derived 'normal' background concentrations for lead for England and Wales. In England, the 'normal' background concentrations of lead are 180 mg/kg for the 'principal' domain, 2,400 mg/kg for the 'mineralisation' domain and 820 mg/kg for the 'urban' domain (Defra, 2012) (see table below). In Wales the 'normal' background concentrations are 230 mg/kg for the 'principal' domain, 280 mg/kg for the 'mineralisation' domain and 890 - 1300 mg/kg for the 'urban' domain (Defra, 2013). Current advances in our understanding of the toxicology of lead have resulted in Category 4 Screening Levels for Residential, Allotments and Public Open Space 1 that are lower than the 'normal' background concentration of lead in **urban** areas. This was also the case for the (now withdrawn) Soil Guideline Value for lead of 450 mg/kg.*

43. The report identifies other relevant considerations that may have a bearing on the final choice of Category 4 Screening Levels and the background level in soil is one of these. A pragmatic approach for lead would be to recommend the use of the 'normal' background concentration when the land use and domain permit (for example, providing other site and contaminant specific characteristics such as chemical form, bioavailability, soil depth, site use, etc. are comparable between the background and the site under investigation) so as not to disproportionately target land where there is widespread diffuse pollution of lead.

Normal background concentrations of contaminants in England

Substance	Principal domain	Urban domain	Mineralisation domain 1	Mineralisation domain 2	Ironstone	Chalk South
Arsenic	32 mg/kg		290 mg/kg		220 mg/kg	
Benzo-a-pyrene	0.5 mg/kg	3.6 mg/kg				
Cadmium	1.0 mg/kg	2.1 mg/kg	17 mg/kg	2.9 mg/kg		2.5 mg/kg
Lead	180 mg/kg	820 mg/kg	2400 mg/kg			

Where a valid Soil Guideline Value exists for a contaminant where a Category 4 Screening Level has also been derived, it is anticipated that risk assessors will use the Category 4 Screening Level in line with the Part 2A Statutory Guidance. In the absence of a suitable C4SL, risk assessors should identify and select appropriate generic assessment criteria in accordance with established good practice....'

The general approach indicated in the SP1010 document has been adopted in this report (as appropriate), although the C4SL values have been used as a second tier of risk assessment, due to the difference in the level of 'acceptable' risk between the various GACs (which we will adopt as the first tier of risk assessment) and the C4SLs.

National Planning Policy Framework (NPPF)

In relation to the requirements of a contaminated land risk assessment, the Department for Communities and Local Government publication titled '*National Planning Policy Framework*' (NPPF), dated March 2012, provides the following commentary:

'121. Planning policies and decisions should also ensure that:

- *the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
- *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
- *adequate site investigation information, prepared by a competent person, is presented.'*

The Defra SP1010 document states: '***The Part 2A Statutory Guidance and accompanying Impact Assessment were developed on the basis that Category 4 Screening Levels could be used under the planning regime, as they would be in Part 2A investigations directly***' [GeoDyne emphasis added].

Summary

Taking account of the foregoing, we consider that industry good practice is currently best represented by GAC (variously LQM/CIEH, Atkins ATRISKSOIL or EIC/AGS/CL:AIRE) that adopt a MRL as the foundation for its derivation. In the case of Lead (which is modelled on blood lead concentrations rather than typical exposure scenarios applicable to other contaminants), the relevant C4SL value has been adopted, as this incorporates the most up-to-date toxicological information in the derivation of the various end-use specific screening criteria.

In relation to the remaining C4SL values, these have been adopted as a second tier of generic assessment criteria, and will be utilised where the GAC has been exceeded at a Tier 1 generic level and where justified in a site-specific context. Whilst representing a LLTC, the C4SL values are considered to represent a suitably conservative assessment tool, given that they fall comfortably within Category 4. In the following sections, screening criteria have collectively been referred to as Generic Assessment Criteria (GAC). The C4SL values have been referenced as such. The GAC/C4SL adopted herein, i.e. residential with plant uptake, are included in the table in Section 5.8.

5.4.2 Selection of Soil Organic Matter (SOM) Content

The SOM content and soil type are used to provide an assessment of the applicability of the Tier 1 GAC adopted (the GAC are typically based upon SOM of 1%, 2.5% and 6%, as applicable, with Defra C4SL based on the default assumption of a UK Sandy Loam soil with 6% SOM).

Determinands have in the first instance, been compared to GAC adopting a conservative SOM of 1%, or, in the absence of one of the former, a relevant C4SL value. Where the determinand exceeds the relevant GAC at 1% SOM, a site specific SOM may be adopted as appropriate to derive new GAC and the dataset reassessed.

5.4.3 Assessment Methodology

Taking account of the foregoing, an initial qualitative Tier 1 Soil Assessment has been undertaken to assess the soils at the site. We have adopted a policy whereby determinands within the dataset are individually compared to the relevant screening values.

Where determinands within the dataset are less than the appropriate Tier 1 GAC value the determinand is considered to be present at an acceptable concentration and no further assessment is required. However, where a determinand exceeds the relevant Tier 1 GAC value on at least one occasion further assessment is required and will be undertaken in accordance with CL:AIRE/CIEH *'Guidance on Comparing Soil Contamination Data with a Critical Concentration'*.

The methodology for undertaking the statistical assessment is provided in Section 5.5 below.

5.5 Statistical Considerations

Statistical tests relating to contaminated land, typically referred to as a Mean and Maximum Value Tests, were detailed in Department for Environment, Food and Rural Affairs and The Environment Agency publication CLR 7 *'Assessment of Risks to Human Health From Land Contamination: An Overview of the Development of Soil Guideline Values and Related Research'*, dated 2002, ISBN 1-857-05732-5.

This guidance was superseded by publication of CL:AIRE/CIEH *'Guidance on Comparing Soil Contamination Data with a Critical Concentration'* dated May 2008.

5.5.1 Null and Alternative Hypothesis

In consideration of statistical guidance jointly published by CL:AIRE/CIEH *'Guidance on Comparing Soil Contamination Data with a Critical Concentration'*, statistical convention requires consideration of the Null Hypothesis (expressed as H_0) or an Alternative Hypothesis (expressed as H_1). Appropriate statistical tests are then applied to the data to assess whether the strength of evidence favours the Null or the Alternative Hypothesis. For the purpose of the following contamination assessments and in accordance with the CL:AIRE/CIEH guidance the key question for the site is as follows.

Question - *'Is there sufficient evidence that the true mean concentration of a contaminant in soil (μ) is less than some critical concentration (C_c)?'*

The Null and Alternative hypotheses are therefore defined as follows.

The Null Hypothesis (H_0)

$\mu \geq Cc$ (i.e. Tier 1 or 2 Assessment Criteria).

The Alternative Hypothesis (H_1) (the question the selected statistical test is designed to answer)

$\mu < Cc$ (i.e. Tier 1 or 2 Assessment Criteria).

5.5.2 95th Percentile Upper Confidence Level Mean Values

The selected relevant statistical assessment undertaken to evaluate the Null and Alternative Hypotheses requires consideration of the 95th Percentile Upper Confidence Level Mean value (this is abbreviated as the UCL).

The UCL value takes account the number of samples tested, the data set mean and the standard deviation of the data set and applies a correction factor to take account of the uncertainty of the data set.

CL:AIRE/CIEH guidance states that ‘...since the 95% UCL is at most times greater than the true population mean, it follows that if the 95% UCL is less than Cc , the assessor will know (with a defined high level of confidence) that the true population mean (μ , the value which is not known) is also likely to be less than Cc ’.

5.5.3 Considerations for Appropriate Dataset(s)

The CL:AIRE/CIEH statistical guidance requires consideration of the appropriateness of the dataset being subjected to the statistical testing and notes the following three key elements to be considered.

- Consideration of any non-detects within the dataset.
- Consideration of potential outliers within the dataset.
- Consideration of the statistical distribution of the data (i.e. normality/non normality).

5.5.4 Consideration of Normality of Dataset

CL:AIRE/CIEH statistical guidance notes that the choice of statistical test to be applied to the dataset will depend on the assumptions about the distribution of the data being tested. The assumptions of the statistical test adopted therefore must be appropriate to the distribution assumptions of the data being considered.

The CL:AIRE/CIEH statistical guidance details the following two key statistical tests.

- **The one-sample t test** - assumes the data being assessed is approximately normally distributed.
- **The one-sided Chebychev Theorem** - assumes the data being assessed does not demonstrate normality (method makes no assumption about the shape of the distribution).

The selection of the most appropriate statistical test for the dataset being considered will be dependent upon a number of factors (including dataset population, the determinands being assessed and the anticipated origin of the elevated contaminant concentrations).

The choice of statistical test will therefore be made following an initial assessment of the relevant dataset(s).

5.5.5 Consideration of Non-Detects within the Dataset

The dataset may reveal the presence of non-detects for a number of the determinands tested. Where this occurs, we have adopted the LOD (i.e. 1.0LOD) as the chemical concentration, which provides a suitably conservative approach. However, please note that GACs have only been used for determinands where they are present at concentrations in excess of the LOD on at least one occasion.

5.5.6 Consideration of Outliers

The CL:AIRE/CIEH statistical guidance advises that *'...if outliers are identified, assessors have to decide whether they represent genuine soil concentrations or are the result of an error'*.

The guidance further notes that outliers should only be excluded from a dataset where they *'...are obviously and demonstrably the result of an error that can be identified and explained'* or *'...clearly indicate that more than one soil population exists within the dataset and this can be justified by (or informs the further development of) the conceptual model- in which case the different population expressed by the outlier(s) should be explored in more detail'*.

Taking account of the foregoing, we have adopted a policy of interrogating the relevant dataset to calculate the UCL and to ascertain the possible presence of statistical outliers (where relevant).

At this point the possible relevance of statistical outliers to the interpretation of the data is considered, in accordance with the following matrix.

TABLE 3 – OUTLIER DECISION MATRIX		
	UCL < GAC	UCL > GAC
Outlier Test reveals No Hotspot(s)	Determinand present at acceptable concentrations.	Pervasive contamination present in soil at unacceptable concentrations.
Outlier Test reveals Hotspot(s)	Determinand present at acceptable concentrations. Possible second population identified. Only of potential concern where outlier is at an individual concentration in excess of the Tier 1 GAC.	Pervasive contamination present in soil at unacceptable concentrations with possible hotspots of contamination identified.

5.5.7 Averaging Area for Statistical Assessments

The adoption of a statistical approach requires consideration of an averaging area, i.e. an area within which the UCL is calculated and compared to the Tier 1 GAC. Within our assessments (where appropriate) the entire site has been adopted as the averaging area, in the first instance.

5.6 Sampling Strategy

Our sampling strategy is based on our review of the desk study information within the Nicholls Colton Geotechnical report, together with the current site setting and the ground conditions encountered during our Phase II exploratory works, taking account of the proposed end-use and the revised site boundary.

No specific areas of concern were identified at the site with respect to ground contamination. Therefore, it was considered appropriate to position the exploratory holes to provide general site coverage.

Table 4 summarises the reasoning behind the exploratory hole positions.

TABLE 4 – REASONING FOR EXPLORATORY HOLE LOCATION	
Exploratory Hole Reference	Reasoning Behind Location
WS13, WS17 & WS18	Situated in the vicinity of an off-site historically mapped former landfill site (ground gas monitoring points installed)
All remaining exploratory holes	General site coverage avoiding known utilities
<u>Key</u> WS – Window Sample Borehole	

The ground conditions encountered during our Phase II works principally revealed the presence of two distinct types of material i) Topsoil and ii) the underlying Natural Strata. Made Ground was not encountered within any of the exploratory holes advanced at the site.

Representative samples were obtained during our Phase II works and subjected to chemical analysis for a suite of contaminants deemed appropriate based on the land use assessment. It is noted that the suite of contaminants detailed in Section 2.5 were considered to remain applicable as an initial chemical screen of the encountered soils following completion of the site investigation works.

5.7 Contamination Analysis

A total of 30No. standard chemical contamination tests (including speciated PAH and TOC) were carried out on selected soil samples obtained during the site works, which comprised 15No. tests of the topsoil and 15No. tests of the underlying Natural Strata.

5.8 Contamination Soil Test Results

5.8.1 Topsoil

The contamination assessment for the topsoil analysed at the site is summarised in Table 5.

TABLE 5 – SUMMARY OF TIER 1 GENERIC ACCEPTANCE CRITERIA DATA ASSESSMENT (RESIDENTIAL WITH PLANT UPTAKE END-USE)						
Contaminants – Potentially Harmful to Human Health	No. of Samples Tested	Concentration Range (mg/kg)	Tier 1 GAC (mg/kg)	C4SL (mg/kg)	UCL (mg/kg)	Tier 1 GAC Exceeded (Yes/No)
Metals						
Arsenic	15	8 – 55	37 S4UL	37	21	No*
Chromium III	15	16 – 47	910 S4UL	-	NA	No
Copper	15	13 – 23	2400 S4UL	-	NA	No
Lead	15	20 – 41	200 C4SL	200	NA	No
Nickel	15	10 – 27	180 S4UL	-	NA	No
Zinc	15	50 – 110	3700 S4UL	-	NA	No
<u>Key</u> * – See comments below table. S4UL – CIEH/LQM Suitable 4 Use Levels (2015). Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3026. All rights reserved. C4SL –value for Lead taken from DEFRA publication SP1010 and based on a residential (with home-grown produce) end-use. NA – UCL not applicable as all individual concentrations are present at concentrations individually below the GAC.						

Arsenic

The statistical assessment has revealed that the UCL value for arsenic (21mg/kg), within the topsoil, is below the appropriate Tier 1 GAC value of 37mg/kg. However, the Outlier test, has shown that the one elevated arsenic value within the topsoil (55mg/kg; TP24) is an outlier, i.e. should be considered a statistical hotspot. The statistical assessment sheets for arsenic are included in Appendix X.

All of the remaining determinands assessed were present either at individual concentrations below the Limit of Detection of the method of analysis adopted by the laboratory or below the appropriate Tier 1 GAC based on a residential with plant uptake end-use.

5.8.2 Natural Strata

The contamination assessment for the Natural Strata analysed at the site is summarised in Table 6.

TABLE 6 – SUMMARY OF TIER 1 GENERIC ACCEPTANCE CRITERIA DATA ASSESSMENT (RESIDENTIAL WITH PLANT UPTAKE END-USE)						
Contaminants – Potentially Harmful to Human Health	No. of Samples Tested	Concentration Range (mg/kg)	Tier 1 GAC (mg/kg)	C4SL (mg/kg)	UCL (mg/kg)	Tier 1 GAC Exceeded (Yes/No)
Metals						
Arsenic	15	7 – 20	37 S4UL	37	NA	No
Chromium III	15	17 – 59	910 S4UL	-	NA	No
Copper	15	9 – 29	2400 S4UL	-	NA	No
Lead	15	13 – 32	200 C4SL	200	NA	No
Nickel	15	11 – 53	180 S4UL	-	NA	No
Zinc	15	45 – 150	3700 S4UL	-	NA	No
Key S4UL – CIEH/LQM Suitable 4 Use Levels (2015). Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3026. All rights reserved. C4SL –value for Lead taken from DEFRA publication SP1010 and based on a residential (with home-grown produce) end-use. NA – UCL not applicable as all individual concentrations are present at concentrations individually below the GAC.						

All of the determinands assessed were present either at individual concentrations below the Limit of Detection of the method of analysis adopted by the laboratory or below the appropriate Tier 1 GAC based on a residential with plant uptake end-use.

5.8.3 Pesticide Screening

A total of fifteen pesticide screens were undertaken on selected samples of the topsoil recovered, based on the historical and contemporary agricultural use of the site. The testing revealed all determinands, within all samples tested, to be present below the limit of detection.

5.8.4 Asbestos Screens

A total of fifteen soil samples of the topsoil were screened for the presence of asbestos by the laboratory. None of the samples analysed by the laboratory revealed the presence of asbestos fibres.

5.9 Specification for Topsoil

Based on the visually poor quality of the topsoil, we were asked by our Client to recover three additional samples of the topsoil from three locations across the site for laboratory analysis relating to a suite of contaminants as referenced by BS3882: 2015 '*Specification for Topsoil*'.

This analysis is biased towards the nutritional content of the soil as opposed to the testing of determinands as a means of benchmarking the soils from a contamination perspective. The laboratory test certificates relating to this element of the works are included in Appendix VII, with the three sampling locations indicated on the plan in Appendix IV (Figure No. D36147/04).

The results have been cross-referenced with the topsoil characteristics table within the BS3882 documentation. This indicates that the topsoil tested may be classified as a low-fertility multipurpose topsoil. However, we would recommend liaison with a topsoil specialist to confirm the topsoils suitability for use within the proposed development.

5.10 Contamination Assessment Summary

Contamination testing was carried out on selected samples of the Topsoil and underlying Natural Strata.

On the basis of the chemical contamination assessment undertaken, the soils may be considered to be uncontaminated in the context of the proposed end-use (i.e. in relation to human health). However, we would note a very localised hotspot of arsenic contamination in the topsoil recovered from TP24.

We would additionally note that no visual or olfactory evidence of contamination was identified during the course of the exploratory investigation works.

Given the low contaminant concentrations revealed by the testing, there are considered to be no specific risks posed to Controlled Waters by the findings of the laboratory analysis undertaken.

6.0 CONCEPTUAL SITE MODEL

6.1 General

The DEFRA publication *'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance'* (dated April 2012) states the following with regards to the production of a Conceptual Site Model (CSM) for a site:

'The process of risk assessment involves understanding the risks presented by land, and the associated uncertainties. In practice, this understanding is usually developed and communicated in the form of a "conceptual model"'. The development of a CSM is typically undertaken in an iterative process, reflecting the changes in understanding as more detailed site information becomes available. In developing a CSM, and specifically in the context of land contamination, consideration needs to be given to three essential elements; which form the basis of any risk present. The statutory guidance sections 3.8 and 3.9 (April 2012) states the following with respect to Part 2A.

'Under Part 2A, for a relevant risk to exist there needs to be one or more contaminant-pathway-receptor [CPR] linkages – "contaminant linkage" – by which a relevant receptor might be affected by the contaminants in question. In other words, for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters. For the purposes of this guidance:

- (a) A "contaminant" is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.*
- (b) A "receptor" is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters. The various types of receptors that are relevant under the Part 2A regime are explained in later sections.*
- (c) A "pathway" is a route by which a receptor is or might be affected by a contaminant.*

The term "contaminant linkage" means the relationship between a contaminant, a pathway and a receptor. All three elements of a contaminant linkage must exist in relation to a particular land before the land can be considered potentially to be contaminated land under Part 2A, including evidence of the actual presence of contaminants. The term "significant contaminant linkage", as used in this Guidance, means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land. The term "significant contaminant" means the contaminant which forms part of a significant contaminant linkage.'

With respect to the presence of background levels of contaminants, section 3.21 to 3.23 states *'The Part 2A regime was introduced to help identify and deal with land which poses unacceptable levels of risk. It was not intended to apply to land with levels of contaminants in soil that are commonplace and widespread throughout England or parts of it, and for which in the very large majority of cases there is no reason to consider that there is an unacceptable risk.*

Normal levels of contaminants in soil should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise. Therefore, if it is established that land is at or close to normal levels of particular contaminants, it should usually not be considered further in relation to the Part 2A regime...

For the purpose of this Guidance, "normal" levels of contaminants in soil may result from:

- (a) *The natural presence of contaminants (e.g. caused by soil formation processes and underlying geology) at levels that might reasonably be considered typical in a given area and have not been shown to pose an unacceptable risk to health or the environment.*
- (b) *The presence of contaminants caused by low level diffuse pollution, and common human activity other than specific industrial processes. For example, this would include diffuse pollution caused by historic use of leaded petrol and the presence of benzo(a)pyrene from vehicle exhausts, and the spreading of domestic ash in gardens at levels that might reasonably be considered typical.'*

In selecting appropriate generic assessment criteria Section 3.27 of the Guidance states:

'It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work would be warranted'.

With respect to assessing contaminated land, section 4.17 of the Guidance states:

'In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health, the local authority should use the categorisations described in paragraphs 4.19 – 4.30 below. Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on the grounds of significant possibility of harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds.'

In relation to the use of GAC values in the assessment of contaminated land, section 3.29 of the Guidance states:

'GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regards to such GACs:

- (a) *They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.*
- (b) *They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which the GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.*
- (c) *They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risk to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.*
- (d) *They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.*
- (e) *They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.'*

In undertaking a risk assessment and deriving a CSM for the purposes of the redevelopment of a site (i.e. planning and development control) reference has been made to both the Model Procedures for the Management of Land Contamination, as well as the National Planning Policy Framework (NPPF, dated March 2012). Reference has also been made to the Contaminated Land Statutory Guidance (referenced above), although this is primarily concerned with Local Government determinations of Statutory '*Contaminated Land*', which is separate to planning framework requirements.

6.2 Contaminant-Pathway-Receptor [CPR] Considerations

The following CPR assessment has been undertaken based on the conservative assumption of a residential with plant uptake end-use for the proposed development.

6.3 Consideration of Potential Sources of Contamination [C]

Based on the findings of our works, the potential key sources of contamination at the site are considered to be the following:

- Metals or metalloids associated with any Made Ground.
- Polycyclic Aromatic Hydrocarbons (PAHs) from any ashy inclusions and/or carbonaceous inclusions in the near surface soils.
- Pesticides associated with the current (and historical) agricultural use of the site.
- Asbestos associated with any Made Ground.
- Hazardous ground gas (i.e. methane and carbon dioxide).

We would note that the foregoing list of contaminants was considered to remain broadly applicable following completion of the site works.

In addition, consideration has also been given to the following:

- Radon.
- Sulphate/Acid conditions (mainly for constructional reasons).

6.4 Consideration of Potential Pathways [P]

The potential pathways at the site are primarily:

- Direct ingestion of soil.
- Inhalation of dust and vapours.
- Direct skin contact with the ground.
- Direct ground contact with building materials.
- Direct ingestion of home-grown produce.
- Vertical and lateral migration of contamination.
- Vertical and lateral migration of potentially hazardous ground gases/vapours.

6.5 Consideration of Potential Receptors [R]

The potential receptors at the site are:

- The construction personnel (i.e. site workers) involved with the development of the site (typically short term (acute) exposure).
- The final end users (i.e. residents - typically long term (chronic) exposure or site visitors (typically acute exposure)).

- Controlled Waters (i.e. underlying groundwater).
- Neighbouring properties (off-site receptors).
- Buildings/construction materials (including buried utilities).

6.6 Summary

GeoDyne Limited's conceptual site model of possible CPR pollutant linkages, applicable to the proposed site usage and based on the information currently available, is summarised in Table 7.

TABLE 7 – SUMMARY OF CPR ASSESSMENT						
Contaminant	Pathway	Receptor	Comments	Plausible Pollutant Linkage	Possible Mitigation	Possible Statutory 'Contaminated Land' following mitigation
Contaminated Soils	<i>Direct Ingestion / Direct Contact</i>	<i>Site Workers</i>	The soils tested may be regarded as uncontaminated based on a residential with plant uptake end-use. However, a very localised hotspot of arsenic contamination is present within the topsoil (TP24).	No	Site workers to wear appropriate PPE for health and safety reasons.	No
Contaminated Soils	<i>Inhalation of Dust and Vapours</i>	<i>Site Workers</i>	The soils tested may be regarded as uncontaminated based on a residential with plant uptake end-use. However, a very localised hotspot of arsenic contamination is present within the topsoil (TP24).	No	Site workers to wear appropriate PPE for health and safety reasons.	No
Contaminated Soils	<i>Direct Ingestion / Direct Contact</i>	<i>End Users (Residents & Site Visitors)</i>	The soils tested may be regarded as uncontaminated based on a residential with plant uptake end-use. However, a very localised hotspot of arsenic contamination is present within the topsoil (TP24).	No	No mitigation required except for very localised hotspot delineation and potential source removal (TP24) assuming that the topsoil is to be retained within the proposed development.	No
Contaminated Soils	<i>Inhalation of Dust and Vapours</i>	<i>End Users (Residents & Site Visitors)</i>	The soils tested may be regarded as uncontaminated based on a residential with plant uptake end-use. However, a very localised hotspot of arsenic contamination is present within the topsoil (TP24). Following development, generation of significant levels of dust on a chronic basis unlikely.	No	No mitigation required except for very localised hotspot delineation and potential source removal (TP24) assuming that the topsoil is to be retained within the proposed development.	No

TABLE 7 – SUMMARY OF CPR ASSESSMENT						
Contaminant	Pathway	Receptor	Comments	Plausible Pollutant Linkage	Possible Mitigation	Possible Statutory 'Contaminated Land' following mitigation
Contaminated Soils	<i>Uptake in home grown produce</i>	<i>Site End Users – Residents & Visitors</i>	The soils tested may be regarded as uncontaminated based on a residential with plant uptake end-use. However, a very localised hotspot of arsenic contamination is present within the topsoil (TP24).	No	No mitigation required except for very localised hotspot delineation and potential source removal (TP24) assuming that the topsoil is to be retained within the proposed development.	No
Contaminated Soils	<i>Vertical and Lateral Migration</i>	<i>Neighbouring properties (off site receptors)</i>	No sources of potentially mobile contamination have been identified.	No	None required.	No
Contaminated Soils	<i>Vertical and Lateral Migration</i>	<i>Controlled Waters</i>	The site is underlain by both Unproductive Strata and a Secondary A Aquifer, and at depth by a Secondary B Aquifer. The site does not lie within an SPZ. The concentrations of determinands detected are considered unlikely to represent a significant risk to Controlled Waters.	No	No specific mitigation required, based on the findings of the works undertaken.	No
Water Soluble Sulphate/Acid Contaminated Soils	<i>Direct Contact</i>	<i>Building Materials</i>	Design Class DS-1/ACEC Class AC-1. (BRE Spec. Digest 1:2005).	No	Adopt appropriate concrete mix for all concrete in contact with the ground.	No
Radon	<i>Vertical and Lateral Migration</i>	<i>Site Users & Building Envelope</i>	Based on the Desk Study information, the site does not lie within an area affected by radon.	No	No specific precautions required in proposed dwellings.	No
Ground Gases	<i>Vertical and Lateral Migration</i>	<i>Site Users & Building Envelope</i>	Characteristic Situation 'CS1' based on the gas monitoring programme undertaken to date.	No	No specific precautions required in proposed dwellings.	No
KEY Where text is in <i>Bold Italic</i> item is potentially present. Where normal text is used item is not present/plausible. No - Pollutant linkage not plausible. Yes - Pollutant linkage plausible, mitigation required. ? - Insufficient information, further work necessary. The requirement for mitigation is subject to review and confirmation by the appropriate regulatory authority.						

In the foregoing CPR assessment, determinands identified by chemical analysis are only considered to be contaminated with respect to generic guidance where the determinand is present at concentrations above the respective screening criteria.

7.0 CONCLUSIONS & RECOMMENDATIONS

7.1 Site Summary

The site currently comprises several large open fields used for arable farming. Historically, the site has essentially remained in agricultural use.

7.2 Site Geology

The geological publications indicate the site to be underlain by variable drift deposits comprising Wolston Clay, Wolston Sand & Gravel and Alluvium, all of Quaternary age. The drift deposits are indicated to be underlain at depth by the Mercia Mudstone Group of Triassic age.

7.3 Ground Conditions

Reference should be made to the Ground Conditions Plan (Figure No. D36147/06), which is presented in Appendix XI of this report and summarises the ground conditions on a field by field basis.

Ploughed topsoil was encountered in all of the exploratory holes advanced at the site, to depths of between 0.20m and 0.50m begl, with an approximate average thickness of 0.30m.

Made Ground was not encountered in any of the exploratory holes advanced at the site.

Natural Strata (Drift)

The Natural Strata across the site typically comprised firm to stiff (locally very stiff) silty CLAY. The Clay was often sandy and/or gravelly, particularly near surface to depths of approximately 1.20m begl.

