

FLOOD RISK ASSESSMENT Land south of Chiswell Green Lane

Prepared for: Alban Developments Ltd and Alban Peter Pearson, CALA Homes (Chiltern) Ltd and Redington Capital Ltd Ref: 015_8210856_Flood_Risk_Assessment Issue 3: 31 March 2022



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Glanville

Glanville Consultants is a multi-disciplinary engineering, design and surveying consultancy with the following expertise:

Structural Engineering | Transport and Highways Civil Engineering | Geomatics | Building Surveying

Cornerstone House
62 Foxhall Road
Didcot
Oxfordshire OX11 7ADOffices also at:3 Grovelands Business Centre
Boundary Way
Hemel Hempstead
Hertfordshire HP2 7TETelephone:01235 515550Telephone::01442 835999

postbox@glanvillegroup.com www.glanvillegroup.com

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Contents

Execut	ive Summary	.1
1.0	Introduction	.2
2.0	Site Description	.3
3.0	Development Proposals	.7
4.0	Planning Policy and Guidance	.8
5.0	Sources of Potential Flooding	10
6.0	Flood Risk Assessment	13
7.0	Surface Water Drainage	14
8.0	Summary and Conclusions	22

Appendices

Appendix A:	Hertfordshire County Council's Pre-Application Advice
Appendix B:	Location Plan
Appendix C:	Topographical Survey
Appendix D:	Geological Mapping and Soilscape Mapping
Appendix E:	Site investigation Report
Appendix F:	Thames Water Records
Appendix G:	Site Proposals
Appendix H:	Fluvial Flood Risk Mapping
Appendix I:	Surface Water Flood Risk Mapping
Appendix J:	Indicative Surface Water Drainage Strategy Scheme
Appendix K:	MicroDrainage Network Outputs



Executive Summary

This Flood Risk Assessment has been prepared to accompany an outline planning application associated with a development on land to the south of Chiswell Green Lane, near St Albans. The proposals include the provision of up to 391 dwellings and a 2 Form Entry (2FE) primary school with a capacity for 420 pupils.

The site had been identified Draft Local Plan for St Albans City and District as one of the "Broad Locations" for development to contribute towards addressing housing, infrastructure and other development needs over the period 2020 to 2036. Through the plan making process, it was recognised as a suitable Broad Location for release from the Green Belt, with the expectation that it would deliver a minimum of 365 dwellings.

Following the withdrawal of the Draft Local Plan from the Examination process, the City and District Council is preparing a new Local Plan and this site is being promoted once again for development.

St Albans City and District Council provided pre-application advice in January 2022 (Ref: PRE/2021/0177), which referred to advice and guidance on flooding and drainage from Hertfordshire County Council as Lead Local Flood Authority (LLFA). This report has been prepared in accordance with the relevant advice and guidance from the LLFA.

The report has also been prepared in accordance with the requirement of National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), flood risk and drainage guidance and with reference to the relevant Strategic Flood Risk Assessment.

This report has demonstrated that the proposed development:

- is in accordance with the National Planning Policy Framework;
- is in compliance with Local Policy and guidance listed in paragraphs 4.4 to 4.12 of this report including local Strategic Flood Risk Assessments and Flood Management Strategies;
- will not be at an unacceptable risk from fluvial flooding or other sources;
- will not increase flood risk elsewhere;
- will employ a surface water drainage strategy based on the principles of sustainable drainage; and
- will provide effective pollution mitigation measures for the surface water run-off from the proposed development, thereby avoiding any potential detrimental effects to groundwater.

Therefore, the site is considered suitable to accommodate the development proposed, and any potential impacts can be overcome through appropriate mitigation. As such, the proposals are considered to fully comply with National and Local planning policies in respect of flood risk and surface water drainage.

1



1.0 Introduction

- 1.1 This Flood Risk Assessment has been prepared by Glanville Consultants on behalf of Alban Developments Ltd and Alban Peter Pearson, CALA Homes (Chiltern) Ltd and Redington Capital Ltd to accompany an outline planning application associated with development on land to the south of Chiswell Green Lane, near St Albans. The proposals include the provision of up to 391 dwellings and a 2 Form Entry (2FE) primary school with a capacity for 420 pupils.
- 1.2 The site had been identified Draft Local Plan for St Albans City and District as one of the "Broad Locations" for development to contribute towards addressing housing, infrastructure and other development needs over the period 2020 to 2036. Through the plan making process, it was recognised as a suitable Broad Location for release from the Green Belt, with the expectation that it would deliver a minimum of 365 dwellings. Following the withdrawal of the Draft Local Plan from the Examination process, the City and District Council is preparing a new Local Plan and this site is being promoted once again for development.
- 1.3 St Albans City and District Council provided pre-application advice in January 2022 (Ref: PRE/2021/0177), which referred to advice and guidance on flooding and drainage from Hertfordshire County Council as Lead Local Flood Authority (LLFA). A copy of the advice from the Landscape / SuDS Officer at Hertfordshire County Council in a letter dated 11 November 2021 can be found at Appendix A.
- 1.4 The purpose of this document is to assess the existing level of flood risk to the site and its surroundings within the context of the development proposals and to demonstrate a suitable drainage strategy for the disposal of surface water from the site.
- 1.5 This assessment has been prepared in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF. It has also been prepared with reference to the relevant Strategic Flood Risk Assessment, published in August 2007, as well as South West Hertfordshire Level 1 Strategic Flood Risk Assessment – Final Draft – published in October 2018.
- 1.6 This assessment was undertaken with reference to information provided and/or published by the following bodies:
 - Ordnance Survey;
 - British Geological Survey;
 - Affinity Water;
 - Thames Water;
 - St Albans City and District Council;
 - Hertfordshire County Council; and
 - Environment Agency.
- 1.7 This report concludes that the development is not at an unacceptable risk of flooding and the site can be developed safely without increasing flood risk elsewhere, and therefore the development proposals comply with relevant planning policy concerning flood risk. The report demonstrates that suitable provision for the disposal of surface water from the proposed development can be provided.



2.0 Site Description

Site Location & Description

- 2.1 The site comprises of agricultural land, a farmyard with stables and equine facilities, and a derelict farmhouse and outbuildings. The agricultural land is divided into four distinct fields separated by mature trees. The fields in the northern part are intensively grazed by horses whilst the fields in the south are currently unmanaged grassland.
- 2.2 The site is located adjacent to the village of Chiswell Green and is approximately 1.1km southeast of the cathedral city of St Albans. The northern boundary is formed by Chiswell Green Lane. The eastern and south-eastern boundaries are directly adjacent to the residential area of Chiswell Green with the site bordered by the gardens of the residential properties.
- 2.3 The site is located within the St Albans City and District Council authority area. The approximate centre of the site is located at Ordnance Survey National Grid reference TL 13104 04286 and the postcode is AL2 3EQ. The plan showing the extent of the site is included in Appendix B.
- 2.4 There is a small woodland area to the east of the site which is not included within the site boundary and sits between the site and the residential area. Beyond the western boundary of the site, a car park separates Miriam Lane from the western site boundary. Lying adjacent to Miriam Lane approximately 25m to the east is the site of the former 'Butterfly World' visitor attraction.
- 2.5 St Albans Polo Club lies approximately 80m northeast of the site with Chiswell Green Lane lying in. The M1 is 1.4km to the east and meets the M25 1.5km southeast of the site. The wider surrounding area comprises residential areas to the east and agricultural land to the west.
- 2.6 The site does not benefit from any planning history of relevance to the current proposals.

Existing Watercourses

2.7 The closest watercourses designated as a main river by the Environment Agency (EA) is the River Ver, located approximately 1.5km to the east of the site, which flows in a southerly direction.

Topographical Survey

2.8 Topographical surveys were carried out by Groundsurveys Ltd (Ref: 7290/06, date: January 2020), for the southern land parcel, and Greenhatch Group (Ref: 41518_T, date: September 2021), for the northern land parcel. The topographical surveys indicate that the site generally falls from a high point of approximately 101.72m AOD, adjacent to Chiswell Green Lane to the north of the site, to a low point of approximately 84.64m AOD to the southern corner of the site. The topographical surveys show the relatively steeply sloping nature of the site falling generally in a south-easterly direction. This constant fall across the site will assist in gravitating any run-off away from the proposed development. The topographical surveys are included in Appendix C.



Geological Characteristics

- 2.9 Geological records published by the British Geological Survey (BGS) indicate the entire site is likely to be underlain by bedrock geology comprising chalk from the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated), as well as superficial deposits of sand and gravels from the Kesgrave Catchment Subgroup to the far north and south of the site. Extracts from BGS mapping are included in Appendix D.
- 2.10 Soilscapes mapping provided by Cranfield University on behalf of DEFRA shows that the site of the proposed development falls entirely on HOST soil class 6, which is described as "Freely draining slightly acid loamy soils". This soil type is described as being freely draining that drains to local groundwater. An extract from Cranfield University "Soilscapes" website is included in Appendix D.

Site Investigations

- 2.11 A Geo-Environmental Site Investigation was carried out by BRD Environmental Ltd for the southern land parcel between March and July 2020 verifying that ground conditions encountered were generally as expected from the anticipated geology shown on the available BGS geology maps, although superficial deposits were found across the entire land parcel. The site investigation report is included in Appendix E.
- 2.12 A total of 10 No. windowless sample boreholes and 22 No. trial pits were undertaken within the southern land parcel.
- 2.13 Superficial deposits of the Kesgrave Catchment Subgroup were recorded in all of the exploratory holes. These deposits were encountered as three different soil types, either gravelly, clay-rich or sandy soils. The thickness of these deposits is greater than 5.45m in some areas of the site.
- 2.14 Underlying the superficial deposits, the bedrock geology of the Lewes Nodular Chalk Formation and Seaford Chalk Formation was found in 6No. windowless sample boreholes and 4No. trial pit locations in two different areas of the site at depths between 1.70m and 4.10m bgl indicating an irregular undulating chalk surface beneath the superficial deposits. The Lewes Nodular Chalk Formation and Seaford Chalk Formation was typically described as 'structureless chalk excavated as off white, silty, clayey gravel.
- 2.15 Monitoring wells were installed in boreholes WS02, WS04, WS06, WS07 and WS10, to depths between 2.8m and 4.0m bgl. The 5 No. monitoring wells were found dry during the two monitoring visits carried out to date.
- 2.16 Trial pits TP01 to TP05 were utilised for soakage tests ranging from 2.00m to 2.70m depth. Due to the irregular undulating surface of the chalk across the site, the bedrock was only found in one of the proposed soakage pits (TP03).



- 2.17 Infiltration rates ranged between 6.68x10⁻⁷ m/s and 4.26x10⁻⁸ m/s. Given the infiltration rates recorded in TP01, TP02 and TP05, BRD concludes that the disposal of collected surface water to infiltration devices into the clay-rich soils of the Kesgrave Catchment Subgroup will be marginally feasible. The only exception was TP04 where surface granular soils and clay-rich soils with increased sand content gave better infiltration rates, ranging between 2.5x10⁻⁵ m/s and 3.9x10⁻⁵ m/s. Chalk was established in TP03 at a depth of 2.20m bgl and, as was expected, the infiltration rates were good ranging between 3.5x10⁻⁴ m/s and 3.7x10⁻⁴ m/s.
- 2.18 BRD states that in the areas where the chalk bedrock was recorded at shallower depth then soakaways could be considered. There may also be the potential to use deep borehole soakaways. There is also the possibility of using attenuation basins with trench excavated through their base to intercept the chalk bedrock with the trenches then backfilled with free draining gravel to provide a permeable pathway to facilitate infiltration into the chalk.
- 2.19 Furthermore, BRD states that the site has been classified with a moderate to high potential risk for solution features. It is considered that soakaways could concentrate rainfall ingress at the soakaway positions, which could result in the formation of solution features. As such, surface water drainage discharging into the chalk will require careful design. In particular, the potential to create dissolution features within the chalk by the ingress of water means that any soakaways should be located well away from foundations for buildings or roads. The guidance on this issue presented in CIRIA C574 is that for low to medium density chalk as proven at the site, soakaways should be sited a minimum of 20m away from any foundation.

Groundwater Vulnerability

- 2.20 The EA defines Source Protection Zones (SPZs) for groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The SPZs mapping indicates that the site is located within a SPZ II (Outer Protection Zone).
- 2.21 A Nitrate Vulnerable Zone (NVZ) is a conservative designation for areas of land that drain to nitrate polluted waters or waters which could become polluted by nitrates. The NVZs mapping indicates that the site is not located within a Surface Water NVZ.
- 2.22 The EA defines Drinking Water Safeguard Zones (SgZs) for water sources used for public drinking water supply. SgZs are catchment areas that influence the water quality for their respective Drinking Water Protected Area (Surface Water), which are at risk of failing the drinking water protection objectives. The site is located within a SgZ (Surface Water).
- 2.23 The bedrock Aquifer Designation Map published by the EA indicates that the bedrock underlying the site is classed as a Principal Aquifer. Principal Aquifers are layers of rocks that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage.
- 2.24 The superficial Aquifer Designation Map published by the EA indicates that the superficial drift to the far southern side of the site is classed as a Secondary A Aquifer. Secondary A Aquifers are permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers.

5



Existing Surface Water Drainage

- 2.25 The incumbent drainage undertaker is Thames Water. From a review of Thames Water Asset Location plans, included in Appendix F, there are no public surface water sewers located within the site. The records indicate a 300mm diameter public surface water sewer along Chiswell Green Lane to the north-east of the site. The records also indicate public surface water sewers serving properties to the east and south of the site, along Hammers Gate, Forge End, Long Fallow and Watford Road. The surface water network at Forge End according to the asset plans discharge to a series of soakaways.
- 2.26 The records show only those sewers that are known to be maintained by Thames Water, other privately owned sewers may be present in the vicinity of the site that are not shown on public records.



3.0 Development Proposals

- 3.1 The proposal comprises the demolition of existing structures and construction of up to 391 dwellings (Use Class C3), the provision of land for a new 2FE primary school, open space provision and associated landscaping and new access arrangements.
- 3.2 The key components of the scheme comprise:
 - up to 391 homes (of which 40% will be affordable and 60% private plots);
 - land to construct a 2FE primary school;
 - publicly accessible open space;
 - publicly accessible children's play space;
- 3.3 The development will be split into two residential parcels separated by a Green Core at its centre.
- 3.4 It is proposed to provide three vehicular accesses into the site. Two of these will be on Chiswell Green Lane and will serve the northern residential development parcel and the future primary school.
- 3.5 The access to the southern parcel will connect with the northern end of the existing Forge End cul-de-sac which in turn will provide access to Watford Road. A secondary pedestrian / cycle / emergency access will be provided on Long Fallow.
- 3.6 An illustrative masterplan for the proposed development is provided in Appendix G.
- 3.7 A breakdown of the impermeable areas associated with the proposed development site is shown in Table 1.

Catchment	Area Description	Area (m²)
North Land Parcel	Roof areas and roads	32,085
North Land Parcer	Total + 10% urban creep	35,294
South Land Parcel	Roof areas and roads	26,055
South Land Parcer	Total + 10% urban creep	28,661

Table 1: Proposed Impermeable Areas on Site



4.0 Planning Policy and Guidance

4.1 Set out below is a summary of the national and local planning policy and guidance relating to flood risk and surface water management that are relevant to the development proposals.

National

- 4.2 At a national level, the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF ensure flood risk is taken into account at all stages of the planning process, to avoid inappropriate development in areas at risk of flooding and to direct development towards areas at lowest flood risk. The NPPF retains a riskbased approach to the planning process and defines four Flood Zones to be used as the basis for applying the sequential test to consider a development in terms of Flood Risk Vulnerability Classifications, which define the type of development that is considered appropriate within each zone.
- 4.3 The NPPF establishes the Flood Zones as the starting point for assessment with the overarching aim to steer new development to areas with the lowest probability of flooding. The Flood Zones are defined as follows:
 - Flood Zone 1 (Low Probability) comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).
 - Flood Zone 2 (Medium Probability) comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% 0.1%) in any year.
 - Flood Zone 3a (High Probability) comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
 - Flood Zone 3b (The Functional Floodplain) comprises land where water has to flow or be stored in times of flood.

Local Policy and Guidance

Dacorum Borough Council, St Albans City & District Council, Three Rivers District Council and Watford Borough Council Strategic Flood Risk Assessment (SFRA), August 2007

- 4.4 This SFRA was produced by these four councils to inform their planning process. The SFRA summarises the main causes of flooding in the district and key historic incidents and includes flood maps of the district.
- 4.5 The SFRA provides a reference and policy document to advise and inform developers of their obligations under the NPPF. The maps and accompanying report and guidance provide a sound framework enabling consistent and sustainable decisions to be made when making future planning decisions.



South West Hertfordshire Level 1 Strategic Flood Risk Assessment (SFRA), Final Draft, October 2018

4.6 This SFRA 2018 document for South West Hertfordshire replaces the Level 1 SFRA originally published by Dacorum Borough Council, St. Albans City and District Council, Three Rivers District Council and Watford Borough Council in August 2007. The purpose of this study is to provide a comprehensive and robust evidence base to support the production of Local Plans for the four Councils.

Hertfordshire County Council Local Flood Risk Management Strategy (LFRMS 2), 2019 – 2029

4.7 The aim of this Local Flood Risk Management Strategy, adopted in February 2019, is to give an understanding of local flood risk in Hertfordshire and the actions that will be taken to manage it most appropriately within available resources.

Hertfordshire County Council LLFA Summary Guidance for Developers, updated August 2021

4.8 The guidance provides a summary of information and a developer's checklist to assist with producing satisfactory Surface Water Drainage Assessment / Flood Risk Assessment for development in accordance with national planning policy.

Environment Agency's Approach to Groundwater Protection Guidance, Version 1.2, February 2018

- 4.9 This document contains position statements which provide information about the Environment Agency's approach to managing and protecting groundwater. It details how the Environment Agency delivers government policy for groundwater and adopts a risk-based approach where legislation allows.
- 4.10 The primary aim of the position statements is the prevention of pollution of groundwater and protection of it as a resource. Groundwater protection is long term, so these principles and position statements aim to protect and enhance this valuable resource for future generations.

Policy 84 – Flooding and River Catchment Management – and Policy 84A – Drainage Infrastructure – from the City and District of St Albans District Local Plan Review 1994 – Saved Policies, July 2020

- 4.11 The Council will consult with the National Rivers Authority (now the Environment Agency) on all matters likely to affect the water environment to reduce the risk of flooding and to ensure proper management of the river catchment.
- 4.12 The Council will consult Thames Water Utilities and the National Rivers Authority (now the Environment Agency) on all planning applications that might cause sewerage flooding.



5.0 Sources of Potential Flooding

5.1 Flood risk to the site has been considered from all likely sources of flooding, as defined in the NPPF and the Planning Practice Guidance to the NPPF. These include tidal, artificial sources (reservoir), fluvial, surface water, sewer and groundwater. The following paragraphs consider flood risk to the site from all these sources.

Tidal

5.2 Given that there is no tidally influenced watercourse on or within the vicinity of the site, tidal flooding is not an issue that would prevent the development of the site.

Fluvial

5.3 The Environment Agency (EA) publishes its Flood Map for Planning on the GOV.UK website which shows the maximum extent of fluvial flooding. The mapping indicates that the site is located within Flood Zone 1, beyond the limits of the 1 in 1,000-year fluvial flood event (<0.1%). It is therefore considered that the risk of fluvial flooding to the development is very low. An extract from the GOV.UK database is included within Appendix H.

Surface Water

- 5.4 The EA publishes a Flood Risk from Surface Water map on the GOV.UK website which indicates the predicted risk of surface water flooding in the event that rainwater does not drain away through normal drainage systems or soak into the ground. The mapping indicates that most of the site is at 'very low' risk of surface water flooding, with an annual probability of flooding of less than 1:1,000.
- 5.5 An isolated area to the south corner of the site is at 'low' (between 1:100 and 1,000 annual probability) and 'medium' (between 1:30 and 1:100 annual probability) risks of surface water flooding. An extract from the GOV.UK surface water flood map is included within Appendix I.
- 5.6 Since the EA Surface Water Flood Risk modelling does not consider either normal drainage systems or ground infiltration, the abovementioned isolated area is related to ground depressions which facilitate some surface water ponding. The topographic survey verifies this assumption by showing a lower ground level in that location.
- 5.7 The SFRAs (2007 and 2018) include records of historical surface water flooding incidents. They indicate that there have been no recorded surface water flooding incidents in Chiswell Green.
- 5.8 Therefore it is reasonable to conclude that the risk of surface water flooding is low and not an issue that would prevent the development of the site.



Reservoir

5.9 The EA publishes indicative mapping on the GOV.UK website which shows the maximum extent of reservoir flooding in the unlikely event that a reservoir should fail. The mapping indicates that the entire the site is located outside of a reservoir flood risk area. Therefore, reservoir flooding is not considered to be an issue that would prevent the development of the site for its intended end use.

Sewer

- 5.10 The SFRAs (2007 and 2018) includes data from Thames Water DG5 sewer flooding register. This register provides information on the number of recorded sewer flooding incidents by postcode area. The SFRA 2007 indicates that 20 properties have been flooded form overloaded sewers in the last ten years in the postcode area associated with the site (AL2). While the SFRA 2018 indicates a total of 10 recorded incidents of sewer flooding occurring within the AL2 3 postcode area.
- 5.11 It should be noted that maintenance work may have been undertaken by Thames Water or since the flooding incidents occurred and therefore the risk may have been reduced or removed. As such, these records do not necessarily represent the current of future sewer flood risk situation.
- 5.12 As previously noted in Section 2 of this report, there are currently no public foul or surface water sewers within the proposed development site.
- 5.13 It is therefore reasonable to conclude that the risk of sewer flooding to the site is low and is not an issue that would prevent the development of the site for its intended use.

Groundwater

- 5.14 The SFRA (2007) indicates that groundwater flooding occurred in the River Ver catchment in the Winter of 2000/01. This was limited to dry valleys, particularly high in the headwaters of the Ver. The cause of the groundwater flooding was thought to be exacerbated by developments on the floodplain further downstream. The SFRA indicated that the recorded incidents of groundwater flooding were not located on or in the vicinity of the site.
- 5.15 The updated SFRA (2018) states that the highest levels of groundwater flood risk are identified around the Tring Reservoirs and in the chalk valleys of the Rivers Bulbourne, Gade, Lee, Ver and Colne, where groundwater levels are estimated to lie within 0.025m of the ground surface. High groundwater levels of approximately 0.025m to 0.5m below the ground surface are across the east of the study area, affecting north-east St Albans.
- 5.16 The JBA Groundwater Flood Map from the updated SFRA (2018) for South West Hertfordshire indicates groundwater levels of approximately 0.025m to 0.5m below the ground surface within the site.



5.17 As described in Section 2, windowless sample boreholes and trial pits, along with groundwater monitoring visits, carried out by BRD Environmental Ltd during site investigation works confirm that no groundwater was found within the boreholes. In addition, no basements will be proposed for the development site and proposed mitigation measures will be provided to protect the development against surface water flooding, which would also positively deal with with any likely groundwater flood event. Therefore, the risk of groundwater flooding is considered to be low, and no special measures are required to mitigate this risk in the design of the development.

Historic Flooding

5.18 The SFRAs (2007 and 2018) include historic flooding data which includes locations of known historical flood incidents. These maps indicate that there have been no historical flood incidents within the site boundary or surrounding area.

Summary

5.19 The site is located entirely within Flood Zone 1, which is land at the lowest risk of fluvial flooding and is at very low risk from all other potential sources of flooding.



6.0 Flood Risk Assessment

Fluvial

- 6.1 The NPPF encourages a sequential, risk-based approach to determine the suitability of land for development. This document advises that the development of sites within Flood Zone 1 should be given preference where available.
- 6.2 Table 2 of the Planning Practice Guidance to the NPPF categorises different types of development into five flood risk vulnerability classifications:
 - Essential Infrastructure;
 - Highly Vulnerable;
 - More Vulnerable;
 - Less Vulnerable; and
 - Water Compatible Development.
- 6.3 The NPPF classifies residential development and non-residential educational establishments as being 'More Vulnerable' in flood risk terms. Table 3 of the PPG states that 'More Vulnerable' development is compatible with Flood Zones 1 and 2.
- 6.4 As discussed in Section 5 of this report, the entire site is located within Flood Zone 1. Table 3 of the PPG states that all uses are appropriate within Flood Zone 1. Therefore, the proposed development uses are compatible with the flood zone of the site and developing the site for its intended purposes is considered appropriate in terms of flood risk. As such, the Sequential Test and Exception Test do not need to be applied to this development.

Surface Water

- 6.5 The risk of surface water flooding to the site is very low, with an annual probability of flooding of less than 1:1,000. However, the proposed development would cause an increase in terms of impermeable area and the respective increase in run-off, which would need to be appropriately managed to ensure flood risk does not increase.
- 6.6 A suitable drainage strategy will offer protection against surface water flooding by providing a positive drainage system, which will intercept overland flows generated within the site. The drainage system will be designed to ensure that no flooding takes place up to and including the design rainfall event (1 in 100 year return period), with additional capacity within the system to allow for the potential future effects of climate change.
- 6.7 Therefore, after applying this drainage strategy (described in Section 7), surface water flooding is not considered to be an issue that would prevent the development of the site for its intended end use.

Other Sources

6.8 A review of sources of potential flooding in Section 5 of this report has concluded that there is a low risk to the proposed development from all other sources of flooding examined. As such, no flood risk mitigation measures are necessary.



7.0 Surface Water Drainage

- 7.1 The PPG recommends that priority should be given to the use of Sustainable Drainage Systems (SuDS) as they are designed to control surface water run-off where it falls and mimic natural drainage characteristics as closely as possible. Source control techniques will be incorporated into the drainage strategy to ensure that surface water run-off is managed as close to source as possible. Sustainable drainage systems (SuDS) also provide opportunities for the following:
 - Reducing the causes and impacts of flooding;
 - Removing pollutants from urban run-off at source; and
 - Combining water management and green space with benefits for amenity, recreation and wildlife.
- 7.2 SuDS encompass a wide range of drainage techniques intended to minimise the rate of discharge, volume and environmental impact of run-off and include:
 - pervious pavements;
 - swales and basins;
 - green roofs and rainwater reuse;
 - infiltration trenches and filter drains; and
 - ponds and wetlands.
- 7.3 When used across a site these techniques control the rate of discharge, attenuate flow, provide storage and improve water quality. The combination of techniques that are appropriate will be dependent upon ground conditions, topography and other site-specific characteristics.
- 7.4 The Building Regulations part H3 stipulates that rainwater from roofs and paved areas is carried away from surface to discharge to one of the following, listed in order of priority:
 - a) An adequate soakaway or some other adequate infiltration system; where that is not practical;
 - b) A watercourse; or, where that is not practical
 - c) A sewer.
- 7.5 Infiltration based techniques, such as porous paving and soakaways, are high up in the hierarchy of techniques available due to the ability for close to source dispersion of surface water. These techniques are considered the closest solution to mimic the natural drainage of undeveloped sites.

Groundwater Source Protection Zone

7.6 As shown in Section 2, the development site is located in a Source Protection Zone 2 (Outer Protection Zone). As such, the proposed surface water drainage strategy has been designed in accordance with the Environment Agency's Approach to Groundwater Protection Guidance, Version 1.2 (February 2018).



- 7.7 The Environment Agency may object in principle to, or refuse to permit, some activities or developments if they have potential to adversely affect groundwater. However, it should be noted that SPZs and aquifer designation are not site-specific risk assessments. The Environment Agency uses them as generic indicators of risk. Developers or operators may need to supply site-specific information to demonstrate that the risks are acceptable and can be mitigated.
- 7.8 The Environment Agency's guidance states that some discharges to ground, such as clean roof drainage or highway drainage, may not require permits. However, they can still have the potential to cause pollution if the discharge is not carefully designed or managed.
- 7.9 The discharge of clean roof water to ground is acceptable both within and outside SPZ1, provided that all roof water down-pipes are sealed against pollutants entering the system from surface water run-off, effluent disposal or other forms of discharge. The method of discharge must not create new pathways for pollutants to groundwater or mobilise contaminants already in ground. No permit is required if the above criteria can be met.
- 7.10 The Government's expectation is that sustainable drainage systems (SuDS) will be provided in new developments wherever this is appropriate. The Environment Agency supports this expectation. Where infiltration SuDS are to be used for surface run-off from roads, car parking and public or amenity areas, they should:
 - be suitably designed;
 - meet Government's non-statutory technical standards for sustainable drainage systems – these standards should be used in conjunction with the NPPF and PPG; and
 - use a SuDS management treatment train that is, use drainage components in series to achieve a robust surface water management system that does not pose an unacceptable risk of pollution to groundwater.
- 7.11 In addition, the CIRIA document C753 'The SuDs Manual' (2015) states that in England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (i.e. over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance.
- 7.12 A number of SuDS components in series (forming a management train) through a development site facilitates the capture, conveyance and storage of surface water runoff while delivering interception and pollution risk management.
- 7.13 Therefore, in accordance with Hertfordshire County Council pre-application advice, a robust surface water drainage strategy has been designed for this site, as shown in the following paragraphs, by using different SuDS features established in 'cascade' (i.e. in-line) in order to provide a suitable SuDS management train, as well as potential ecological and biodiversity benefits to the proposed development site.



Sustainable Drainage

7.14 The choice of SuDS features has been assessed against site / development constraints. Table 2 includes details of various SuDS features as set out in the SuDS Manual and identifies those features most suited for Highbury Works.

Table 2: SuDS Features

SuDS Feature	Description	Water Quality	Amenity	Biodiversity	Site-Specific Suitability
Rainwater harvesting	Systems that collect runoff from roofs / surfaces for re- use		Y		Use of these features will be considered on a plot-by-plot
Green roofs	Planted soil layers on flat roofs that slow and store runoff	Y	Y	Y	basis at detailed design stage.
Filter strips	Grass strips that promote sedimentation and filtration as water flows over the surface	Y	Y	Y	Filter strips could be provided adjacent to hardstanding areas to replace conventional piped systems within the development wherever appropriate, conveying water to downstream SuDS features.
Filter drains	Shallow stone-filled trenches that provide attenuation, conveyance and treatment	Y	Y	Y	Swales provide higher pollution mitigation measures compared to filter drains, so these SuDS features were not considered for this site.
Swales	Vegetated channels used to convey and treat runoff	Y	Y	Y	Swales will be provided along the edge of the major access roads, which will collect and treat run-off from the road.
Trees / bio- retention	Trees within soil-filled tree pits, tree planters or structural soils used to collect, store and treat runoff	Y	Y	Y	Tree pit systems and bioretention systems could be used to enhance other features, such as swales and filter strips. Tree pits will be provided along the edge of the major access road, along the swales, to enhance water quality entering the downstream features.
Raingarden	Shallow landscaped depressions used to collect, store and treat runoff	Y	Y	Y	Use of these features will be considered on a plot-by-plot basis at detailed design stage.
Infiltration systems	Systems that collect and store runoff, allowing it to infiltrate into the ground	Y	Y	Y	Infiltration basins will be used to provide attenuation and treatment of run-off prior discharging into the underlying chalk strata via deep boreholes.



Pervious pavements	Paving through which runoff soaks and is stored in the sub-base beneath, and/ or allowed to infiltrate into the ground	Υ	Y	Y	Pervious paving with lined sub- base will be used to collect and treat run-off from shared surface streets and private drives.
Attenuation storage (geo- cellular storage tanks)	Below-ground geo-cellular crates used to temporarily store run-off before infiltration, controlled release or use	Y	Y	Y	Above-ground SuDS features have been prioritized over geo- cellular storage tanks, so these SuDS features were not considered for this site.
Detention basins	Vegetated depressions that store and treat runoff	Y	Y	Y	Attenuation basins will be used to provide attenuation and treatment of run-off.
Ponds and wetlands	Permanent pools of water used to treat runoff with storage above the pool	Y	Y	Y	Due to the use of infiltration basins within the drainage design, these SuDS features were not considered for this site.

7.15 A Drainage and SuDS Strategy is included in Appendix J which indicates proposed SuDS features to be incorporated within the development, in accordance with Hertfordshire County Council's requirements, which are described below.

Proposed Surface Water Drainage Strategy

- 7.16 The proposed strategy strives to utilise sustainable drainage techniques in accordance with the guidance described in CIRIA document C753 'The SuDS Manual' (2015) to accommodate run-off from all rainfall events up to and including the 1 in 100-year event, with a 40% allowance for climate change.
- 7.17 The proposed surface water drainage system has been designed to adoptable standards in accordance with Sewers for Adoption (7th Edition) to produce a robust design.
- 7.18 As discussed in Section 2 of this report, site investigation works carried out by BRD Environmental Ltd within the southern land parcel concluded that the disposal of collected surface water to infiltration devices into the clay-rich soils of the Kesgrave Catchment Subgroup will be marginally feasible and therefore recommended discharging into the underlying chalk bedrock using deep boreholes.
- 7.19 Due to the similarity between the northern and southern land parcels in terms of geological characteristics and ground conditions, as shown in Section 2 of this report, the drainage strategies for both parcels have been designed following the same approach.
- 7.20 All surface water run-off from the proposed development is to be discharged by gravity to infiltration basins to provide sufficient storage volumes before discharging to the underlaying chalk bedrock via deep boreholes, with no direct discharges off-site.
- 7.21 The initial surface water drainage proposals will provide SuDS storage for both northern and southern land parcels, maximising the use of above ground storage and source control as described below.



Northern Catchment

- Two above-ground infiltration basins in the open space in the south-east corner of the catchment (in the centre of the wider site), established in cascade.
- An above-ground attenuation basin discharging into the aforementioned downstream infiltration basin at a restricted rate.
- An additional above-ground attenuation basin whereby excesses from the aforementioned infiltration basins will be discharged into the downstream drainage system allocated within the southern land parcel at a restricted rate.

Southern Catchment

- Three above-ground infiltration basins in the open space area to the south-east, behind the treeline and in the landscape buffer in the south-west corner of the site.
- 7.22 Surface water run-off from the proposed major access roads will be drained towards kerb inlets established along the road margins and then discharged into tree pits and swales established along the edge of the roads. Run-off will be then treated and conveyed towards the underground drain established beneath the access road, thereby allowing water to flow into the pipework downstream towards the infiltration basins. These SuDS features will provide a first level of water quality treatment. Filter strips could also be accommodated alongside the access road within the development to provide a further level of treatment, if required.
- 7.23 The proposed shared surface streets and private drives are proposed to be constructed with permeable surfacing and a lined / tanked sub-base constructed with a minimum 30% void ratio. This construction will provide attenuation storage as well as a first level of water quality treatment.
- 7.24 The proposed shared surface streets and private drives will drain under their own footprint into the porous sub-base beneath. Perforated pipes will be provided in trenches below the permeable paving, with gravel around the pipe to connect with the pavement, thereby allowing water to flow into the pipework downstream towards the infiltration basins. The sub-base formation level will fall towards the perforated pipes.
- 7.25 Attenuation basins will be established within the northern land parcel in order to provide additional surface water storage, before discharging into the adjacent downstream infiltration basin located in the open space (in the centre of the wider site) and into the downstream drainage system allocated within the southern land parcel at a restricted rate.
- 7.26 The site investigation carried out by BRD Environmental Ltd, described in Section 2 of this report and provided in Appendix E, recorded infiltration rates of the order of 10⁻⁴m/s in the chalk bedrock, which are indicative of good drainage characteristics. As such, deep borehole soakaways will be assigned to the base level of the infiltration systems, to reach the chalk bedrock (Lewes Nodular Chalk and Seaford Chalk Formations) and allow run-off from the proposed development to infiltrate into the underlying chalk bedrock.



- 7.27 A maximum infiltration rate of 1.0l/s has been considered for each borehole soakaway as an initial approach. As such, by establishing minimum offset distances of 10m between boreholes and 20m between boreholes and adjacent building foundations, a maximum number of 13 boreholes have been allocated to the infiltration features of the northern land parcel, giving a total infiltration rate of 13.0l/s, and 14 boreholes for the southern land parcel, giving a total infiltration rate of 14.0l/s.
- 7.28 As shown in Section 3 of this report, the total impermeable area of the proposed development within the northern land parcel is approximately 3.53ha, while the total impermeable area of the southern land parcel is approximately 2.87ha, which also include the areas allocated to the proposed shared surface streets and private drives, which will be built using permeable materials. A 10% allowance for urban creep has been included within the proposed impermeable areas in accordance with the Hertfordshire County Council Local Flood Risk Management Strategy (LFRSM 2).
- 7.29 For the northern land parcel, results from the MicroDrainage model show that two infiltration basins with base areas between 291m² and 411m² and depths between 1.4m and 1.7m, along with two attenuation basins with base areas between 181m² and 176m² and depths between 1.4m and 1.09m, would be capable of managing run-off from the impermeable surface areas during the 1:100 year+40%CC rainfall event. Both infiltration and attenuation basins have been designed with sides slopes of 1/3 between the basin and the adjacent trees and roads and 1/6 between the basins and those areas publicly accessible.
- 7.30 A maximum of 13no. deep boreholes has been established within the base level of the basins. The infiltration and attenuation basins would reach a maximum flood depth of between 1.67m and 1.07m, as well as maximum storage volume of between 1,123m³ and 311m³.
- 7.31 For the southern land parcel, results from the MicroDrainage model show that three infiltration basins with base areas between 427m² and 169m², depths between 1.0m and 1.57m and with sides slope of 1/3, would be capable of managing run-off from the impermeable surface areas during the 1:100 year+40%CC rainfall event. The infiltration basins would reach a maximum flood depth of between 0.87m and 1.47m, as well as maximum storage volume of between 1,113m³ and 208m³.
- 7.32 Due to the good infiltration rates recorded in the chalk bedrock and MicroDrainage model results showing the system draining from full to half full within 24 hours, it has been concluded that infiltration basins will only show standing water at times of exceptionally heavy rainfall events when people and local residents would not choose to be outside using the public open space allocated for these SuDS features. On this basis, MicroDrainage results indicate that water within the infiltration basins would swiftly drain into the underlying soil strata, and therefore these basins would be dry and useable as public open space the vast majority of the time.
- 7.33 Refer to Appendix K for the full hydraulic calculations for the SuDS features and surface water drainage network.
- 7.34 The indicative surface water drainage strategy is presented in Appendix J.



- 7.35 At source techniques, such as rainwater harvesting, green roofs and raingardens, will be considered on a plot-by-plot basis at detailed design stage. These will reduce the rate and/or volume discharging into downstream SuDS features, as well as providing additional water quality treatment.
- 7.36 As discussed in Section 6, the proposed drainage strategy will provide protection against any surface water flood risk by providing a positive drainage system, which will intercept overland flows generated within the site. Existing flow routes though the site will also be preserved. The development layout incorporates road routes throughout the site, whereby any potential overland exceedance flows would be routed via the road network, away from buildings.

Summary

7.37 The proposed surface water drainage strategy is in accordance with Building Regulations Part H where discharging run-off by infiltration to ground is the most appropriate drainage solution.

Pollution Control

- 7.38 The use of SuDS on the site would help to remove urban pollutants from run-off before discharge to the ground or watercourses.
- 7.39 The SuDS Manual indicates that a SuDS management train is a robust pollutant removal strategy. Using a number of different SuDS components in series will help target a good range of particulate-bound and dissolved pollutants, will deliver gradual improvement in water quality and will act as a buffer for accidental spills and intermittent high pollutant loads. The SuDS Manual verifies the suitability of different SuDS components, including pervious pavement, bioretention, swales and basins within the management train as are proposed in this case.
- 7.40 Due to the surface water disposal from the infiltration basins via deep boreholes distributed at different locations of the base, it is concluded that pollutant mitigation measures from the infiltration basins could be comparable with those of 'detention' basins.
- 7.41 Detention basins provide a useful stage in pollution control; the slowing of flows allows the settlement of suspended solids and allows biological uptake of pollutants by plants, algae and bacteria. Basins can also deliver biodiversity, ecology and amenity benefits to a development.
- 7.42 The Pollution Prevention Guidance advises that oil interceptors may not be required if SuDS are used within a development. The need for interceptors will be assessed when detailed proposals for the development are available.



Maintenance and Adoption

- 7.43 SuDS serving single properties will be owned and maintained by the owner of that property.
- 7.44 SuDS serving more than one property would be the responsibility of the local authority or private management company as appropriate. The maintenance of above ground features within open space areas could be undertaken by the local authority or by a private management company as appropriate, with the outlets and underlying pipework maintained by a private management company.
- 7.45 Suitable adoption and maintenance regimes for SuDS will be developed when detailed proposals for the development are available.



8.0 Summary and Conclusions

Summary

- 8.1 This Flood Risk Assessment has been prepared by Glanville Consultants on behalf of Alban Developments Ltd and Alban Peter Pearson, CALA Homes (Chiltern) Ltd and Redington Capital Ltd to accompany an outline planning application associated with development on land to the south of Chiswell Green Lane, near St Albans. The proposals include the provision of up to 391 dwellings and a 2 Form Entry (2FE) primary school with a capacity for 420 pupils.
- 8.2 The site had been identified Draft Local Plan for St Albans City and District as one of the "Broad Locations" for development to contribute towards addressing housing, infrastructure and other development needs over the period 2020 to 2036. Through the plan making process, it was recognised as a suitable Broad Location for release from the Green Belt, with the expectation that it would deliver a minimum of 365 dwellings. Following the withdrawal of the Draft Local Plan from the Examination process, the City and District Council is preparing a new Local Plan and this site is being promoted once again for development.
- 8.3 St Albans City and District Council provided pre-application advice in January 2022 (Ref: PRE/2021/0177), which referred to advice and guidance on flooding and drainage from Hertfordshire County Council as Lead Local Flood Authority (LLFA). This report has been prepared in accordance with the relevant advice and guidance from the LLFA.
- 8.4 This assessment has also been prepared in accordance with the requirement of National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), flood risk and drainage guidance and with reference to the relevant Strategic Flood Risk Assessments.
- 8.5 The site is located entirely within Flood Zone 1, which is land at the lowest risk of fluvial flooding and is at very low risk from all other potential sources of flooding.
- 8.6 Site investigation works carried out by BRD Environmental Ltd within the southern land parcel concluded that the disposal of collected surface water to infiltration devices into the clay-rich soils of the Kesgrave Catchment Subgroup will be marginally feasible and therefore recommended discharging into the underlying chalk bedrock using deep boreholes.
- 8.7 Due to the similarity between the northern and southern land parcels in terms of geological characteristics and ground conditions, the drainage strategies for both parcels have been designed following the same approach.
- 8.8 All surface water run-off from the proposed development is to be discharged by gravity to infiltration basins in order to provide sufficient storage volumes before discharging to the underlaying chalk bedrock via deep boreholes, with no direct discharges off-site, maximising the use of above ground storage and source control.
- 8.9 The proposed surface water drainage scheme will provide storage for the 1 in 100 year plus 40% climate change event without flooding from surface water.