Firm clayey SILT was also encountered across the majority of the site, either as large pockets or discrete bands within the Clay strata. Thicker deposits of Silt were encountered underlying the Clay in some southwestern and eastern areas of the site from typical depths in excess 1.80m begl. Silt was encountered underlying the Clay at shallower depth in TP18 (from 0.65m begl) and was encountered immediately beneath the ploughed topsoil in three locations (TP34 to TP36) to depths in excess of 2.00m begl. In one trial pit (TP33) the Silt was recorded as soft between 2.30m and 3.05m begl.

Medium dense (locally loose) fine to medium grained SAND was encountered in some northern areas of the site at variable depths either above, below or as bands within the Clay/Silt strata. In three of the window sample boreholes (WS3, WS16 and WS17) the Sand was recorded as very loose between approximate depths of 2.00m and 3.00m begl. Sand was also encountered as large pockets within the Clay strata in some southern areas of the site.

Natural Strata (Solid)

Stiff to very stiff CLAY with mudstone lithorelicts was encountered in eleven of the exploratory holes, underlying the drift deposits from depths typically in excess of 2.30m begl. The Clay was encountered from shallower depths in two locations; TP6 (1.10m begl) and WS9 (1.70m begl). These strata are considered typical of the Mercia Mudstone Group which is indicated within the reviewed geological publications to underlie the drift deposits.

7.4 Foundation Design

The following foundation design recommendations comprise general advice for the entire site area. Based on the large size of the site (approximately 45Ha), a prudent developer may wish to commission parcel specific trial pitting and reports once the layout/development proposals, including levels, have been confirmed. In addition to the advice given below, a Foundation Summary Plan (Figure No. D36147/07), which summarises the foundation recommendations on a field by field basis, is presented in Appendix XII.

Variable ground conditions in the north of the site, including localised shallow water and unstable soils, indicate that a variety of foundation solutions are likely to be adopted in this area to ensure the most cost-effective foundation solution. These may include the localised use of rafts or piles as well as the more widespread use of traditional strip or trench fill. The natural soils underlying the approximate southern half of the site generally appear more consistent (predominantly firm to stiff Clay) and foundations for this area are likely to comprise traditional strip or trench fill. Net allowable bearing capacities and anticipated foundation options are indicated on the Foundation Summary Plan.

Shallow foundations within cohesive soils should generally be advanced to a minimum depth of 0.90m below existing or proposed ground levels (whichever being the deeper) and founded within undisturbed suitably competent natural soils. A minimum foundation depth of 1.00m below existing or proposed ground levels should be adopted in the field towards the southwest corner of the site where laboratory testing has indicated soils of high volume potential (See Section 7.6) to be present.

Where shallow foundations are constructed within entirely non-cohesive soils, i.e. Sand and/or Silt (as confirmed by laboratory testing), foundations should be advanced to a minimum depth of 0.60m below existing or proposed ground levels (whichever being the deeper) and founded within undisturbed suitably competent natural soils. When founding in non-cohesive soils the developer should be aware of regulations/design constraints relating to non-cohesive soils overlying shrinkable soils.

Where foundations straddle the interface between cohesive and non-cohesive soils, it is recommended that nominal light mesh reinforcement is included within foundations to reduce the potential for differential settlement. Alternatively, foundations may be deepened to encounter a single founding stratum.

Should any Made Ground or soft spots be encountered at founding depth, foundations will require further deepening to encounter underlying undisturbed suitably competent natural soils. During the intrusive works, significant soft spots were encountered in four locations, generally located in northern and northeastern areas of the site and at depths of the order 2m to 3m begl. The presence of these soft spots should be investigated further to enable confirmation of foundation design.

Foundations within cohesive soils may require localised deepening due to the influence of trees and hedgerows.

7.5 Floor Slab Design

For the proposed low-rise residential properties, ground bearing floor slabs may be adopted at the site provided that there is less than 0.60m of suitably compacted geotechnically competent sub-slab fill beneath proposed slabs and subject to NHBC Standards Chapter 4.2. Alternatively, a suspended slab may be adopted, which may be either cast in-situ or a pre-cast suspended floor with a clear ventilated void (i.e. beam and block).

For the proposed school buildings within the proposed development, ground bearing floor slabs may be adopted subject to confirmation by detailed Structural Engineer design, taking account of loading characteristics and settlement criteria etc. Alternatively, suspended floor slabs may be adopted.

7.6 Building Near Trees

Foundation designs may require adjusting in accordance with NHBC Standards Chapter 4.2 '*Building Near Trees*' and BRE Digest 240 '*Low-rise buildings on shrinkable clay soils: Part 1*' (1993) when building near existing, proposed or recently removed trees/hedgerows. Heave precautions will be required due to the presence of shrinkable soils underlying the site of medium and locally high volume change potential (as confirmed by laboratory testing).

Based on the results of the laboratory testing, we would recommend that soils of high volume change potential are assumed in the first instance in the field towards the southwest corner of the site, with soils of medium volume change potential across the wider site area (see Foundation Summary Plan in Appendix XII).

We would recommend that an arborist survey is undertaken to identify the species and heights of the existing trees and hedgerows at, and within influencing distance of, the site to enable a plot-specific foundation schedule to be produced.

7.7 Ground Gas Precautions

On the basis of the ground gas monitoring undertaken to date, the site does not require any ground gas precautions in relation to methane and carbon dioxide. It may become necessary to prepare bespoke, parcel specific reports in due course to satisfy the Clients development aspirations and it is recommended that the gas regime is reassessed on a parcel by parcel basis at that time, if appropriate.

7.8 Radon

No radon precautions are required at the site.

7.9 Water

Slight water seepages were recorded in sixteen (approximately one third) of the exploratory holes advanced at the site. The seepages were recorded at variable depths, generally in excess of 2.00m begl. In two of the exploratory holes (WS2 and WS5) water seepages were encountered at shallower depth (1.00m begl). A summary of the water strikes encountered during the intrusive works can also be seen on the Ground Conditions Plan in Appendix XI.

The seepages appeared to be indicative of perched water encountered within more permeable horizons in the natural drift deposits.

Based on the ground conditions encountered during the intrusive works, it is considered that the variable water depths recorded within the installations during the monitoring programme are likely to comprise both perched water within the Natural Strata and surface run-off, rather than true groundwater levels.

On this basis, it is considered that some foundation and service excavations are likely to require dewatering, involving minor sump pumping in the first instance. Excavations within cohesive soils may be susceptible to standing water following periods of wet weather. We would note that water levels may vary due to seasonal or other effects.

7.10 Excavations / Stability

The sides of the trial pits were noted to remain generally stable during their excavation and for the short period of time they remained open following completion. The majority of the boreholes were cased to depths of up to 3.00m begl either as a precautionary measure or to prevent collapse upon encountering water seepages. A summary of the ground stability issues across the site can also be seen on the Ground Conditions Plan in Appendix XI.

Collapsing of trial pit walls was only recorded in four locations, each time during excavations within the natural Silt strata and at depths in excess of 1.50m begl.

It is considered that during development, excavations within some areas of the site may require trench support. The assessment of excavations and provision of support will be the responsibility of the contractor on site.

The natural soils may be subject to deterioration and softening if excavations are left open and exposed to wet weather. Any softened soils should be removed from excavations prior to the pouring of concrete and foundation construction.

7.11 Sulphate Classification

In accordance with BRE Special Digest 1:2005 the site falls into Design Sulfate Class DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) classification of AC-1, based on the assumption of natural ground conditions and potentially mobile groundwater conditions beneath the site.

Therefore, an appropriate concrete mix should be adopted in accordance with BRE Special Digest 1 for all buried concrete in contact with the ground.

7.12 Coal Mining

No specific investigation or mitigation measures in relation to coal mining issues are considered to be necessary at the site.

7.13 California Bearing Ratios (CBRs)

A CBR value of between 2% to 4% may be anticipated within the shallow Natural Strata, subject to confirmation by in-situ testing along the lines of roads etc.

7.14 Surface Water Drainage

The site is considered unlikely to be suitable for the use of soakaways based on the relatively impermeable nature of the Natural Strata encountered at shallow depth beneath the site. At this stage it is recommended that alternative methods of surface water drainage are investigated in the first instance.

It is understood that the use of attenuation features, including SUDs/balancing ponds etc, are already being considered as a means of managing surface water drainage within the proposed development.

7.15 Contamination Assessment

Contamination testing was carried out on selected samples of the Topsoil and underlying Natural Strata.

On the basis of the chemical contamination assessment undertaken, the soils may be considered to be uncontaminated in the context of the proposed end-use (i.e. in relation to human health). However, we would note a very localised hotspot of arsenic contamination in the topsoil recovered from TP24.

We would additionally note that no visual or olfactory evidence of contamination was identified during the course of the exploratory investigation works.

Given the low contaminant concentrations revealed by the testing, there are considered to be no specific risks posed to Controlled Waters by the findings of the laboratory analysis undertaken.

7.16 Remediation Proposals

7.16.1 Introduction

It is considered that taking account of the current setting of the site and development proposals, human health should be the principle driver for any remediation works based on the proposed end-use of the site.

7.16.2 Proposed Garden Areas/Soft Landscape

Following delineation and removal of the arsenic hotspot, the site may be considered to be uncontaminated with respect to the determinands tested, based on a conservative residential with plant uptake end-use. Therefore, no further remediation works will be required other than the provision of topsoil in proposed gardens and areas of soft landscape to provide a suitable growing media for plants. It may be necessary to increase the thickness of topsoil around the root balls of trees to suit the proposed planting regime.

The chemical analysis has revealed an arsenic hotspot within the topsoil at one location in the east of the site (TP24). It is recommended that hotspot delineation works, by means of targeted sampling and laboratory testing, are undertaken in the vicinity of TP24. Following these recommended further works, any contaminated soils should be removed to a suitably licensed tipping facility.

7.16.3 Proposed Areas of Hard Standing

Specific remedial measures are considered not necessary within areas of proposed hard standing at the site (i.e. external hard standing areas and beneath the floor slabs to the proposed structures).

7.16.4 Comments Relating to Existing Topsoil and Natural Strata

Following the delineation and removal of the arsenic hotspot, the remaining topsoil is considered chemically suitable for re-use within the proposed development from a human health perspective. We would recommend that the existing topsoil is stripped and appropriately stockpiled prior to commencement of the development.

Based on the visually poor quality of the topsoil, we were asked by our Client to recover samples of the topsoil for laboratory analysis relating to a suite of contaminants as referenced by BS3882: 2015 '*Specification for Topsoil*'. This analysis is biased towards the nutritional content of the soil as opposed to the testing of determinands as a means of benchmarking the soils from a contamination perspective.

The results have been cross-referenced with the topsoil characteristics table within the BS3882 documentation. This indicates that the topsoil tested may be classified as a low-fertility multipurpose topsoil. However, we would recommend liaison with a topsoil specialist to confirm the topsoils suitability for use within the proposed development.

On this basis there may be a requirement to import topsoil to the site. Any topsoil imported to the site should be tested at source to ensure it is suitably clean (prior to importation) in accordance with CLEA/generic guidance. The topsoil should also conform to BS3882: 2015 '*Specification for topsoil*', with respect to the presence of foreign objects, and ideally nutrient levels etc. The results of the chemical analysis on topsoil proposed for importation should be forwarded to the Local Authority (Environmental Health Officer) for approval (prior to importation).

Furthermore, where there is an excess volume of topsoil, consideration should be given to re-use on other developments (subject to regulatory approval) rather than off-site disposal. Similarly, the Natural Strata may be regarded as suitable for re-use within proposed gardens as subsoil (to raise levels, as appropriate) or for landscaping/capping on alternative developments (subject to regulatory approval) where surplus arisings are generated from the site. Please note that further sampling and analysis may be required in due course where these options are to be investigated and a Materials Management Plan (MMP) prepared accordingly.

7.17 Off Site Disposal & Waste Acceptance Criteria Testing

If off-site disposal is required the chemical testing regime can be different to the chemical testing required to assess the suitability of the soils for retention on site and the risks to human health. Therefore, a new contamination assessment may be required to include bespoke leachate analysis (i.e. Waste Acceptance Criteria [WAC] testing) to classify the soils for off-site disposal with testing criteria to assess whether the soil is hazardous, non-hazardous or inert waste. However, the existing chemical test data will assist this process.

If disposal is necessary then the environmental laboratory test results (included within Appendix VII) should be provided to several landfill operators for consideration and cost provision in the first instance, prior to the material being removed from the site.

7.18 Construction Workers

No contamination has been identified that requires specific PPE. However, it is recommended that construction personnel involved with direct contact with the soils at the site use appropriate PPE equipment (i.e. boots, gloves and overalls) together with hygiene facilities in accordance with general health and safety guidelines. A copy of this report should be included in the site health and safety file, and site workers should be made fully aware of the sites setting.

7.19 Utilities

Prior to development of the site, we would recommend that a copy of this report is supplied to utility companies, and that their recommendations relating to appropriate supply pipes are adhered to.

7.20 Unforeseen Circumstances

Should any areas of potentially contaminated soil, or anomalous ground conditions, be encountered during site construction works we would recommend consultation with GeoDyne Limited to ensure that our recommendations continue to apply. Any potentially contaminated soils should be left in-situ and subjected to further assessment, to potentially include further chemical testing and risk assessment.

The following procedure should be adhered to if any areas of previously unidentified suspected contamination are encountered during the development of the site:

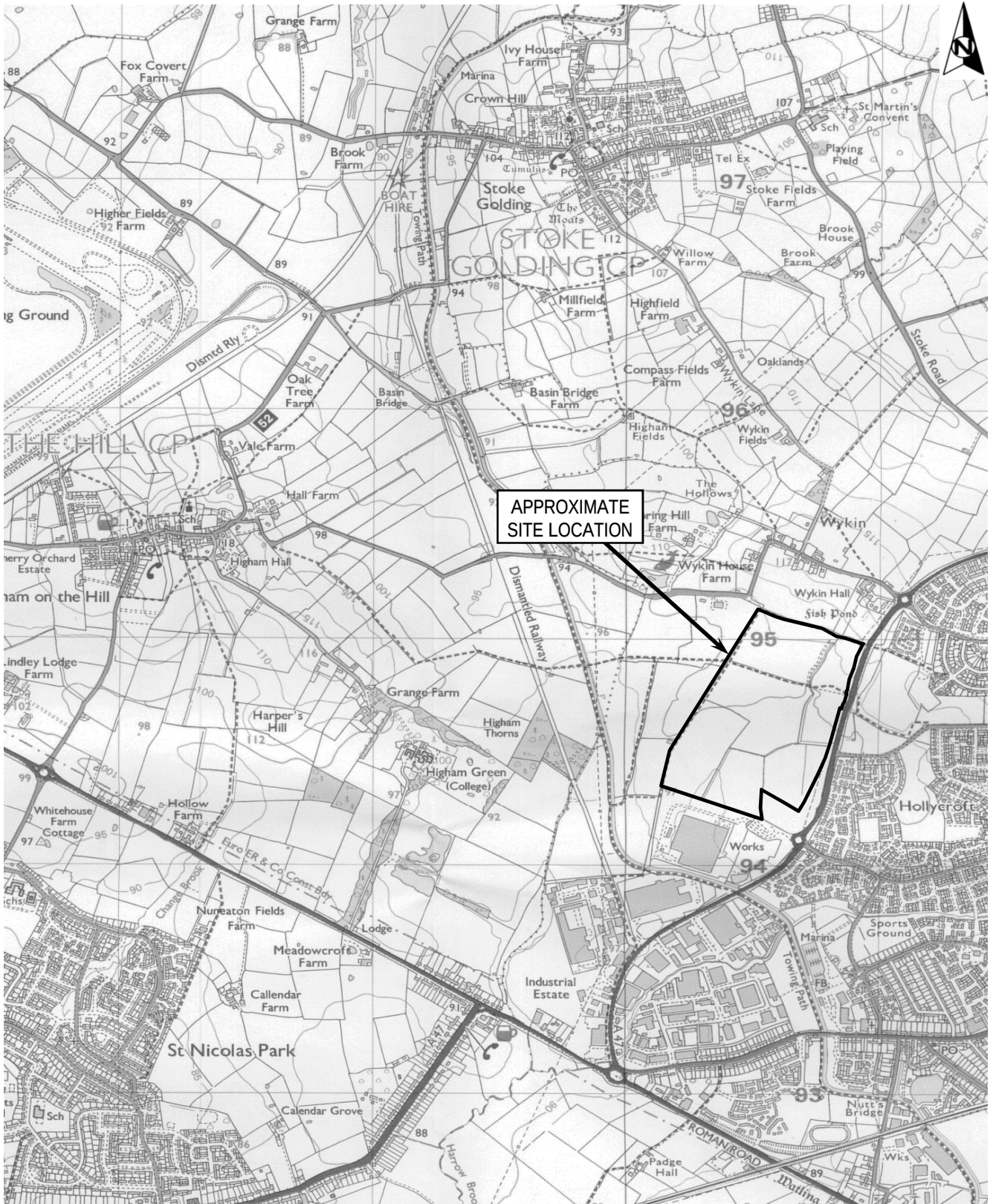
- i. Suspected contaminated material will remain in-situ.
- ii. GeoDyne Limited to be notified. We will then undertake a visual assessment of the possible contamination, followed by appropriate sampling/testing (as necessary).
- iii. If necessary, an appropriate strategy to remove/remediate the contamination will be submitted to the Local Authority.

7.21 Licences, Permits, Registrations, Plans & Approvals

The Contractor/Developer is responsible for, and must ensure that, all necessary licenses, permits, plans, registrations and approvals are in place prior to commencing with the earthworks at the site. These will include any Mobile Treatment Licenses (MTLs), Materials Management Plans (MMPs), Site Waste Management Plans (SWMPs) and/or Environmental Permits as necessary to enable the completion of the proposed works.

APPENDIX I

**Site Location Plan
(Figure No. D36147/01)**

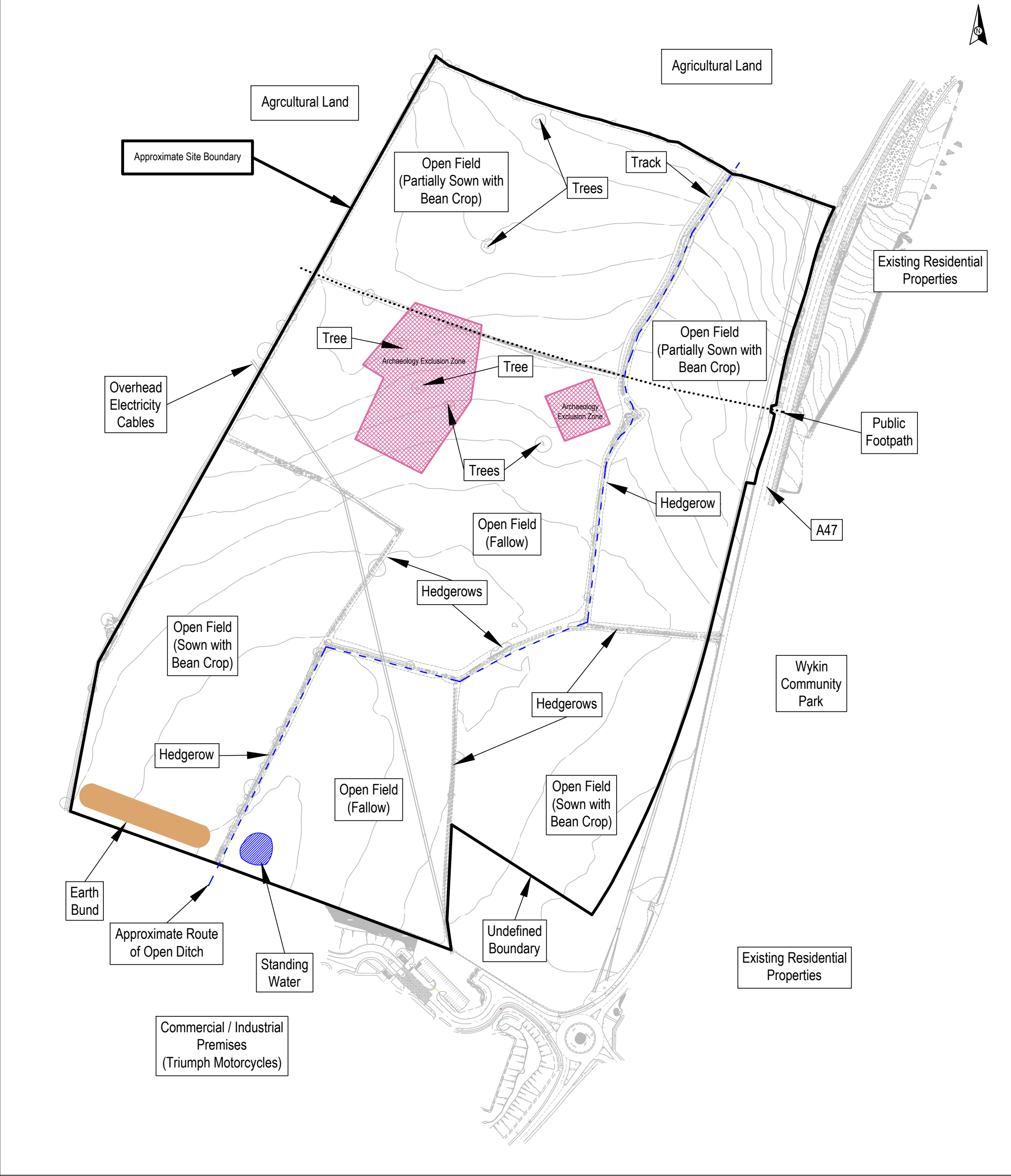


REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE.
CROWN COPYRIGHT RESERVED. LICENCE NO. LAN 1001274

Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	PK
Project	Hinckley West	Approved	PK
		Scale	NTS
		Date Drawn	15/06/2017
Title	Site Location Plan	Rev.	
		Figure No.	D36147/01

APPENDIX II

**Annotated Site Plan
(Figure No. D36147/02)**



Adapted from a plan for Bloor Homes by Greenhatch Group. Plan No. 19969 OGL revision A dated March 2014. Used with permission of the Client

Project No.	D36147	Drawn By	BP
Client	Bloor Homes Midlands	Checked By	SS
		Approved By	PK
Project	Hinckley West	Scale	NTS
		Date Drawn	14/06/2017
Title	Annotated Site Plan	Revision	
		Figure No.	D36147/02



Unit 2.2, Clarendon House, Clarendon Park,
Clumber Avenue, Nottingham
NG5 1AH
Tel: 0115 962 0001
9 Brunel Parkway, Pride Park, Derby DE24 8HR
Tel: 01332 290 798
info@geodyne.co.uk

APPENDIX III

**Site Plan Showing General Site Views
(Figure No. D36147/03)**



Approximate Site Boundary



Adapted from a plan for Bloor Homes by Greenhatch Group. Plan No. 19969 OGL revision A dated March 2014. Used with permission of the Client

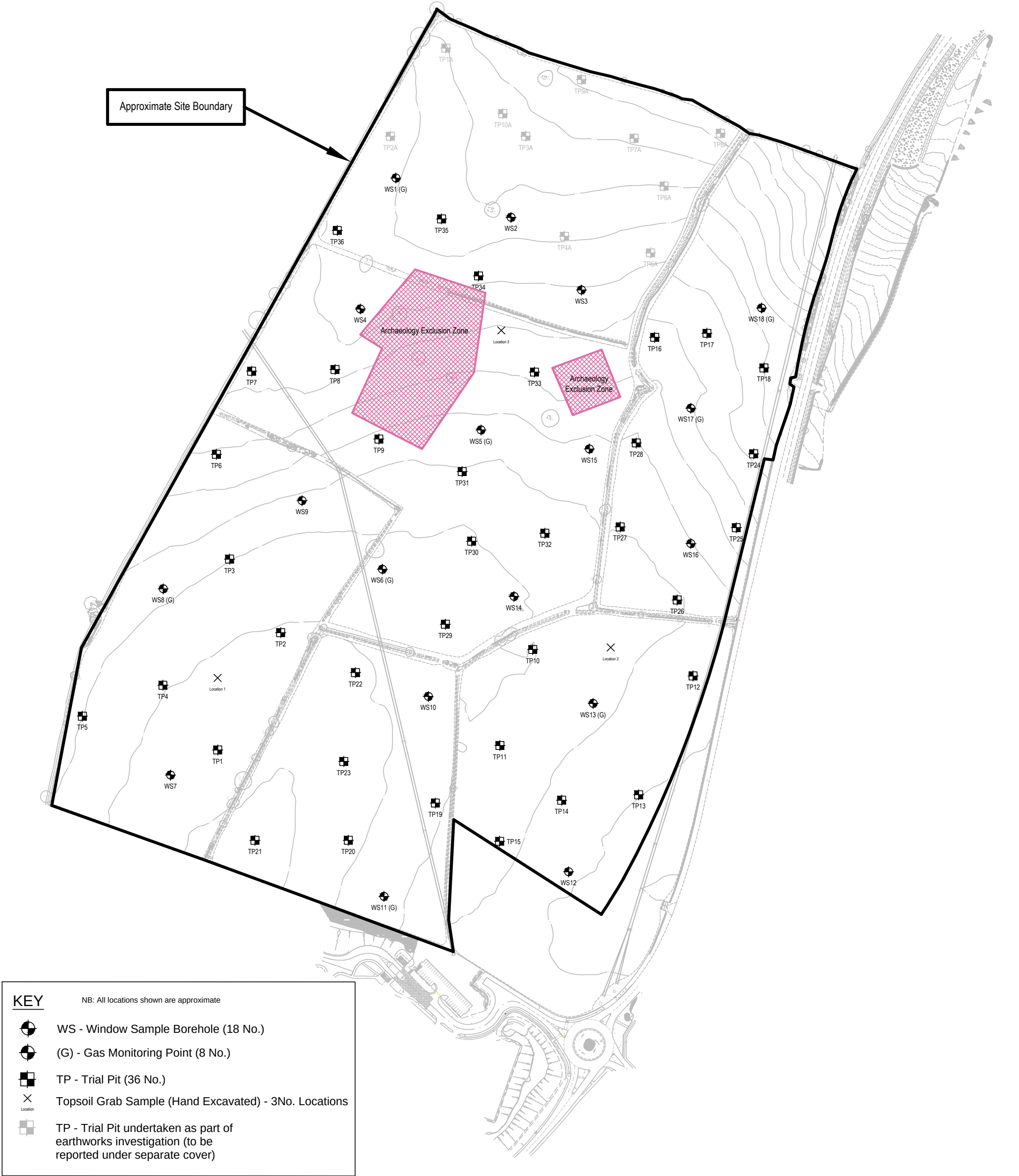
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Client	Bloor Homes Midlands	Checked By	SS
		Approved By	PK
Project	Hinckley West	Scale	NTS
		Date Drawn	14/06/2017
Title	Site Plan Showing General Site Views	Revision	
		Figure No.	D36147/03



Unit 2.2, Clarendon House, Clarendon Park,
Clumber Avenue, Nottingham
NG5 1AH
Tel: 0115 962 0001
9 Brunel Parkway, Pride Park, Derby DE24 8HR
Tel: 01332 290 798
info@geodyne.co.uk

APPENDIX IV

**Exploratory Hole Location Plan & GPS Co-ordinates
(Figure No. D36147/04)**



Adapted from a plan for Bloor Homes by Greenhatch Group. Plan No. 19969 OGL revision A dated March 2014. Used with permission of the Client

Project No.	D36147	Drawn By	BP
Client	Bloor Homes Midlands	Checked By	SS
		Approved By	PK
Project	Hinckley West	Scale	NTS
		Date Drawn	14/06/2017
Title	Exploratory Hole Location Plan	Revision	
		Figure No.	D36147/04



Unit 2.2, Clarendon House, Clarendon Park,
Clumber Avenue, Nottingham
NG5 1AH
Tel: 0115 962 0001
9 Brunel Parkway, Pride Park, Derby DE24 8HR
Tel: 01332 290 798
info@geodyne.co.uk