- 8.10 As well as allowing infiltration and attenuation, the drainage strategy employed will also include SuDS measures as part of a robust treatment train, including pervious pavement, bioretention, swales and basins, to degrade pollutants, improve the quality of surface water discharged to the ground and protect groundwater.
- 8.11 Suitable adoption and maintenance regimes for SuDS will be developed when detailed proposals for the development are available.

Conclusion

- 8.12 In conclusion, this report has demonstrated that the proposed development:
 - is in accordance with the National Planning Policy Framework;
 - is in compliance with Local Policy and Guidance listed in paragraphs 4.4 to 4.12 of this report, including local Strategic Flood Risk Assessments and Flood Management Strategies;
 - will not be at an unacceptable risk from fluvial flooding or other sources;
 - will not increase flood risk elsewhere;
 - will employ a surface water drainage strategy based on the principles of sustainable drainage; and
 - will provide effective pollution mitigation measures for the surface water run-off from the proposed development, thereby avoiding any potential detrimental effects to groundwater.
- 8.13 Therefore, the site is suitable to accommodate the development proposed, and any potential impacts can be overcome through appropriate mitigation. As such, the proposals are considered to fully comply with National and Local planning policies in respect of flood risk and surface water drainage.

Glanville

Appendices

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Appendix A

Hertfordshire County Council's Pre-Application Advice

Director of Environment & Infrastructure: Mark Kemp



Ruth Ambrose St Albans City and District Council Civic Centre St Peters Street, St Albans Hertfordshire AL1 3JE Lead Local Flood Authority Post Point CHN 215 Hertfordshire County Council County Hall, Pegs Lane HERTFORD SG13 8DN

Contact Adam Rumble Email <u>FRMConsultations@hertfordshire.gov.uk</u>

Date 11 November 2021

RE: 5/2021/2905 – Land South of Chiswell Green Lane, St Albans, Hertfordshire

Dear Ruth,

Thank you for consulting us on the above application for the Screening Opinion – Development of between 415 – 450 residential dwellings, a new two form entry primary school, landscaping, and support infrastructure.

As the Lead Local Flood Authority, we will assess Surface Water Drainage Assessments and Flood Risk Assessments as part of a formal full / outline application. An FRA / Surface Water Drainage Assessment should be carried out to demonstrate that the proposed development will not create an increased risk of flooding from surface water to the development site and the surrounding area. It should be carried out in accordance with the National Planning Policy Framework and the National Planning Practice Guidance.

Due to the nature of the development, we will expect the development to demonstrate that the surface water drainage from the development can be managed in a suitable manner, giving priority to above ground storage and source control. By giving preference to infiltration, then discharge to a watercourse thereafter surface water sewer. The development should also seek to manage the flow route on site.

We would expect any FRA submitted to support any future planning applications to demonstrate that the proposed drainage system can be designed to cater within the site and the post development surface water run-off rates and volumes for its lifetime for all rainfall events up to and including the 1 in 100-year rainfall event + 40% allowance for climate change. The FRA should also demonstrate that any existing areas of surface water flood risk can be managed within the site without increasing flood risk elsewhere.

Where it will be proposed to infiltrate ground investigations should be carried out and provided within the FRA. This should include detailed assessment of ground conditions, groundwater levels, permeability of the underlying geology, with infiltration tests carried

out in accordance BRE Digest 365. The FRA should also demonstrate that there will be sufficient surface water quality treatment by implementing an appropriate amount of water quality treatment stages through the use of SuDS. We would recommend a minimum of two SuDS treatment stages should be provided to manage any potential contaminants from surface water run-off from car parking areas and access roads.

We note the site lies over a groundwater source protection zone 2 Outer catchment Source protection zone. For this reason, we recommend the applicant to implement appropriate treatment stages in case infiltration is considered as means of discharge for the surface water. The applicant should also consider consulting the Environment Agency in relation to water quality.

Details of required maintenance of any SuDS features and structures and who will be adopting these features for the lifetime of the development should be provided. It is up to the Local Planning authority to ensure that the drainage/SuDS system can be managed for the lifetime of the development.

For further guidance on HCC's policies on SuDS, HCC Developers Guide and Checklist and links to national policy and industry best practice guidance please refer to our surface water drainage webpage:

https://www.hertfordshire.gov.uk/services/recycling-waste-andenvironment/water/surface-water-drainage/surface-water-drainage.aspx#

Please note that if the LPA decides to grant planning permission we wish to be notified for our records.

Yours sincerely,

Adam Rumble Landscape / SuDS Officer Environment and Infrastructure



Appendix B

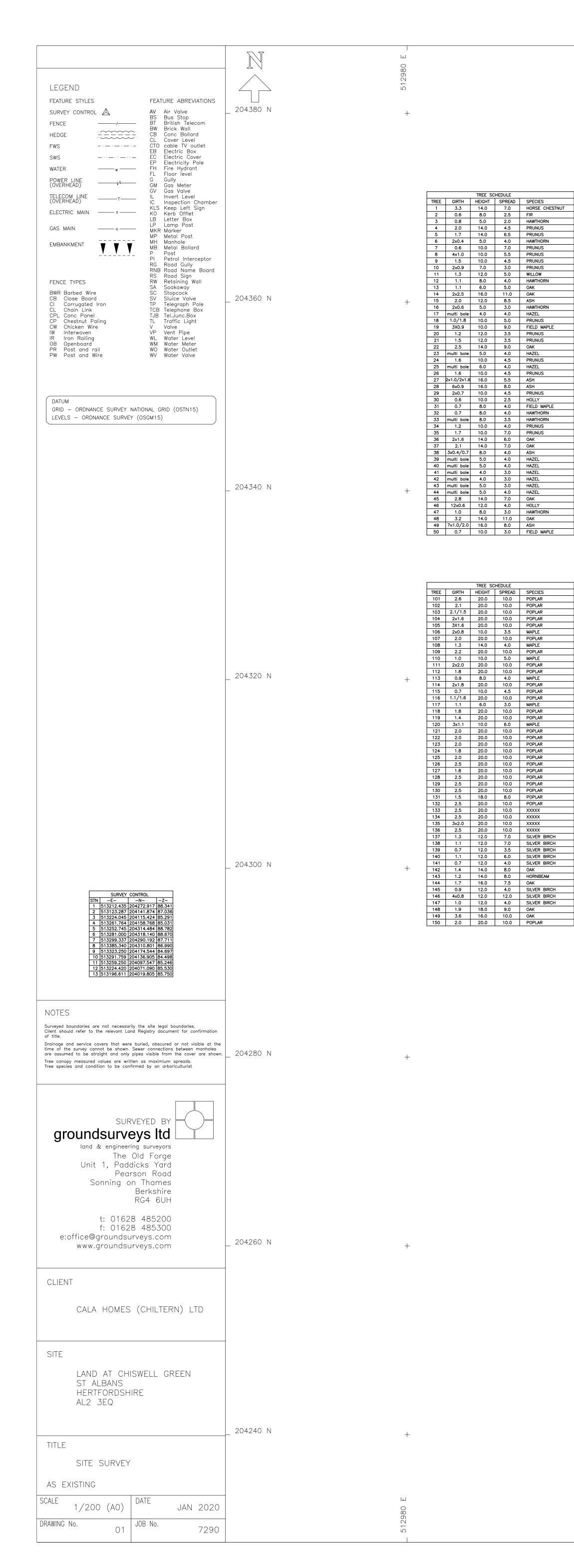
Location Plan





Appendix C

Topographical Survey



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		TREE SC	HEDULE		
TREE	GIRTH	HEIGHT	SPREAD	SPECIES	
51	2x0.6	8.0	3.0	HOLLY	
52	2.0	14.0	7.0	ASH	
53	6x0.6	8.0	4.5	ASH	
54	4x0.6	8.0	5.5	ASH	
55	3x0.6	8.0	4.0	ASH	
56	2x1.0	8.0	3.5	HAWTHORN	
57	2x0.6	8.0	2.5	HOLLY	
58	0.7/1.4	14.0	8.0	OAK	
59	2.9	16.0	11.0	OAK	
60	2x0.6	14.0	5.0	PRUNUS	
61	3x0.1/3x1.0	14.0	12.0	PRUNUS	
62	0.7	8.0	2.0	CYPRESS	
63	0.7	8.0	2.0	CYPRESS	
64	0.9	10.0	4.0	MAPLE	
65	2x1.2/2x0.4	12.0	4.0	HOLLY	4 +
66	0.4	12.0	4.0	HOLLY	
67	0.4	12.0	4.0	HOLLY	_
68	2x1.0	12.0	4.0	HOLLY	
69	1.0	12.0	4.0	HOLLY	
70	1.0	12.0	4.0	HOLLY	
71	1.0	12.0	4.0	HOLLY	
72	0.9	10.0	4.0	PRUNUS	
73	2x1.6	16.0	7.0	POPLAR	
74	2.3	18.0	12.0	POPLAR	
75	0.9/3x1.7	20.0	12.0	POPLAR	
76	8x0.5	8.0	6.0	PRUNUS	
77	2x0.6	8.0	4.0	PRUNUS	
78	2.6	20.0	11.0	POPLAR	
79	2.6	20.0	11.0	POPLAR	
80	2.6	20.0	11.0	POPLAR	
81	1.7	20.0	11.0	POPLAR	
82	2.6	20.0	11.0	POPLAR	
83	2.6	20.0	11.0	POPLAR	_
84	2.6	20.0	11.0	POPLAR	_
85	2.6	20.0	11.0	POPLAR	_
86	0.6	10.0	8.0	POPLAR	_
87	0.6	10.0	8.0	POPLAR	_
88	1.4	20.0	10.0	POPLAR	_
89	2.4	20.0	10.0	POPLAR	4
90	1.4	20.0	10.0	POPLAR	4
91	1.4	20.0	10.0	POPLAR	4
92	2.5	20.0	10.0	POPLAR	4
93	2.8	20.0	10.0	POPLAR	
94	1.0	10.0	4.5	MAPLE	\neg +
95	2.8	20.0	10.0	POPLAR	4
96	0.9	6.0	6.0	PRUNUS	_
97	3.7	20.0	10.0	POPLAR	4
98	3.7	20.0	10.0	POPLAR	_
99	2.6	20.0	10.0	POPLAR	

			TREE SC	HEDULE		
	TREE	GIRTH	HEIGHT	SPREAD	SPECIES	
	151	2.0	20.0	10.0	POPLAR	
	152	2.0	20.0	10.0	POPLAR	
	153	3.2	20.0	10.0	POPLAR	
	154	1.8	20.0	10.0	POPLAR	
	155	1.7	14.0	5.0	ACACIA	
	156	5x0.4	6.0	3.0	PRUNUS	
	157	1.4	8.0	4.0	SILVER BIRCH	
	158	0.8	6.0	2.5	SCOTS PINE	
	159	0.8	6.0	2.5	SILVER BIRCH	
	160	1.2	6.0	2.5	WHITE BEAM	
	161	1.2	6.0	2.5	WHITE BEAM	
	162	1.2	6.0	2.5	WHITE BEAM	
_	163	0.9	6.0	3.5	FIELD MAPLE	+
	164	0.7	6.0	2.5	FIELD MAPLE	
	165	0.9	8.0	3.5	FIELD MAPLE	
	166	0.9	8.0	3.5	FIELD MAPLE	
	167	0.9	8.0	3.5	FIELD MAPLE	
	168	0.8	8.0	3.5	FIELD MAPLE	
	169	0.7	8.0	3.5	FIELD MAPLE	
	170	0.9	8.0	4.0	FIELD MAPLE	
	171	1.4	7.0	4.0	PURPLE PRUNUS	
	172	0.7	6.0	4.0	MAPLE	
	173	0.7	5.0	4.0	PRUNUS	
	174	1.8	10.0	5.0	APPLE	
	175	multi bole	5.0	3.5	ROWAN	
	176	0.8	10.0	4.0	SILVER BIRCH	
	177	0.8	10.0	4.0	SILVER BIRCH	
	178	1.2	10.0	4.5	PRUNUS	
	179	0.9	8.0	3.0	PRUNUS	
	180	0.6	5.0	4.0	PRUNUS	
	181	1.5	8.0	5.0	PRUNUS	
	182	1.1	12.0	4.0	SILVER BIRCH	
	183	1.7	8.0	5.0	PRUNUS	
	184	2.6	20.0	10.0	POPLAR	
	185	1.2	6.0	4.0	APPLE	

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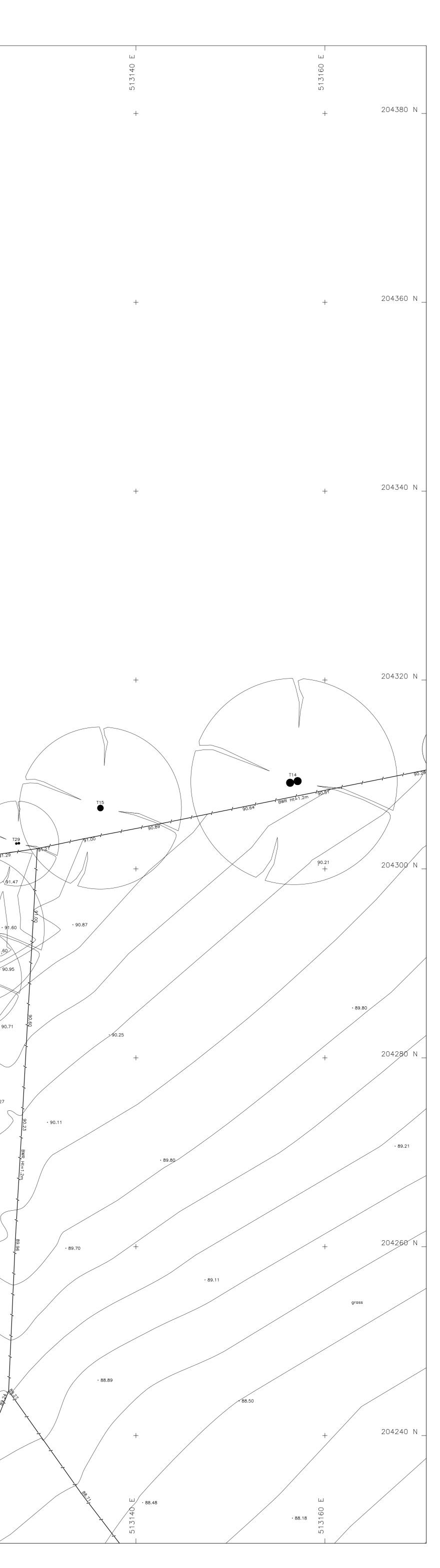
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FIELD MAPLE

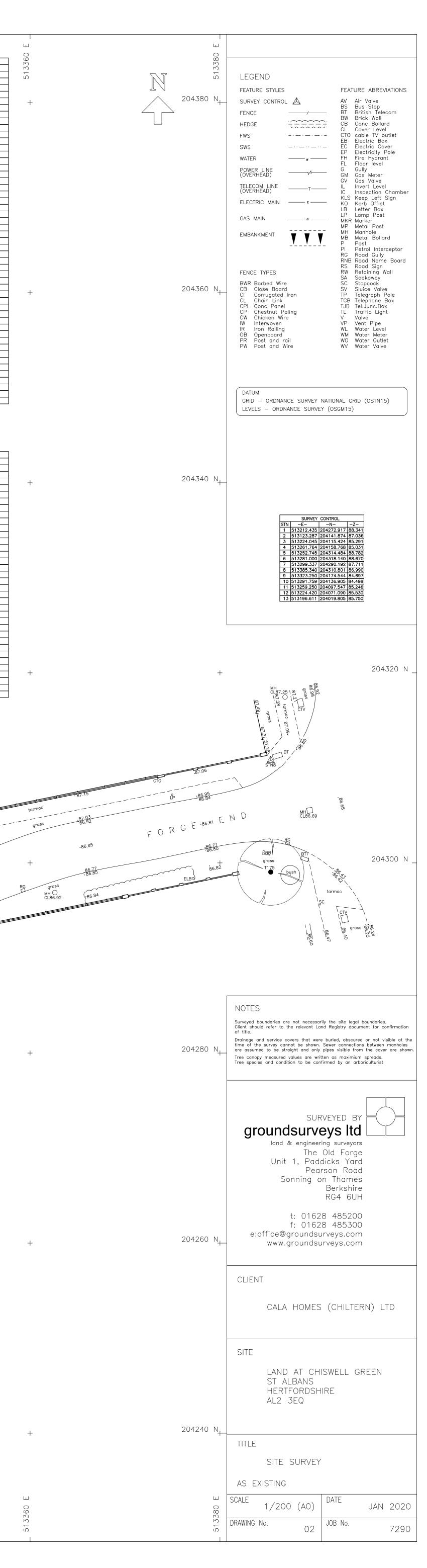
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te beam D MAPLE SILVER BIRCH PRUNUS POPLA

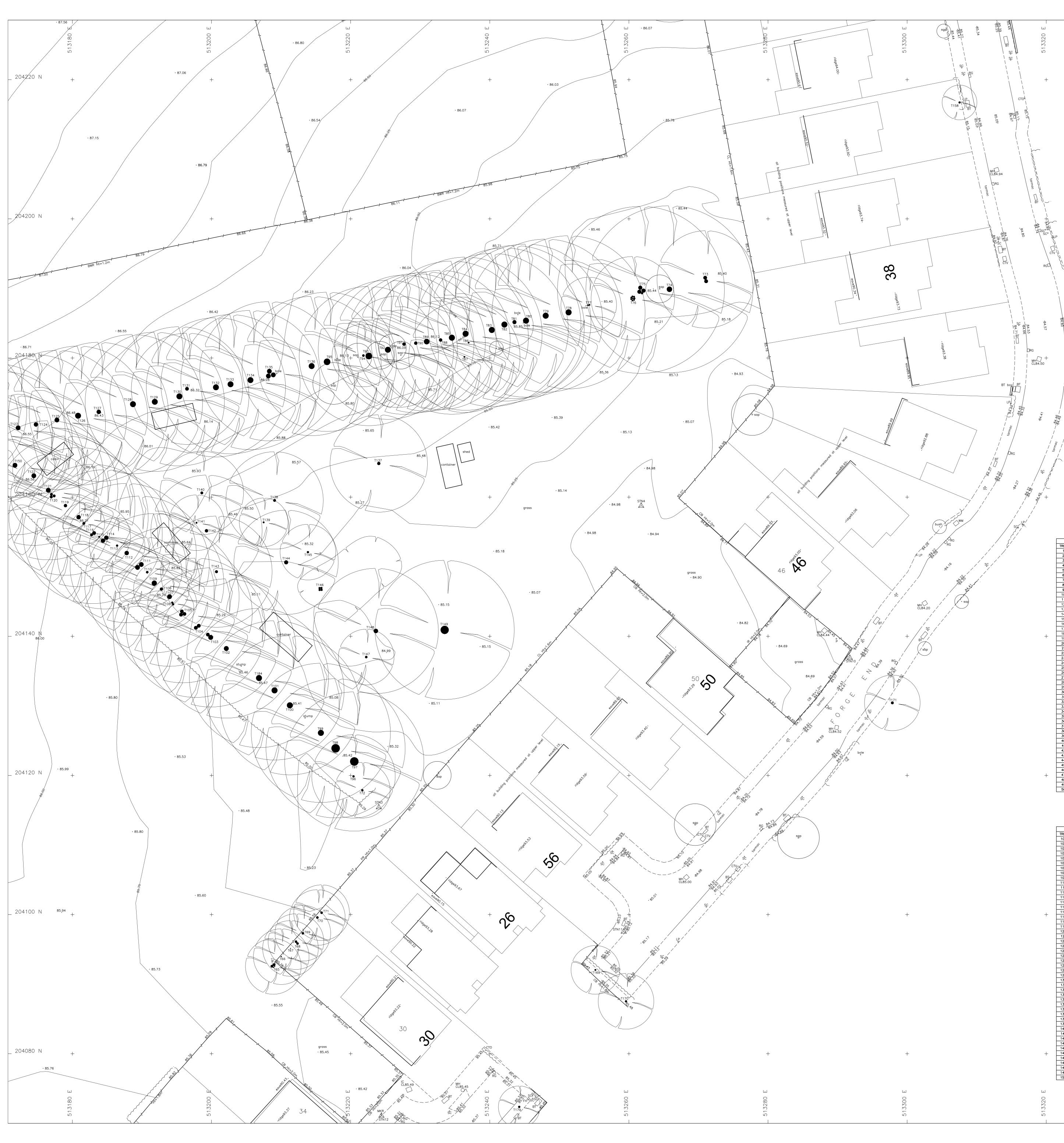
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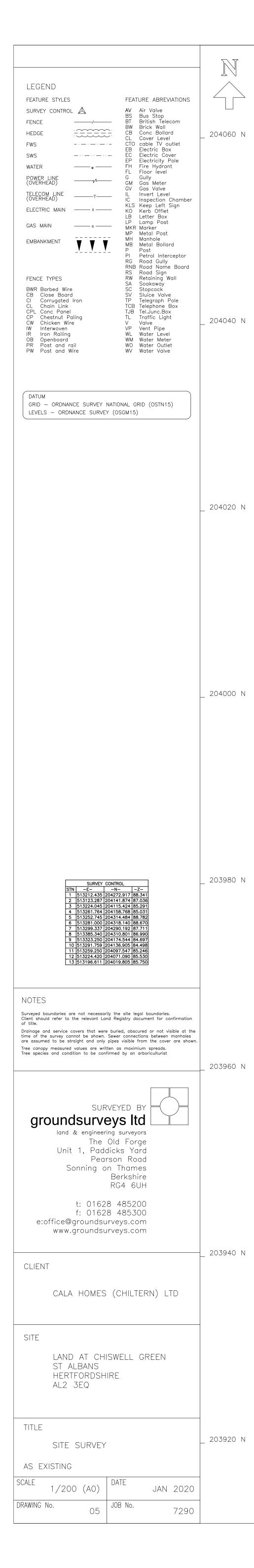
5.0	WILLOW		61	3
4.0	HAWTHORN		62	Γ
5.0	OAK		63	T
11.0	OAK		64	Γ
8.5	ASH		65	2>
3.0	HAWTHORN		66	Γ
4.0	HAZEL		67	Г
5.0	PRUNUS		68	Γ
9.0	FIELD MAPLE	+	69	Г
3.5	PRUNUS		70	Г
3.5	PRUNUS		71	Г
9.0	OAK		72	Γ
4.0	HAZEL		73	Г
4.5	PRUNUS		74	Г
4.0	HAZEL		75	0
4.5	PRUNUS		76	T
5.5	ASH		77	Γ
8.0	ASH		78	Г
4.5	PRUNUS		79	Γ
2.5	HOLLY		80	Г
4.0	FIELD MAPLE		81	Γ
4.0	HAWTHORN		82	Г
3.5	HAWTHORN		83	Γ
4.0	PRUNUS		84	Г
7.0	PRUNUS		85	Г
6.0	OAK		86	Γ
7.0	OAK		87	Г
4.0	ASH		88	Γ
4.0	HAZEL		89	Г
4.0	HAZEL		90	Г
3.0	HAZEL		91	Г
3.0	HAZEL		92	Г
3.0	HAZEL		93	Г
4.0	HAZEL		94	Γ
7.0	OAK		95	Τ
4.0	HOLLY		96	Γ
3.0	HAWTHORN	+	97	Τ
11.0	OAK		98	
8.0	ASH		99	Τ
3.0	FIELD MAPLE		100	