D36147 Exploratory hole GPS co-ordinates



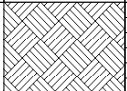
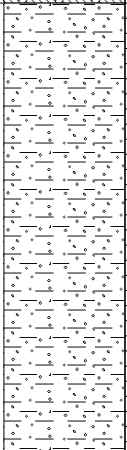
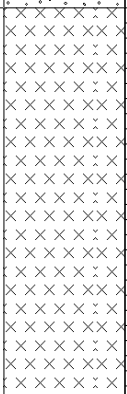
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WS2	440600 294936
WS3	440669 294845
WS4	440450 294864
WS5	440570 294725
WS6	440742 294587
WS7	440261 294382
WS8	940254 294567
WS9	440392 294655
WS10	440517 294460
WS11	440473 294262
WS12	440657 294286
WS13	440681 294453
WS14	440602 294560
WS15	440677 294706
WS16	440799 204612
WS17	440778 294746
WS18	440848 294846

TP1	440308 294407
TP2	440371 294524
TP3	440320 294597
TP4	440254 294471
TP5	440174 294490
TP6	440307 294701
TP7	440342 294783
TP8	440425 294785
TP9	440468 294716
TP10	440621 294507
TP11	440589 294412
TP12	440795 294481
TP13	440726 294363
TP14	440650 294357
TP15	440588 294316
TP16	440742 294817
TP17	440794 249821
TP18	440851 294787

TP19	294354 440524
TP20	294317 440438
TP21	294329 440345
TP22	294484 440445
TP23	294396 440434
TP24	294701 440841
TP25	294628 440834
TP26	294556 440765
TP27	294629 440708
TP28	296712 440724
TP29	294532 440534
TP30	294614 440560
TP31	294684 440551
TP32	294622 440633
TP33	294782 440623
TP34	294878 440567
TP35	294935 440531
TP36	294923 440427

APPENDIX V

**Exploratory Hole Logs
(TP1 to TP36 & WS1 to WS18)**

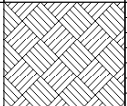
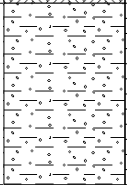
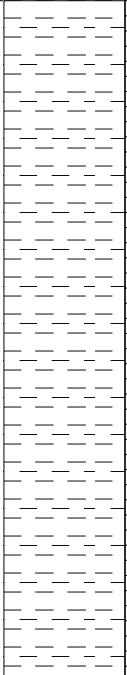
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.10	T1	D			
Firm grey-brown slightly gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
		0.50	T2	D			
...with some pockets of brown fine to medium grained sand below 0.90m		0.75	B1	B	In-Situ SV	61	
		0.80				62	
						63	
		1.70			Ex-Situ SV	60	
		1.80				62	
						64	
Firm grey-brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)							
...becoming brown with increased depth							
End of Trial Pit at 3.10m		3.10					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP1
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 24/04/2017	Approved: PK		Scale: 1:25		

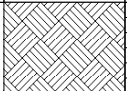
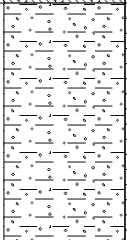
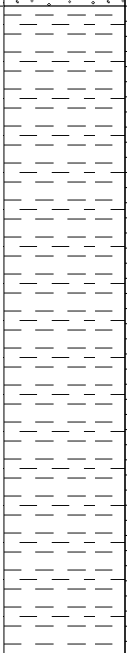
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey very clayey ploughed TOPSOIL (TOPSOIL)		0.20	T3	D			
Firm grey-brown slightly gravelly CLAY with occasional small pockets of brown fine to medium grained sand. Gravel is fine to coarse and predominantly rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35 0.45 0.75 0.95	T4	D	In-Situ SV	61 64 65	
Stiff grey locally brown CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		1.80 2.80 3.20			Ex-Situ SV	102 89 95	
...with rare fine to coarse subrounded to subangular gravel below 1.70m							
End of Trial Pit at 3.20m							

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP2
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 24/04/2017	Approved: PK		Scale: 1:25		

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey very clayey ploughed TOPSOIL (TOPSOIL)		0.25	T5	D	In-Situ SV	70 71 75	
Stiff grey-brown slightly gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
		0.55	T6	D			
		0.70					
Very stiff grey locally brown CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		1.10					
		1.50	B2	B			
...becoming darker in colour below 2.00m		2.00			Ex-Situ SV	120 120 120	
		3.00			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.25m		3.25					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP3
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 24/04/2017	Approved: PK		Scale: 1:25		

**Project No: D36147**

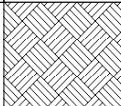
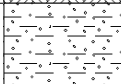
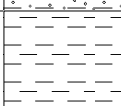
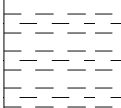
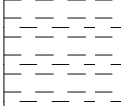
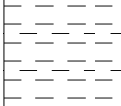
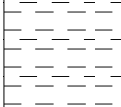
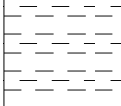
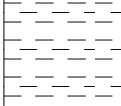
Sheet 1 of 1

Remarks:

- 1.Sides generally stable.
- 2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
 J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
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Date: 24/04/2017	Approved: PK		Scale: 1:25		

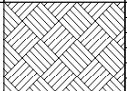
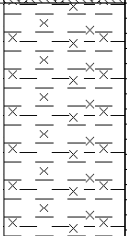
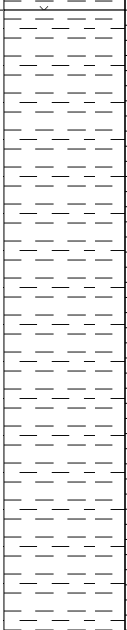
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty very clayey ploughed TOPSOIL (TOPSOIL)		0.20	T9	D			
Firm grey-brown slightly gravelly CLAY. Gravel is fine to coarse and predominantly rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35 0.40	T10	D			
Stiff dark grey CLAY with occasional pockets of brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS) ...sand pockets becoming less prevalent with increased depth		0.65 0.70			In-Situ SV	61 63 65	
							
		1.60			Ex-Situ SV	102 95 97	
							
		2.25	B3	B			
							
...becoming very stiff below approximately 2.50m		2.60			Ex-Situ SV	120 120 120	
							
End of Trial Pit at 3.10m		3.10					
							

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP5	
Date: 24/04/2017	Approved: PK		Scale: 1:25		

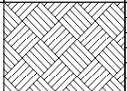
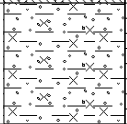
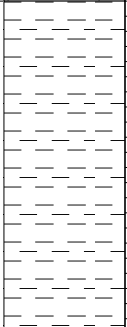
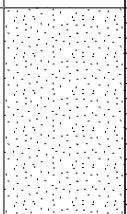
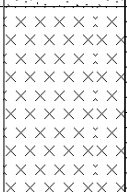
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey gravelly ploughed TOPSOIL (TOPSOIL)		0.05	T11	D			
Firm to stiff grey-brown slightly gravelly silty CLAY with occasional small pockets of brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
...becoming less gravelly with increased depth		0.80			In-Situ SV	64 70 72	
Stiff grey and grey-brown CLAY with occasional mudstone lithorelicts (MERCIA MUDSTONE GROUP)		1.10					
		1.50	T12	D			
		1.70			Ex-Situ SV	103 107 110	
...becoming very stiff with increased depth		2.70			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.20m		3.20					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP6	
Date: 24/04/2017	Approved: PK		Scale: 1:25		

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.15	T13	D	In-Situ SV	92 95 96	
Firm grey-brown sandy gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 0.45	T14	D			
Stiff grey locally orange-brown CLAY with occasional pockets of brown fine grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.70 1.00					
Medium dense brown very silty fine grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		1.80 2.00	B4	B			
Firm brown locally grey SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.50					
End of Trial Pit at 3.15m		3.15					

Remarks:

- Sides generally stable.
- Slight water seepage at 2.50m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project:

Hinckley West

Logged:

SS

Checked:

PK

Field Book Ref:

SS/10

Date:

24/04/2017

Approved:

PK

Client:

Bloor Homes Midlands

Plant:

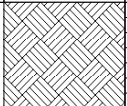
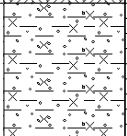
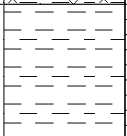
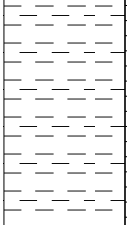
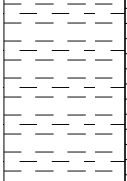
360 Tracked
Excavator

Scale:

1:25

Drawing No.

TP7

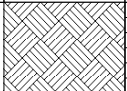
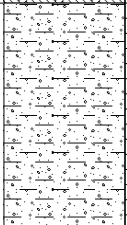
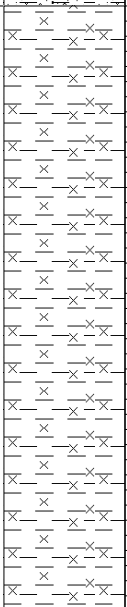
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey slightly gravelly ploughed TOPSOIL (TOPSOIL)		0.30	T15	D			
Firm sandy gravelly silty CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35					
		0.70			In-Situ SV	62	
		0.80				64	
						65	
Stiff grey CLAY with some large pockets of brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		1.00			In-Situ SV	104	
						110	
						99	
...sand pockets becoming smaller and less prevalent with increased depth		2.00	T16	D			
		2.60					
Very stiff grey locally purple-grey CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.70			Ex-Situ SV	120	
						120	
						120	
End of Trial Pit at 3.25m		3.25					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP8	
Date: 24/04/2017	Approved: PK		Scale: 1:25		

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.10	T17	D			
Firm grey-brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30	T18	D			
		0.50					
...becoming stiff with increased depth		0.65			In-Situ SV	57 59 63	
		0.95			In-Situ SV	75 78 79	
Stiff dark grey locally brown silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		1.05	B5	B			
		1.50			Ex-Situ SV	104 93 97	
		1.75					
...becoming very stiff with increased depth		2.50			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.05m		3.05					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project:

Hinckley West

Logged:

SS

Checked:

PK

Field Book Ref:

SS/10

Client:

Bloor Homes Midlands

Plant:

360 Tracked
Excavator

Drawing No.

Scale:

1:25

TP9

Date:

24/04/2017

Approved:

PK

**Project No: D36147**

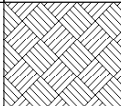
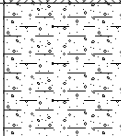
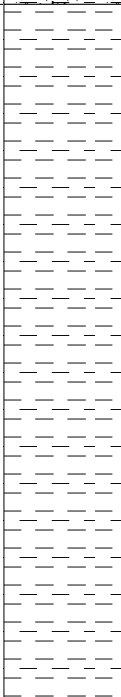
Sheet 1 of 1

Remarks:

- 1.Sides generally stable.
- 2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
 J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP10	
Date: 25/04/2017	Approved: PK		Scale: 1:25		

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.30	T21	D			
Firm grey-brown slightly gravelly sandy CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35 0.60	T22	D			
Stiff grey CLAY with occasional pockets of brown fine to coarse grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.80 1.50			Ex-Situ SV	102 110 112	
...sand pockets becoming larger and more prevalent with increased depth		2.50			Ex-Situ SV	105 108 114	
End of Trial Pit at 3.10m		3.10					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project:

Hinckley West

Client:

Bloor Homes Midlands

Logged:

SS

Checked:

PK

Field Book Ref:

SS/10

Plant:

360 Tracked
Excavator

Drawing No.

TP11

Date:

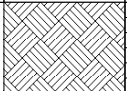
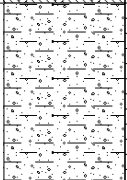
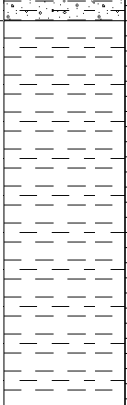
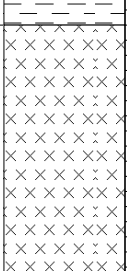
25/04/2017

Approved:

PK

Scale:

1:25

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey gravelly ploughed TOPSOIL (TOPSOIL)		0.05	T23	D			
Firm brown sandy gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 0.35	T24	D			
...becoming less sandy with increased depth		0.80			In-Situ SV	59 63 64	
Stiff grey CLAY with large pockets of brown fine to coarse grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.95					
		1.70			Ex-Situ SV	109 112 115	
Firm grey-brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.30 2.35	B7	B			
...becoming clayey with increased depth							
End of Trial Pit at 3.15m		3.15					

Remarks:

- Sides generally stable.
- Slight water seepage encountered at 2.95m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP12
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 25/04/2017	Approved: PK		Scale: 1:25		

**Project No: D36147**

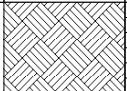
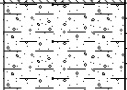
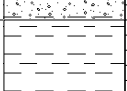
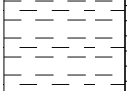
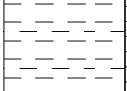
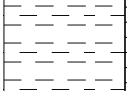
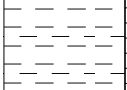
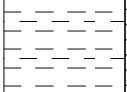
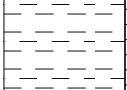
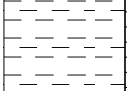
Sheet 1 of 1

Remarks:

- 1.Sides generally stable.
- 2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
 J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP13	
Date: 25/04/2017	Approved: PK		Scale: 1:25		

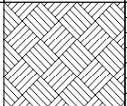
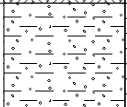
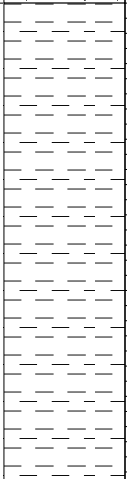
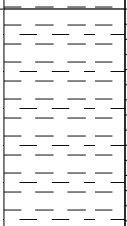
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.25 0.30	T27	D			
Stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.45	T28	D			
Very stiff grey CLAY with large pockets of red-brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.65 0.70			In-Situ SV	120 120 120	
...sand pockets becoming less prevalent with increased depth							
		1.70 1.80	B8	B	Ex-Situ SV	120 120 120	
							
							
							
							
		2.70 2.80			Ex-Situ SV	120 120 120	
Very stiff grey and purple-grey CLAY with some mudstone lithorelicts (MERCIA MUDSTONE GROUP)							
End of Trial Pit at 3.30m		3.30					
							
							

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP14
Date: 25/04/2017	Approved: PK		Scale: 1:25	

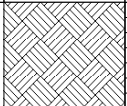
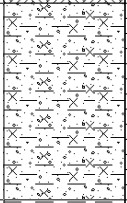
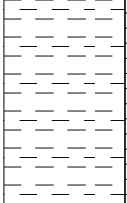
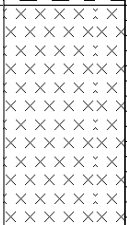
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty gravelly ploughed TOPSOIL (TOPSOIL)		0.15	T29	D			
Firm to stiff grey-brown slightly gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35 0.50 0.55 0.70	T30	D	Ex-Situ SV	63 70 77	
Stiff grey CLAY with large pockets of red-brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.90			In-Situ SV	110 114 117	
Very stiff grey and purple-grey CLAY with some mudstone lithorelicts (MERCIA MUDSTONE GROUP)		2.30 2.35			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.05m		3.05					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP15
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 25/04/2017	Approved: PK		Scale: 1:25		

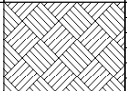
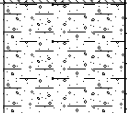
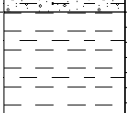
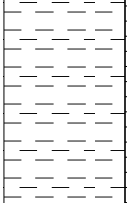
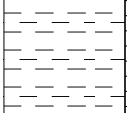
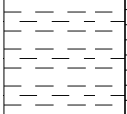
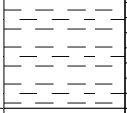
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey clayey ploughed TOPSOIL (TOPSOIL)		0.20	T31	D			
Medium dense grey-brown gravelly silty very clayey fine to coarse grained SAND. Gravel is fine to coarse and predominantly rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35					
...becoming more clayey with increased depth		0.55	T32	D			
Stiff grey CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.90	B9	B			
...with some small pockets of firm brown sandy silt between 1.30m and 1.80m		1.00					
		1.20			Ex-Situ SV	100 103 96	
		2.10			Ex-Situ SV	112 114 95	
Firm grey SILT with occasional narrow bands of fine sand (UNDIFFERENTIATED DRIFT DEPOSITS)		2.40					
End of Trial Pit at 3.15m		3.15					

Remarks:

- Sides generally stable.
- Slight water seepage encountered at 3.00m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP16
Date: 25/04/2017	Approved: PK		Scale: 1:25	

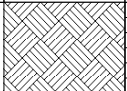
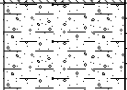
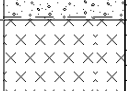
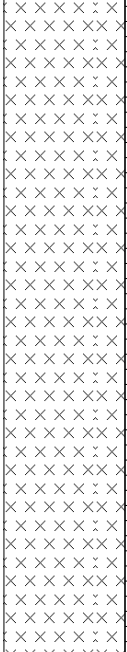
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey clayey silty gravelly ploughed TOPSOIL (TOPSOIL)		0.05	T33	D			
Stiff grey-brown very silty sandy slightly gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
Stiff grey CLAY with large pockets of brown gravelly fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.70 0.80			In-Situ SV	80 83 87	
...sand pockets becoming less prevalent with increased depth		1.80			Ex-Situ SV	112 116 118	
		2.50	T34	D			
Very stiff grey locally mottled brown CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.80 2.90			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.10m		3.10					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP17
Date: 25/04/2017	Approved: PK		Scale: 1:25	

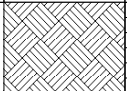
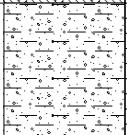
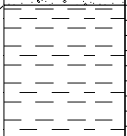
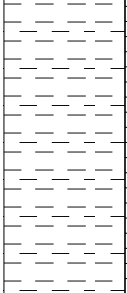
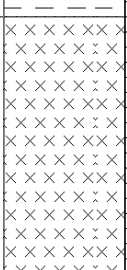
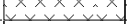
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty gravelly ploughed TOPSOIL (TOPSOIL)		0.15	T35	D			
Firm grey-brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
		0.45	T36	D			
		0.65					
Firm grey-brown clayey SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.00					
Firm grey SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.30	B10	B			
...with occasional narrow bands of fine grained sand below 2.40m		3.35					
End of Trial Pit at 3.35m							

Remarks:

1. Collapsing of trial pit walls below 2.70m after pit had remained open for 5 minutes, causing undermining of shallower strata.
2. Slight water seepages below 2.70m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP18
Date: 25/04/2017	Approved: PK		Scale: 1:25	

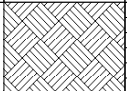
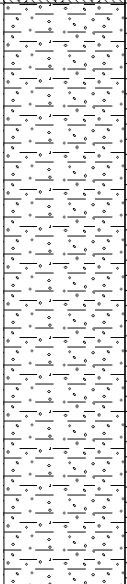
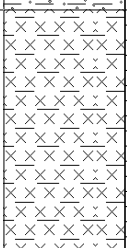
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.20 0.30	T37	D	In-Situ SV	92 96 97	
Stiff grey-brown sandy gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.60 0.70 0.75	T38	D			
...becoming less gravelly with increased depth							
Stiff grey locally brown CLAY with some large pockets of brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		1.70					
Firm grey and brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.20			Ex-Situ SV	102 112 96	
End of Trial Pit at 3.10m		3.10					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP19
Date: 26/04/2017	Approved: PK		Scale: 1:25	

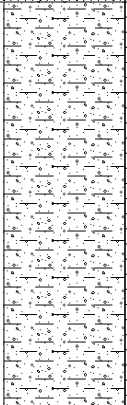
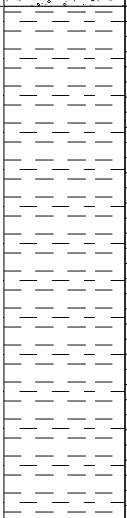
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.15	T39	D			
Stiff grey-brown slightly gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 0.40 0.90	T40	D			
...becoming very stiff below approximately 1.00m					In-Situ SV	100 105 106	
...with some pockets of brown fine to medium grained sand between 1.25m and 1.75m		1.90			Ex-Situ SV	120 120 120	
Firm grey-brown CLAY and SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.25 2.30	B11	B			
End of Trial Pit at 3.05m		3.05					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP20
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 26/04/2017	Approved: PK		Scale: 1:25		

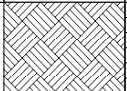
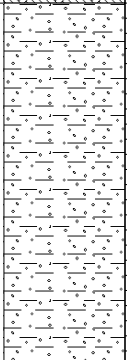
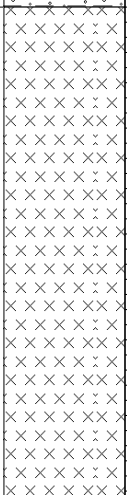
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey clayey ploughed TOPSOIL (TOPSOIL)		0.10	T41	D			
Firm to stiff grey-brown slightly gravelly locally slightly sandy CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.25					
		0.45	T42	D			
...with a large pocket of gravelly sand at 0.80m		1.00			In-Situ SV	63 69 77	
		1.60					
Very stiff grey CLAY with large pockets of firm brown sandy silt (UNDIFFERENTIATED DRIFT DEPOSITS)		2.00			Ex-Situ SV	120 120 120	
		3.30					
End of Trial Pit at 3.30m							

Remarks:

- Sides generally stable.
- Slight water seepage encountered at 3.10m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP21
Date: 26/04/2017	Approved: PK		Scale: 1:25	

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey clayey silty ploughed TOPSOIL (TOPSOIL)		0.05	T43	D			
Stiff grey-brown slightly gravelly CLAY. Gravel is fine to medium and predominantly rounded (UNDIFFERENTIATED DRIFT DEPOSITS) ...with a pocket of gravelly sand at southern end of trial pit at 0.55m		0.30					
		0.80	T44	D			
		0.90	B12	B			
...becoming less gravelly with increased depth		1.00			In-Situ SV	84 88 90	
Firm grey-brown locally clayey SILT (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming less clayey with increased depth		1.50					
End of Trial Pit at 3.15m		3.15					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project:

Hinckley West

Logged:

SS

Checked:

PK

Field Book Ref:

SS/10

Date:

26/04/2017

Approved:

PK

Client:

Bloor Homes Midlands

Plant:

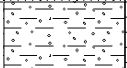
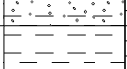
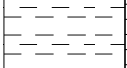
360 Tracked
Excavator

Scale:

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Drawing No.

TP22

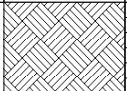
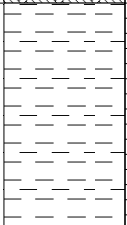
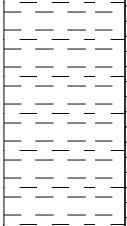
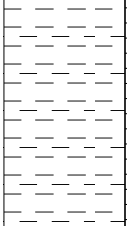
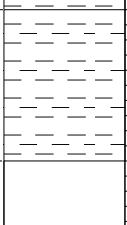
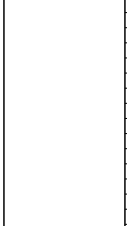
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey gravelly ploughed TOPSOIL (TOPSOIL)		0.20	T45	D			
Firm grey-brown slightly gravelly CLAY. Gravel is fine to coarse and predominantly rounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.25					
		0.50	T46	D			
Stiff grey locally grey-brown CLAY with some pockets of brown fine to medium grained sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.55					
...sand pockets becoming less prevalent with increased depth		0.95			In-Situ SV	75 78 80	
...becoming very silty below approximately 2.00m		1.95			Ex-Situ SV	81 82 97	
End of Trial Pit at 3.10m		3.10					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP23	
Date: 26/04/2017	Approved: PK		Scale: 1:25		

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey gravelly ploughed TOPSOIL (TOPSOIL)		0.25 0.30	T47	D			
Firm grey CLAY with rare fine to coarse rounded gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.70			In-Situ SV	56 59 60	
...with large pockets of brown and grey-brown sandy silt below 1.10m		1.40	B13	B			
...becoming stiff below approximately 1.85m		1.70			Ex-Situ SV	60 62 64	
Very stiff grey CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.55 2.70			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.05m		3.00 3.05	T48	D			

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP24
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 26/04/2017	Approved: PK		Scale: 1:25		

**Project No: D36147**

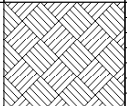
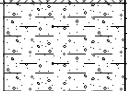
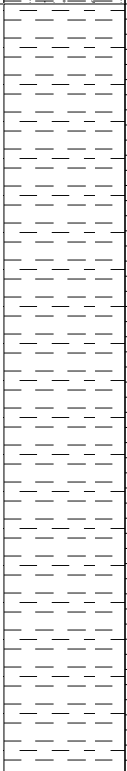
Sheet 1 of 1

Remarks:

- 1.Sides generally stable.
- 2.No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
 J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP25	
Date: 26/04/2017	Approved: PK		Scale: 1:25		

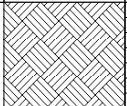
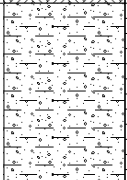
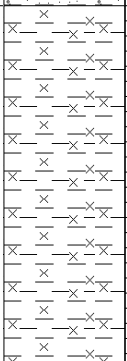
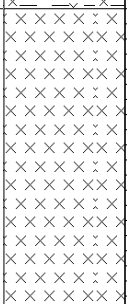
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey clayey sandy silty ploughed TOPSOIL (TOPSOIL)		0.05	T51	D			
Firm grey-brown sandy gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35 0.50	T52	D			
Stiff grey CLAY with occasional small pockets of red-brown fine to coarse sand (UNDIFFERENTIATED DRIFT DEPOSITS)		0.65 0.75			In-Situ SV	70 75 77	
...sand pockets becoming less prevalent with increased depth		2.00			Ex-Situ SV	73 75 78	
End of Trial Pit at 3.20m		3.20					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP26
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 26/04/2017	Approved: PK		Scale: 1:25		

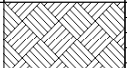
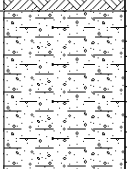
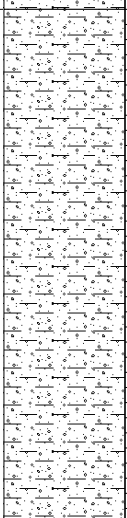
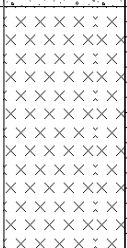
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.30	T53	D	In-Situ SV	60 62 68	
Firm to stiff grey-brown sandy slightly gravelly CLAY. Gravel is fine to coarse and predominantly rounded (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming less sandy with increased depth		0.35 0.65					
Firm grey-brown very silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.95 1.15	T54	D			
		1.65			Ex-Situ SV	60 65 68	
Firm grey and brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.15					
		3.15					
End of Trial Pit at 3.15m							

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP27	
Date: 26/04/2017	Approved: PK		Scale: 1:25		

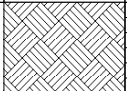
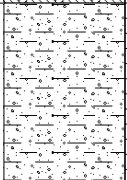
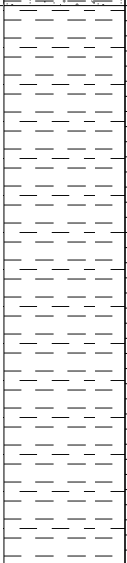
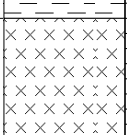
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.10	T55	D			
Firm brown sandy very gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.25 0.35	T56	D			
Firm grey-brown CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.80 1.00			In-Situ SV	53 57 59	
		2.00			Ex-Situ SV	56 59 60	
		2.40 2.50	B15	B			
Firm grey SILT (UNDIFFERENTIATED DRIFT DEPOSITS)							
End of Trial Pit at 3.30m		3.30					

Remarks:

- Sides generally stable.
- Slight water seepage at 3.10m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP28
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 26/04/2017	Approved: PK		Scale: 1:25		

Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey-brown clayey ploughed TOPSOIL (TOPSOIL)		0.25	T57	D			
Stiff brown sandy very gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 0.40 0.75 0.90	T58	D			
Stiff grey mottled dark grey CLAY (UNDIFFERENTIATED DRIFT DEPOSITS) ...with occasional small pockets of grey fine to coarse grained sand between 1.30m and 1.85m		1.70 2.70 2.80			In-Situ SV Ex-Situ SV	70 73 75 103 116 118	
Firm grey locally brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		3.20			Ex-Situ SV	105 110 117	
End of Trial Pit at 3.20m							

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project:

Hinckley West

Logged:

SS

Checked:

PK

Field Book Ref:

SS/10

Date:

27/04/2017

Approved:

PK

Client:

Bloor Homes Midlands

Plant:

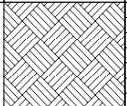
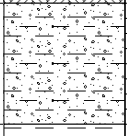
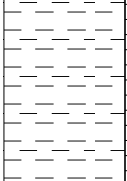
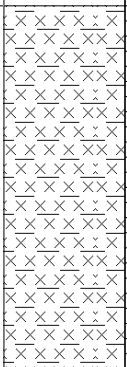
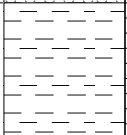
360 Tracked
Excavator

Scale:

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Drawing No.

TP29

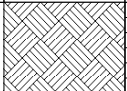
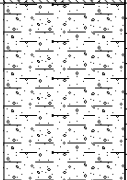
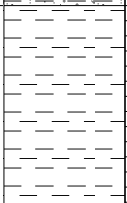
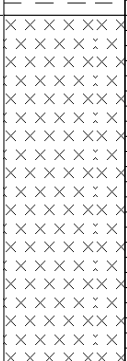
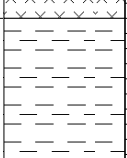
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey-brown clayey ploughed TOPSOIL (TOPSOIL)		0.05	T59	D			
Firm brown sandy gravelly CLAY. Gravel is fine to coarse and rounded to subangular (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming less gravelly with increased depth		0.35 0.50 0.60 0.75	T60	D	In-Situ SV	60 64 65	
Firm to stiff grey CLAY with some pockets of firm brown sandy silt (UNDIFFERENTIATED DRIFT DEPOSITS)		1.30 1.40 1.45	B16	B	In-Situ SV	72 75 78	
Firm grey and brown slightly sandy CLAY and SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.60 2.75			In-Situ SV	120 120 120	
Very stiff grey mottled brown CLAY with some mudstone lithorelicts (MERCIA MUDSTONE GROUP)		3.05					
End of Trial Pit at 3.05m							

Remarks:

- Sides generally stable.
- Water encountered at 2.55m.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP30
Date: 27/04/2017	Approved: PK		Scale: 1:25	

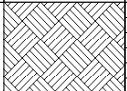
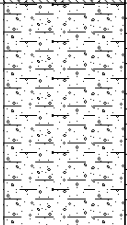
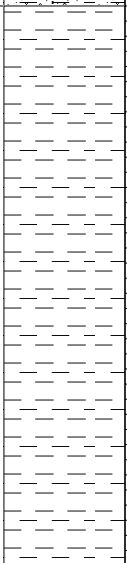
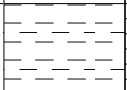
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey-brown clay ploughed TOPSOIL (TOPSOIL)		0.15	T61	D			
Firm brown sandy slightly gravelly CLAY. Gravel is fine to coarse and rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 0.35	T62	D			
...sand concentrated in small pockets below 0.70m		0.75			In-Situ SV	57 59 62	
Stiff grey CLAY with rare coarse rounded gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.90					
		1.35			Ex-Situ SV	78 81 82	
Firm grey and brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.60					
...becoming clayey with increased depth							
Stiff grey CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.80 3.00			Ex-Situ SV	88 90 92	
End of Trial Pit at 3.30m		3.30					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP31
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 27/04/2017	Approved: PK		Scale: 1:25		

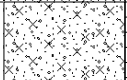
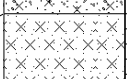
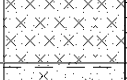
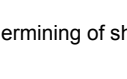
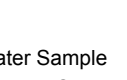
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey silty clayey ploughed TOPSOIL (TOPSOIL)		0.10	T63	D			
Stiff grey-brown slightly sandy gravelly CLAY. Gravel is fine to coarse and predominantly rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
		0.90			In-Situ SV	75 77 79	
Stiff grey CLAY with some large pockets of firm grey-brown sandy silt (UNDIFFERENTIATED DRIFT DEPOSITS)		1.05					
		1.70	T64	D			
		1.85			Ex-Situ SV	102 104 96	
		1.95	B17	B			
...becoming very silty below 2.25m							
		2.90					
Very stiff grey CLAY with some mudstone lithorelicts (MERCIA MUDSTONE GROUP)		3.10			Ex-Situ SV	120 120 120	
End of Trial Pit at 3.25m		3.25					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP32
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator		
Date: 27/04/2017	Approved: PK		Scale: 1:25		

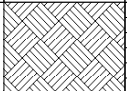
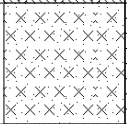
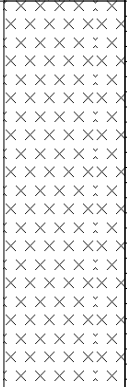
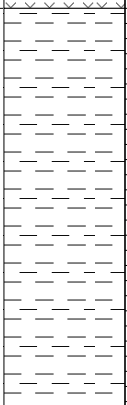
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey-brown sandy clayey ploughed TOPSOIL (TOPSOIL)		0.20	T65	D			
Medium dense brown clayey very silty slightly gravelly fine to medium grained SAND. Gravel is fine to coarse and predominantly rounded to subrounded (UNDIFFERENTIATED DRIFT DEPOSITS)		0.25					
Firm grey-brown slightly sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		0.55	T66	D			
		0.60					
...becoming soft clayey and wet below approximately 2.30m							
							
							
							
							
							
							
							
							
							
							
							
Stiff grey silty slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		3.05			Ex-Situ SV	75	
End of Trial Pit at 3.15m		3.10				79	
		3.15				80	

Remarks:

- Sides generally stable.
- Slight water seepages between 2.30m and 3.05m
- Collapsing of trial pit walls between 2.30m and 3.05m causing undermining of shallower strata.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m2) P = Penetrometer (kN/m2)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		Drawing No. TP33	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator			
Date: 27/04/2017	Approved: PK		Scale: 1:25			

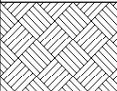
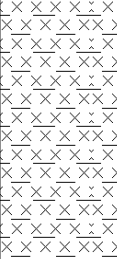
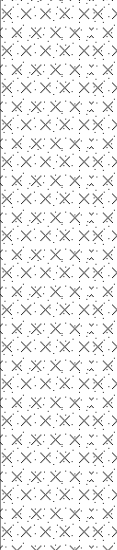
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey-brown silty clayey sandy ploughed TOPSOIL (TOPSOIL)		0.25	T67	D			
Firm brown very sandy SILT with rare fine to medium rounded gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 0.50	T68	D			
Firm grey-brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming clayey with increased depth		0.70 2.00					
Stiff grey CLAY with occasional pockets of firm slightly sandy silt (UNDIFFERENTIATED DRIFT DEPOSITS) ...silt pockets becoming less prevalent with increased depth		2.45 2.50	B18	B	Ex-Situ SV	84 88 93	
End of Trial Pit at 3.35m		3.35					

Remarks:

- Sides generally stable.
- No water encountered.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP34
Date: 27/04/2017	Approved: PK		Scale: 1:25	

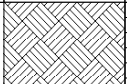
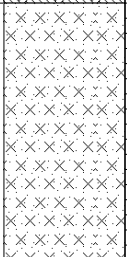
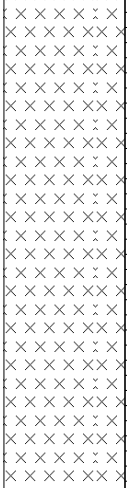
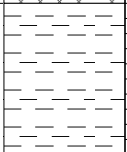
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Brown sandy ploughed TOPSOIL (TOPSOIL)		0.20 0.30	T69	D			
Firm brown very sandy slightly clayey SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.10 1.20	T70	D			
...with occasional fine to coarse rounded gravel below 0.60m							
...becoming more sandy with increased depth							
Firm grey-brown locally slightly sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.95 3.05	B19	B			
...becoming wet below 2.50m							
End of Trial Pit at 3.05m							

Remarks:

- Sides generally stable.
- Slight water seepages below 2.50m.
- Collapsing of trial pit walls below 2.50m causing undermining of shallower strata.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands	
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP35
Date: 27/04/2017	Approved: PK		Scale: 1:25	

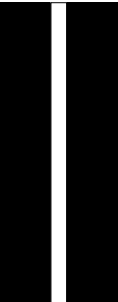
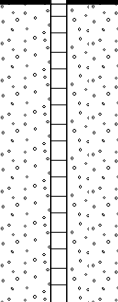
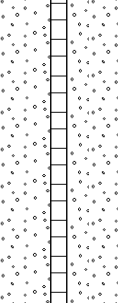
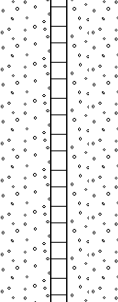
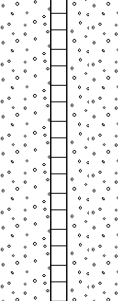
Description of Strata	Legend	Depth (m)	Sample Ref	Sample Type	Field Test Type	Field Test Result	Ground-water
Grey sandy silty TOPSOIL (TOPSOIL)		0.10	T71	D			
Firm brown very sandy SILT with rare fine to coarse rounded to subrounded gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30					
...becoming slightly clayey with increased depth		0.55	T72	D			
Firm grey-brown SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.15					
...becoming locally slightly sandy below 2.10m		2.80					
Stiff grey CLAY (MERCIA MUDSTONE GROUP)		2.85			Ex-Situ SV	90 93 98	
...mottled purple-grey and red-brown and with occasional mudstone lithorelicts below 3.05m		3.30					
End of Trial Pit at 3.30m							

Remarks:

- Sides generally stable.
- Slight water seepage at 1.95m.
- Collapsing of trial pit walls between 1.50m and 2.80m after pit had been left open for 5 minutes.

Key: B = Bulk Sample D = Disturbed Sample W = Water Sample SV = Shear Vane (kN/m²) P = Penetrometer (kN/m²)
J = Jar Sample V = Vial Sample  = Water Strike (m)  = Steady Water Level (m)

Project: Hinckley West			Client: Bloor Homes Midlands		
Logged: SS	Checked: PK	Field Book Ref: SS/10	Plant: 360 Tracked Excavator	Drawing No. TP36	
Date: 27/04/2017	Approved: PK		Scale: 1:25		

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10 - 0.20	D	T1	10	Brown sandy gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
0.40 - 0.50	D	T2		Firm light brown-grey slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
1.00 - 1.45	S			...with a band of firm orange-brown very sandy very silty clay between 0.60m and 0.70m ...with a band of firm orange-brown very sandy very clayey silt between 0.85m and 1.00m		(1.95)			
2.00 - 2.45	S		10						
				Medium dense light brown damp very silty fine grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		2.25			
						(0.55)			
3.00 - 3.45	S		10	Stiff dark grey slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.80			
						(0.70)			
						3.50			
4.00 - 4.45	S		12	Firm dark grey very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)					
				...becoming stiff with depth		(1.50)			
									
5.00 - 5.45	S		18						
									
									
5.00 - 5.45	S		18	End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable.
2.Slight water seepage from approximately 2.25m.
3.Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4.Bung, valve and lockable cover installed.
5.In-situ shear vane reading of 68kN/m² obtained at 1.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

Plant: Competitor Rig

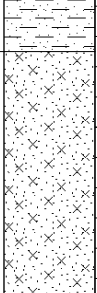
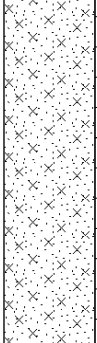
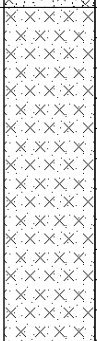
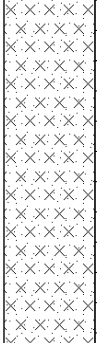
Drawing Ref:

Date: 21/04/2017

Approved: PK

Scale: 1:25

WS1

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S	T3	6	Brown sandy gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Firm orange-brown very sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 (0.45)			
				Loose orange-brown damp very silty fine grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming wet below approximately 1.00m		0.75			
1.60 - 1.70	D	T3	9	..becoming brown below approximately 2.40m		(1.95)	3.00		
2.00 - 2.45	S								
3.00 - 3.45	S			Firm dark grey very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		2.70			
4.00 - 4.45	S	T3	12	...becoming stiff with depth		(2.30)			
5.00 - 5.45	S					5.00			
				End of Borehole at 5.00m					

Remarks

1. Borehole cased to 3.00m due to presence of water causing unstable sides.
2. Water encountered at approximately 1.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

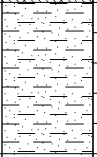
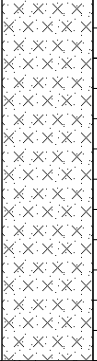
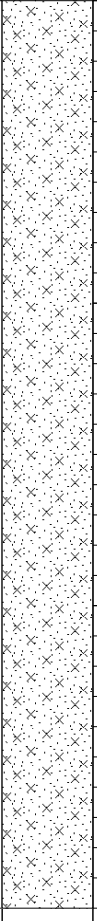
Plant: Competitor Rig

Drawing Ref: WS2

Date: 21/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.20 - 0.30	D	T4		Brown sandy gravelly ploughed TOSPOIL (TOPSOIL)		(0.30)			
				Firm light brown-grey very sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 (0.50)			
1.00 - 1.45	S		6	Firm orange-brown and light grey very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming damp below approximately 1.00m		0.80 (1.20)			
2.00 - 2.45	S		0	Very loose to loose brown wet very silty fine grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS) ...poor recovery between 2.00m and 3.00m		2.00			
3.00 - 3.45	S		16	...becoming medium dense with depth ...becoming dark grey between approximately 3.20m and 3.60m			3.00		
				...becoming brown below 3.60m		(3.00)			
4.00 - 4.45	S		15	...with occasional pockets of soft very sandy silt below approximately 4.00m					
5.00 - 5.45	S		29	End of Borehole at 5.00m		5.00			

Remarks

1. Borehole cased to 3.00m due to presence of water causing unstable sides.
2. Water encountered at approximately 2.00m.
3. In-situ shear vane reading of 70kN/m² obtained at 1.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

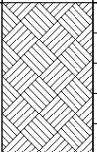
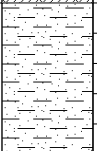
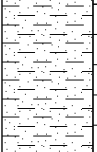
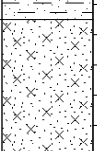
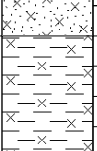
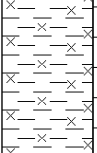
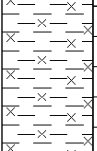
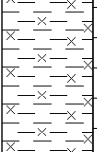
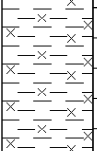
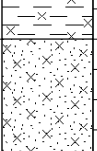
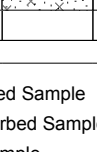
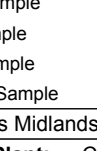
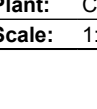
Plant: Competitor Rig

Drawing Ref: WS3

Date: 21/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S	T5	12	Brown very sandy gravelly ploughed TOPSOIL (TOPSOIL)		(0.50)			
				Firm to stiff light brown-grey sandy CLAY with rare subrounded quartzite gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.50			
				...becoming slightly damp and very silty below approximately 1.00m		(1.05)			
1.70 - 1.80	D	T5	13	Medium dense orange-brown very silty fine grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		1.55	2.00		
2.00 - 2.45	S					(0.55)			
				Stiff dark grey silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.10			
3.00 - 3.45	S		10			(2.50)			
									
									
4.00 - 4.45	S		33						
									
									
				Medium dense brown very silty fine to medium grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		4.60			
						(0.40)			
5.00 - 5.45	S		13			5.00			
				End of Borehole at 5.00m					

Remarks

1. Borehole cased to 2.00m due to presence of water causing unstable sides.
2. Water encountered at approximately 3.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

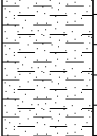
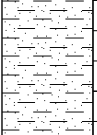
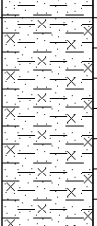
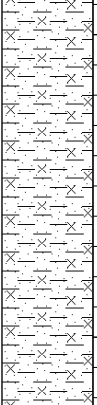
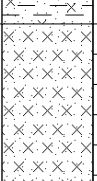
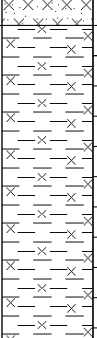
Plant: Competitor Rig

Drawing Ref: WS4

Date: 21/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10 - 0.20	D	T6		Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		0.25			
1.00 - 1.45	S		5	Firm to stiff light brown-grey slightly sandy CLAY with rare subrounded quartzite gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		(0.95)			
				...becoming stiff with depth					
2.00 - 2.45	S		9	...with a band of orange-brown wet very silty sand between 1.00m and 1.20m		1.20			
				Firm orange-brown and light grey very sandy very clayey SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		(2.10)	2.00		
3.00 - 3.45	S		14	...becoming light brown with depth		3.30			
				Firm dark grey damp very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		(0.60)			
4.00 - 4.45	S		17	Stiff dark grey very silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		3.90			
						(1.10)			
5.00 - 5.45	S		16	End of Borehole at 5.00m		5.00			

Remarks

1. Borehole cased to 2.00m due to presence of water causing unstable sides.
2. Slight water seepage from approximately 1.00m.
3. Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4. Bung, valve and lockable cover installed.
5. In-situ shear vane reading of 84kN/m² obtained at 1.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▼ = Water Strike (m)
▽ = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

Plant: Competitor Rig

Drawing Ref: WS5

Date: 21/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S	T7	10	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Stiff brown-grey slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
1.90 - 2.00	D	T7	14						
2.00 - 2.45	S								
3.00 - 3.45	S		21	...becoming mottled light brown with depth					
4.00 - 4.45	S		22	...becoming dark grey with depth					
5.00 - 5.45	S		22	End of Borehole at 5.00m		5.00	5.00		

Remarks

1.Sides generally stable.
2.No water encountered.
3.Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4.Bung, valve and lockable cover installed.
5.In-situ shear vane reading of 100kN/m² obtained at 1.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▼ = Water Strike (m)
▽ = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

Plant: Competitor Rig

Drawing Ref: WS6

Date: 21/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10	D	T8		Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Firm to stiff light brown-grey slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
1.00 - 1.45	S		8	...becoming stiff with depth			1.00		
				...becoming brown mottled grey with depth					
2.00 - 2.45	S		11	...becoming red-brown mottled grey with depth		(3.20)			
									
3.00 - 3.45	S		20						
									
4.00 - 4.45	S		22	Stiff red-brown slightly silty CLAY with rare mudstone lithorelicts (MERCIA MUDSTONE GROUP)		3.50			
									
									
									
									
									
									
									
									
5.00 - 5.45	S		21	End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

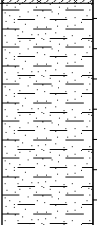
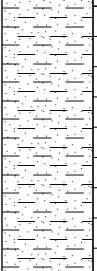
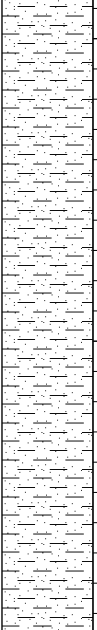
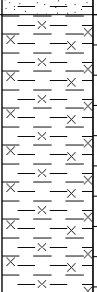
Plant: Competitor Rig

Drawing Ref: WS7

Date: 26/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S		8	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		0.25			
				Firm to stiff light brown slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)					
1.70 - 1.80	D	T9		...becoming stiff and red-brown mottled grey with depth			1.00		
2.00 - 2.45	S		13						
3.00 - 3.45	S		19			(3.75)			
4.00 - 4.45	S		22	Stiff red-brown slightly silty CLAY with occasional mudstone lithorelicts (MERCIA MUDSTONE GROUP)		4.00			
5.00 - 5.45	S		24			(1.00)			
				End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.
3.Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4.Bung, valve and lockable cover installed.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▼ = Water Strike (m)
▽ = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

Plant: Competitor Rig

Drawing Ref: WS8

Date: 26/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.20 - 0.30	D	T10	9	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)	1.00		
				Firm to stiff light brown slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
1.00 - 1.45	S			...becoming stiff with depth		(1.40)			
				...becoming red-brown mottled grey with depth		1.70			
2.00 - 2.45	S		16	Stiff brown-grey slightly silty CLAY (MERCIA MUDSTONE GROUP)					
3.00 - 3.45	S		16	...becoming red-brown with depth and with occasional mudstone lithorelicts		(3.30)			
4.00 - 4.45	S		20						
5.00 - 5.45	S		20						
				End of Borehole at 5.00m		5.00			

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10 - 0.20	D	T11		Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Firm to stiff light brown-grey slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
1.00 - 1.45	S		8	...becoming brown-grey with depth		(1.60)	1.00		
				...becoming silty with depth					
2.00 - 2.45	S		8	Firm brown sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming damp below approximately 2.00m		1.90			
						(0.50)			
				Stiff dark grey silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.40			
3.00 - 3.45	S		12			(1.60)			
									
4.00 - 4.45	S		12	End of Borehole at 4.00m		4.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

Plant: Competitor Rig

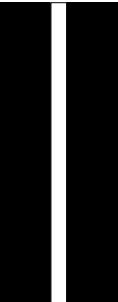
Drawing Ref:

Date: 26/04/2017

Approved: PK

Scale: 1:25

WS10

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S		10	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)	1.00		
				Firm to stiff light brown-grey slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
2.00 - 2.45	S		10	...becoming stiff and brown-grey and silty with depth					
2.70 - 2.80	D	T12				(4.70)			
3.00 - 3.45	S		22	...becoming red-brown mottled brown with depth					
4.00 - 4.45	S		21						
5.00 - 5.45	S		23	End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.
3.Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4.Bung, valve and lockable cover installed.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
▼ = Water Strike (m)
▽ = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

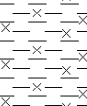
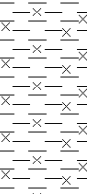
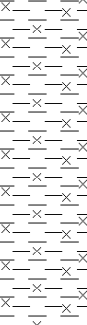
Plant: Competitor Rig

Drawing Ref: WS11

Date: 26/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.20 - 0.30	D	T13	8	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)	1.00		
1.00 - 1.45	S			Firm light brown-grey silty CLAY with rare subrounded quartzite gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
				...becoming slightly sandy below approximately 0.70m					
				...with a pocket of brown silty medium to coarse grained sand between 0.95m and 1.25m		(1.30)			
2.00 - 2.45	S		8	Firm to stiff brown-grey slightly sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.60			
				...becoming damp between approximately 2.00m to 2.40m		(1.00)			
3.00 - 3.45	S		18	Stiff red-brown slightly silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.60			
						(1.40)			
4.00 - 4.45	S		23	End of Borehole at 4.00m		4.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.

Key

D = Disturbed Sample	S = Standard Penetration Test (Split Spoon)
U = Undisturbed Sample	C = Standard Penetration Test (Cone)
B = Bulk Sample	 = Water Strike (m)
J = Jar Sample	 = Steady Water Level (m)
V = Vial Sample	
W = Water Sample	

Project:	Hinckley West
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Client:	Bloor Homes Midlands
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Logged: PK

Checked:	SS
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Field Book Ref:

Plant:	Competitor Rig
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Drawing Ref:

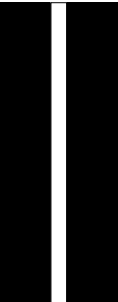
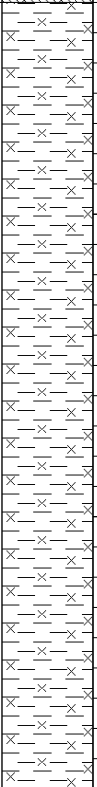
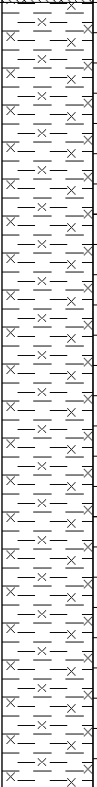
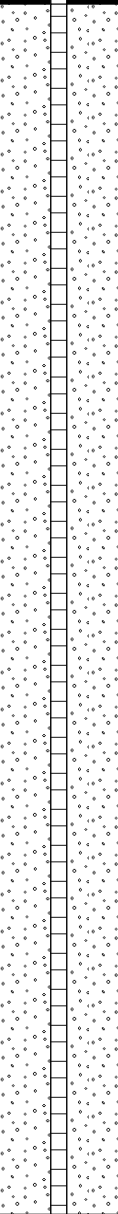
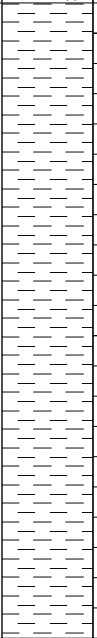
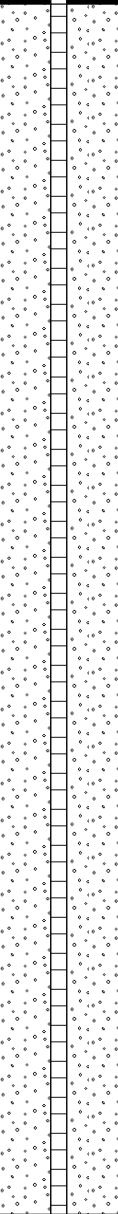
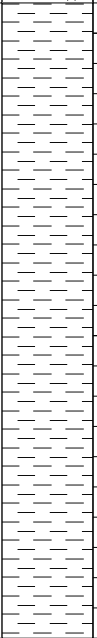
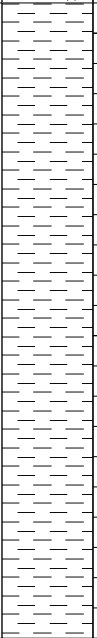
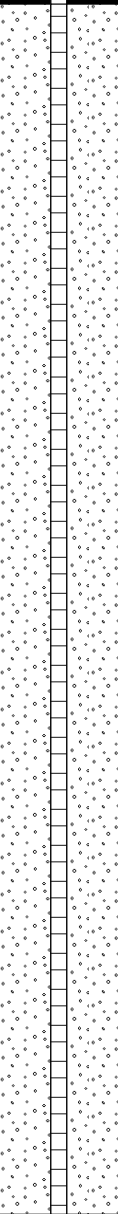
Date: 26/04/2017

Approved:	PK
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PK2017/01

Scale: 1:25

WS12

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S	T14	9	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)	1.00		
				Firm light brown grey slightly silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS) ...with a pocket of gravelly silty sand between 0.75m and 0.90m		0.30			
1.80 - 1.90	D	T14	11			(2.60)			
2.00 - 2.45	S								
3.00 - 3.45	S		17	Stiff red-brown CLAY and with occasional mudstone lithorelicts (MERCIA MUDSTONE GROUP) ...becoming stiff and red-brown with depth and with occasional mudstone lithorelicts		2.90			
4.00 - 4.45	S		20			(2.10)			
5.00 - 5.45	S		27	End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.
3.Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4.Bung, valve and lockable cover installed.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample
S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

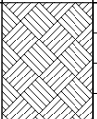
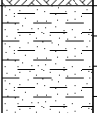
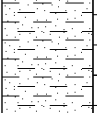
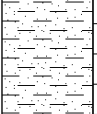
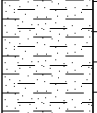
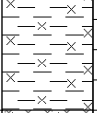
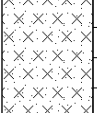
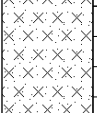
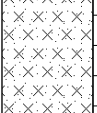
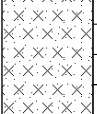
Plant: Competitor Rig

Drawing Ref: WS13

Date: 26/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10 - 0.20	D	T15		Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.40)			
				Firm to stiff light brown slightly sandy CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.40			
1.00 - 1.45	S		9	...becoming very gravelly below approximately 1.00m. Gravel comprises mainly subrounded quartzite and angular flint		(1.60)	1.00		
2.00 - 2.45	S		10	Stiff brown-grey slightly silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		2.00			
						(0.60)			
						2.60			
3.00 - 3.45	S		10	Firm to stiff brown very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)					
				...becoming stiff and red-brown with depth		(2.40)			
4.00 - 4.45	S		17						
									