		TREE SC	HEDULE	
TREE	GIRTH	HEIGHT	SPREAD	SPECIES
51	2x0.6	8.0	3.0	HOLLY
52	2.0	14.0	7.0	ASH
53	6x0.6	8.0	4.5	ASH
54	4x0.6	8.0	5.5	ASH
55	3x0.6	8.0	4.0	ASH
56	2x1.0	8.0	3.5	HAWTHORN
57	2x0.6	8.0	2.5	HOLLY
58	0.7/1.4	14.0	8.0	OAK
59	2.9	16.0	11.0	OAK
60	2x0.6	14.0	5.0	PRUNUS
61	3x0.1/3x1.0	14.0	12.0	PRUNUS
62	0.7	8.0	2.0	CYPRESS
63	0.7	8.0	2.0	CYPRESS
64	0.9	10.0	4.0	MAPLE
65	2x1.2/2x0.4	12.0	4.0	HOLLY
66	0.4	12.0	4.0	HOLLY
67	0.4	12.0	4.0	HOLLY
68	2x1.0	12.0	4.0	HOLLY
69	1.0	12.0	4.0	HOLLY
70	1.0	12.0	4.0	HOLLY
71	1.0	12.0	4.0	HOLLY
72	0.9	10.0	4.0	PRUNUS
73	2x1.6	16.0	7.0	POPLAR
74	2.3	18.0	12.0	POPLAR
75	0.9/3x1.7	20.0	12.0	POPLAR
76	8x0.5	8.0	6.0	PRUNUS
77	2x0.6	8.0	4.0	PRUNUS
78	2.6	20.0	11.0	POPLAR
79	2.6	20.0	11.0	POPLAR
80	2.6	20.0	11.0	POPLAR
81	1.7	20.0	11.0	POPLAR
82	2.6	20.0	11.0	POPLAR
83	2.6	20.0	11.0	POPLAR
84	2.6	20.0	11.0	POPLAR
85	2.6	20.0	11.0	POPLAR
86	0.6	10.0	8.0	POPLAR
87	0.6	10.0	8.0	POPLAR
88	1.4	20.0		POPLAR
89	2.4	20.0	10.0 10.0	POPLAR
90	1.4	20.0	10.0	POPLAR
91	1.4	20.0	10.0	POPLAR
92	2.5	20.0	10.0	POPLAR
93	2.8	20.0	10.0	POPLAR
94	1.0	10.0	4.5	MAPLE
95	2.8	20.0	10.0	POPLAR
96	0.9	6.0	6.0	PRUNUS
97	3.7	20.0	10.0	POPLAR
98	3.7	20.0	10.0	POPLAR
99	2.6	20.0	10.0	POPLAR
100	2.6	20.0	10.0	POPLAR

		TREE SC	HEDULE	
TREE	GIRTH	HEIGHT	SPREAD	SPECIES
151	2.0	20.0	10.0	POPLAR
152	2.0	20.0	10.0	POPLAR
153	3.2	20.0	10.0	POPLAR
154	1.8	20.0	10.0	POPLAR
155	1.7	14.0	5.0	ACACIA
156	5x0.4	6.0	3.0	PRUNUS
157	1.4	8.0	4.0	SILVER BIRCH
158	0.8	6.0	2.5	SCOTS PINE
159	0.8	6.0	2.5	SILVER BIRCH
160	1.2	6.0	2.5	WHITE BEAM
161	1.2	6.0	2.5	WHITE BEAM
162	1.2	6.0	2.5	WHITE BEAM
163	0.9	6.0	3.5	FIELD MAPLE
164	0.7	6.0	2.5	FIELD MAPLE
165	0.9	8.0	3.5	FIELD MAPLE
166	0.9	8.0	3.5	FIELD MAPLE
167	0.9	8.0	3.5	FIELD MAPLE
168	0.8	8.0	3.5	FIELD MAPLE
169	0.7	8.0	3.5	FIELD MAPLE
170	0.9	8.0	4.0	FIELD MAPLE
171	1.4	7.0	4.0	PURPLE PRUNUS
172	0.7	6.0	4.0	MAPLE
173	0.7	5.0	4.0	PRUNUS
174	1.8	10.0	5.0	APPLE
175	multi bole	5.0	3.5	ROWAN
176	0.8	10.0	4.0	SILVER BIRCH
177	0.8	10.0	4.0	SILVER BIRCH
178	1.2	10.0	4.5	PRUNUS
179	0.9	8.0	3.0	PRUNUS
180	0.6	5.0	4.0	PRUNUS
181	1.5	8.0	5.0	PRUNUS
182	1.1	12.0	4.0	SILVER BIRCH
183	1.7	8.0	5.0	PRUNUS
184	2.6	20.0	10.0	POPLAR
185	1.2	6.0	4.0	APPLE

+

+ 513360 E	Ш 082 133 0 204220 N _	LEGEND FEATURE STYLES SURVEY CONTROL A FENCE HEDGE FWS SWS FENCE FWS FENCE FWS FENCE FWS FENCE FWS FENCE FWS FUCE FUCE FUCE FUCE FWS FUCE FWS FUCE FWS FUCE FWS FUCE
+	204200 N ₊ -	WATER
+	204180 N ₊ -	DATUM GRID – ORDNANCE SURVEY NATIONAL GRID (OSTN15) LEVELS – ORDNANCE SURVEY (OSGM15)
+	204160 N ₊ -	
+	204140 N_	SURVEY CONTROL STN -E- -N- -Z- 1 513212.435 204272.917 88.341 2 513123.287 204141.874 87.036 3 513224.045 20415.424 85.291 4 513261.764 204158.768 85.031 5 513252.745 204318.140 88.670 7 513299.337 204290.192 87.711 8 513325.250 204174.544 84.697 0 513229.1759 204136.905 84.498 11 513225.250 20407.547 85.230 10 513229.1759 204136.905 84.498 11 513229.250 20407.547 85.246 12 51324.420 204071.909 85.530 13 513196.611 204019.805 85.750
+	204120 N ₊ -	NOTES Surveyed boundaries are not necessarily the site legal boundaries. Client should refer to the relevant Land Registry document for confirmation of title. Drainage and service covers that were buried, obscured or not visible at the time of the survey cannot be shown. Sewer connections between manholes are assumed to be straight and only pipes visible from the cover are shown. Tree canopy measured values are written as maximium spreads. Tree species and condition to be confirmed by an arboriculturist SURVEYED BY GROUNDASURVEYS Itd
+	204100 N ₊ -	Iand & engineering surveyors The Old Forge Unit 1, Paddicks Yard Pearson Road Sonning on Thames Berkshire RG4 6UH t: 01628 485200 f: 01628 485300 e:office@groundsurveys.com www.groundsurveys.com CLIENT CALA HOMES (CHILTERN) LTD SITE
3360 E +	204080 N ₁	LAND AT CHISWELL GREEN ST ALBANS HERTFORDSHIRE AL2 JEQ TITLE SITE SURVEY AS EXISTING SCALE 1/200 (A0) DATE JAN 2020
5133	2 2 3 3	DRAWING No. 04 JOB No. 7290

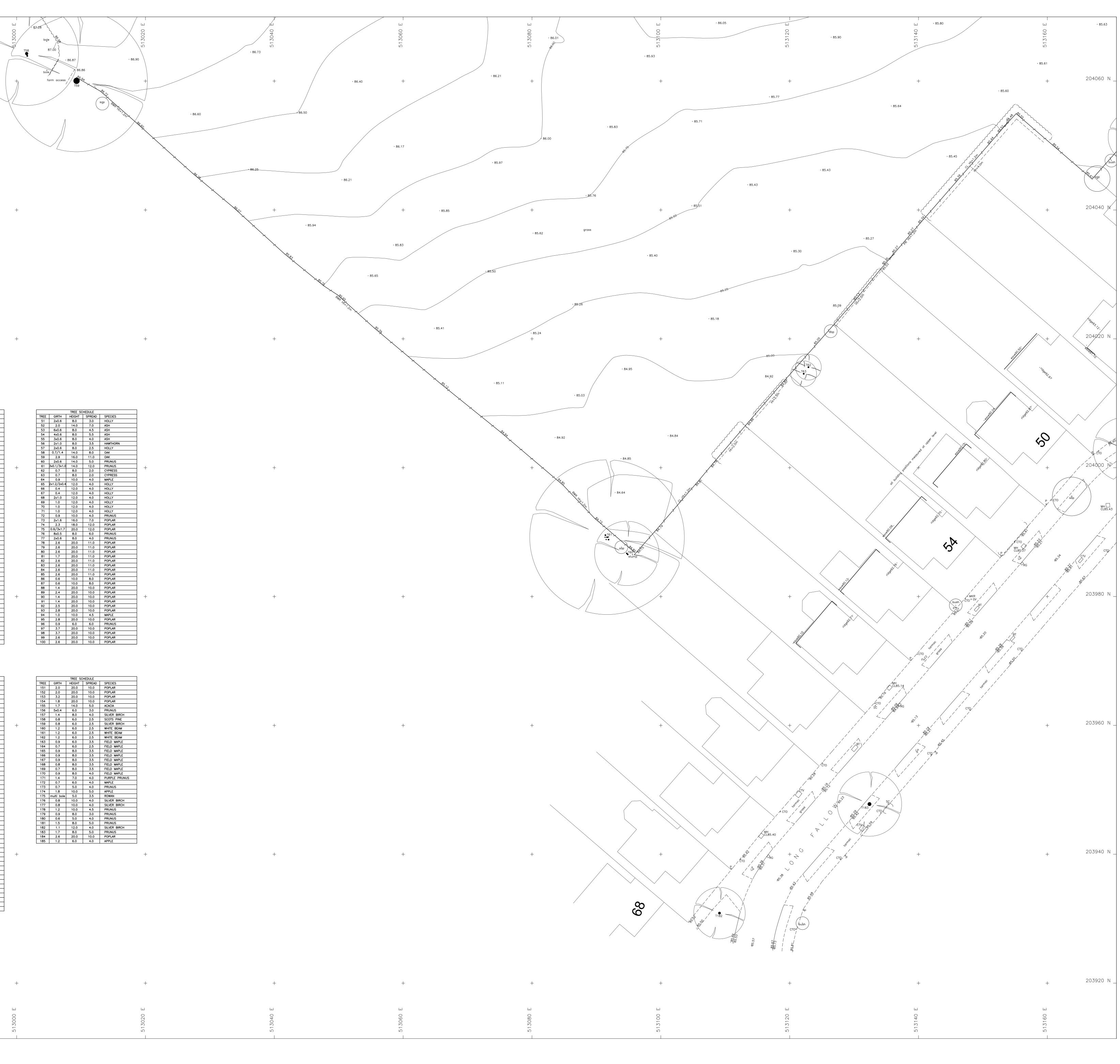


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		TREE SC	HEDULE	
TREE	GIRTH	HEIGHT	SPREAD	SPECIES
1	3.3	14.0	7.0	HORSE CHESTNUT
2	0.6	8.0	2.5	FIR
3	0.8	5.0	2.0	HAWTHORN
4	2.0	14.0	4.5	PRUNUS
5	1.7	14.0	6.5	PRUNUS
6	2x0.4	5.0	4.0	HAWTHORN
7	0.6	10.0	7.0	PRUNUS
8	4x1.0	10.0	5.5	PRUNUS
9	1.5	10.0	4.5	PRUNUS
10	2x0.9	7.0	3.0	PRUNUS
11	1.3	12.0	5.0	WILLOW
12	1.1	8.0	4.0	HAWTHORN
13	1.1	6.0	5.0	OAK
14	2x2.5	16.0	11.0	OAK
15	2.0	12.0	8.5	ASH
16	2x0.6	5.0	3.0	HAWTHORN
17	multi bole	4.0	4.0	HAZEL
18	1.0/1.8	10.0	5.0	PRUNUS
19	3X0.9	10.0	9.0	FIELD MAPLE
20	1.2	12.0	3.5	PRUNUS
21	1.5	12.0	3.5	PRUNUS
22	2.5	14.0	9.0	OAK
23	multi bole	5.0	4.0	HAZEL
24	1.6	10.0	4.5	PRUNUS
25	multi bole	6.0	4.0	HAZEL
26	1.6	10.0	4.5	PRUNUS
20	2x1.0/2x1.6	16.0	5.5	ASH
28	6x0.9	16.0	8.0	ASH
20	2x0.7	10.0	4.5	PRUNUS
30	0.6	10.0	2.5	HOLLY
31	0.7	8.0	4.0	FIELD MAPLE
32	0.7	8.0	4.0	HAWTHORN
33	multi bole	8.0	3.5	HAWTHORN
34	1.2	10.0	4.0	PRUNUS
35	1.7	10.0	7.0	PRUNUS
36	2x1.6	14.0	6.0	OAK
37	2.1	14.0	7.0	OAK
38	3x0.4/0.7	8.0	4.0	ASH
39	multi bole	5.0	4.0	HAZEL
40	multi bole	5.0	4.0	HAZEL
41	multi bole	4.0	3.0	HAZEL
42	multi bole	4.0	3.0	HAZEL
43	multi bole	5.0	3.0	HAZEL
44	multi bole	5.0	4.0	HAZEL
44	2.8	14.0	7.0	OAK
46	12x0.6	12.0	4.0	HOLLY
40	1.0	8.0	3.0	HAWTHORN
47	3.2	14.0	11.0	OAK
49	7x1.0/2.0	14.0	8.0	ASH
+9	1,2.0	10.0	3.0	A311

	TREE SCHEDULE						
	TREE	GIRTH	HEIGHT	SPREAD	SPECIES		
	101	2.6	20.0	10.0	POPLAR		
	102	2.1	20.0	10.0	POPLAR		
	103	2.1/1.5	20.0	10.0	POPLAR		
	104	2x1.6	20.0	10.0	POPLAR		
	105	3X1.6	20.0	10.0	POPLAR		
	106	2x0.8	10.0	3.5	MAPLE		
	107	2.0	20.0	10.0	POPLAR		
	108	1.3	14.0	4.0	MAPLE		
	109	2.2	20.0	10.0	POPLAR		
+	110	1.0	10.0	5.0	MAPLE		
	111	2x2.0	20.0	10.0	POPLAR		
	112	1.8	20.0	10.0	POPLAR		
	112	0.9	8.0	4.0	MAPLE		
	114	2x1.8	20.0	10.0	POPLAR		
	115	0.7	10.0	4.5	POPLAR		
	115	1.1/1.6	20.0	10.0	POPLAR		
	117	1.1/1.0	6.0	3.0	MAPLE		
	118	1.1	20.0	10.0	POPLAR		
	119	1.4	20.0	10.0	POPLAR		
	120	3x1.1	10.0	6.0	MAPLE		
	120	2.0	20.0	10.0	POPLAR		
	121	2.0	20.0	10.0	POPLAR		
	122	2.0	20.0	10.0	POPLAR		
	123	1.8	20.0	10.0	POPLAR		
	125	2.0	20.0	10.0	POPLAR		
	125	2.5	20.0	10.0	POPLAR		
	120	1.8	20.0	10.0	POPLAR		
	127	2.5	20.0	10.0	POPLAR		
	120	2.5	20.0	10.0	POPLAR		
	130	2.5	20.0	10.0	POPLAR		
	130	1.5	18.0	8.0	POPLAR		
	132	2.5	20.0	10.0	POPLAR		
	133	2.5	20.0	10.0	XXXXX		
	134	2.5	20.0	10.0	XXXXX		
	135	3x2.0	20.0	10.0	XXXXX		
	136	2.5	20.0	10.0	XXXXX		
	130	1.3	12.0	7.0	SILVER BIRCH		
+	137	1.1	12.0	7.0	SILVER BIRCH		
I	138	0.7	12.0	3.5	SILVER BIRCH		
	139	1.1	12.0	5.5 6.0	SILVER BIRCH		
		0.7					
	141 142		12.0	4.0	SILVER BIRCH OAK		
	142	1.4	14.0	8.0			
		1.2 1.7	14.0	8.0 7.5	HORNBEAM		
	144		16.0				
	145	0.9	12.0	4.0	SILVER BIRCH		
	146	4x0.8	12.0	12.0	SILVER BIRCH		
	147	1.0	12.0	4.0	SILVER BIRCH		
	148	1.9	18.0	9.0	OAK		
	149	3.6	16.0	10.0	OAK		
	150	2.0	20.0	10.0	POPLAR		

+



		TREE SC	HEDULE	
TREE	GIRTH	HEIGHT	SPREAD	SPECIES
51	2x0.6	8.0	3.0	HOLLY
52	2.0	14.0	7.0	ASH
53	6x0.6	8.0	4.5	ASH
54	4x0.6	8.0	5.5	ASH
55	3x0.6	8.0	4.0	ASH
56	2x1.0	8.0	3.5	HAWTHORN
57	2x0.6	8.0	2.5	HOLLY
58	0.7/1.4	14.0	8.0	OAK
59	2.9	16.0	11.0	OAK
60	2x0.6	14.0	5.0	PRUNUS
61	3x0.1/3x1.0	14.0	12.0	PRUNUS
62	0.7	8.0	2.0	CYPRESS
63	0.7	8.0	2.0	CYPRESS
64	0.9	10.0	4.0	MAPLE
65	2x1.2/2x0.4	12.0	4.0	HOLLY
66	0.4	12.0	4.0	HOLLY
67	0.4	12.0	4.0	HOLLY
68	2x1.0	12.0	4.0	HOLLY
69	1.0	12.0	4.0	HOLLY
70	1.0	12.0	4.0	HOLLY
71	1.0	12.0	4.0	HOLLY
72	0.9	10.0	4.0	PRUNUS
73	2x1.6	16.0	7.0	POPLAR
74	2.3	18.0	12.0	POPLAR
75	0.9/3x1.7	20.0	12.0	POPLAR
76	8x0.5	8.0	6.0	PRUNUS
77	2x0.6	8.0	4.0	PRUNUS
78	2.6	20.0	11.0	POPLAR
79	2.6	20.0	11.0	POPLAR
80	2.6	20.0	11.0	POPLAR
81	1.7	20.0	11.0	POPLAR
82	2.6	20.0	11.0	POPLAR
83	2.6	20.0	11.0	POPLAR
84	2.6	20.0	11.0	POPLAR
85	2.6	20.0	11.0	POPLAR
86	0.6	10.0	8.0	POPLAR
87	0.6	10.0	8.0	POPLAR
88	1.4	20.0	10.0	POPLAR
89	2.4	20.0	10.0	POPLAR
90	1.4	20.0	10.0	POPLAR
91	1.4	20.0	10.0	POPLAR
92	2.5	20.0	10.0	POPLAR
93	2.8	20.0	10.0	POPLAR
94	1.0	10.0	4.5	MAPLE
95	2.8	20.0	10.0	POPLAR
96	0.9	6.0	6.0	PRUNUS
97	3.7	20.0	10.0	POPLAR
98	3.7	20.0	10.0	POPLAR
99	2.6	20.0	10.0	POPLAR