5.00 - 5.45	S		22	End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.No water encountered.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

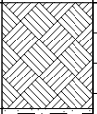
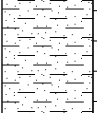
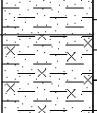
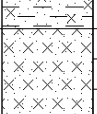
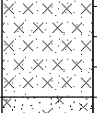
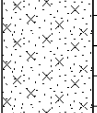
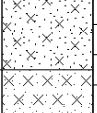
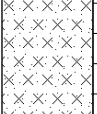
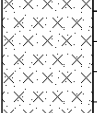
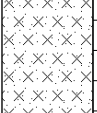
Plant: Competitor Rig

Drawing Ref: WS14

Date: 27/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S		8	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.35)			
				Firm light brown silty very sandy CLAY with occasional gravel of subrounded quartzite and angular flint (UNDIFFERENTIATED DRIFT DEPOSITS)		0.35 (0.50)			
				Firm to stiff brown-grey slightly sandy slightly silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.85 (0.35)			
				Firm to stiff light brown and light grey very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.20 (0.60)			
2.00 - 2.45	S		5	...becoming slightly damp with depth		1.80 (0.65)			
				Loose light brown and light grey damp very silty fine to medium grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS) ...becoming wet below approximately 2.00m		2.45 (2.55)			
2.60 - 2.70	D	T16		Firm dark grey slightly sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)					
3.00 - 3.45	S		9	...becoming stiff with depth					
4.00 - 4.45	S		13						
5.00 - 5.45	S		19						
				End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable.
2.No water encountered.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

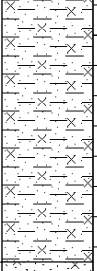
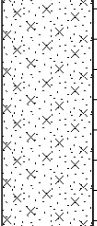
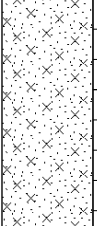
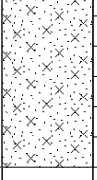
Plant: Competitor Rig

Drawing Ref: WS15

Date: 27/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10 - 0.20	D	T17		Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Medium dense brown very clayey very silty medium grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30 (0.30)			
				Firm light brown sandy silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.60			
1.00 - 1.45	S		5	...becoming very sandy and very silty below approximately 1.00m		(1.15)			
				Very loose to loose brown damp very silty fine to medium grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		1.75			
2.00 - 2.45	S		0	...becoming wet below approximately 2.20m		(1.40)			
				...becoming medium dense with depth					
3.00 - 3.45	S		13	Firm grey very sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		3.15 (0.35)			
				Medium dense grey damp very silty fine to medium grained SAND (UNDIFFERENTIATED DRIFT DEPOSITS)		3.50			
4.00 - 4.45	S		16	...becoming medium dense to dense with depth		(1.50)			
5.00 - 5.45	S		35	End of Borehole at 5.00m		5.00			

Remarks

1. Borehole cased to 3.00m due to presence of water causing unstable sides.
2. Water encountered at approximately 2.00m.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

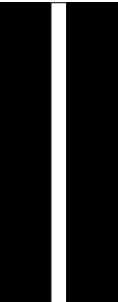
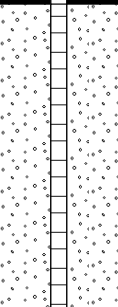
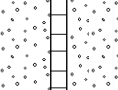
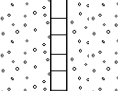
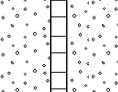
Plant: Competitor Rig

Drawing Ref: WS16

Date: 27/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
1.00 - 1.45	S	T18	10	Brown sandy clayey gravelly ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Loose to medium dense light brown clayey silty medium grained SAND with occasional subrounded quartzite and angular flint gravel (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
				...becoming less gravelly with depth					
				...becoming brown-grey and very silty with depth					
2.00 - 2.45	S	T18	0	...becoming very loose and wet below approximately 2.00m		(3.25)	3.00		
				...becoming loose with depth					
2.90 - 3.00	D	T18	7				3.00		
3.00 - 3.45	S								
4.00 - 4.45	S	T18	12	Stiff dark grey silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		3.55	3.00		
						(1.45)			
5.00 - 5.45	S	T18	15	End of Borehole at 5.00m		5.00	3.00		

Remarks

1. Borehole cased to 3.00m due to presence of water causing unstable sides.
2. Water encountered at approximately 2.00m.
3. Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4. Bung, valve and lockable cover installed.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

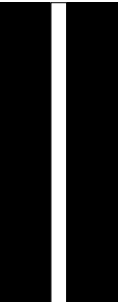
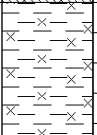
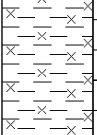
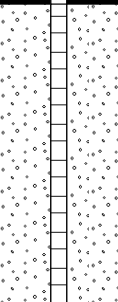
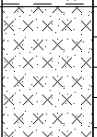
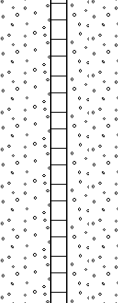
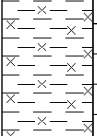
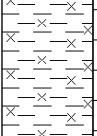
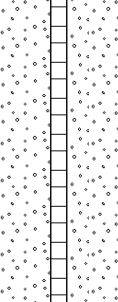
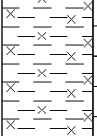
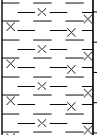
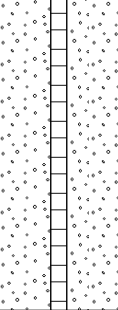
Plant: Competitor Rig

Drawing Ref: WS17

Date: 27/04/2017

Approved: PK

Scale: 1:25

Samples and Tests				Description of Strata	Legend	Depth & (Thickness) (m)	Casing (m)	Ground-water	Installation
Depth (m)	Type	Sample Ref	SPT "N" Value						
0.10 - 0.20	D	T19		Brown sandy clayey ploughed TOPSOIL (TOPSOIL)		(0.30)			
				Firm to stiff light brown and grey silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		0.30			
1.00 - 1.45	S		7			(0.90)			
				Firm to stiff brown-grey sandy SILT (UNDIFFERENTIATED DRIFT DEPOSITS)		1.20	1.00		
				...with a band of damp very silty sand between 1.70m and 1.80m		(0.70)			
2.00 - 2.45	S		8	Firm to stiff dark grey silty CLAY (UNDIFFERENTIATED DRIFT DEPOSITS)		1.90			
3.00 - 3.45	S		10	...becoming wet below approximately 4.00m		(3.10)			
4.00 - 4.45	S		18	...becoming very silty with depth					
5.00 - 5.45	S		9	End of Borehole at 5.00m		5.00			

Remarks

1.Sides generally stable. Borehole cased to 1.00m as a precautionary measure.
2.Water encountered at approximately 4.00m.
3.Plain pipe installed from ground level to 1.00m with a bentonite surround. Slotted pipe installed from 1.00m to 5.00m with a gravel surround.
4.Bung, valve and lockable cover installed.

Key

D = Disturbed Sample
U = Undisturbed Sample
B = Bulk Sample
J = Jar Sample
V = Vial Sample
W = Water Sample

S = Standard Penetration Test (Split Spoon)
C = Standard Penetration Test (Cone)
 = Water Strike (m)
 = Steady Water Level (m)

Project: Hinckley West

Client: Bloor Homes Midlands

Logged: PK

Checked: SS

Field Book Ref: PK2017/01

Plant: Competitor Rig

Drawing Ref: WS18

Date: 27/04/2017

Approved: PK

Scale: 1:25

APPENDIX VI

Ground Gas & Water Monitoring Results



Project No.	D36147
Client	Bloor Homes Midlands
Site Location	Hinckley West
Date	04/05/2017
Weather	Sunny
Atmospheric Pressure (mb)	1007
Equipment	GA2000 (GEO 11=Derby) & Dipmeter
Operator	PK

MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665								
Borehole No.	Peak Steady	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Gas Flow (l/h)	Depth to Groundwater (mbgl)	Time to steady reading (secs)	Other Issues i.e. odour, condition of installation, etc
WS1	Peak	0.0	0.2	20.5	0.0	1.11	10	Monitored for 120 Seconds
	Steady	0.0	0.2	20.5	0.0			
WS5	Peak	0.0	0.6	20.1	0.0	0.97	15	Monitored for 120 Seconds
	Steady	0.0	0.6	20.1	0.0			
WS6	Peak	0.0	0.5	20.1	0.0	NGW	15	Monitored for 120 Seconds
	Steady	0.0	0.5	20.1	0.0			
WS8	Peak	0.0	0.8	19.7	0.0	NGW	20	Monitored for 120 Seconds
	Steady	0.0	0.8	19.7	0.0			
WS11	Peak	0.0	1.1	19.6	0.0	3.26	25	Monitored for 120 Seconds
	Steady	0.0	1.1	19.6	0.0			
WS13	Peak	0.0	0.6	20.0	0.0	2.95	15	Monitored for 120 Seconds
	Steady	0.0	0.6	20.0	0.0			
WS17	Peak	0.0	0.1	20.0	0.0	1.90	15	Monitored for 120 Seconds
	Steady	0.0	0.1	20.0	0.0			
WS18	Peak	0.0	0.0	20.8	0.0	0.74	NA	Monitored for 120 Seconds
	Steady	0.0	0.0	20.8	0.0			
Ambient		0.0	0.0	20.8	NA	NA	NA	

Notes

- Cell is highlighted in the following conditions
- Where Methane exceeds 1% v/v (after BR212)
 - Where Carbon Dioxide exceeds 5% v/v (after BR212)

Key

- NA - Not Applicable/ Not Available
 BOH - Bottom of Hole
 ND - Not Determined
 NGW - No groundwater encountered



Project No.	D36147
Client	Bloor Homes Midlands
Site Location	Hinckley West
Date	11/05/2017
Weather	Sunny & Warm
Atmospheric Pressure (mb)	981
Equipment	GA2000 (GEO 11=Derby) & Dipmeter
Operator	SS

MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665								
Borehole No.	Peak Steady	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Gas Flow (l/h)	Depth to Groundwater (mbgl)	Time to steady reading (secs)	Other Issues i.e. odour, condition of installation, etc
WS1	Peak	0.0	0.2	20.0	0.0	1.12	15	Monitored for 120 Seconds
	Steady	0.0	0.2	20.0	0.0			
WS5	Peak	0.0	0.4	19.7	0.0	0.88	20	Monitored for 120 Seconds
	Steady	0.0	0.4	19.7	0.0			
WS6	Peak	0.0	0.6	19.6	0.0	4.21	25	Monitored for 120 Seconds
	Steady	0.0	0.6	19.6	0.0			
WS8	Peak	0.0	0.8	19.4	0.0	NGW	30	Monitored for 120 Seconds
	Steady	0.0	0.8	19.4	0.0			
WS11	Peak	0.0	0.9	19.2	0.0	2.15	30	Monitored for 120 Seconds
	Steady	0.0	0.9	19.2	0.0			
WS13	Peak	0.0	0.4	19.6	0.0	1.29	25	Monitored for 120 Seconds
	Steady	0.0	0.4	19.6	0.0			
WS17	Peak	0.0	0.2	19.8	0.0	1.92	20	Monitored for 120 Seconds
	Steady	0.0	0.2	19.8	0.0			
WS18	Peak	0.0	0.0	20.7	0.0	0.71	NA	Monitored for 120 Seconds
	Steady	0.0	0.0	20.7	0.0			
Ambient		0.0	0.0	20.7	NA	NA	NA	

Notes

- Cell is highlighted in the following conditions
- Where Methane exceeds 1% v/v (after BR212)
 - Where Carbon Dioxide exceeds 5% v/v (after BR212)

Key

- NA - Not Applicable/ Not Available
 BOH - Bottom of Hole
 ND - Not Determined
 NGW - No groundwater encountered



Project No.	D36147
Client	Bloor Homes Midlands
Site Location	Hinckley West
Date	15/05/2017
Weather	Overcast & Drizzle
Atmospheric Pressure (mb)	1004
Equipment	GA2000 (GEO 11=Derby) & Dipmeter
Operator	SS

MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665								
Borehole No.	Peak Steady	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Gas Flow (l/h)	Depth to Groundwater (mbgl)	Time to steady reading (secs)	Other Issues i.e. odour, condition of installation, etc
WS1	Peak	0.0	0.3	20.4	0.0	1.23	20	Monitored for 120 Seconds
	Steady	0.0	0.3	20.4	0.0			
WS5	Peak	0.0	0.3	20.4	0.0	0.93	25	Monitored for 120 Seconds
	Steady	0.0	0.3	20.4	0.0			
WS6	Peak	0.0	0.6	20.2	0.0	4.03	30	Monitored for 120 Seconds
	Steady	0.0	0.6	20.2	0.0			
WS8	Peak	0.0	0.9	19.9	0.0	NGW	35	Monitored for 120 Seconds
	Steady	0.0	0.9	19.9	0.0			
WS11	Peak	0.0	0.8	20.0	0.0	1.88	25	Monitored for 120 Seconds
	Steady	0.0	0.8	20.0	0.0			
WS13	Peak	0.0	0.2	20.5	0.0	1.08	25	Monitored for 120 Seconds
	Steady	0.0	0.2	20.5	0.0			
WS17	Peak	0.0	0.3	20.5	0.0	2.01	15	Monitored for 120 Seconds
	Steady	0.0	0.3	20.5	0.0			
WS18	Peak	0.0	0.0	20.9	0.0	0.77	NA	Monitored for 120 Seconds
	Steady	0.0	0.0	20.9	0.0			
Ambient		0.0	0.0	20.9	NA	NA	NA	

Notes

- Cell is highlighted in the following conditions
- Where Methane exceeds 1% v/v (after BR212)
 - Where Carbon Dioxide exceeds 5% v/v (after BR212)

Key

- NA - Not Applicable/ Not Available
 BOH - Bottom of Hole
 ND - Not Determined
 NGW - No groundwater encountered



Project No.	D36147
Client	Bloor Homes Midlands
Site Location	Hinckley West
Date	26/05/2017
Weather	Sunny & Warm
Atmospheric Pressure (mb)	1007 rising to 1009
Equipment	GA2000 (GEO 11=Derby) & Dipmeter
Operator	BP

MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665								
Borehole No.	Peak Steady	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Gas Flow (l/h)	Depth to Groundwater (mbgl)	Time to steady reading (secs)	Other Issues i.e. odour, condition of installation, etc
WS1	Peak	0.0	0.3	20.0	0.0	0.99	20	Monitored for 120 Seconds
	Steady	0.0	0.3	20.0	0.0			
WS5	Peak	0.0	0.1	20.1	0.0	0.86	20	Monitored for 120 Seconds
	Steady	0.0	0.1	20.1	0.0			
WS6	Peak	0.0	0.5	19.8	0.0	3.29	30	Monitored for 120 Seconds
	Steady	0.0	0.5	19.8	0.0			
WS8	Peak	0.0	0.9	19.4	0.0	4.50	20	Monitored for 120 Seconds
	Steady	0.0	0.9	19.4	0.0			
WS11	Peak	0.0	0.1	20.5	0.0	1.11	15	Monitored for 120 Seconds
	Steady	0.0	0.1	20.5	0.0			
WS13	Peak	0.0	0.0	20.2	0.0	0.73	30	Monitored for 120 Seconds
	Steady	0.0	0.0	20.2	0.0			
WS17	Peak	0.0	0.2	20.0	0.0	1.80	55	Monitored for 120 Seconds
	Steady	0.0	0.2	20.1	0.0			
WS18	Peak	0.0	0.0	20.4	0.0	0.72	25	Monitored for 120 Seconds
	Steady	0.0	0.0	20.4	0.0			
Ambient		0.0	0.0	20.8	NA	NA	NA	

Notes

- Cell is highlighted in the following conditions
- Where Methane exceeds 1% v/v (after BR212)
 - Where Carbon Dioxide exceeds 5% v/v (after BR212)

Key

- NA - Not Applicable/ Not Available
 BOH - Bottom of Hole
 ND - Not Determined
 NGW - No groundwater encountered



Project No.	D36147
Client	Bloor Homes Midlands
Site Location	Hinckley West
Date	01/06/2017
Weather	Cloudy
Atmospheric Pressure (mb)	1007
Equipment	GA2000 (GEO 11=Derby) & Dipmeter
Operator	BP

MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665								
Borehole No.	Peak Steady	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Gas Flow (l/h)	Depth to Groundwater (mbgl)	Time to steady reading (secs)	Other Issues i.e. odour, condition of installation, etc
WS1	Peak	0.0	0.4	20.2	0.0	1.05	20	Monitored for 120 Seconds
	Steady	0.0	0.4	20.2	0.0			
WS5	Peak	0.0	0.0	20.6	0.0	0.86	10	Monitored for 120 Seconds
	Steady	0.0	0.0	20.6	0.0			
WS6	Peak	0.0	0.6	20.1	0.0	2.76	20	Monitored for 120 Seconds
	Steady	0.0	0.6	20.1	0.0			
WS8	Peak	0.0	0.9	19.5	0.0	4.36	15	Monitored for 120 Seconds
	Steady	0.0	0.9	19.5	0.0			
WS11	Peak	0.0	0.1	20.5	0.0	0.96	25	Monitored for 120 Seconds
	Steady	0.0	0.1	20.5	0.0			
WS13	Peak	0.0	0.0	20.2	0.0	0.79	20	Monitored for 120 Seconds
	Steady	0.0	0.0	20.2	0.0			
WS17	Peak	0.0	0.3	19.9	0.0	1.84	30	Monitored for 120 Seconds
	Steady	0.0	0.3	19.9	0.0			
WS18	Peak	0.0	0.0	20.4	0.0	0.62	30	Monitored for 120 Seconds
	Steady	0.0	0.0	20.4	0.0			
Ambient		0.0	0.0	20.8	NA	NA	NA	

Notes

- Cell is highlighted in the following conditions
- Where Methane exceeds 1% v/v (after BR212)
 - Where Carbon Dioxide exceeds 5% v/v (after BR212)

Key

- NA - Not Applicable/ Not Available
 BOH - Bottom of Hole
 ND - Not Determined
 NGW - No groundwater encountered



Project No.	D36147
Client	Bloor Homes Midlands
Site Location	Hinckley West
Date	05/06/2017
Weather	Light Rain
Atmospheric Pressure (mb)	992
Equipment	GA2000 (GEO 11=Derby) & Dipmeter
Operator	BP

MONITORING OF SOIL GASES AND GROUNDWATER - IN ACCORDANCE WITH CIRIA C665								
Borehole No.	Peak Steady	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Gas Flow (l/h)	Depth to Groundwater (mbgl)	Time to steady reading (secs)	Other Issues i.e. odour, condition of installation, etc
WS1	Peak	0.0	0.5	20.4	0.0	0.99	25	Monitored for 120 Seconds
	Steady	0.0	0.5	20.4	0.0			
WS5	Peak	0.0	0.0	21.0	0.0	0.80	15	Monitored for 120 Seconds
	Steady	0.0	0.0	21.0	0.0			
WS6	Peak	0.0	0.7	20.6	0.0	2.47	65	Monitored for 120 Seconds
	Steady	0.0	0.7	20.7	0.0			
WS8	Peak	0.0	1.1	20.1	0.0	4.25	40	Monitored for 120 Seconds
	Steady	0.0	1.1	20.1	0.0			
WS11	Peak	0.0	0.1	20.9	0.0	0.83	25	Monitored for 120 Seconds
	Steady	0.0	0.1	20.9	0.0			
WS13	Peak	0.0	0.0	21.0	0.0	0.75	10	Monitored for 120 Seconds
	Steady	0.0	0.0	21.0	0.0			
WS17	Peak	0.0	0.4	20.2	0.0	1.81	30	Monitored for 120 Seconds
	Steady	0.0	0.4	20.2	0.0			
WS18	Peak	0.0	0.0	20.9	0.0	0.57	20	Monitored for 120 Seconds
	Steady	0.0	0.0	20.9	0.0			
Ambient		0.0	0.0	21.1	NA	NA	NA	

Notes

- Cell is highlighted in the following conditions
- Where Methane exceeds 1% v/v (after BR212)
 - Where Carbon Dioxide exceeds 5% v/v (after BR212)

Key

- NA - Not Applicable/ Not Available
 BOH - Bottom of Hole
 ND - Not Determined
 NGW - No groundwater encountered

APPENDIX VII

Laboratory Soil Test Results



LABORATORY REPORT REPORT



4043

Contract Number: PSL17/2097

Report Date: 23 May 2017
Client's Reference: D36147
Client Name: Geodyne
9 Brunel Parkway
Pride Park
Derby
DE24 8HR

For the attention of: Steve Sellars

Contract Title: Hinckley West - 1
Date Received: 5/5/2017
Date Commenced: 5/5/2017
Date Completed: 23/5/2017

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

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(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)

C Marshall
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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP1	B1		0.75		Brown slightly gravelly CLAY.
TP3	B2		1.50		Brown sandy CLAY.
TP5	B3		2.25		Brown CLAY.
TP7	B4		2.00		Brown very silty SAND.
TP9	B5		1.75		Brown CLAY.
TP10	B6		1.25		Dark brown slightly sandy very silty CLAY.
TP12	B7		2.35		Brown slightly clayey very silty SAND.
TP14	B8		1.70		Brown mottled grey CLAY.
TP16	B9		0.90		Brown very gravelly very sandy CLAY.
TP18	B10		1.30		Brown SILT.
TP20	B11		2.30		Dark brown slightly sandy very silty CLAY.
TP22	B12		0.90		Brown CLAY.
TP24	B13		1.40		Brown CLAY.
TP25	B14		1.90		Brown very clayey very silty SAND.
TP28	B15		2.40		Brown CLAY.
TP30	B16		1.45		Brown mottled grey sandy very silty CLAY.
TP32	B17		1.95		Brown CLAY.
TP34	B18		2.45		Brown slightly sandy CLAY.



Hinckley West

Contract No:

PSL17/2097

Client Ref:

D36147

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP1	B1		0.75		23			70	28	42	97	High plasticity CH.
TP3	B2		1.50		27			58	22	36	100	High plasticity CH.
TP5	B3		2.25		28			61	24	37	100	High plasticity CH.
TP9	B5		1.75		26			58	24	34	100	High plasticity CH.
TP12	B7		2.35		26				NP			
TP14	B8		1.70		24			56	22	34	100	High plasticity CH.
TP18	B10		1.30		25				NP			
TP22	B12		0.90		32			48	22	26	100	Intermediate plasticity CI.
TP24	B13		1.40		30			49	22	27	100	Intermediate plasticity CI.
TP28	B15		2.40		28			54	24	30	100	High plasticity CH.
TP32	B17		1.95		27			54	23	31	100	High plasticity CH.
TP34	B18		2.45		30			56	25	31	100	High plasticity CH.

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.



Hinckley West

Contract No:

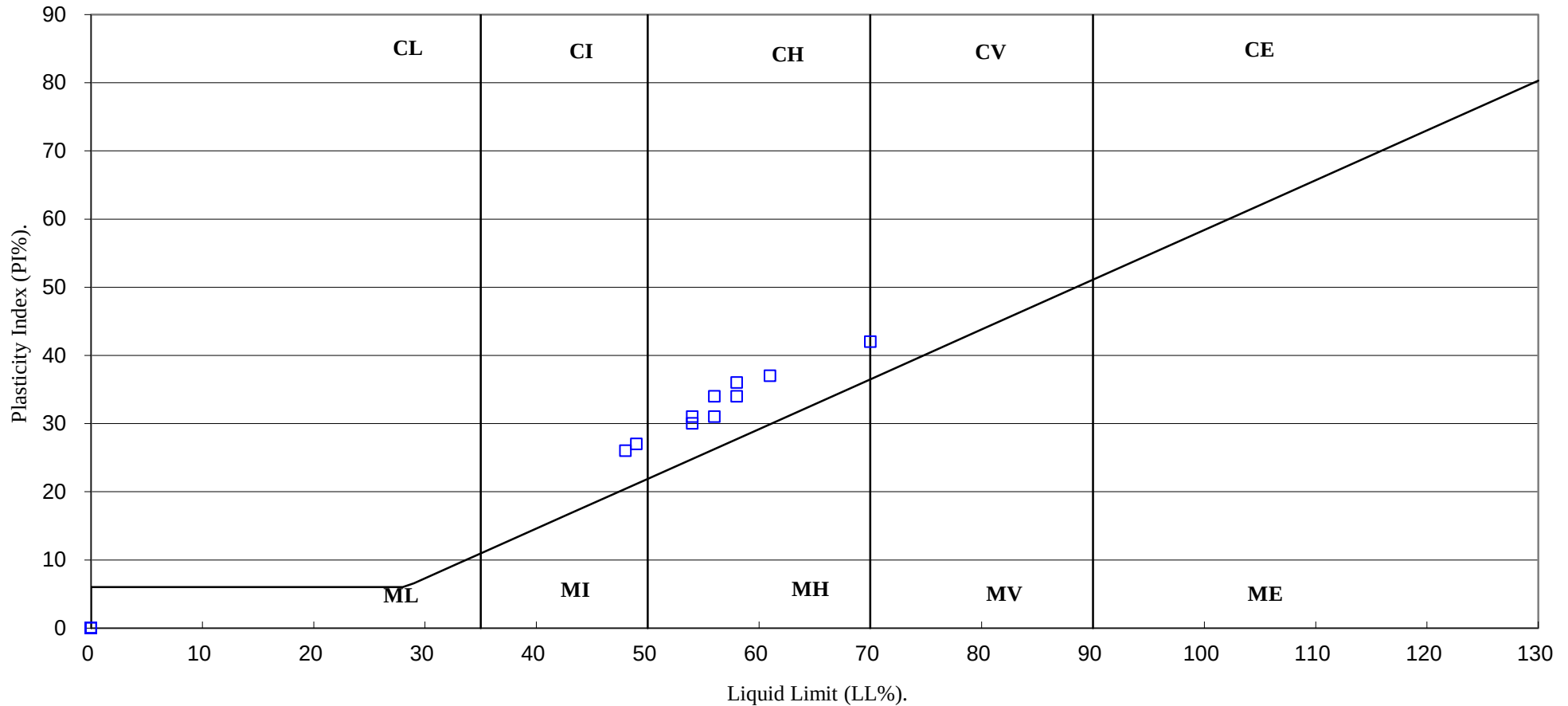
PSL17/2097

Client Ref:

D36147

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



PSL
Professional Soils Laboratory

Hinckley West

Contract No:

PSL17/2097

Client Ref:

D36147

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

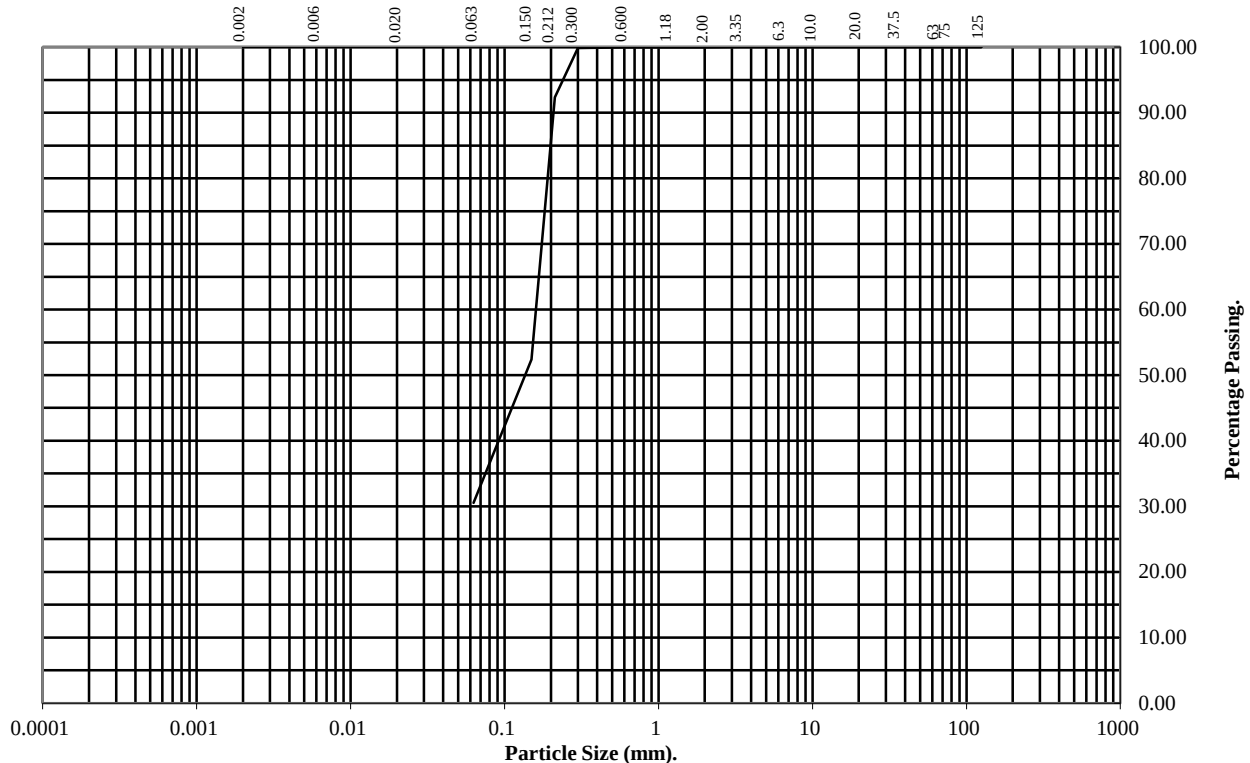
Hole Number: TP7

Top Depth (m): 2.00

Sample Number: B4

Base Depth(m):

Sample Type:



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	92
0.15	52
0.063	31

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	69
Silt/Clay	31

Remarks:

See summary of soil descriptions.



Hinckley West

Contract No:
PSL17/2097
Client Ref:
D36147

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

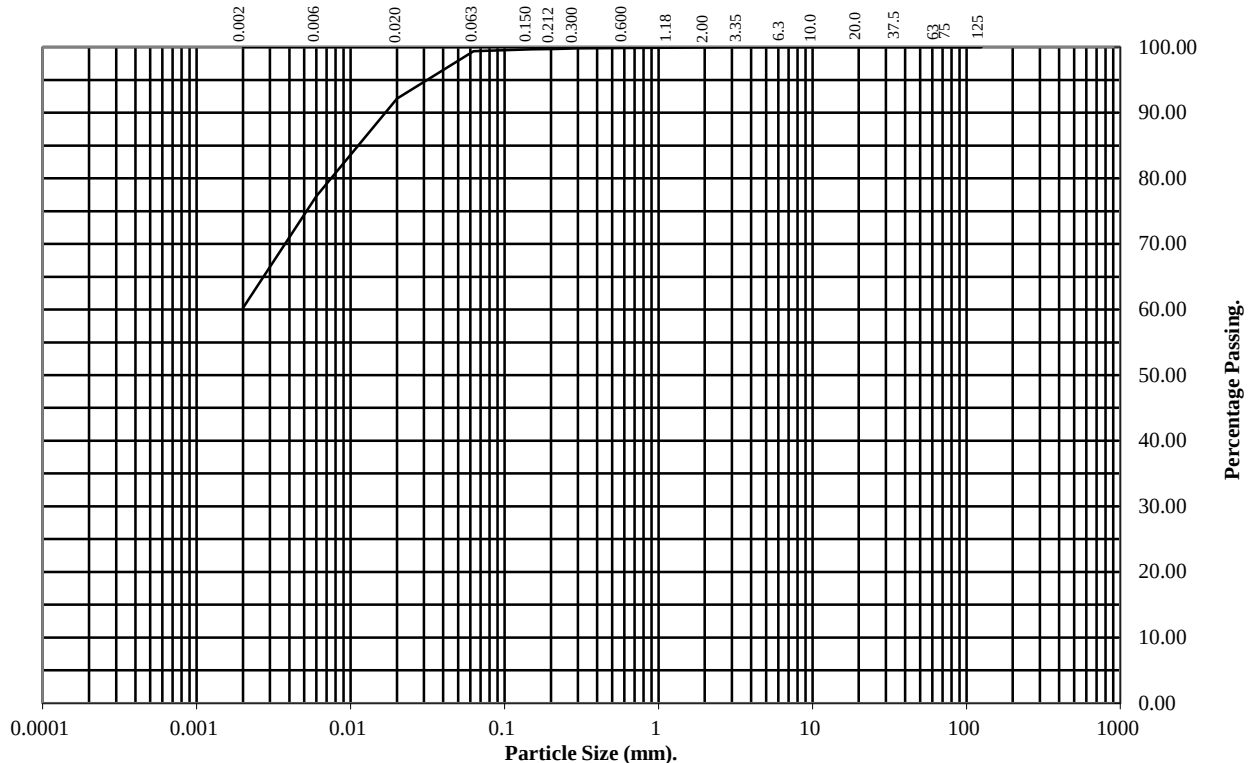
Hole Number: TP10

Top Depth (m): 1.25

Sample Number: B6

Base Depth(m):

Sample Type:



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	100
0.15	100
0.063	99

Particle Diameter	Percentage Passing
0.02	92
0.006	77
0.002	60

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	1
Silt	39
Clay	60

Remarks:

See summary of soil descriptions.



Hinckley West

Contract No:
PSL17/2097
Client Ref:
D36147

PARTICLE SIZE DISTRIBUTION TEST

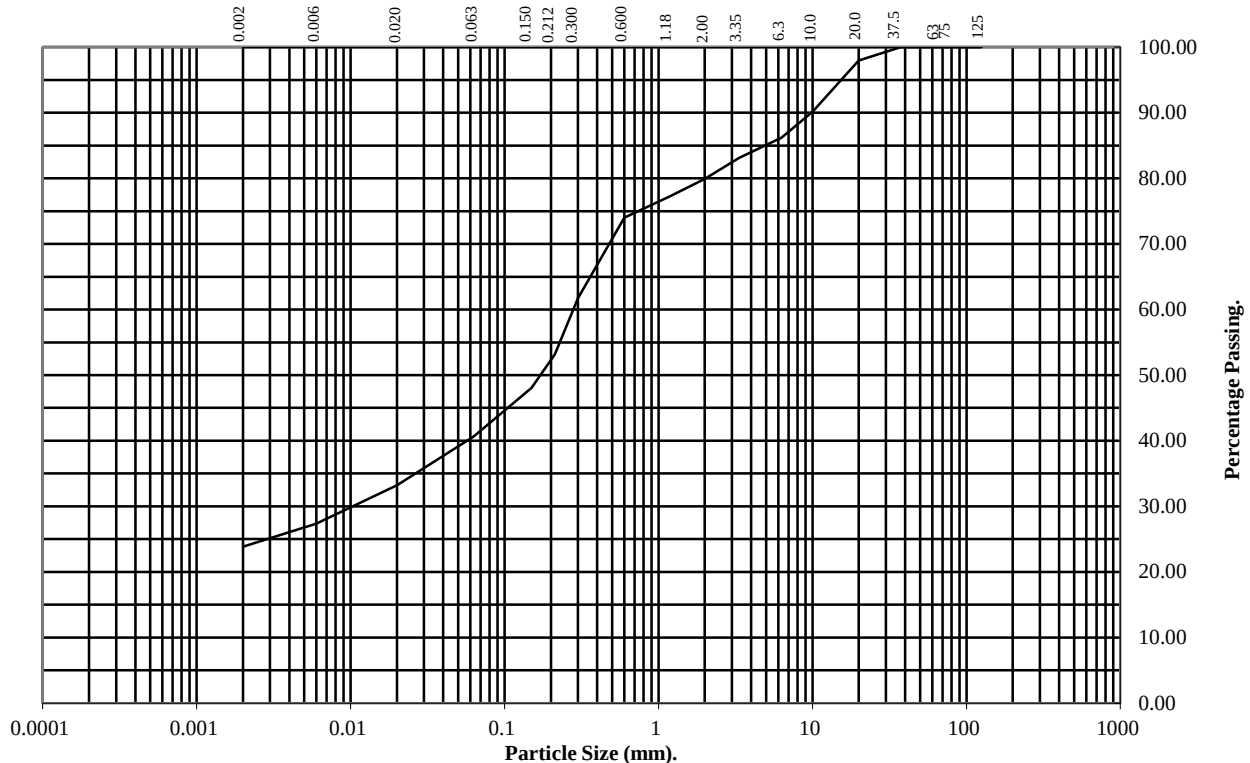
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP16 Top Depth (m): 0.90

Sample Number: B9 Base Depth(m):

Sample Type:



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	98
10	90
6.3	86
3.35	83
2	80
1.18	77
0.6	74
0.3	62
0.212	53
0.15	48
0.063	41

Particle Diameter	Percentage Passing
0.02	33
0.006	27
0.002	24

Soil Fraction	Total Percentage
Cobbles	0
Gravel	20
Sand	39
Silt	17
Clay	24

Remarks:

See summary of soil descriptions.



Hinckley West

Contract No:
PSL17/2097
Client Ref:
D36147

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

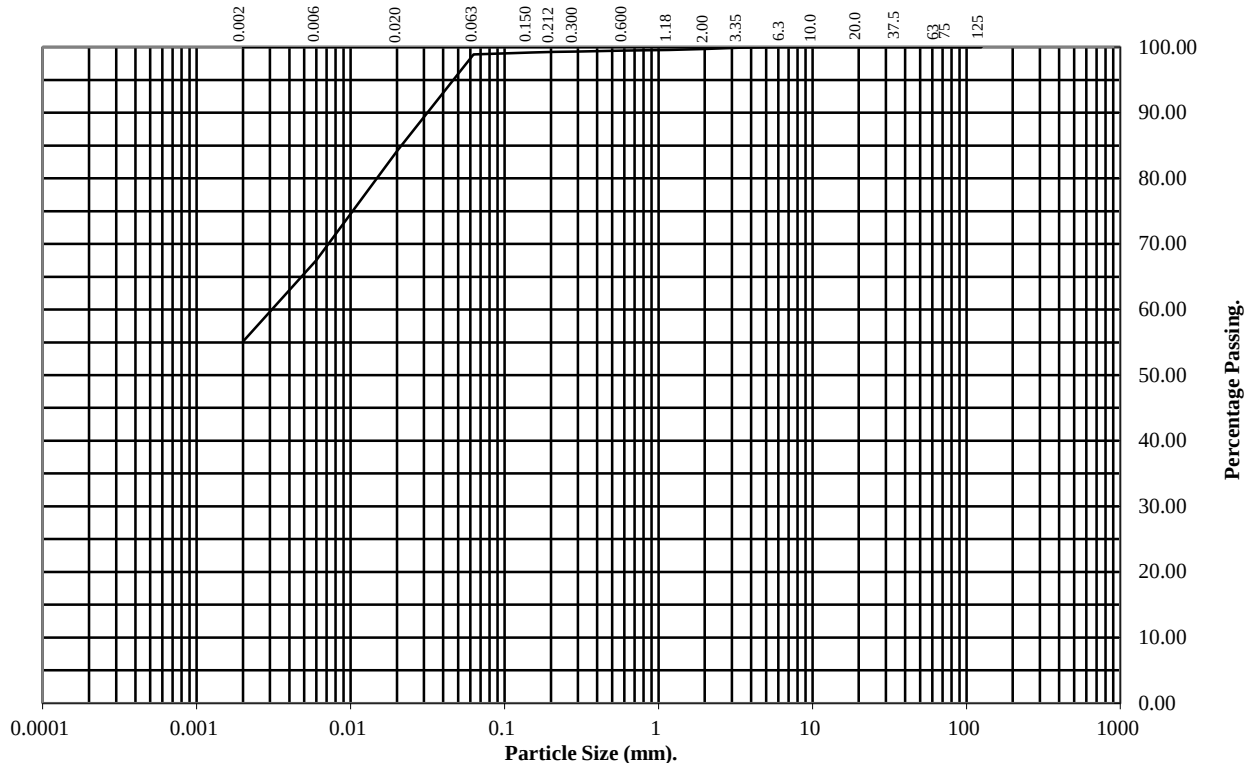
Hole Number: TP20

Top Depth (m): 2.30

Sample Number: B11

Base Depth(m):

Sample Type:



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	99
0.212	99
0.15	99
0.063	99

Particle Diameter	Percentage Passing
0.02	84
0.006	68
0.002	55

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	1
Silt	44
Clay	55

Remarks:

See summary of soil descriptions.



Hinckley West

Contract No:
PSL17/2097
Client Ref:
D36147

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

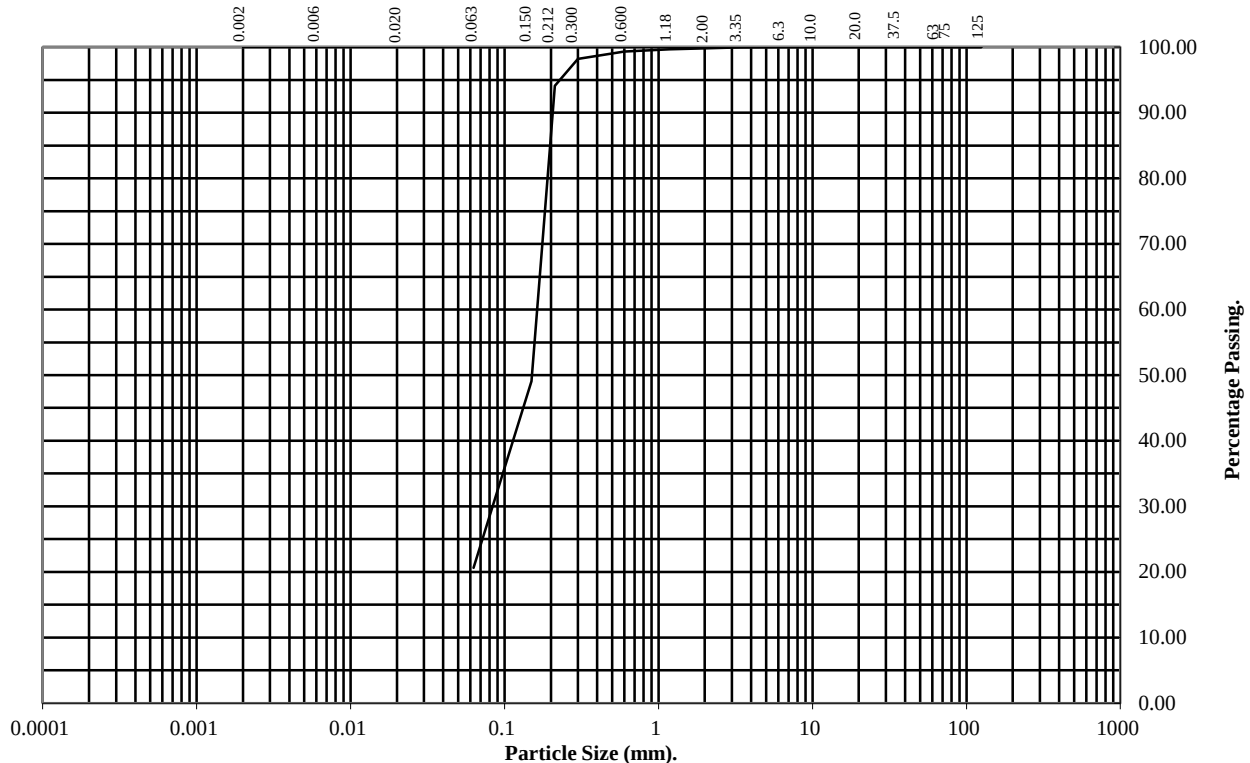
Hole Number: TP25

Top Depth (m): 1.90

Sample Number: B14

Base Depth(m):

Sample Type:



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	98
0.212	94
0.15	49
0.063	21

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	79
Silt/Clay	21

Remarks:

See summary of soil descriptions.



Hinckley West

Contract No:
PSL17/2097
Client Ref:
D36147

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

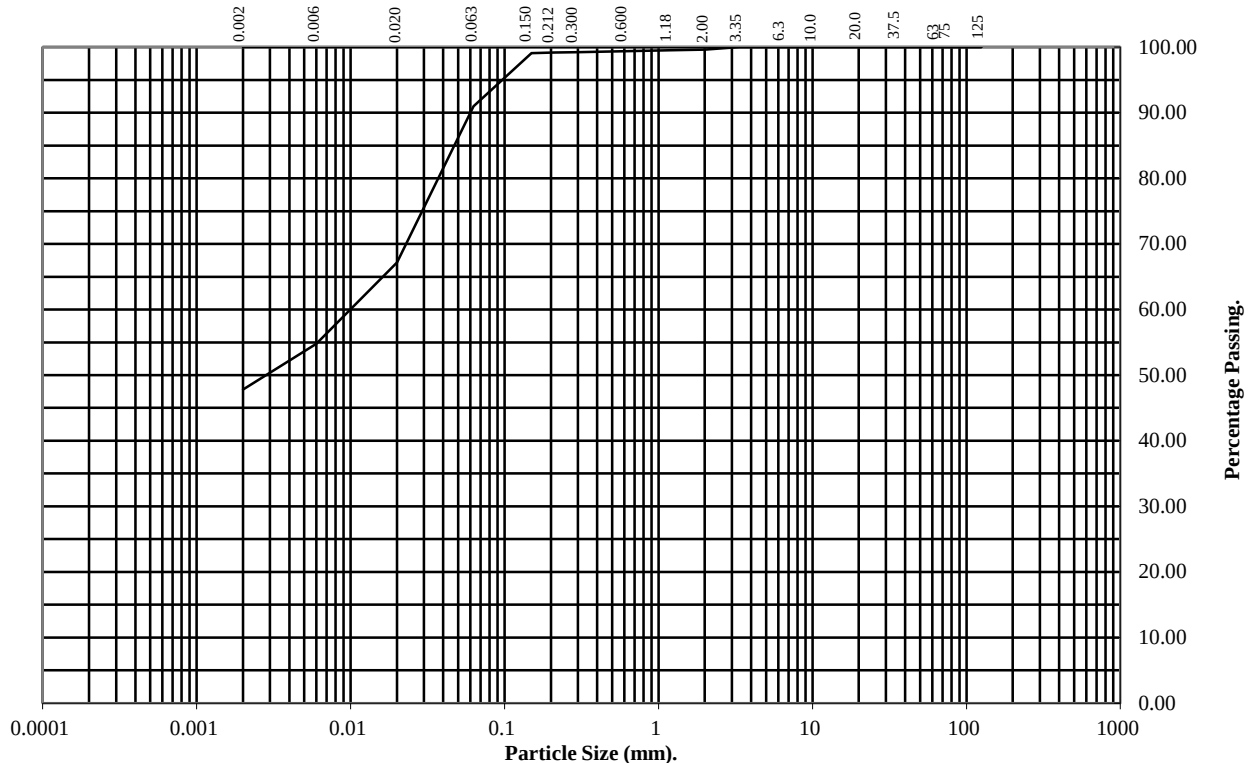
Hole Number: TP30

Top Depth (m): 1.45

Sample Number: B16

Base Depth(m):

Sample Type:



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	99
0.212	99
0.15	99
0.063	91

Particle Diameter	Percentage Passing
0.02	67
0.006	55
0.002	48

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	9
Silt	43
Clay	48

Remarks:

See summary of soil descriptions.



Hinckley West

Contract No:
PSL17/2097
Client Ref:
D36147

Concept Life Sciences

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 651846-1

Date of Report: 15-May-2017

Customer: Geodyne Ltd
9 Brunel Parkway
Pride Park
Derby
DE24 8HR

Customer Contact: Mr Steve Sellers

Customer Job Reference: D36147

Customer Purchase Order: D36147

Customer Site Reference: Hinckley West

Date Job Received at Concept: 28-Apr-2017

Date Analysis Started: 09-May-2017

Date Analysis Completed: 15-May-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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Tests covered by this certificate were conducted in accordance with Concept SOPs



Report checked
and authorised by :
Aleksandra Pacula
Project Manager

Issued by :
Aleksandra Pacula
Project Manager



Concept Reference: 651846									
Project Site: Hinckley West									
Customer Reference: D36147									
Soil					Analysed as Soil				
MCERTS Preparation									
Concept Reference					651846 002	651846 003	651846 005	651846 010	651846 011
Customer Sample Reference					TP1 T2	TP2 T3	TP3 T5	TP10 T10	TP11 T11
Bottom Depth					0.50	0.20	0.25	0.40	0.05
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Clay	Topsoil	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	24	27	22	19	22
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846									
Project Site: Hinckley West									
Customer Reference: D36147									
Soil					Analysed as Soil				
MCERTS Preparation									
Concept Reference					651846 015	651846 018	651846 021	651846 024	651846 027
Customer Sample Reference					TP15 T15	TP18 T18	TP21 T21	TP24 T24	TP27 T27
Bottom Depth					0.30	0.50	0.30	0.35	0.25
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Clay	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	15	19	20	19	15
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846									
Project Site: Hinckley West									
Customer Reference: D36147									
Soil					Analysed as Soil				
MCERTS Preparation									
Concept Reference					651846 028	651846 032	651846 035	651846 036	651846 039
Customer Sample Reference					TP28 T28	TP32 T32	TP35 T35	TP36 T36	TP39 T39
Bottom Depth					0.45	0.55	0.15	0.45	0.15
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Clay	Clay	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	23	11	14	20	19
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846									
Project Site: Hinckley West									
Customer Reference: D36147									
Soil					Analysed as Soil				
MCERTS Preparation									
Concept Reference					651846 042	651846 043	651846 046	651846 047	651846 050
Customer Sample Reference					TP42 T42	TP43 T43	TP46 T46	TP47 T47	TP50 T50
Bottom Depth					0.45	0.05	0.50	0.25	0.35
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Clay	Topsoil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	31	29	27	17	19
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147									
Soil					Analysed as Soil				
MCERTS Preparation									
Concept Reference					651846 053	651846 057	651846 058	651846 061	651846 062
Customer Sample Reference					TP53 T53	TP57 T57	TP58 T58	TP61 T61	TP62 T62
Bottom Depth					0.30	0.25	0.40	0.15	0.35
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Topsoil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	24	29	6.3	26	22
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147									
Soil		Analysed as Soil							
MCERTS Preparation									
Concept Reference					651846 065	651846 066	651846 068	651846 069	651846 070
Customer Sample Reference					TP65 T65	TP66 T66	TP68 T68	TP69 T69	TP70 T70
Bottom Depth					0.20	0.60	0.50	0.20	1.10
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Clay	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	16	14	19	16	17
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147									
Soil		Analysed as Soil							
Geodyne Suite 1									
Concept Reference					651846 002	651846 003	651846 005	651846 010	651846 011
Customer Sample Reference					TP1 T2	TP2 T3	TP3 T5	TP10 T10	TP11 T11
Bottom Depth					0.50	0.20	0.25	0.40	0.05
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Clay	Topsoil	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
pH	T7	AR			7.4	7.1	7.2	7.2	7.2
Arsenic	T6	M40	2	mg/kg	19	12	12	14	12
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	50	47	36	40	33
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Copper	T6	M40	1	mg/kg	29	17	17	22	17
Lead	T6	M40	1	mg/kg	24	28	35	18	30
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	M40	1	mg/kg	53	27	24	41	24
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	72	82	67	64	63
Total Organic Carbon	T21	A40	0.1	%	0.6	1.8	0.7	1.6	1.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147 Soil Analysed as Soil Geodyne Suite 1									
Concept Reference					651846 015	651846 018	651846 021	651846 024	651846 027
Customer Sample Reference					TP15 T15	TP18 T18	TP21 T21	TP24 T24	TP27 T27
Bottom Depth					0.30	0.50	0.30	0.35	0.25
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Clay	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
pH	T7	AR			6.6	7.4	7.5	6.5	6.9
Arsenic	T6	M40	2	mg/kg	9	14	11	14	10
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	19	34	34	31	30
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Copper	T6	M40	1	mg/kg	15	23	14	17	14
Lead	T6	M40	1	mg/kg	25	18	31	14	28
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	M40	1	mg/kg	14	37	18	27	17
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	55	67	60	49	52
Total Organic Carbon	T21	A40	0.1	%	0.8	1.8	0.4	1.6	0.5

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147 Soil Analysed as Soil Geodyne Suite 1									
Concept Reference					651846 028	651846 032	651846 035	651846 036	651846 039
Customer Sample Reference					TP28 T28	TP32 T32	TP35 T35	TP36 T36	TP39 T39
Bottom Depth					0.45	0.55	0.15	0.45	0.15
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Clay	Clay	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
pH	T7	AR			7.5	7.3	6.8	6.9	6.8
Arsenic	T6	M40	2	mg/kg	14	13	16	18	10
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	44	28	19	28	29
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Copper	T6	M40	1	mg/kg	21	14	13	16	13
Lead	T6	M40	1	mg/kg	20	15	31	18	26
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	M40	1	mg/kg	39	26	14	27	18
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	64	52	60	56	56
Total Organic Carbon	T21	A40	0.1	%	0.6	0.3	1.5	0.6	1.3

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147
Soil GeoDyne USEPA16 PAHs
Analysed as Soil

Concept Reference					651846 002	651846 003	651846 005	651846 010	651846 011
Customer Sample Reference					TP1 T2	TP2 T3	TP3 T5	TP10 T10	TP11 T11
Bottom Depth					0.50	0.20	0.25	0.40	0.05
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Clay	Topsoil	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T99	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
PAH(total)	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147	
Soil	Analysed as Soil
GeoDyne USEPA16 PAHs	

Concept Reference					651846 015	651846 018	651846 021	651846 024	651846 027
Customer Sample Reference					TP15 T15	TP18 T18	TP21 T21	TP24 T24	TP27 T27
Bottom Depth					0.30	0.50	0.30	0.35	0.25
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Clay	Topsoil	Clay	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T99	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
PAH(total)	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147 Soil Analysed as Soil GeoDyne USEPA16 PAHs									
Concept Reference					651846 053	651846 057	651846 058	651846 061	651846 062
Customer Sample Reference					TP53 T53	TP57 T57	TP58 T58	TP61 T61	TP62 T62
Bottom Depth					0.30	0.25	0.40	0.15	0.35
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Topsoil	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T99	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
PAH(total)	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 651846 Project Site: Hinckley West Customer Reference: D36147 Soil Analysed as Soil GeoDyne USEPA16 PAHs									
Concept Reference					651846 065	651846 066	651846 068	651846 069	651846 070
Customer Sample Reference					TP65 T65	TP66 T66	TP68 T68	TP69 T69	TP70 T70
Bottom Depth					0.20	0.60	0.50	0.20	1.10
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Clay	Clay	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T99	M105	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
PAH(total)	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference:	651846
Project Site:	Hinckley West
Customer Reference:	D36147
Soil	Analysed as Soil
Organochlorine insecticides	

Concept Reference					651846 003	651846 009	651846 017	651846 025	651846 033
Customer Sample Reference					TP2 T3	TP9 T9	TP17 T17	TP25 T25	TP33 T33
Bottom Depth					0.20	0.20	0.10	0.10	0.05
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Topsoil	Topsoil	Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02
Hexachlorobenzene	T1	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02
Aldrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor epoxide	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02
Endosulphan	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02
DDE	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02
Dieldrin	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02	(162) <0.02
Endrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
DDD	T16	AR	0.01	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
DDT	T16	AR	0.01	mg/kg	(162) <0.05	(162) <0.05	(162) <0.05	(162) <0.05	(162) <0.05

Concept Reference: 651846	
Project Site: Hinckley West	
Customer Reference: D36147	
Soil	Analysed as Soil
Organochlorine insecticides	

Concept Reference					651846 041	651846 053	651846 067
Customer Sample Reference					TP41 T41	TP53 T53	TP67 T67
Bottom Depth					0.10	0.30	0.25
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units			
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02
Hexachlorobenzene	T1	AR	0.01	mg/kg	<0.01	<0.01	<0.01
Heptachlor	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02
Aldrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01
Heptachlor epoxide	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01
Chlordane	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02
Endosulphan	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02
DDE	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02
Dieldrin	T16	AR	0.01	mg/kg	(162) <0.02	(162) <0.02	(162) <0.02
Endrin	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01
DDD	T16	AR	0.01	mg/kg	<0.02	<0.02	<0.02
DDT	T16	AR	0.01	mg/kg	(162) <0.05	(162) <0.05	(162) <0.05

Concept Reference:	651846
Project Site:	Hinckley West
Customer Reference:	D36147
Soil	Analysed as Soil
Organophosphorous insecticides	

Soil	Analysed as Soil
Organophosphorous insecticides	

Concept Reference					651846 005	651846 013	651846 021	651846 029	651846 039
Customer Sample Reference					TP3 T5	TP13 T13	TP21 T21	TP29 T29	TP39 T39
Bottom Depth					0.25	0.15	0.30	0.15	0.15
Date Sampled					05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017	05-MAY-2017
Type					Topsoil	Topsoil	Topsoil	Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units					
Dichlorvos	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Mevinphos	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dimethoate	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Diazinon	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Pirimiphos methyl	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Malathion	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Fenitrothion	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Parathion	T16	AR	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Azinphos methyl	T16	AR	0.01	mg/ka	<0.01	<0.01	<0.01	<0.01	<0.01

	Concept Reference: 651846
	Project Site: Hinckley West
	Customer Reference: D36147
Soil	Analysed as Soil
Organophosphorous insecticides	

Soil	Analysed as Soil
Organophosphorous insecticides	

Concept Reference					651846 049	651846 061
Customer Sample Reference					TP49 T49	TP61 T61
Bottom Depth					0.25	0.15
Date Sampled					05-MAY-2017	05-MAY-2017
Type					Topsoil	Topsoil
Determinand	Method	Test Sample	LOD	Units		
Dichlorvos	T16	AR	0.01	mg/kg	<0.01	<0.01
Mevinphos	T16	AR	0.01	mg/kg	<0.01	<0.01
Dimethoate	T16	AR	0.01	mg/kg	<0.01	<0.01
Diazinon	T16	AR	0.01	mg/kg	<0.01	<0.01
Pirimiphos methyl	T16	AR	0.01	mg/kg	<0.01	<0.01
Malathion	T16	AR	0.01	mg/kg	<0.01	<0.01
Fenitrothion	T16	AR	0.01	mg/kg	<0.01	<0.01
Parathion	T16	AR	0.01	mg/kg	<0.01	<0.01
Azinphos methyl	T16	AR	0.01	mg/kg	<0.01	<0.01

Index to symbols used in 651846-1

Value	Description
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
A40	Assisted dried < 40C
AR	As Received
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
N.D.	Not Detected
162	LOD determined by matrix spike recovery
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos was subcontracted to REC Asbestos.