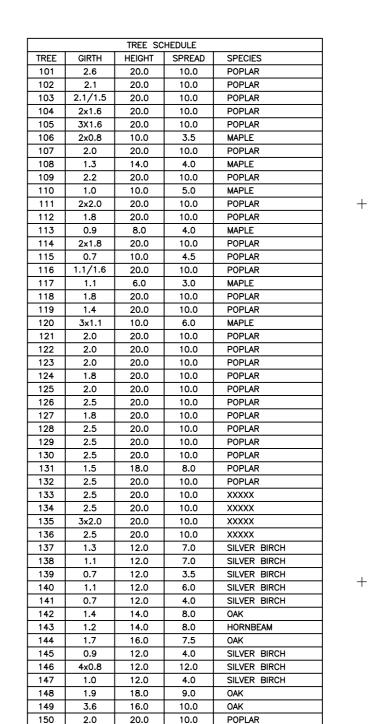
	1	TREE SC		
TREE	GIRTH	HEIGHT	SPREAD	SPECIES
151	2.0	20.0	10.0	POPLAR
152	2.0	20.0	10.0	POPLAR
153	3.2	20.0	10.0	POPLAR
154	1.8	20.0	10.0	POPLAR
155	1.7	14.0	5.0	ACACIA
156	5x0.4	6.0	3.0	PRUNUS
157	1.4	8.0	4.0	SILVER BIRCH
158	0.8	6.0	2.5	SCOTS PINE
159	0.8	6.0	2.5	SILVER BIRCH
160	1.2	6.0	2.5	WHITE BEAM
161	1.2	6.0	2.5	WHITE BEAM
162	1.2	6.0	2.5	WHITE BEAM
163	0.9	6.0	3.5	FIELD MAPLE
164	0.7	6.0	2.5	FIELD MAPLE
165	0.9	8.0	3.5	FIELD MAPLE
166	0.9	8.0	3.5	FIELD MAPLE
167	0.9	8.0	3.5	FIELD MAPLE
168	0.8	8.0	3.5	FIELD MAPLE
169	0.7	8.0	3.5	FIELD MAPLE
170	0.9	8.0	4.0	FIELD MAPLE
171	1.4	7.0	4.0	PURPLE PRUNUS
172	0.7	6.0	4.0	MAPLE
173	0.7	5.0	4.0	PRUNUS
174	1.8	10.0	5.0	APPLE
175	multi bole	5.0	3.5	ROWAN
176	0.8	10.0	4.0	SILVER BIRCH
177	0.8	10.0	4.0	SILVER BIRCH
178	1.2	10.0	4.5	PRUNUS
179	0.9	8.0	3.0	PRUNUS
180	0.6	5.0	4.0	PRUNUS
181	1.5	8.0	5.0	PRUNUS
182	1.1	12.0	4.0	SILVER BIRCH
183	1.7	8.0	5.0	PRUNUS
184	2.6	20.0	10.0	POPLAR
185	1.2	6.0	4.0	APPLE



+ + +

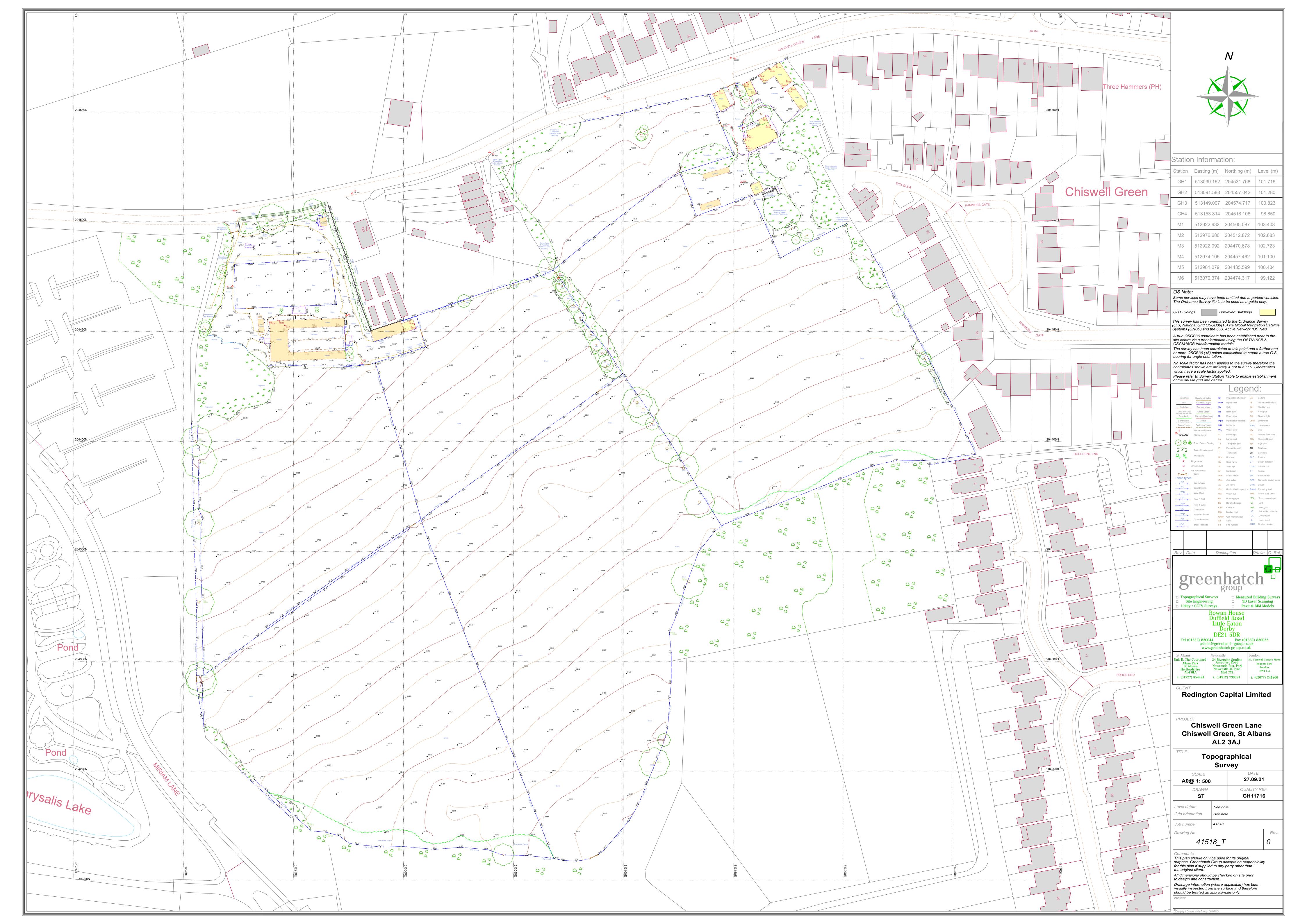
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69	1.0	12.0	4.0	HOLLY
70	1.0	12.0	4.0	HOLLY
71	1.0	12.0	4.0	HOLLY
72	0.9	10.0	4.0	PRUNUS
73	2x1.6	16.0	7.0	POPLAR
74	2.3	18.0	12.0	POPLAR
75	0.9/3x1.7	20.0	12.0	POPLAR
76	8x0.5	8.0	6.0	PRUNUS
77	2x0.6	8.0	4.0	PRUNUS
78	2.6	20.0	11.0	POPLAR
79	2.6	20.0	11.0	POPLAR
80	2.6	20.0	11.0	POPLAR
81	1.7	20.0	11.0	POPLAR
82	2.6	20.0	11.0	POPLAR
83	2.6	20.0	11.0	POPLAR
84	2.6	20.0	11.0	POPLAR
85	2.6	20.0	11.0	POPLAR
86	0.6	10.0	8.0	POPLAR
87	0.6	10.0	8.0	POPLAR
88	1.4	20.0	10.0	POPLAR
89	2.4	20.0	10.0	POPLAR
90	1.4	20.0	10.0	POPLAR
91	1.4	20.0	10.0	POPLAR
92	2.5	20.0	10.0	POPLAR
93	2.8	20.0	10.0	POPLAR
94	1.0	10.0	4.5	MAPLE
95	2.8	20.0	10.0	POPLAR
96	0.9	6.0	6.0	PRUNUS
97	3.7	20.0	10.0	POPLAR
98	3.7	20.0	10.0	POPLAR
99	2.6	20.0	10.0	POPLAR
100	2.6	20.0	10.0	POPLAR



TDEE				CDEOIEC
TREE	GIRTH	HEIGHT	SPREAD	SPECIES
151	2.0	20.0	10.0	POPLAR
152	2.0	20.0	10.0	POPLAR
153	3.2	20.0	10.0	POPLAR
154	1.8	20.0	10.0	POPLAR
155	1.7	14.0	5.0	ACACIA
156	5x0.4	6.0	3.0	PRUNUS
157	1.4	8.0	4.0	SILVER BIRCH
158	0.8	6.0	2.5	SCOTS PINE
159	0.8	6.0	2.5	SILVER BIRCH
160	1.2	6.0	2.5	WHITE BEAM
161	1.2	6.0	2.5	WHITE BEAM
162	1.2	6.0	2.5	WHITE BEAM
163	0.9	6.0	3.5	FIELD MAPLE
164	0.7	6.0	2.5	FIELD MAPLE
165	0.9	8.0	3.5	FIELD MAPLE
166	0.9	8.0	3.5	FIELD MAPLE
167	0.9	8.0	3.5	FIELD MAPLE
168	0.8	8.0	3.5	FIELD MAPLE
169	0.7	8.0	3.5	FIELD MAPLE
170	0.9	8.0	4.0	FIELD MAPLE
171	1.4	7.0	4.0	PURPLE PRUN
172	0.7	6.0	4.0	MAPLE
173	0.7	5.0	4.0	PRUNUS
174	1.8	10.0	5.0	APPLE
175	multi bole	5.0	3.5	ROWAN
176	0.8	10.0	4.0	SILVER BIRCH
177	0.8	10.0	4.0	SILVER BIRCH
178	1.2	10.0	4.5	PRUNUS
179	0.9	8.0	3.0	PRUNUS
180	0.6	5.0	4.0	PRUNUS
181	1.5	8.0	5.0	PRUNUS
182	1.1	12.0	4.0	SILVER BIRCH
183	1.7	8.0	5.0	PRUNUS
184	2.6	20.0	10.0	POPLAR
185	1.2	6.0	4.0	APPLE

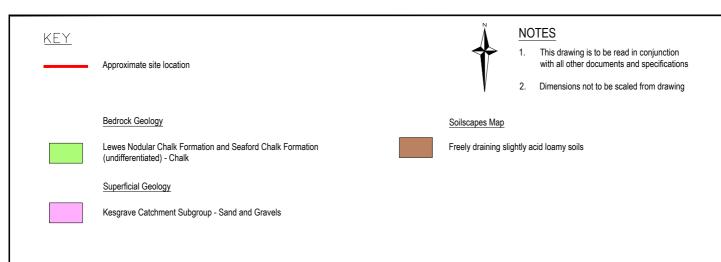
Ι					
513300 E	513320 E	513340 E	513360 E	- 213380 E	LEGEND FEATURE STYLES FEATURE ABREVIATIONS
+	+	+	+	204060 N _	SURVEY CONTROL AV Air Valve FENCE BS Bus Stop HEDGE BS Brick Wall FWS CD Cover Level SWS SWS Electric Box
					SWS EC Electric Cover EP Electricity Pole WATER FH Fire Hydrant POWER LINE G Gully (OVERHEAD)
					ELECTRIC MAINE KLS Keep Left Sign KO Kerb Offlet LB Letter Box LP Lamp Post MKR Marker MP Metal Post MH Manhole MB Metal Bollard P Post
					PI Petrol Interceptor RG Road Gully RNB Road Name Board RS Road Sign FENCE TYPES RW RV Retaining Wall SA Soakaway BWR Barbed Wire CB Close Board CI Corrugated Iron CL Chain Link
+	+	+	+	204040 N _	CPL Conc PanelIJB Tel.Junc.BoxCP Chestnut PalingTL Traffic LightCW Chicken WireV ValveIW InterwovenVP Vent PipeIR Iron RailingWL Water LevelOB OpenboardWM Water MeterPR Post and railWO Water Outlet
					PW Post and Wire WV Water Valve
					GRID – ORDNANCE SURVEY NATIONAL GRID (OSTN15) LEVELS – ORDNANCE SURVEY (OSGM15)
+	+	+	+	204020 N _	
	13.314.07.020.68.02.530.85.02.042.014.04.551.714.06.5	SPECIES TREE GIRTH HEIG HORSE CHESTNUT 51 2x0.6 8. FIR 52 2.0 14 HAWTHORN 53 6x0.6 8. PRUNUS 54 4x0.6 8. PRUNUS 55 3x0.6 8.	EE SCHEDULE GHT SPREAD SPECIES .0 3.0 HOLLY .0 7.0 ASH .0 4.5 ASH .0 5.5 ASH .0 4.0 ASH		
+	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	PRUNUS 57 2x0.6 8. PRUNUS 58 0.7/1.4 14 PRUNUS 59 2.9 16 PRUNUS 60 2x0.6 14 WILLOW 61 3x0.1/3x1.0 14 HAWTHORN 62 0.7 8. OAK + 63 0.7 8.	.0 3.5 HAWTHORN .0 2.5 HOLLY .0 8.0 OAK .0.0 11.0 OAK .0.0 5.0 PRUNUS .0.0 12.0 PRUNUS .0.0 2.0 CYPRESS .0 2.0 CYPRESS	204000 N _	
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+	$+ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	SILVER BIRCH SILVER BIRCH SILVER BIRCH SILVER BIRCH OAK HORNBEAM OAK	+	203940 N	CLIENT
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					LAND AT CHISWELL GREEN ST ALBANS HERTFORDSHIRE AL2 3EQ
				007000 1	TITLE
+ ш	+	+ ω	+ ш	203920 N _ ш	SITE SURVEY AS EXISTING SCALE 1 (2000 (100) DATE
513300	513320	513340	513360		1/200 (A0) DATE JAN 2020 DRAWING No. 06 JOB No. 7290



Glanville

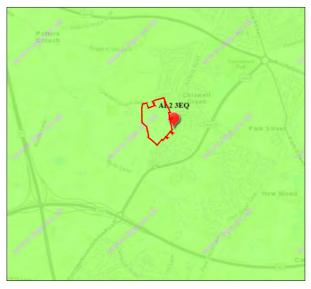
Appendix D

Geological Mapping and Soilscape Mapping



Superficial Geology

Bedrock Geology



Soilscapes Map_Cranfield University

Poters Crowch Bagned risk gan Charles Crowch Bagned risk gan Charles C



Glanville	Project :	Project : Land West of Chiswell Green, St Albans					
Cornerstone House 62 Foxhall Road, Didco Oxon, OX11 7AD	Title :	Titte : British Geological Survey & Soilscapes Mapping Extract					
Tel: (01235) 515550 Fax: (01235)	817799 Project Engineer :	A. Quigley	Scale :	NTS	Drawing No.	CV8210856 - BGS	Rev_
postbox@glanvillegroup.com www.glanville	group.com Project Director :	J. Birch	Date: F	February 2022	Diawing No.	CV0210000 - BGS	



Appendix E

Site investigation Report



Report Title:

Project Name:

Geo-Environmental Site Investigation Forge End, Chiswell Green



Report Reference: BRD3604-OR2-C

Date: July 2020

BRD Environmental Ltd

Hawthorne Villa, 1 Old Parr Road, Banbury, Oxfordshire, OX16 5HT 01295 272244 info@brduk.com www.brduk.com

SUMMARY REPORT - GENERAL INFORMATION

SUBJECT	COMMENTS
CURRENT SITE	The site currently comprises mainly open fields. To the south of the site is a small coppice of mature trees. Within the area of trees are severa shipping containers, building materials and used containers where a building contractor previously utilised the coppice to store building supplies.
	In the east of the site is a small fenced off paddock and a dilapidated breezeblock building
PROPOSED DEVELOPMENT	It is proposed that the site will be developed as residential houses with private gardens, access roads and public open spaces.
HISTORICAL SUMMARY	The site has remained largely undeveloped comprising open fields and paddocks. A building was constructed in the early 1990s in the northeast corner of the site and more recently the coppice in the eastern part of the site has been utilised by a building contractor to store materials.
PUBLISHED GEOLOGY	The north western to northern fringe of the site is shown to be devoid of superficial deposits. The southern extents of the site is shown to be underlain by superficial deposits comprising sand and gravels of the Kesgrave Catchment Subgroup. The shallowest bedrock unit is shown to be Lowes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated).
ACTUAL GROUND CONDITIONS	The ground conditions encountered were generally as expected from the anticipated geology shown on the available BGS geology maps, although superficial deposits were found across the entire site.
	Generally, a layer of Topsoil or Made Ground Topsoil was generally found overlying the superficial deposits of the Kesgrave Catchment Subgroup, which in turn were found overlying the chalk bedrock.
	The bedrock was either found as shallow as 1.70m bgl or not proven in some of the windowless sample boreholes (>7.45m depth) across the site with the top of the chalk beneath the superficial deposits having an irregular undulating surface.
HYDROGEOLOGY	A proportion of the site is situated upon superficial deposits designated a Secondary A Aquifer.
	The underlying bedrock geology is designated a Principal Aquifer.
	The site is located within a groundwater Source Protection Zone 2 (Outer Protection Zone).
HYDROLOGY	The closest surface water feature to the site is a pond group of small ponds approximately 50m to 70m west of the site. The River Ver is approximately 1.5km east of the site running north to south.
	The site is not in an area indicated to be at risk of flooding.
PREVIOUS GROUND REPORTS	BRD is not aware of any previous ground investigations having been conducted at the site. However, BRD has undertaken geo-environmental desk study research for a larger area and this has been reported separately.



Geo-Environmental Site Investigation Forge End, Chiswell Green BRD3604-OR2-C

SUMMARY REPORT - GEOTECHNICAL

SUBJECT	COMMENTS	
EXCAVATIONS	It should be possible to forward excavations employing normal equipment. Specific groundwater control unlikely to be required at this site. Limited groundwater control in the form of pumping from sumps is likely to be required. It is unlikely that requirements of the Party Wall Act will apply to the development.	
SLOPE STABILITY	It is considered that slope stability is unlikely to be a concern at this site.	
SUB-SURFACE CONCRETE	Design Sulphate Class of DS-1 and Aggressive Chemical Environment for Concrete class of AC-1s applies.	
SOAKAWAYS	Site is generally not suitable for surface water disposal to conventional soakaways, but deep drainage into the chalk is available subject to careful design.	
PAVEMENT DESIGN	A preliminary design California Bearing Ratio (CBR) of 4% has been recommended.	
FOUNDATIONS		
LIKELY FOUNDATION TYPE	The site is suitable for the adoption of shallow strip/trench fill footings to bear on the Kesgrave Catchment Subgroup clay and or gravelly soils. Due to the difficulty in distinguishing different soil types, they will need to be reinforced with steel mesh.	
VOLUME CHANGE POTENTIAL	The Kesgrave Catchment Subgroup soils have been shown to have a low volume change potential when assessed against NHBC standards.	
ESTIMATED FOUNDATION DEPTHS	The minimum footing depth required is 0.75m, but 1.00m where required to allow for restricted new tree planting. Foundations up to 2.45m depth will be required for some plots due to the tree influence.	
HEAVE PROTECTION	Will not be required.	



SUMMARY REPORT - CONTAMINATION ISSUES

SUBJECT	COMMENTS	
SOIL RISKS TO HUMAN HEALTH	A mound of soil with bonfire residues was found to be contaminated. A single fragment of asbestos cement was found in one area of soil and removed.	
LANDFILL GAS	No landfill gas risks have been identified.	
RADON GAS	Radon gas protection measures are not required.	
RISKS TO THE WATER ENVIRONMENT	No unacceptable contamination risks to water resources have been identified by this investigation.	
RISKS TO BUILDING MATERIALS AND SERVICES	No unacceptable contamination risks to building materials and services have been identified by this investigation.	
REMEDIATION	The remediation of the mound of soil and bonfire arisings would be best achieved by disposing of this discrete pile from site. Whilst no more asbestos cement fragments were found in the additional phase of ground investigation, it would be prudent to have a watching brief by a competent person during the stripping of topsoil at the site so that if any further such fragments are discovered they can be safely removed.	
ASBESTOS	Stacks of suspected corrugated Asbestos Cement sheets have been observed on site. These sheets will need safe removal as part of demolition / site clearance.	
WASTE SOIL DISPOSAL	It is considered that the any natural sub-soils disposed of from the site would be classified as 'inert waste'.	
	The mound of mixed soils and bonfire waste remains should be disposed of from site as 'non-hazardous' waste. The asbestos containing materials will need disposal as 'hazardous waste'.	

SUMMARY REPORT - KEY RECOMMENDATIONS

RECOMMENDATIONS

No further ground investigation is recommended at this stage. The need may arise for further targeted geotechnical investigation, e.g. deep infiltration, as the design of the development evolves.

A remediation strategy should be developed to formalise the planned removal of the bonfire waste mound, removal of asbestos sheets and watching brief during the topsoil strip.



Geo-Environmental Site Investigation Forge End, Chiswell Green BRD3604-OR2-C

2. SITE CHARACTERISTICS

2.1. SITE SETTING

SITE ADDRESS AND POST CODE	Land off 16 Forge End, Chiswell Green, St Albans, Hertfordshire, AL2 3BN.
NATIONAL GRID REFERENCE	Approximately centred at 513160E, 204175N.

2.2. SITE DESCRIPTION

SUBJECT	COMMENTS
CURRENT SITE DESCRIPTION	The southern part of the site comprises primarily a large grassed open field and a small coppice near the eastern boundary, which surrounds an area previously used by a building contractor to store materials. In the northeast of the site is a disused breezeblock building adjacent to several small paddocks.
SURROUNDING LAND USE	The site is set in a mixed area of residential and agricultural land.
PROPOSED DEVELOPMENT	It is proposed that the site will be developed as residential houses with private gardens, access roads and public open spaces.
HISTORICAL SUMMARY	The site has remained largely undeveloped comprising open fields and paddocks. A building was constructed in the early 1990s in the northeast corner of the site and more recently the coppice in the eastern part of the site has been utilised by a building contractor to store materials.
PUBLISHED GEOLOGY	The north western to northern fringe of the site is shown to be devoid of superficial deposits. The southern extents of the site is shown to be underlain by superficial deposits comprising sand and gravels of the Kesgrave Catchment Subgroup. The shallowest bedrock unit is shown to be Lowes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) and is present underneath the whole site.
RADON	Radon protection measures are not required.
HYDROGEOLOGY	A proportion of the site is situated upon superficial deposits designated a Secondary A Aquifer.
	The underlying bedrock geology is designated a Principal Aquifer.
	The site is located within a groundwater Source Protection Zone 2 (Outer Protection Zone).



SUBJECT	COMMENTS
HYDROLOGY	The closest surface water feature to the site is a pond group of small ponds approximately 50m to 70m west of the site.
	The River Ver is approximately 1.5km east of the site running north to south.
	The site is not in an area indicated to be at risk of flooding.
DISSOLUTION HAZARDS	Due to the risk of dissolution hazards, BRD employed Stantec (formerly Peter Brett Associates) to undertake a cavities occurrence assessment and this is included in Appendix 2.
	On the basis of the geological, hydrogeological and geomorphological conditions for the site it has been concluded that the potential for solution feature formation is moderately-high.
CHALK MINING	Chalk mining is commonly associated with brick making and agricultural purposes and us also considered within the Stantec assessment.
	In consideration of the geology, topography and history of the area it is considered that the potential for past chalk mining at the site is considered to be high.

2.3. PREVIOUS INVESTIGATIONS

BRD is unaware of any previous ground investigations having been conducted at the site. However, the site is part of far larger area that has been the subject of geo-environmental desk study research by BRD and this has been reported separately in 'Phase 1 Environmental Desk Study - Chiswell Green Lane, St Albans', BRD Environmental Ltd, report ref. BRD3604-OR1-A, dated January 2020. This current report should be read in conjunction with the previous desk study report.



3. **GROUND INVESTIGATION**

3.1. INVESTIGATION DESIGN

METHODOLOGY	The investigation was proposed to be a c windowless sample boreholes to provide inf across the site. For the additional investigat also included to identify any potential solution the strength of the underlying soils.	ormation on the general soils ion, dynamic probe tests were
	Trial pits were selected as they expose mor reliable record of the ground condition facilitating BRD365 soakage tests. Window selected as monitoring installations and in- required. Both the trial pits and windowles a sufficient number of soil samples to be to geotechnical assessment purposes.	s encountered, as well as dess sample boreholes were situ density of the soils were s samples boreholes provided
DATES OF SITE WORKS	The main field works were undertaken betw The additional ground investigation was und and the 3 rd July 2020. Monitoring visits undertaken on 24 th March, and 20 th May 2020.	dertaken on 22 nd to 25 th June
CONSTRAINTS TO EXPLORATORY HOLE LAYOUT	No constraints to exploratory hole layout we	re found.
EXPLORATORY HOLE SPACING	Generally, approximately 20-50m grid but H less in areas suspected of potential solutions	
LAYOUT RATIONALE	SOURCE / FEATURE	EXPLORATORY HOLE
	Derelict building - storage of fuel containers.	TP08, TP22 & WS10.
TARGETED	Area of the site used as building materials storage.	TP06, TP07, WS06 & WS107.
	Mound of unknown soils.	TP18
	Area around previous TP20 where one piece of asbestos cement was encountered.	TP116 to TP119.
GROUND	Soil permeability.	TP01-TP05
FEATURES TARGETED	General site coverage.	All initial exploratory holes.
	Central band running southwest to northeast of the site to further characterise the ground conditions coverage.	WS101 to WS122, TP101 to TP115 and DP101 to DP110.



CONTAMINATION SAMPLING PLAN	Based on the proposed end use, the sampling and analysis plan is more positively biased towards near surface samples as these represent the soils most likely to be available to future site users.
	Samples have also been analysed from the typical depths where services pipes will be placed.
	Trial pit TP20 was targeted by TP116 to TP119 due to one fragment of asbestos cement found in TP20. However, from visual inspection no further suspected Asbestos Containing Materials (ACM) were found by the additional pits and so no samples were sent for testing.
ANALYSIS PLAN	Given the history of the site, it was considered that the majority of the site soils should be targeted with a general suite of contaminants, including metals, polycyclic aromatic hydrocarbons (PAHs), asbestos fibres and pesticides.
	In addition to this, the soils were also analysed for total petroleum hydrocarbons (TPH), hydrocarbons, benzene, toluene, ethylbenzene and xylene (BTEX) compounds, methyl tertiary butyl ether (MTBE), volatile organic compound (VOC) and semi volatile organic compounds (SVOC) in order to confirm the water supply pipe specification.

3.2. BRD FIELDWORK

TRIAL PITS	
REFERENCES	TP01 to TP22. Additional investigation pits: TP101 to TP119.
DEPTH RANGE	From 0.30m to 3.30m.
EXCAVATOR	JCB 3CX style wheeled backactor.
BACKFILL	Trial pits TP01 to TP05 were backfilled with coarse gravel and an observation well for the soakage tests. Topsoil was reinstated. The surplus spoil was stockpiled at the edge of the field. The observation wells were removed at the end of the works.
	All the remaining trial pits were backfilled with arisings upon completion and compacted with rams of the excavator bucket.
	TP22, located adjacent to the derelict building, was logged in one of the two open holes left on site by the energy supplier company. It is understood these trial holes were excavated to locate and cut off the power cable that fed the derelict building.

DYNAMIC PROBING	
REFERENCES	DP101 to DP110.
DEPTH RANGE	From 0.70m to 7.00m.
RIG TYPE	DPSH-A (Super Heavy): 63.5kg mass, 750mm fall.
CONE TYPE	Sacrificial cone.



Geo-Environmental Site Investigation Forge End, Chiswell Green BRD3604-OR2-C

REFERENCES	WS01 to WS10. Additional investigation boreholes: WS101 to WS122.
DEPTH RANGE	From 2.80m to 7.45m.
RIG TYPE	Premier Drilling Rig.
INSTALLATION / BACKFILL	Boreholes WS01, WS03, WS05, WS08, WS09 and WS101 to WS122 were backfilled with arisings only.
	Boreholes WS02, WS04, WS06, WS07 and WS10 had monitoring wells installed. These comprised 50mm nominal diameter standpipes fitted with a gas tap finished with a flush metal cover. The slotted response length of the well is shown on the individual logs. Bentonite seals are also indicated on the logs. The filter medium used was pea gravel.

LIGHT WEIGHT DE	FLECTOMETER
REFERENCES	LWD01 to LWD10.
DEPTH RANGE	From 0.40m to 0.60m.
METHODOLOGY	Light Weight Deflectometer.

MONITORING	
ТҮРЕ	Ground gases. Groundwater monitoring.
DATES	Monitoring visits undertaken on 24 th March, 1 st , 9 th and 21 st April, and 6 th and 20 th May 2020.
GROUNDWATER SAMPLING METHOD	Boreholes were found dry.



4. GROUND CONDITIONS

4.1. OVERVIEW

The ground conditions encountered were generally as expected from the anticipated geology shown on the available BGS geology maps except that a site wide cover of superficial deposits was found.

Generally, a layer of Topsoil or Made Ground Topsoil was found overlying the superficial deposits of the Kesgrave Catchment Subgroup, which in turn were found overlying the bedrock identified as the Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated). For ease, the bedrock is sometimes abbreviated within the report and the logs to Chalk.

The bedrock was either found as shallow as 1.70m bgl or not proven in some of the windowless sample boreholes (maximum 7.45m depth bgl) across the site. This implies that the top of the chalk beneath the superficial deposits has an irregular undulating surface and significant variations were noted in short distances between exploratory points.

Details of the various stratigraphic units are given in the following sections.

4.2. ARTIFICIAL GROUND

Limited Made Ground was encountered in a few areas around the site.

Trial pits TP08 and TP22 targeted the area around the derelict building located in the northeast corner of the site. In TP08 a thin layer of granite gravel over reworked Topsoil down to 0.2m bgl were encountered. A layer of Made Ground comprising a dark brown, very gravelly clay with brick and charcoal fragments was found in TP22.

Made Ground was found in TP01, TP20 and TP21 in the northern part of the site, up to 0.60m bgl and was generally described as dark brown, gravelly, sandy clay with occasional bricks, scrap metal and plastic fragments. A single suspected asbestos cement fragment was found in TP20.

Made Ground was also encountered in exploratory point WS107 beneath surface Made Ground Topsoil. It was described as a brown, gravelly, sandy clay. The gravel included flint, quartzite, charcoal and brick fragments and was found between 0.30m bgi and 0.40m bgl.

Trial pit TP18 targeted the soil mound located in the western boundary of the site. Two differentiated layer of Made Ground were recorded, the shallower comprising up to 1.0m of 'dark brown, ashy, gravelly, sandy, silty topsoil with brick, concrete, clinker, timber fragments and bonfire waste'. The deeper layer comprised up to 0.70m of 'dark brown to light brown, sandy, gravelly clay with occasional brick fragments and decaying plant remains'.

4.3. TOPSOIL AND MADE GROUND TOPSOIL

The majority of the site was surfaced in either a Topsoil or Made Ground Topsoil. The Topsoil was generally described as a gravelly, sandy clay or slightly sandy, gravelly silt with rootlets. Gravel includes both flint and quartzite.

The Made Ground Topsoil was of a similar composition but generally included charcoal and brick fragments. Glass and ceramic was also found in TP118 and plastic, electrical wire and tarmac in TP115. The depth to the base of the Topsoil varied between 0.05m bgl and 0.50m bgl. The depth to the base of the Topsoil varied between 0.10m bgl and 0.50m bgl.



4.4. SUPERFICIAL DEPOSITS

4.4.1. Kesgrave Catchment Subgroup

The Kesgrave Catchment Subgroup was encountered in all of the exploratory holes (except TP116, TP117 and TP119 that were terminated at the base of the Topsoil). These deposits were encountered as three different soil types, either gravelly, clay-rich or sandy soils. The thickness of these deposits is greater than 5.45m in some areas of the site.

Typically, there was a consistent thin sub-soil layer of light brown varying from slightly gravelly silt to silty gravel beneath the Topsoil/Made Ground Topsoil.

Gravelly soils were mostly found in the central and northern part of the site underlying the topsoil cover and were generally described as 'brown, red brown and orange brown, slightly clayey, sandy gravel of fine to coarse, subangular to subrounded flint'. When recorded from near surface, the gravelly soils have been recorded with a variable thickness from 0.2m to 0.8m. Deeper gravel layers, recorded below the clay-rich soils, were found in some of the exploratory holes across the site comprising 'orange brown, clayey, medium to coarse gravel and cobbles of subangular to subrounded flint'.

Clay-rich soils were generally found underlying the gravelly soils, across the site and below the topsoil in the southern section of the site. The clay-rich soils were generally described as 'firm to stiff, orange brown with occasional reddish brown mottling, slightly gravelly to gravelly, slightly sandy to sandy, clay. Gravel of fine to coarse, subangular to subrounded flint and occasional cobbles'. The clayey soils sometimes had natural black specks (probable manganese deposits) that increased in number and size with depth.

Sandy soils were found at variable depths and thickness intercalated within the clay-rich soils. Generally were described as 'orange brown to brown, slightly gravelly, slightly silty sand'.

The superficial deposits had notable clay content, flint content and distinctive red brown colouration in part. It is conjectured that the Kesgrave Catchment Subgroup at the site is a combination of locally eroded and re-deposited Clay-with-Flints together with the sand and quarzitic gravel from further afield.

In a couple of trial pits it was noted that towards the base of the pits there were nodular cobbles to boulders of flint that had a 'putty' chalk matrix adhering to them. Some trial pits recorded large pockets of chalk within the Kesgrave Catchment Subgroup. Borehole WS113 appears to have gone through one such pocket with it going through superficial clay, into chalk and then back into superficial clay. Other boreholes included pockets of off white chalk. These features are suggestive of geological re-working and erosion of the chalk bedrock surface. Where proven, this features were indicative of the transition to chalk bedrock was not much deeper.

The superficial deposits as a whole were found to depths varying between 1.70m bgl to often below the typical maximum depth of the windowless sampling boreholes at 5.45m bgl. In exploratory point WS121, however, the superficial deposits were proven to 7.45m bgl and no Chalk was encountered.



4.5. BEDROCK

4.5.1. Lewes Nodular Chalk Cormation and Seaford Chalk Formation

The Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) was encountered in just over a third of the exploratory holes.

The Chalk bedrock was encountered in trial pits TP03, TP07, TP10, TP13, TP105, TP106, TP109 and TP11 as well as 20No. of the boreholes. The majority of these were in a central band running south west to north east across the site. The bedrock geology was found as an irregular undulating chalk surface with the depth to reach the chalk varying significantly in short distances.

The widest area, located from the western boundary of the site (WS02) and extending to the east towards WS07 and north up to WS08. The second area comprises an area between TP07, WS06 and WS09 located to the east of the site.

Based on the trial pits, which show a more reliable description, the Chalk bedrock was typically described as 'structureless chalk excavated as off white, silty, clayey gravel. Gravel of weak, low density, fine to coarse, subangular chalk with occasional fine to coarse gravel and cobbles of flint. Orange staining on surfaces and frequent black specks'.

It was notable that initially the chalk was encountered in a very disturbed state with a soft consistency. This matrix dominated structureless chalk contained chalk gravel that had been rounded. The rounding of the chalk gravel suggests geological movement and re-working of this upper chalk surface.

4.6. GEOTECHNICAL COMMENTS

The ground conditions varied throughout the site with variable thicknesses of the coarse and fine soils of the Kesgrave Catchment Subgroup recorded. It should be noted that any changes in ground conditions over short distances will have an effect on the foundation design.

With the benefit of the additional investigation, it is concluded that there is no evidence of significant dissolution of the chalk. Instead, the irregular surface of the chalk and its initial poor condition is a result of the fluvial erosion and re-working during the deposition of the Kesgrave Catchment Subgroup.

No physical evidence of possible chalk mining was found by this investigation, but the risk cannot be ruled out entirely.

4.7. CONTAMINATION OBSERVATIONS

No visual or olfactory evidence of contamination was noted during the forwarding of exploratory holes with the exception of a single fragment of asbestos cement removed from trial pit TP20.

4.8. GROUNDWATER BEHAVIOUR

Groundwater was not encountered whilst forwarding the exploratory holes.



4.9. GROUNDWATER MONITORING

DATE	RESTING GROUNDWATER RANGE	COMMENTS					
24/03/2020	Dry.	Monitoring wells were installed in boreho					
01/04/2020 Dry.		- WS02, WS04, WS06, WS07 and WS10, to dep between 2.8m and 4.0m bgl.					
09/04/2020	Dry.	The three monitoring visits recorded all boreholes to be dry.					
21/04/2020	Generally dry. 4.02m bgl in WS04.	Ground water was only detected in borehole WS04 situated in the lowest part of the site. However, it is possible that the water					
06/05/2020	Generally dry. 4.03m bgl in WS04.	detected is that which has slowly accumulated in the end cap of the monitoring					
20/05/2020	Generally dry. 4.02m bgl in WS04.	well installation rather than true groundwater.					



6.4. SUB-SURFACE CONCRETE

ALL ON-SITE SOILS	
SITE / SOIL CATEGORY	Natural ground.
DESIGN SULPHATE CLASS	DS-1
GROUNDWATER REGIME	Static.
AGGRESSIVE CHEMICAL ENVIRONMENT FOR CONCRETE (ACEC) CLASS	AC-1s
COMMENTS	Static groundwater conditions have been selected as groundwater is expected to be permanently below the lowest level of proposed construction.

6.5. SOAKAWAYS

6.5.1. Soil Infiltration Rate

The records of the soakage tests are presented in the Appendices that includes the calculation of the soil infiltration rate. A summary of results are presented in the table below:

TRIAL PIT	SOIL IN	FILTRATION RATE	STRATUM TESTED				
TP01	Test 1	6.88 x 10 ^{.7} m/s Result extrapolated and so guide only	0.60m - 0.90m: Brown, clayey, slightly sandy GRAVEL. 0.90m - 2.10m: Fissured, orangish brown to brown				
	Test 2	9.88 x 10 ⁻⁷ m/s	mottled reddish brown, slightly gravelly, silty CLAY.				
TP02	Test 1	6.68 x 10 ⁻⁷ m/s Result extrapolated and so guide only.	 0.80m - 2.10m: Orangish brown mottled reddish brown, gravelly, silty CLAY. 2.10m - 2.60m: Orangish brown, slightly gravelly, 				
-	Test 2	8.91 x 10 ^{.7} m/s	slightly clayey SAND.				
ТРОЗ	Test 1	3.72 x 10 ⁻⁴ m/s					
	Test 2	3.67 x 10 ⁻⁴ m/s	brown, gravelly, sandy CLAY. 2.20m - 2.70m: Structureless CHALK, excavated as				
	Test 3	3.57 x 10 ⁻⁴ m/s	slightly sandy, silty gravel with occasional cobbles.				
TP04	Test 1	2.51 x 10 ⁻⁵ m/s	0.20m - 0.90m: Brown, slightly clayey, sandy				
	Test 2	2.89 x 10 ⁻⁵ m/s	GRAVEL. 0.90m - 2.10m: Brown to orangish brown, slightly				
	Test 3	3.92 x 10 ⁻⁵ m/s	gravelly, sandy CLAY. Occasional sand pockets.				



TRIAL PIT	SOIL IN	TILTRATION RATE	STRATUM TESTED
TP05	Test 1	3.99 x 10 ⁻⁸ m/s Result extrapolated and so guide only.	0.20m - 2.00m: Orangish brown to brown to orangish brown, slightly gravelly, silty CLAY.
	Test 2	4.26 x 10 ⁻⁸ m/s Result extrapolated and so guide only.	

6.5.2. Soakaway Design Advice

Trial pits TP01 to TP05 were undertaken for soakage tests ranging from 2.00 to 2.70m depth. Due to the irregular undulating surface of the chalk across the site, the bedrock was only found in one of the proposed soakage pits (TP03). The rest of the trial pits recorded the variable soils of the superficial deposits that comprised both clay and gravel with a no distribution pattern with depth nor laterally.

6.5.2.1. Kesgrave Catchment Subgroup

Infiltration rates of the order of 10^{-7} m/s and 10^{-8} m/s which are indicative of poor drainage characteristics were recorded in trial pits TP01, TP02 and TP05. It is notable that clay-rich soils were predominant in these pits. The only exception was TP04 where surface granular soils were recorded up to 0.9m depth and clay-rich soils to the base of the pit, but significantly with occasional sand pockets. Moderate infiltration rates of the order of 10^{-5} m/s were recorded.

Based on the above, it is considered that the disposal of collected surface water to soakaways will not generally be feasible at this site due to the variable soil nature of the Kesgrave Catchment Subgroup and proved low permeability of these soils.