Method Index

Value	Description
T27	PLM
T99	GC/MS (LV)
T2	Grav
T21	OX/IR
T162	Grav (1 Dec) (105 C)
T7	Probe
T16	GC/MS
T1	GC/MS (HR)
T6	ICP/OES
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T207	GC/MS (MCERTS)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Hexachlorocyclohexane	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Hexachlorobenzene	T1	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Heptachlor	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Aldrin	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Heptachlor epoxide	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Chlordane	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Endosulphan	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
DDE	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Dieldrin	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
Endrin	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
DDD	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
DDT	T16	AR	0.01	mg/kg	U	003,009,017,025,033,041,053,067
pH	T7	AR			M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Arsenic	T6	M40	2	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Cadmium	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Chromium	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Chromium VI	T6	AR	1	mg/kg	N	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Copper	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Lead	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Mercury	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Nickel	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Selenium	T6	M40	3	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Zinc	T6	M40	1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Total Organic Carbon	T21	A40	0.1	%	N	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Naphthalene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Acenaphthylene	T207	M105	0.1	mg/kg	U	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Acenaphthene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Fluorene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Phenanthrene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Anthracene	T207	M105	0.1	mg/kg	U	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Fluoranthene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Pyrene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Chrysene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Dibenzo(ah)Anthracene	T99	M105	0.10	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
PAH(total)	T207	M105	0.1	mg/kg	U	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Moisture @105C	T162	AR	0.1	%	N	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Retained on 10mm sieve	T2	M40	0.1	%	N	002-003,005,010-011,015,018,021,024,027-028,032,035-036,039,042-043,046-047,050,053,057-058,061-062,065-066,068-070
Dichlorvos	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Mevinphos	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Dimethoate	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Diazinon	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Pirimiphos methyl	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Malathion	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Fenitrothion	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Parathion	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Azinphos methyl	T16	AR	0.01	mg/kg	U	005,013,021,029,039,049,061
Asbestos ID	T27	AR			SU	003,011,015,021,027,035,039,043,047,053,057,061,065,067,069
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	N	002,008,010,016,020,026,030,034,044,048,054,062,066,070



Concept Life Sciences

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 654269-1

Date of Report: 25-May-2017

Customer: Geodyne Ltd
9 Brunel Parkway
Pride Park
Derby
DE24 8HR

Customer Contact: Mr Steve Sellers

Customer Job Reference:

Customer Purchase Order: D36147

Customer Site Reference: Hinckley West

Date Job Received at Concept: 16-May-2017

Date Analysis Started: 17-May-2017

Date Analysis Completed: 25-May-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept SOPs



1549

Report checked
and authorised by :
Aleksandra Pacula
Project Manager

Issued by :
Aleksandra Pacula
Project Manager

A handwritten signature in black ink, appearing to read 'A Pacula'.

Value	Description
A40	Assisted dried < 40C
AR	As Received
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Nitrogen and Sand/Silt/Clay content were subcontracted to NRM.

Method Index

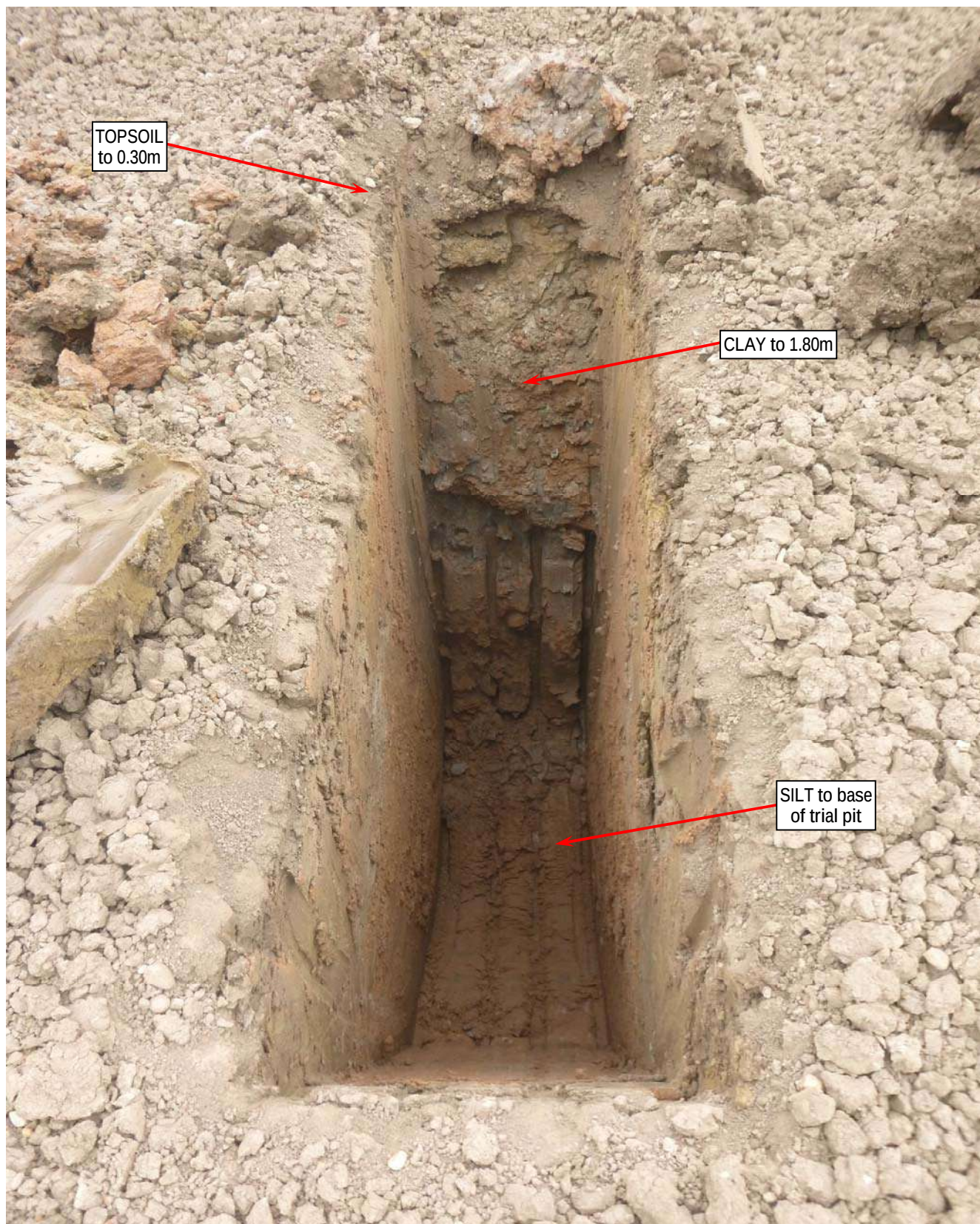
Value	Description
T161	Visual
T272	ICP/OES (Ammonium Nitrate)
T312	ICP-OES (Nitric Acid Extraction)
T22	Titration
T873	Grav (4 Dec) (Dry 125 C)(Ign 440 C)
T21	OX/IR
T7	Probe
T85	Calc
T392	ICP/OES (Sodium Hydrogen Carbonate Extract)
T2	Grav
T837	CSOP Nut007 (Dumas)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Carbon / Nitrogen ratio	T85	AR			N	001-003
Carbonate	T22	AR	0.1	%	N	001-003
Clay Content	T2	AR	1.0	%	SN	001-003
Dry density	T85	AR	0.1	g/cm3	N	001-003
Electrical Conductivity	T7	A40	10	µS/cm	N	001-003
LOI (OM) (125-440)C	T873	AR		%	N	001-003
Mg (Extractable BS 3882)	T272	AR	10	mg/l	N	001-003
Nitrogen (Total)	T837	AR	100	mg/kg	SN	001-003
pH	T7	A40			U	001-003
Extractable P	T392	AR	10	mg/l	N	001-003
K (Extractable BS 3882)	T272	AR	10	mg/l	N	001-003
Sand Content	T2	AR	1.0	%	SN	001-003
Silt Content	T2	AR	1.0	%	SN	001-003
Total Organic Carbon	T21	A40	0.1	%	N	001-003
Visible Contaminants	T161	AR	0.5	%	N	001-003
Retained on 20mm	T2	AR	0.1	%	N	001-003
Retained on 2mm	T2	AR	0.1	%	N	001-003
Retained on 50mm	T2	AR	0.1	%	N	001-003
Copper	T312	AR	1	mg/kg	N	001-003
Nickel	T312	AR	1	mg/kg	N	001-003
Zinc	T312	AR	1	mg/kg	N	001-003

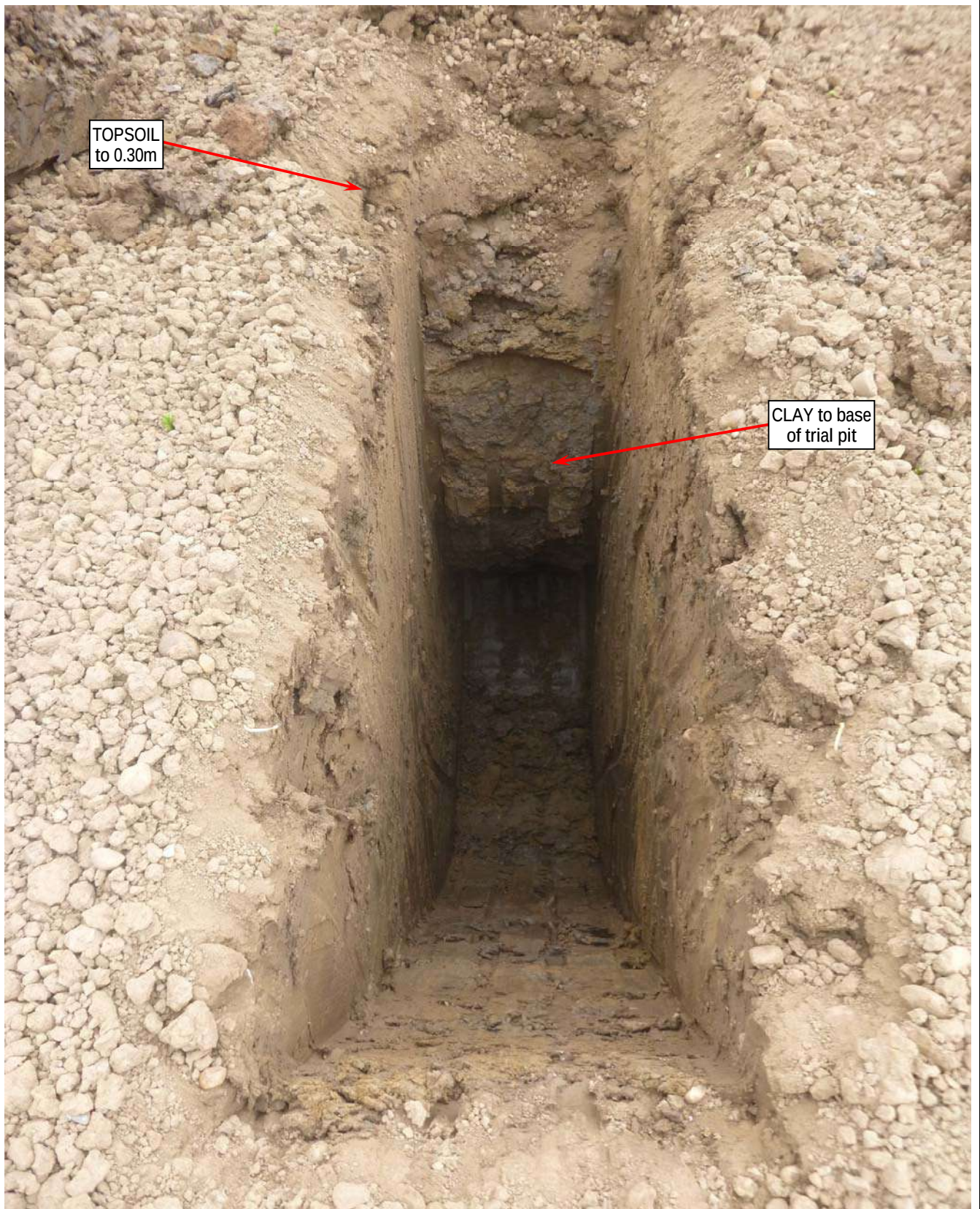
APPENDIX VIII

Plates



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
Title	Completed Excavation (TP1)	Rev.	
		Plate No.	1



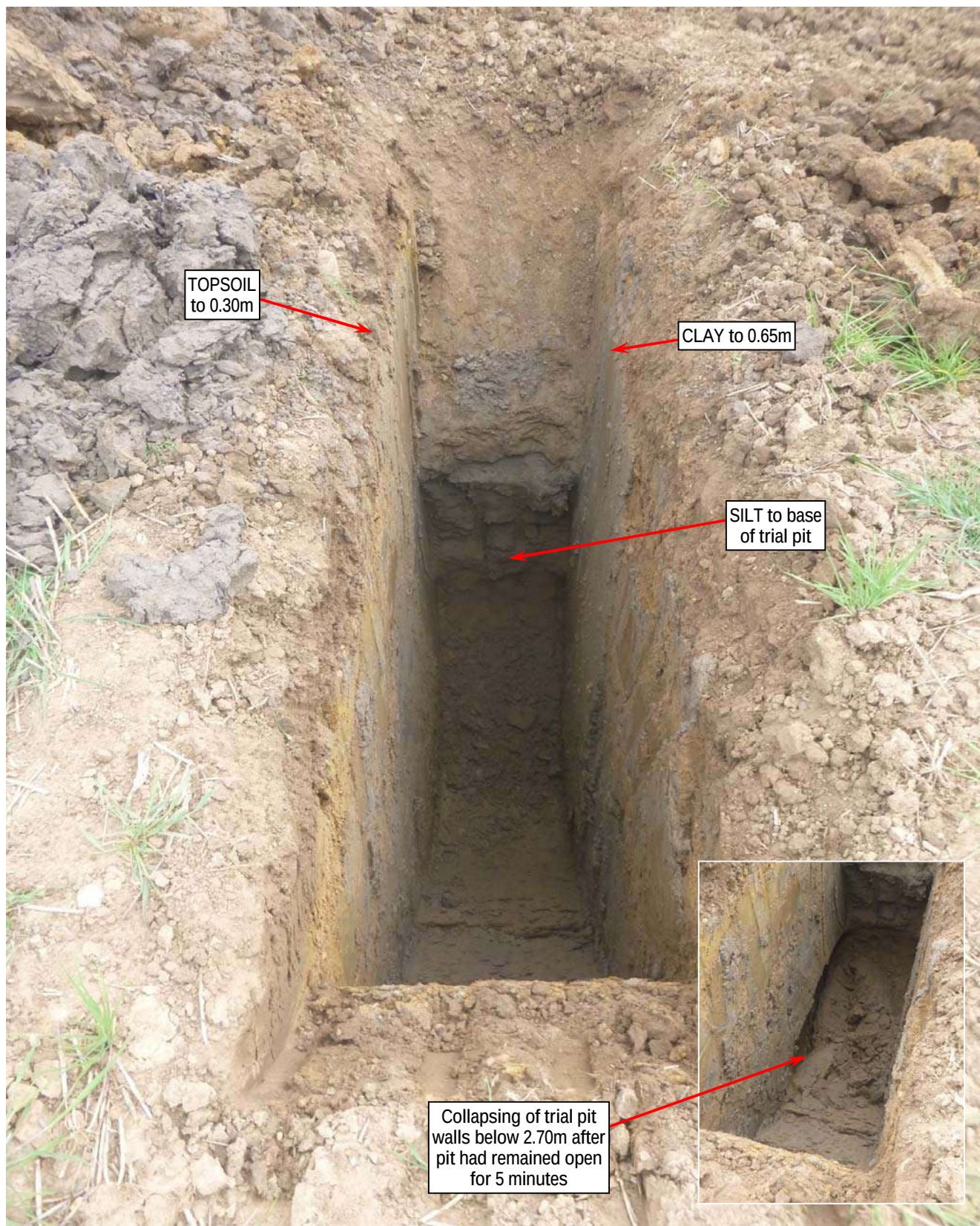


Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Completed Excavation (TP6)	Plate No.	2





Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Completed Excavation (TP15)	Plate No. 3	



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Completed Excavation (TP18)	Plate No.	4

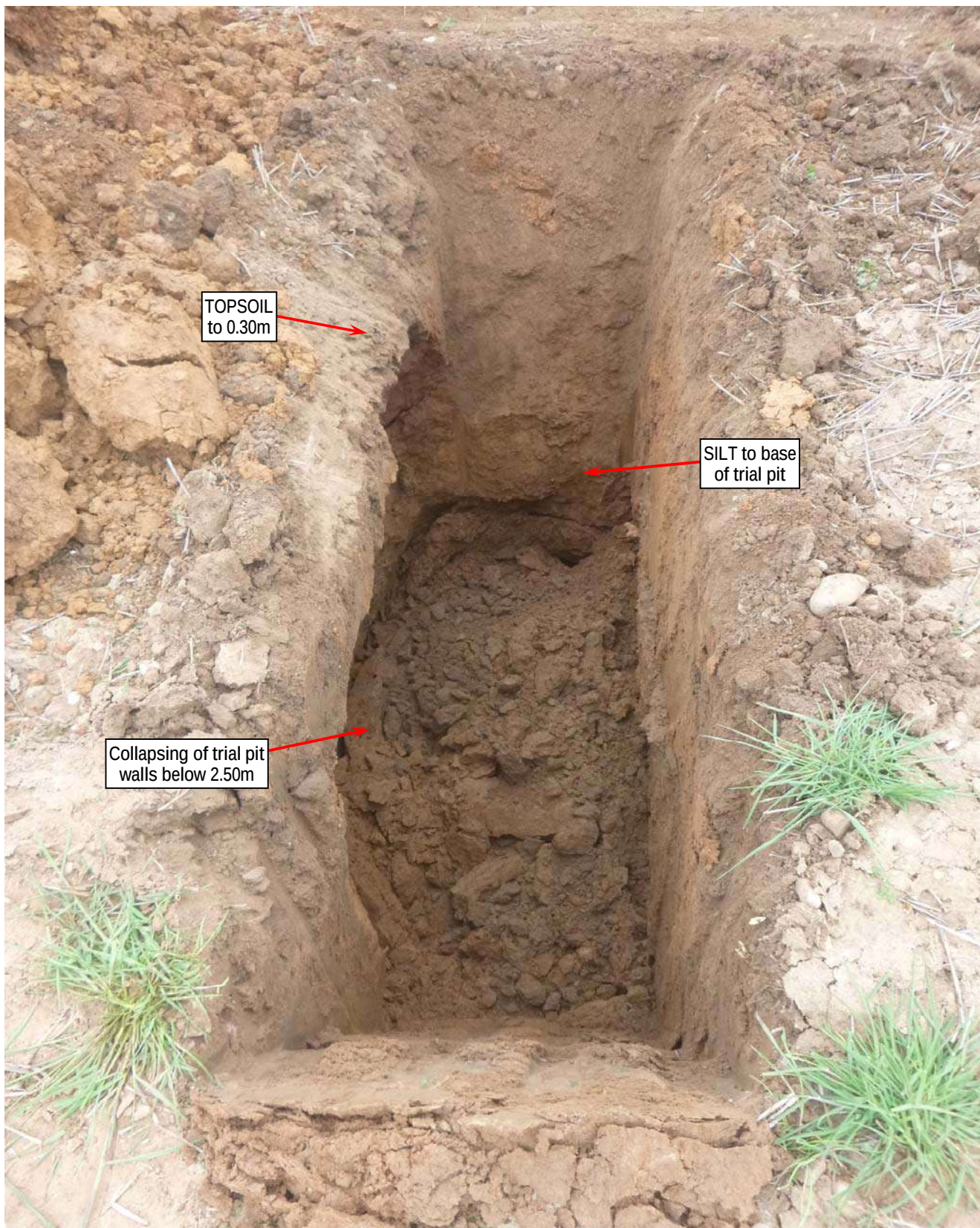




Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Completed Excavation (TP20)	Plate No. 5	



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Completed Excavation (TP30)	Plate No. 6	



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Completed Excavation (TP35)	Plate No. 7	

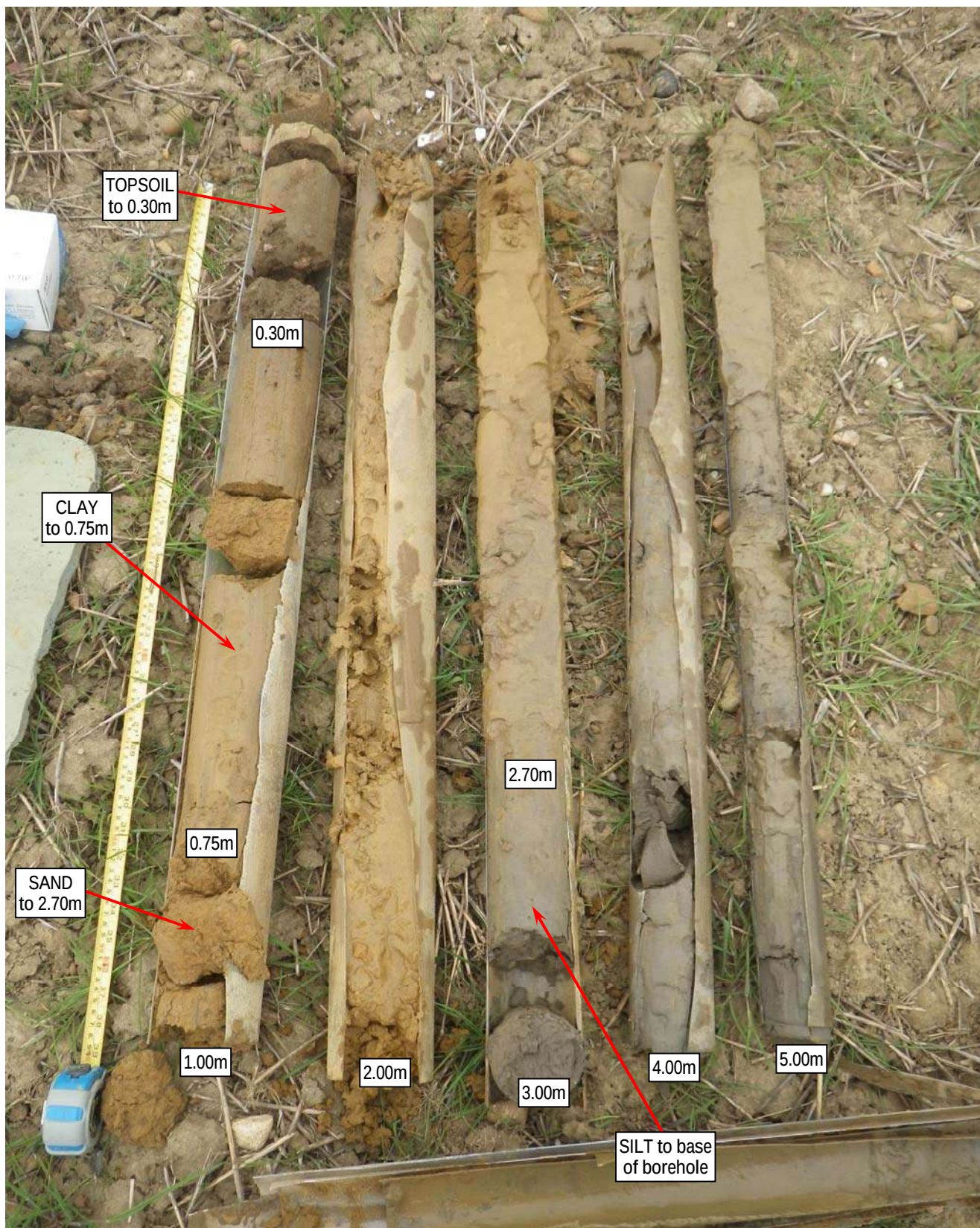




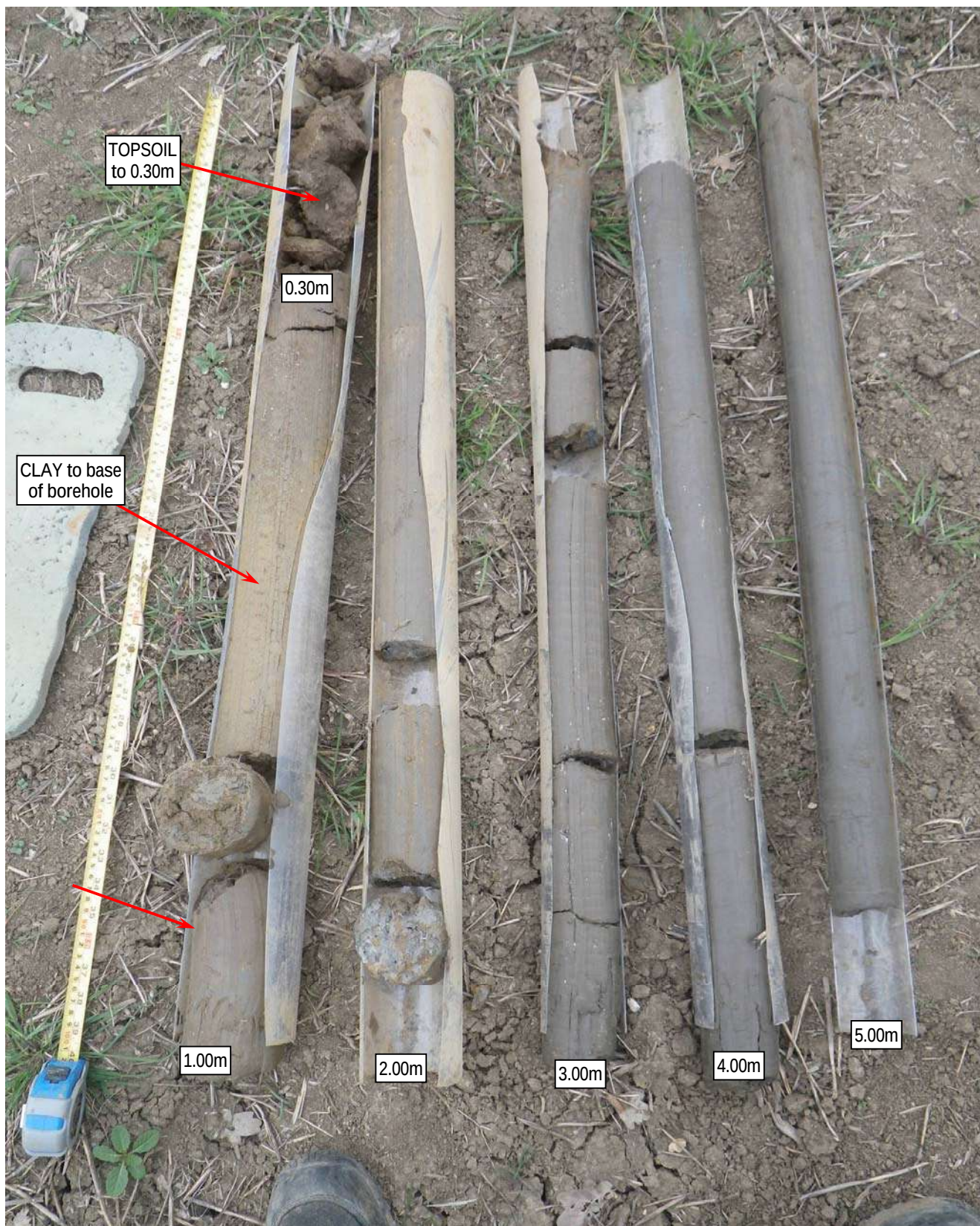
Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Typical Arisings (TP10)	Plate No. 8	