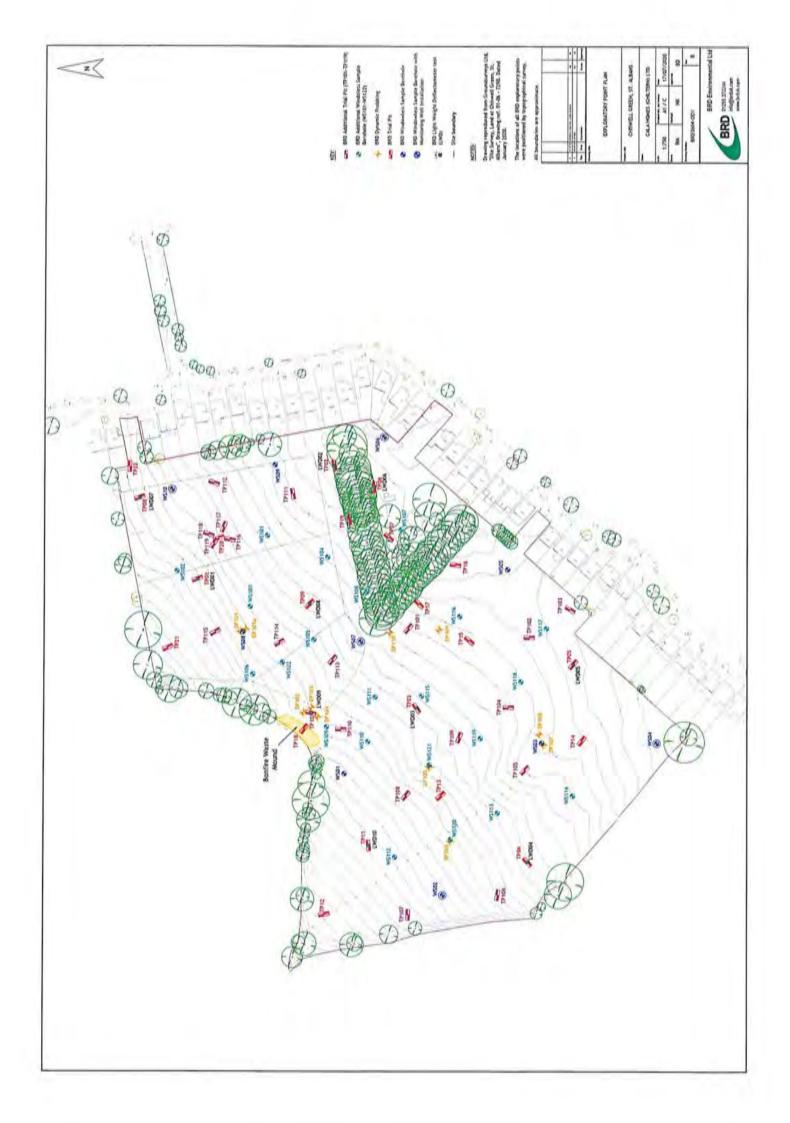
6.5.2.2. Chalk

As mentioned above, within the soakage test pits the chalk bedrock was only proven in TP03 at a depth below 2.20m bgl. As expected, good infiltration rates of the order of 10⁻⁴ m/s were recorded which are indicative of good drainage characteristics.

In the areas where the Chalk bedrock is recorded at shallower depth then soakaways could be considered. There may also be the potential to use deep borehole style soakaways, but this would require specific investigation. There is also the possibility of using attenuation basins with trench excavated through their base to intercept the chalk bedrock with the trenches then backfilled with free draining gravel to provide a permeable pathway for infiltration into the chalk to occur.

Furthermore, it is worth noting that the site has been classified with a moderate to high risk potential risk for solution features. It is considered that soakaways could concentrate rainfall ingress at the soakaway positions, which could result in formation of solution features. On this basis it is considered that soakaway storm water drainage discharging into the chalk will require careful design if pursued. In particular, the potential to create dissolution features within the chalk by the ingress of water means that any soakaways should be located well away from foundations for buildings or roads. The guidance on this issue presented in CIRIA C574 is that for low to medium density chalk as proven at the site, soakaways should be sited at least 10m away from any foundation.





Clier			ALA Homes (Chiltern) Ltd.	I		Tuəl	Fit No.
	ect Title:		orge End, Chiswell Green				
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	ed By:		Marina			~ •	••
	Comple		3/03/2020	[Chao	11051
	od Usec		30° Backhoe excavator (JCB 3CX type)			anee	t i of i
Depth	mples & T Type & No	er	Description of Strata			Goology	l.egend
0.15	JI		MADE GROUND / TOPSOIL: Grass over dark brown, slightly gravelly, clay with rootlots. Gravel of fine to coarse, subangular to subrounded finit. Occasional brick fragments.		70 h,hh)	ВЛ	
0.50	JZ		MADE GROUNC: Brown, gravely, slightly sandy clay, Gravel of fine to conrac, subangular flint with occasional cobbles. Occasional scrap metal and brick fragments.			WC MC	
Q.80	B1		Medium dense, brown, clayey, slightly sandy GRAVEL. Gravel of tine to coarse, subangular to subrounded flint.	(n ii	148)	e'10	82000000000000000000000000000000000000
0.95	5V	110/104/113	Firm to stiff, fissured, grangish brown to brown motified reddish brown,	ator (JCB 3CX type) Sheet 1 of 1 Description of Strata Copth / (nuch) Coellery Legend PSOL: Grass over dark brown, slightly gravelly, rel of fine to course, subangular to subrounded fine to course, subangular to subrounded fine. 0.20 2.00 n. dayey, slightly sandy GHAVEL. Gravel of fine to subrounded fine. 0.20 0.20 0.20 n. dayey, slightly sandy GHAVEL. Gravel of fine to subrounded fine. 0.00 0.00 0.00 n. dayey, slightly sandy GHAVEL. Gravel of fine to course, subangular to subrounded fine. 0.00 0.00 0.00 promptable brown to brown metified readists brown, LAV. Gravel of fine to course, subangular to secasional cobbles becoming frequent. 0.00 0.00 0.00 s becoming frequent. 0.00 0.00 0.00 0.00 0.00 g 2.10 0.00 0.00 0.00 0.00 0.00 </th			
1,10	D1	k) ¹ 21	slightly gravelly, silty CLAY. Gravel of fine to coarse, subangular to subrounded flint with occasional cobbles becoming frequent between 1.50m and 1.80m bgl.			CHMENT SUB	
2,00			1.50 - 1.80 m: Cobbles becoming frequent.			KESGRAVE CAT	
	82				, DB)		
Grou	ndwater	Not er	ly stable throughout countered			89.08	mAOD
Plan (P	of Trial F	≥it: 2.1 A C	testing. Relative density based on visual assessm	uge	Log	Scale *	

Cilent: Projec			ALA Homes (Ch orge End, Chisw					Pit No.
Projec	t No:	БI	RD3604				TF	20
Logge			Marina					
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Sam Oopth Ty	pies & T voe & No	'esis Valua		Description of Strata	De (Le	pth / :vel>	Gaology	Legend
			MADE GROUND sandy clay with fre	/ TOPSOIL: Grass over dark brown, gravelly, slightly equent rootlets. Gravel of fine to coarse, subangular to para built formation	-		LN	
			Medium donse, br	Rare brick fragments. rown, orangiah brown, clayey, slightly sandy CRAVEL. oarse, subangular to subrounded flint.		0 75 (05 30)		
			Firm to stiff, orang Gravel of fine to o cobbles. Occasion	ish brown mottled reddish brown, gravelly, silty CLAY, carso, subangular to subrounded film with occasional nal black to frequent black specks.		0 80 (04 64)	HMENT SUBGROUP	
1.60	B1 SV	100/106/88					KESGRAVE CATCHMENT	
		k₽a	Moist, orangish br	rown, slightly gravelly, slightly clayey SAND.	}; ;	2 10 (83 54)	Ξ.	
2.40	82					2.60 (83.94)	ļ	
					3			
Dit Sta	hillba	Conora	lly stable throug			Loua	 	
Groun	dwate	Not er	ncountered					4 mAOD
Plan of	Plan of Trial Plt:			General Remarks: Trial pit terminated at 2.60m bgl for soa testing. Relative density based on visual assess	_	Loş	dimons 9 Scale	ions in metr 1:25
D		A 	B 0.6	only.				BRD

Ciler	 nt:	Ċ,	ALA Homes (Ch				Trial	Pit No.
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	Comple		Marina 3/03/2020					
	od Use			cavator (JCB 3CX type)			Shee	t1of1
51	imples & 1	řests		Description of Strata	Dept	th /	Gnology	
Depth	Type & No	Vulun		, · · ·	(1,00	/el)	CHORODA	Lugend
0.10	J1		rootists. Gravel of	over dark brown, gravelly, slightly sandy, slity clay with fine to coarse, subangular to subrounded flint,	0.2	15	<u>?</u>	<u> </u>
			Modium dense, br Gravel of fine to cr	own, orangish brown, clayey, slightly sandy GRAVEL. oarse, subangular to subrounded firnt.		7.0W)		0000000
0.70 0.80	S∨ J2	120/112/108 kPo	Firm, orangish bro Occasional cobble flint.	win mottled reddish brown, gravelly, sandy CLAY, is, Gravel of fine to coarse, subangular to subrounded		50 9.04)	MENT SUBGROUP	
1.30	81						KESGENTE CATCHMENT SUBGROUP	b b b b c 9 c 9 c 0 b b c 0 c 0 c 0 c 0 c 0 c 0 c 0 c 0
2.40	D1		 of weak, low densi 	LK excovated as off white, sifty, clayey gravel. Gravel ity, fine to coarse, subangular chalk with fine to coarse ange staining on surfaces and frequent black specks.		2. (14) 20 16:41)	CHALK	
				· · · · · · · · · · · · · · · · · · ·				
			ly stable throug! countered	hout		ijurte:	co Plevano 87.34	mAOD
	of Trial I			General Remarks: Trial pit terminated at 2.70m bgl for soak: testing.	age	All d Log		ons in metres
٢	•	1,9 A	······	Relativo density based on visual assessn only.	nent			
₽		C	B 0.6			Tele	phone:	21295 272244 2brduk.com

Client: Project Title: Project No: Logged By: Date Completed:	CALA Homes (Chiltern) Ltd. Forge End, Chiswell Green BRD3604 R Marina 16/03/2020		TRI PILNO. TP04		
Method Used;	180° Backhoe excavator (JCB 3CX type)		Shee	et 1 of 1	
Samples & Tests Orpth Type & No Val	Description of Strota	Depth / (Level)	Geology	Legend	
	TOPSOIL: Grass over dark brown, gravelly, slightly sandy, sitty clay with rootlets. Gravel of fine to coarse, subangular to subrounded flint.		TS .	1999 - 948 - 949 - 949 1999 - 949 - 949 - 949 1999 - 949 - 949 - 949	
	Modium donse, brown, slightly clayoy, sandy GRAVEL. Grave) of fine to coarse, subangular to subrounded filmt.	(Л7,07)		0000000 000000000000000000000000000000	
D.80 B1	0.70 m: Occasional sand pockets.	-	SGROUP	0-0-0 0-0-0 0-0-0	
0.95 01	Firm to stiff, brown to orangish brown, slightly gravolly, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint. Occasional fiint cobbles	(AC 37)	IMENT SU	<u>• ^ • ^ • ⁄</u>	
1.30 SV 80/06 kP	¹² 1.30 - 1.80 m: Occasional sand pockets.	-	KESCRAVE CATCHMENT SUSCROUP		
1.80 ()2		-	KESGR		
		2 2 (65.17)			
		-			
		- 3			
		-			
Pit Stability: Ger Groundwater: No	rally stable throughout encountered	54	1 NACO Eleven 87.2	n revel 2 mAOD	
Plan of Trial Pit:	General Remarks: Trial pit terminated at 2,10m bgl for soaka testing.			ions in metre	
₩ 2.0 A	Relative density based on visual assessm only,	ent		BRD	
0	B 0,6			DUND	

Clier			ALA Homes (Cr	pilitern) Ltd		Tria	Pit No.
	ect Title:		orge End, Chisv	-	ľ		
	ect No:	в	RD3604			TF	P05
	jed By:		Marina				
1	Comple lod Used		3/03/2020 30° Backhoe ex	cavator (JCB 3CX type)		Shee	t 1 of 1
	amples & T Type & No			Description of Strata	Depth / (Level)	Goology	Logend
0.16	J1	Value	TOPSOIL: Grass rootlets, Gravel of	over dark brown, slightly gravelly, very sitty clay with fine to coarse, subangular to subrounded thint.	 	2	<u> 84 86 86 86 86</u> 6 86 86 86 86 8
			Firm, pranolsh bro	win to brown, slightly gravely, slity CLAY, Gravel of fine ular to subrounded flint. Occasional grey mottling and	0.20 (85,35)		
0.70 0.70	SV J2	80/74/62 kFa				SJBGRO	
1.00	ים				- -	CHUENT	2012 2013 2014 2015 2015 2015 2015 2015 2015 2015 2015
			1.20 Occasional g	רשעפו.	·	KESGRAVE CATCHILENT SUBGROUP	
1,80	50				2 2.00 (43.56)		**************************************
					(#3.56) 		
		1			-		
Pit Şi Grov	ability: ndwater	General : Not er	ly stable through countered	hout		tace Flaveor 85.5	n taval 5 mAOD
Plan	of Trial I	Pit:		General Remarks: Trial pit terminated at 2.00m bgł for soaks testing.	age Lo	dimonsi g Scale	ions in metres 1:25
. • •	<u> </u>	- 2.0 — · · ·	¥	Relative density based on visual assossm only.	rent		BRD
D		<u>``</u>	в о, 5			5	
		·			Te Cr	tephone: nall: info@	01295 272244 §brduk.com

Logg	et No: ed By: Comple		Marina 3/03/2020	ĺ	· · • • •	P06
Meth	od Used	1: 1:	30° Backhoe excavator (JCB 3CX type)		Shee	at 1 of 1
	Type & No	ests Value	Description of Strata	Dopti (Lovo	0 Goology	/ Legond
0.10 0.15	J1 PID B1	2.1 ppin	MADE GROUND / TOPSOIL: Loose, dark brown, gravelly, sandy clay with roots and roottots. Gravel of fine to coarse, subangular to subrounded filmt. Occasional brick fragments and rare clinker. Modilum donso, brown, orangish brown, clayoy, sandy CRAVEL. Gravel of fine to coarse, subangular to subrounded flint.		an En	
1.40	82		Firm, orangish brown mottled reddish brown, gravelly, sity CLAY. Gravel of fine to coarse, subangular to subrounded flint. Occasional to frequent flint cobbles.	(3.97) 1 (84) 1 (84)	CATCHNENT SUBGROUP	
2.70	83			2 	KESGRAVE	
Pit S Grou	tability: ndwater	Genera : Not e	liy stable throughout		Surface Clevel 85.7	ion Level 1 mAOD
	of Trial		Gonoral Remarks; Trial pit terminated at 3.00m bgt. Relativo donsity based on visual assess only. B 0.6		Al) dimens	sions in metr

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+	ct No:	BRD3604			207
	ed By:	R Marina			
	Completed:			Chen	t1 of 1
Meth	od Used:	180" Backhoe excavator (JCB 3CX type)		anee	
Sa Depih	mpies & Tests Type & No – Va	Description of Strata	Depth / (Lavel)	Geology	Løgend
		MADE GROUND / TOPSOIL; Dark brown, pravelly, sandy clay with		1	
0.15	J1	rootlots, Gravel of fine to coalse, subengular to subrounded fint. Occasional brick fragments.	0 20	L) M	
		Medium dense, brown, clayey, sandy GRAVEL. Gravel of fine to coorse, subangular to subrounded flint.	(85.54)		000000
0.65	SI.	Firm, orangish brown, occasional mottled reddish brown, gravelly, silty CLAY. Gravel of fine to coarse, subangular to subrounded film. Occasional to frequent cobbles.	(65.24)		Хоу Х. 40 Х. Хоу Х. 40 Х. Хоу Х. 40 Х. Хоу Х. 40 Х.
		1.70 - 2.10 m: FACE B/C: Pocket of chalk 0.50m width.		KESCRAVE CATCHAIENT SUBGROUP	
3.20	81	Structureless CHALK excevated as off white, silty, claysy gravel. Gravel of weak, low density, fine to coarse, subangular chalk with fine to coarse cobbles of flint. Orange staining on surfaces and frequent black specks. (CIRIA Grade Dc)	(63,04)	CHALK	
			- 3,32 (62 d.4) 		
alt St	ability: Gen	erally stable throughout	ອີທາ	ika Etevano	n Løvøl
irour	ndwater: No	ot encountered		85,74	I mAQD
ب ۲	of Trial Pit: 2.5 A	ъ····	Log	dimensi 9 Scale	ons in metre
미	C	B O G	Tei	ephane:	01205 272244 /brduk.com

Project No:		F	CALA Homes (Chiltern) Ltd. Forge End, Chiswell Green BRD3604 I Hibberd 17/03/2020			TPIN Pit No.		
1	od Usec		180° Backhoe excavator (JCB 3CX type)			Sheet 1 of 1		
	mples & 1 Type & No			Description of Strata	Uepl (Lev	h/ cl) Goology	Legend	
0.10	J1	Valla	(subangular to angu) MADE GROUND: (Loose to medium dense, purplish brown, gravel of ular granite. Compact, dark brown, very silty clay topsoil. Gravel of angular to subrounded flint with occasional brick	(90 0.2	(w) <u>9</u>		
0.50 0.50	SV J2	70/72/74 КРв	0.05 m: Terram mo Firm, erange brown CLAY. Gravel of fir	n with some black specks, slightly slity, slightly sandy he to coarse, subangular to subrounded flint and chalk.	 (A9	'0 k,14)		
0.80 1.00	D1 SV	86/88/02 kFa	fine to coarse with occasional chaik.	y gravelly to gravelly, slightly sandy CLAY. Gravel of cobbles, subangular to subrounded flint and				
	102		Firm to stiff, orange CLAY, Gravel of fir Bint and occasiona	e brown with occasional black specks, very gravelly to to coarse with cobbles, subangular to subrounded I chaik,	12 	SSCRAVE CATCHIVENT SUBGROUP		
1.80	13		2.30 m: Becoming	firm, very gravelly, sandy CLAY.	- - - - - - - - - - - - - - - - - - -			
Grou	ability: ndwatei of Trial	r: Not e	aily stable through incountered	General Remarks: Trial pit terminated at 3.30m bgl.			4 mAOD sions in me	
D	•	- 2.3 A C		Relative density based on visual assessionly.	ment :	4	BRE	

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Clien Proie	it: ect Títlo:		ALA Homes (Chiltern) Ltd. forge End, Chiswell Green				Pit No.
	at No:		BRD3604		ĺ	TF	909
	ed By:		I Kimber				
	Comple od Usec		7/03/2020 80° Backhoe excavator (JCB 3CX type)			Shee	t1 of 1
	amples & T Type & No	ests Value	- Description of Strate		pih / avei)	Goology	Legend
JE pin	19,007 (0.140)	- U.S.	TOPSOIL: Grass over dark brown, gravelly, sandy clay, Gravel of fine to coarse, subangular to subrounded filmt. Frequent rootiels,			 	<u> 34 - 34 - 34 - 3</u>
0.20	J1		coorde, secondular to secondate nink. Produkti tatolony,	È,	2.35	12	<u>কত ক</u> কে ক দ দেশ কে কে
			Medium dense, orange brown, slightly clayey, sandy GRAVEL of fine to coarse with occeational cobbles of subangular to subrounded flint.	-	0.35 (87.20)		00000
0.50 0.70	.12 81			÷,	3.80		0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -
			0.80 - 1.30 m ⁻ FACE O: SII ^{II} , friable in places, orange brown with black specks, gravely, sandy CLAY, Gravel of fine to coarse, subangular to subrounded flint.	- ; ;-	88.70)	- DUP	°0, °0,
1.20	SV D1	50/48 kPn	1.20 m: Lop gravely to undertake three shear vane tosts.	Ŀ	1.30	SGR	
		Stiff, friable in places, orange brown with black specks, gravely, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint.	'	50 25)	HAENT SU		
						KESGRAVE CATCHMENT SUSCROUP	
2.30	D2		Medium dense, orange brown, clayey, gravelly SAND. Gravel of find to coarse, subangular to subrounded filmt. Occasional cobbles of fine.		20 85.35)	KES	
2.80	נט		Stiff, orange brown with black specks, slightly gravely, sandy CLAY. Gravel of fine to coarse, subangular to subrounded film,		70 64 65) 1.90 84.05)		
				3 "	e=.05)		
				F			
	ahili#		 	4	6te	ca Elowago	51 dual
Groun	ability: hdwator:	Senera Not e	illy stable throughout ncountered				mAQD
	of Trial F		General Remarks: Trial pit terminated at 2.90m bgl. Relative density based on visual assess only.	nent		limensi Scale 1	ons in metre
۔ ام		A					BRD
L		С	1)1295 272244 (brduk.com