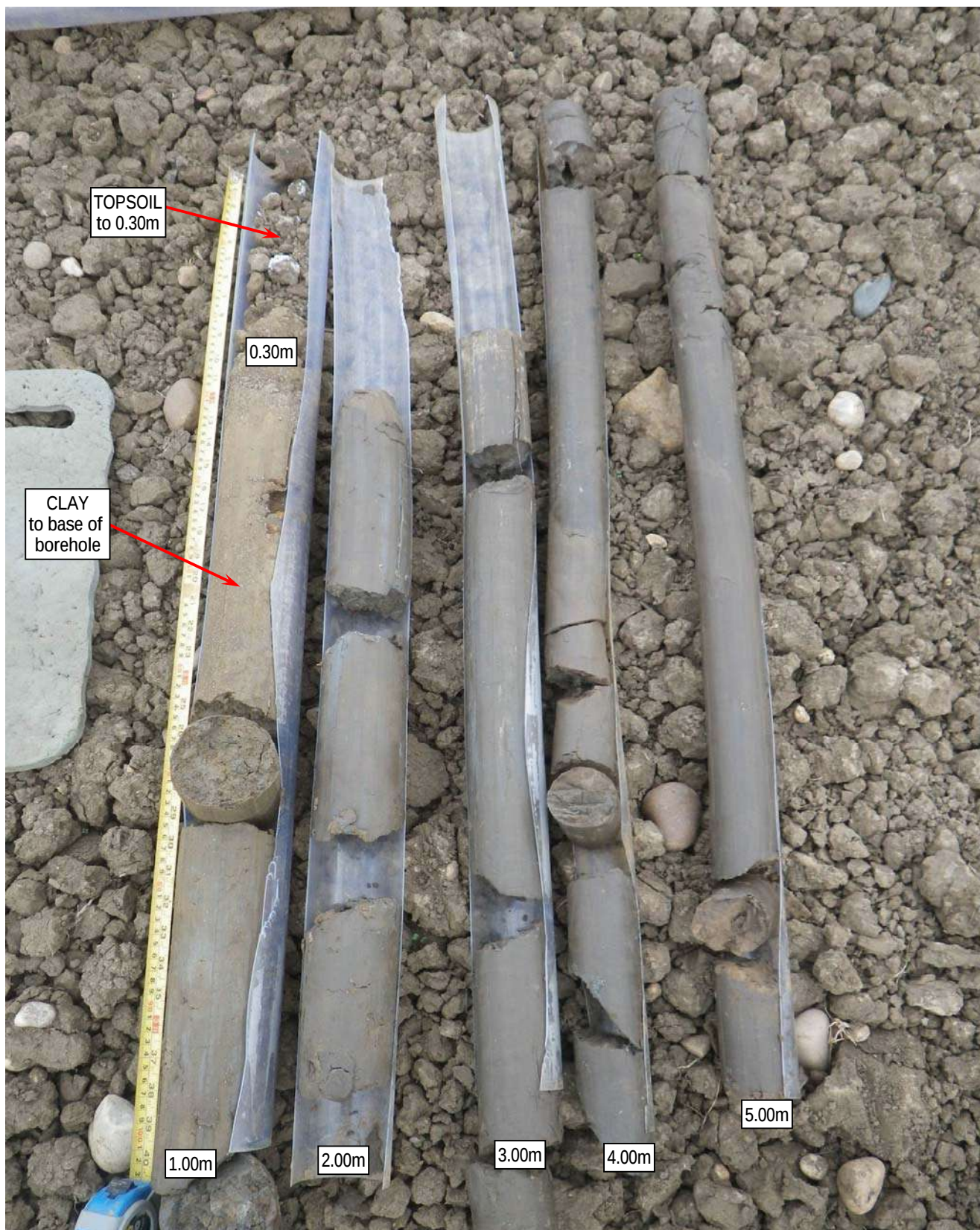
Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
		Rev.	
Title	Typical Arisings (TP36)	Plate No. 9	



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
Title	Recovered Cores from WS2	Rev.	
		Plate No.	10



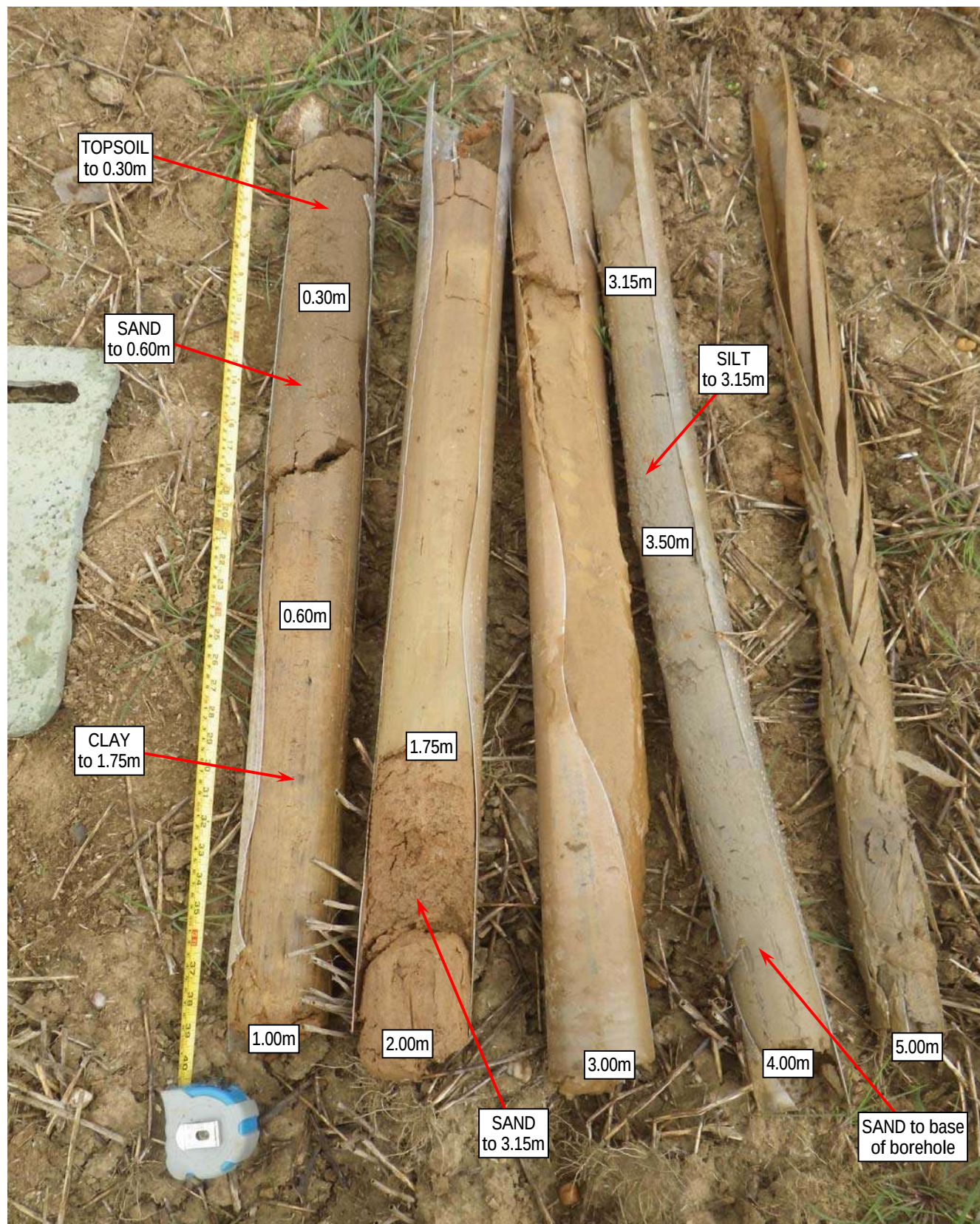
Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
Title	Recovered Cores from WS6	Rev.	
		Plate No.	11



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
Title	Recovered Cores from WS7	Rev.	
		Plate No.	12



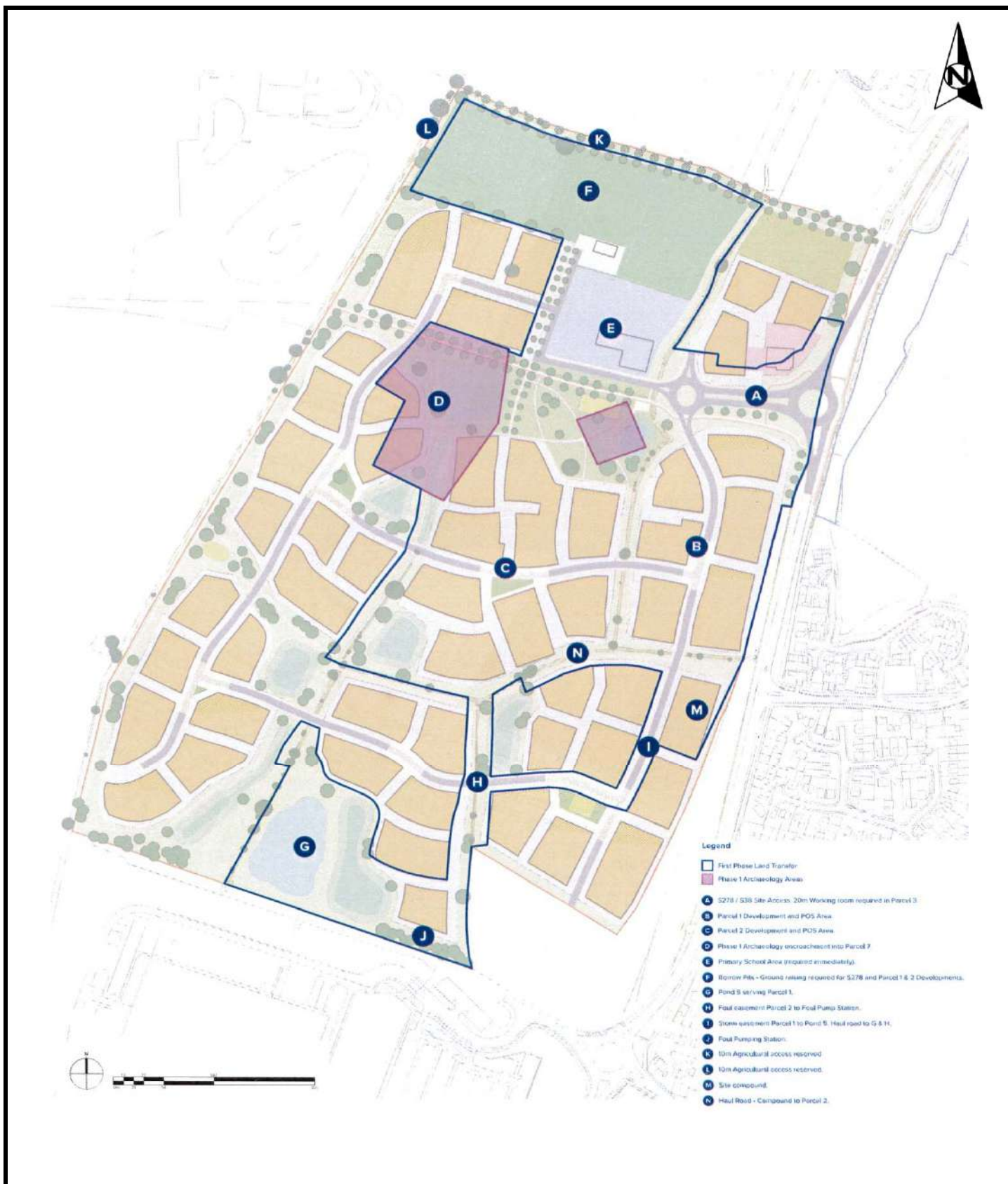
Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
Title	Recovered Cores from WS13	Rev.	
		Plate No.	13



Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	<i>PK</i>
		Approved	<i>PK</i>
Project	Hinckley West	Scale	NTS
		Date Drawn	16/06/2017
Title	Recovered Cores from WS16	Rev.	
		Plate No.	14

APPENDIX IX

**Proposed Development Plan
(Figure No. D36147/05)**



ADAPTED FROM DEFINE ARCHITECTS 'DRAFT INITIAL LAND DRAW DOWN', DRAWING NUMBER DE155_005, REVISION B, UNDATED.
USED WITH PERMISSION OF THE CLIENT

Project No.	D36147	Drawn	SS
Client	Bloor Homes Midlands	Checked	PK
Project	Hinckley West	Approved	PK
		Scale	NTS
		Date Drawn	15/06/2017
Title	Proposed Development Plan	Rev.	
		Figure No.	D36147/05



APPENDIX X
Statistical Assessment Sheets



Client	Bloor Homes Midlands
Site	Hinckley West
Our Ref	D36147
Date	Jun-17
Soil Type	Topsoil

Deg of Freedom	t
1	6.314
2	2.92
3	2.353
4	2.132
5	2.015
6	1.943
7	1.895
8	1.86
9	1.833
10	1.812
11	1.796
12	1.782
13	1.771
14	1.761
15	1.753
16	1.746
17	1.74
18	1.734
19	1.729
20	1.725
21	1.721
22	1.717
23	1.714
24	1.711
25	1.708
26	1.706
27	1.703
28	1.701
29	1.699

8
55

Undertake Outlier Test

Client	Bloor Homes Midlands
Site	Hinckley West
Our Ref	D36147
Date	Jun-17
Soil Type	Topsoil

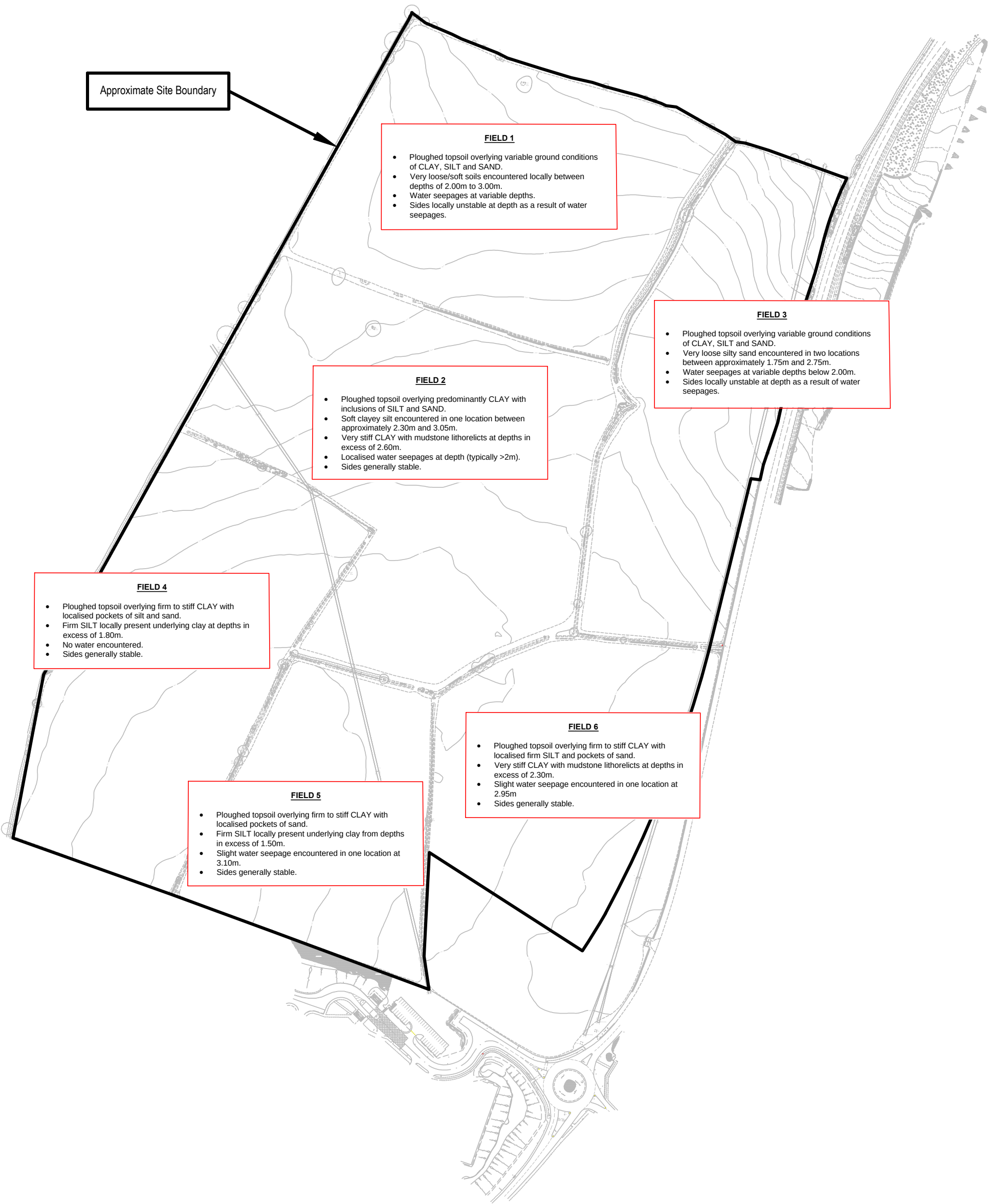
[illegible]

Sample Size	T _{crit} α (@ 0.05)
3	1.153
4	1.462
5	1.671
6	1.822
7	1.938
8	2.032
9	2.11
10	2.176
11	2.234
12	2.285
13	2.331
14	2.372
15	2.409
16	2.443
17	2.475
18	2.504
19	2.531
20	2.557
21	2.58
22	2.603
23	2.624
24	2.644
25	2.663
26	2.681
27	2.698
28	2.714
29	2.73
30	2.745

Arithmetic Mean $\bar{x}$	15.67
Standard Deviation s	11.5
Minimum	8
Maximum Value X_n	55
Number N	15
Critical Value T_{crit}	2.409
Calculate T_n	3.428
Comment/Decision	The maximum value in the dataset is an outlier

APPENDIX XI

**Ground Conditions Plan
(Figure No. D36147/06)**



Adapted from a plan for Bloor Homes by Greenhatch Group. Plan No. 19969 OGL revision A dated March 2014. Used with permission of the Client

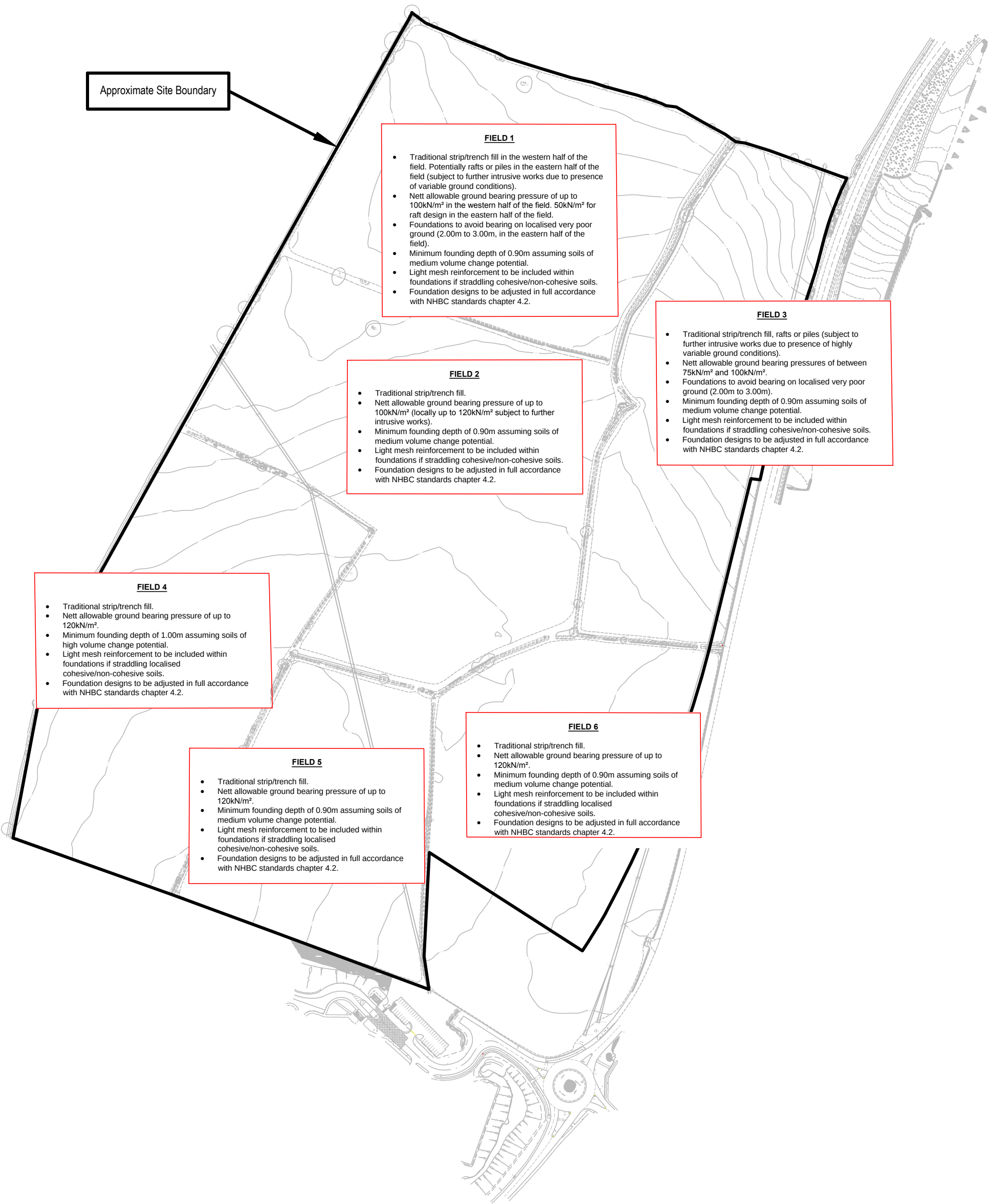
Project No.	D36147	Drawn By	EM
Client	Bloor Homes Midlands	Checked By	SS
		Approved By	PK
Project	Hinckley West	Scale	NTS
		Date Drawn	14/06/2017
Title	Ground Conditions Plan	Revision	
		Figure No.	D36147/06



Unit 2.2, Clarendon House, Clarendon Park,
Clumber Avenue, Nottingham
NG5 1AH
Tel: 0115 962 0001
9 Brunel Parkway, Pride Park, Derby DE24 8HR
Tel: 01332 290 798
info@geodyne.co.uk

APPENDIX XII

**Foundation Summary Plan
(Figure No. D36147/07)**



Adapted from a plan for Bloor Homes by Greenhatch Group. Plan No. 19969 OGL revision A dated March 2014. Used with permission of the Client

Project No.	D36147	Drawn By	EM
Client	Bloor Homes Midlands	Checked By	SS
		Approved By	PK
Project	Hinckley West	Scale	NTS
		Date Drawn	14/06/2017
Title	Foundation Summary Plan	Revision	
		Figure No.	D36147/07



Unit 2.2, Clarendon House, Clarendon Park,
Clumber Avenue, Nottingham
NG5 1AH
Tel: 0115 962 0001
9 Brunel Parkway, Pride Park, Derby DE24 8HR
Tel: 01332 290 798
info@geodyne.co.uk

APPENDIX XIII

Conditions & Limitations

Conditions & Limitations

Phase I Desk Studies

1. Works undertaken to provide the basis of the Phase I Desk Study report comprise a review of information available from a number of sources/parties (potentially also including the Client) together with a walk over of the site (where applicable and included within the quotation). The opinions given in the Phase I Desk Study are based on the information available from third parties/sources that has been obtained within the available timeframe. GeoDyne Limited assumes all third party information to be true and correct and therefore cannot accept liability for the accuracy of such information supplied.
2. Should additional information become available that may affect the comments and opinions made within the Phase I Desk Study, GeoDyne Limited reserves the right to review such information and make modifications to comments/opinions as appropriate.
3. It should be borne in mind that a Phase I Desk Study collates available information to generate a conceptual model of the site. The actual geotechnical and environmental considerations can only be fully quantified by intrusive investigation works to confirm the accuracy of the conceptual site model.

Phase II Intrusive Investigations

1. Our quotation assumes that access to the site will be arranged by others at no cost to ourselves.
2. We have assumed that free access is available throughout to the entire site and that works can be undertaken during a single mobilisation. Where restricted access is encountered, or where additional unscheduled mobilisations are required, additional costs may be incurred to the client.
3. We have assumed that all available information relating to buried services will be supplied by the Client at no cost to ourselves. No responsibility will be accepted for damage to underground services that have not been brought to our prior attention by the Client.
4. All excavations/boreholes will be backfilled with compacted arisings upon completion, with any excess arisings left proud of ground levels. Excess arisings will not be removed from the site unless specifically requested by the Client. Where we are requested to remove excess arisings, all associated costs will be passed to the Client.
5. We will attempt to leave the site in a clean and tidy state, however, it must be understood that some disturbance of the site is unavoidable during intrusive works.
6. Exploratory holes are positioned approximately on site by GeoDyne Limited. Should the client require precise locations of all exploratory points, additional fees will be incurred. It must be borne in mind that backfilled trial pits can create 'soft spots', therefore, should the Client wish to designate 'no dig' zones, for example under the footprint of proposed structures, these must be brought to our attention prior to commencement of works.
7. Groundwater observations relate to conditions encountered at the time of investigation. It must be understood that groundwater levels may vary as a result of recent climatic conditions or seasonal variation.
8. Trial pits and boreholes examine only a small proportion of the total site area. No liability can be accepted for conditions not revealed in exploratory holes, particularly between positions. All extrapolations of available data are given in good faith.

Payment

1. Payment terms are strictly 28 days from the invoice date.
2. Prior to commencement of works, we require receipt of formal written instruction from the party accepting full financial responsibility for the work. In the absence of such an instruction, we would expect the instructing Consulting Engineers/Architects to accept full financial responsibility for the works.
3. Receipt of instruction to commence work shall be taken as acceptance and compliance of the foregoing conditions.

Liability

1. GeoDyne Limited offer £5,000,000.00 Professional Indemnity Insurance (in aggregate over the year). This shall be the limit of our liability for works undertaken. No individual liability shall be implied to, or accepted by, any employee for works undertaken for and on the behalf of GeoDyne Limited.