	Comple od Usec		/03/2020 0° Backhoe excavator (JCB 3CX type)		:	Shee	t 1 of 1
	mplos & T Type & No		Description of Strata	Our (Let	oth / vel)	Goology	Legend
0.05	J1		TOPSOIL: Grass over dark brown, slightly gravelly, sandy clay. Gravel of \fine to coarse, subangular to subrounded fint. Frequent rootlets.	0	10	F	<u></u>
0,70 1,00 1,20 1,30 1,30 2,50 2,60	J2 E1 J3 SV D1 J3	⇔П/КО//0 kРа	Medium dense, orange brown, slighily clayey, gravelly SAND. Gravel of fine to corse, subangular to subrounded flint. Firm, orange brown, gravelly, sandy CLAY. Gravel of fine to coarse with occasional cobbles of subangular to subrounded flint. 1.10 m: Small pocket of choik in FACE A, 1.30 m: Difficult to undortake shear vane tests due to gravel content. Structureless CHALK excavated as off white, clayey gravel. Gravel of weak, few density, fine to coarse, subangular chaik with fine to coarse cobbles of flint. Orange staining on surfaces and black specks. (CIRIA Grade DC) 1.70 - 2.10 m: FACE C. Pocket of gravelly sandy clay 0.80m wide. 1.70 - 2.50 m: Infilled solution feature of gravelly. Sandy clay.		10 37 45) 70, 85) 90, 95)	CHALK KESGRAVE CATCHMENT SUBSROUP	
Pit S Grou	tability: ndwatei	Genera :: Not e	ly stable throughout countered		Surfac	as Flevada 88.5	s mAOD
Plan	of Trial	Pit: - 2.2	General Remarks: Trial pit terminated at 3.00m bgl. Relative density based on visual assessionly. B 0,6	ment		limonsi Scale	ions in mo 1:25 BRC

	it: ict Title: ict No:	Fe	ALA Homes (Chiltern) Ltd. orge End, Chiswell Green RD3604		-		Pit No.			
	ed By:		Kimber							
1	Comple		7/03/2020		5	Shee	t1 of 1			
	od Usec		30" Backhoe excavator (JCB 3CX type)		L					
Depih	mples & Type & No		Description of Strata	Dep (Lev	(h / (01))wology	Legend			
0.20	۳ ۱.		IOPSOR : Grass over dark brown, gravolly, sandy clay, Gravel of fine to coarse, subangular to subrounded flint. Frequent rectilets. Firm, erange brown, gravolly, sandy CLAY, Gravel of fine to coarse.	с . — п.: р(4)	30 9 59)	МT	<u></u>			
0.50	D1		subangular to subroundod fint.	- 	60					
0.70	J2		Modium dense, clayey, sandy GRAVEL of fine to coarse, subangular to subrounded flimt.	Ē	ນັ້ງໜ້		00000000000000000000000000000000000000			
1.20 1.20	8V 02	56/78/80 kPa	Reddish brown with black specks, gravelly, very sandy CLAY. Gravel of fine to coarse, subangular to subrounded finit and chaik. Occasional cobbles of flint.		10 8.90)	KESGRAVE CATCHMENT SUBGROUP				
2.50 2.50	J3 D3			a: 1 i 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 ·	70 7 2 9)	KESGRAVE CAT	- 0 - 0 0 0 0 0 0 0 0 0 0 0			
Pit Stability: Generally stable throughout Groundwater: Not encountered							Surface Flavation Lever 89.99 mAOD			
Plan of Trial Pit: General Remarks: Trial oit terminated at 2.70m bgl. Relative density based on visual assessment							All dimensions in metres Log Scale 1:25			
- 		- 2.2				hane:	BRD D1295 272244 Drduk.com			

	Comple lod Use		//03/2020)0" Backhoe excavator (JCB 3CX type)		Shee	et 1 of
	amples & Type & No	,	Description of Strata	Oop) (Lev	(h / el) Coology	/ Le
0.20			TOPSOIL: Grass over dark brown, gravelly, sandy clay. Gravel of fine to coarse, subangular to subrounded flint.	 0,1	XIL .	<u></u>
0.50	st.		Firm, orange brown, gravelly, sandy CLAY, Gravel of fine to coarse, subangular to subrounded fint. Occasional cobbles of fint.	(i) 	1913	
1.00 1.00	SV D1	80/60/80 kPa	Medium dense, orange brown with black specks, clayey, gravely SAND	· · ·	ga NT SUBGRCUP	00100
1.90	HI		Medium dense, orange brown with black spocks, clayey, gravelly SANU with occasional clay lumps. Gravel of fine to coarse with occasional cobbles of subangular to subrounded flint and sandstone.		ga Kesgrave catchaent subgroup	
				 	ů.	
Pit S Grou	itabiliity: Indwato	Genera r: Not e	lly stable throughout		Surface Elevation 91.5	n Level 1 mA
Plan	of Trial	Pit:	General Romarks: Triel pit terminated at 3.10m bgl. Relative density based on visual assos only.		All diment Log Scale	

• • • • • • • •

Clier			CALA Homes (Chiltern) Ltd.		1	't rlus	Pil No.
	ect Title		Forge End, Chiswell Green				14.2
	et No:		BRD3604			11	213 ·
	jed By:		Hibberd				
	Comple od Use		7/03/2020 80° Backhoe excavator (JCB 3CX type)			Shee	t1 of 1
S: Depih	Type & No	_	- Description of Strata		apih / evel)	Goology	Lègend
0.15	J1		TOPSOIL. Grass over soft, dark brown, slightly gravely, very sandy clayey sill. Gravel of fine to coarse, subangular to subrounded filnt,		0 25	127	<u></u>
			Medium donse, light brown, slightly ality SAND and GRAVEL of line coarse, subangular to subrounded filnt.	10 - -	(88.14)		"0 5"0 5"0 5 0 5 0 5 0 5 0 5"0 5"0 5 0 5"0 5"0 5
a.60	ZI.		Medium donse, rod / brown, clayey, gravelly SAND with pockets of	him to	0.80 (87.59)		°0°0°0°0 °0°0°0
1.00	וט		atiff clay. Gravel of fine to cearse with cobbles, subangular to subro fiint.	unded .		ESGRAVE CATCHMENT SUBGROUP	-0 - 0 0 - 0 0 - 0
			Firm, rod brown, vory gravelly, very sandy CLAY, Gravel of fine to c with cobbles, subangular to subrounded fiint and rare sandstone.	oarse	1.40 (86.09)	CHAENT (
1.70	5∨	50/62/54 kPa	1.70 m: Difficult to shear vanu on excavated day due to high gravel content.	<u> </u>		WECAL	
2.00	εL				2.30	KESCRA	• _ • • •
			Modium donse, orange brown, clayey, gravelly SAND with clay lump Gravel of fine to coarse with cobbles, subangular to subrounded film	va.	(00.09)		· · · ·
2.60	D3		2.60 - 2.90 m: FACE A Abundant fint cobblos with some dark brow clay.	F	2 00 (85.49)		• •
			Structureless CHALK excavaled as weak, low to modium density, w with some erange staining and black specks, clayey, medium to cos <u>gravel</u> and complex in a sitty clay matrix. (CIRIA Grade Do)	irse 🔚	(85.20) 3.10 (85.20)	CH	
					_		
rit St Srow	ability: ndwatei	Genera r: Not e	illy stable throughout ncountered		Şinti	88.36	n AOD
	of Trial	Pit:	General Remarks: Trial pit terminated at 3.10m bgl. Relative density based on visual as	sessment	All d		ons in metre
۲		- 2.8 -·· A	only.				
Þ		۲ ۲					BRD
		С					 01295 272244 brduk.com

	Comple tod Use		7/03/2020 30° Backhoe excavator (JCB 3CX type)			Shee	t 1 of 1
	amples & Type & No		Description of Strata	 Πορί (Ι.ον	th / (cl)	Coology	Logend
0.20	J1	-	TOPSOIL: Grass over solt, brown, slightly gravelly, sandy, slity day / clayoy sill, Gravel of fine to modium, subangular to subrounded flint			1S	<u>an an an</u> a <u>an an</u> an a
0.50	S∨	50/48/50	Firm, light brown, slightly gravelly, sandy, slity CLAY, Gravel of fine to coarse, subangular to subrounded flint.	<u> </u>	562)		
0.50	Di	kΡņ	Stiff, orange brown, slightly gravetly, slightly sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint.	0,	10 5,32)		
1.00 1.00	SV DZ	1 100/102/100 kPo		- 		ROUP	
1.70	J2		Firm, friable, dark grange brown with some light grey, slightly gravelly, very sandy, silly CLAY. Gravel of fing to medium, subangular to subrounded flint. Some black specks.		50 4.42)	KESGRAVE CATCHMENT SUBGROUP	
1.90 2.00	5V 03	50/4В/4В к ^р р	1.90 m: Difficult to shear vane due to sand content and clay lumps breaking up.			SCRAVE CATO	- <u> </u>
2.60 2.70	SV D4	457415/4H K ⁶ 18	Firm, partially fissured, light brown with rare light grey, sandy, slity CLAY. Occasional sand lenses with rare fine, subangular to subrounded film gravel,	- - 3	50 3.42) 10 2.52)		
					,		
Pit 9 Grou	itability: Indwate	l Genera r: Notei	l	<u> </u>	Guife	ico Elovaia 85.9	un Loval. 2 MAOD
Plan of Trial Pit:		Pit;	General Remarks: Trial pit terminated at 3.10m bgl. Relative density based on visual assess only. Very iow gravel content throughout.	ment			ions in met

Client: Project Project Logged	No:	CALA Homes (C Forge End, Chisy BRD3604 I Hibberd 17/03/2020					P15
Method		180° Backhoe ex	180° Backhoe excavator (JCB 3CX type)				
	les & Tesis e a No – Vale		Description of Strata	Dop (Le	alh / vel)	Geology	/ Logood
0.50	SV 40/42 SV 100/11/ J1 KPJ D1	TOPSOIL: Grass clayey silt. Graves Soft to firm, light i to medium, subar Stiff, dark orange find to coarse with 1,40 m: Occasion	ise, orange brown, clayey GRAVEL and COBBLES of		30 30 15 14 15 15 14 15 15 14 15 15 14 15 15 14 15 15 14 15 15 14 15 15 14 15 15 14 15 15 14 15 15 15 15 15 15 15 15 15 15	KESGRAVE CATCHMENT SUBGROUP TS	
Fit Stabi Groundv Plan of 1	vator: No Frial Pit:	erally stable throug	General Remarks: Trial pit terminated at 2.60m bgl as hard dig, Relative density based on visual assess only,		All		4 mAOD ions in motro
D	A C	В 0,6 1			Tek Em	aphone:	BRD 01295 272244 8brduk.com

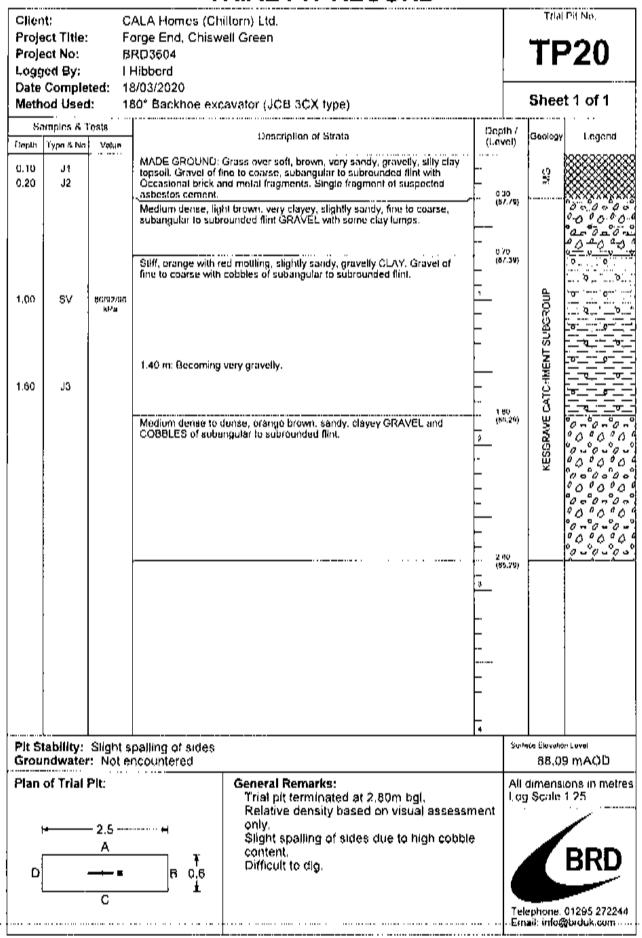
Date	ed By: Complet od Used	ted: 1ξ	Hibberd 3/03/2020 30" Backhoe excavator (JCB 3CX type)		Shee	et 1 of 1
Si Depih	Type & No	esis Valuo	Oescription of Strata	Depth / (Level)	Geology	Legend
0,10	.J1		TOPSOIL: Grass over soft, brown, slightly gravelly, sandy, sity clay. Gravel of fine to coarse, subangular to subrounded flint with Occasional rootlets.	0.25	۳	<u>ar ar ar</u> 4 <u>a</u> u <u>a</u> u <u>a</u> u
0.60 0.60 0.60	.J2 S∨ D1	52/70/54 kPa	Firm, light orange brown, slightly gravelly, very sandy CLAY. Gravel of fine to coarse, sobangular to subrounded flint. 0.50 m: Becoming gravelly. Medium dense to dense, light brown with orange, sandy, clayby GRAVEL and COBBLES of subangular to subrounded flint.	(05 3A)		
1.20 1.30	в1 Ј3				T SUBGROLP	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
			Firm, orange brown, sandy, very gravelly CLAY. Gravel of medium to coarse with cobbles of subangular to subrounded fint. 1.70 m: Unable to shear vane due to high gravel and cobble content.		CSGRAVE CATCHNENT SUBGROUP	
2.50 2.50	\$V D2	72/74/74 k₽ù	2.20 m. Beconving stiff		2	
Pit Stability: Generally stable throug Groundwater: Not encountered			ncountered		••••••	3 mAOD
Plan D	of Trial I	Plt: - 2.5 A	General Remarks: Triat pit terminated at 3.00m bgl. Relative density based on visual assess only. B 0,6	LO	dimens g Scale	BRD

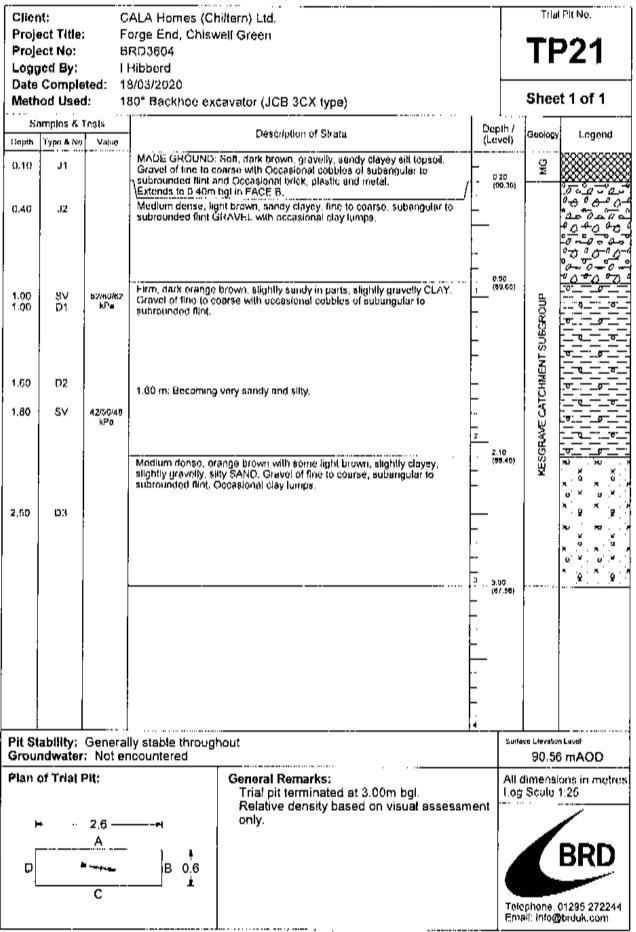
Client: Project Title: Project No: Logged By: Date Completed:			ALA Homes (Chiltern) Ltd. orge End, Chiswell Green RD3604 Hibberd				Pit No.
	od Used		8/03/2020 80" Backhoe excavator (JCB 3CX type)			Shee	t 1 of 1
Se Joph	mples & 1 Type & No	· · · · · ·	Description of Stratu	Deg (Lo	ath / vol)	Goology	Legend
0.20	J1		TOPSOIL: Grass over solt, brown, slightly gravely, sandy, slity clay, Gravel of fine to coarse, subangular to subrounded fint with Occasional rootlets.	- -	.90 (5.90)	ې ۲	<u></u>
			Soft to firm, friable, light brown, alightly gravelly, sandy, very silly CLAY. Gravel of finn to medium, subangular to subrounded flint. Firm to shift, orange brown, very gravelly, slightly sandy CLAY. Gravel of fine to coarse with cobbles of subangular to subrounded flint.		00 15 00)		
1.00 1.00	5V D1	70/52/68 K ³¹ a		- - - - - -	60	ESGRAVE CATCHMENT SUBGROUP	
1.80	Ú2		Medium dense to dense, orange brown, clayey, medium to coarso, GRAVEL and COBBLES of subangular to subrounded flint, 1 80 m: Difficult to dig.	- (1) 	4 (10)	KESGRAVE CATC	
					nd 3 49)		<u>0 n Ú n Ú n</u>
°it St Grour	ability: ndwater	General : Not er	lly stable throughout		მსობ	ca blevelo 86,29	mAQD
Plan d F	of Trial I	Pit: - 2.6	General Remarks: Trial pit terminated at 2.80m bgl. Relative density based on visual assess only. B 0.6	πent	Log	Scale	BRD

Projo	t: ct Title: ct No: ed By:	F B	ALA Homes (Ch orge End, Chisw RO3604 Hibberd	•			Trial	Pit No.	
Date	Complet od Used	(ed): 13	8/03/2020	avator (JCB 3CX type)			Shee	t1of1	
	niples & Ti Type & No	èsis Value		Description of Strata	E,	Doptin / Lovel)	Goology	სიე	
0.10	J1		Gravel of fine to co	l onso, dark brown, ashy, gravelly, sendy, silly topsoil, arish with cobbies of subangular to subrounded filmt, akor and fragmonis of plastic, timber and general bentire wasto).		1.00	MADE GRCUND MOUND		
1.30	JZ		Gravel of fine to co clinker. Occasional	Soft, dark brown and light brown, sandy, graveliy clay arse with cobbles of subangular to subrounded flint. I brick and decaying plant remains.		(03.05)	K MADE C		
						-			
Pit Stability: Generally stable through Groundwater: Not encountered				nout	4	Sur	face Lievalu. 90.05	 n Level 5 π1ΛΟ	
Pjan P D	of Trial F	Pit:	B 0.6	General Remarks: Trial pit terminated once underlying na solls encountered. Excavated in a mound. Relative density based on visual assos only.		Lo	dimensi g Scale	ions in i	

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Client: Project Title: Project No: Logged By: Date Completed:		F	ALA Homes (Chiltern) Ltd. orge End, Chiswell Green RD3604 Hibberd 8/03/2020			TF	Pit No.
	od Used		80° Backhoe excavator (JCB 3CX type)			Shee	t1 of 1
Sa Direth	Type & No	esis Valua	Description of Strate		p(h / aval)	Gentragy	Logend
0.10			TOPSOIL: Soft, brown, slightly gravely, sandy, silly clay. (Srave) of fine (or medium, subangular to subrounded flint. Abundant roots,	_	0.20 85.071	2	<u>an an an an</u> <u>an an</u> an
0.60	st	98/100/92	Medium dense, tight brown, silty, very sandy GRAVEL of fine to coarse, subangular to subrounded flint with rootlets. Stiff, dark orange, very gravelly, sandy CLAY with rootlets. Gravel of fine to coarse with cobbles of subangular to subrounded film.		1.00 N5 17}	പറ	6 6 7 6 7 6 6 7 6 7 6 7 6 6 8 6 7 6 7 7 6 8 6 7 8 7 8 6 8 6 7 8 7 8 6 8 6 7 8 7 8 6 9 6 7 8 7 8 7 8 9 6 7 8 7 8 7 8 7 8 9 6 7 8 7 8 7 8 7 8 9 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7
1.10 1.60 1.70	D1 D2 J3	kPa	 1.10 m: Values affected by high gravel content. 1.60 m. Unable to shear vane on excavaled soil as very gravely, very silty and friable. Medium dense to dense, grange brown, clayoy, very gravely, silty SAND. Gravel of medium to coarse with cobbles of subangular to subrounded 		1.00 мя.371	KESSRAVE CATCHMENT SUBGROUP	
2.40	B1		flint. Some clay lumps with abundant cobbles,		100 53,17)	KESGS	* * * * * * * * * * * * * * * * * * *
Pit St Groun	ability: (Genera Not e	lly stable throughout		Şudu	or Eleveror 86.12	n tavar M AQD
	of Trial P		General Remarks: Trial pit terminated at 3.00m bgl. Difficult to excavate. Relative density based on visual assessm only. B 0.6 1	nent	Log	dimensi Scale	ons in metre





Project Title:FoProject No:BRLogged By:I HDate Completed:18.Method Used:18.			ALA Homes (Chi forge End, Chiswa RD3604 Hibberd 8/03/2020		-	TF	P22
			80° Backhoe exc	avator (JCB 3CX type)		Sheet 1 of 1	
Si Dopih	mples & Type & No	1	-	Description of Strate	Dopt (Levi	h / Geology	Legend
0.10 0.10	רוק 1	D,D ppm	Charcoal. Firm to stiff, orange	Grass over dark brown, very gravelly clay. Gravel of angular to subrounded flint with rare brick and brown mottled red, gravelly to very gravelly GLAY. arse with cobbles of subangular to subrounded flint.		2,, <u>-</u>	
0.60	PiD 32	0.0 ppm				KESS3AIE	
Pit Stability: Generally stable through Groundwater: Not encountered Plan of Trial Pit:				out General Remarks:	4		n tores 1 mAOD Hons in metr
D	-	1.8 A		Existing excavation logged as trial pit. Relative density based on visual assess only.	sment		01295 2722

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Çliont:	Cala Homes (Chiltern) Ltd	Trial Pit No.			
Project Title:	Forge End, Chiswell Green				
Project No:	BRD3604	TP101			
Logged By:	8 Devonshire				
Date Completed:	22/06/2020				
Method Used:	180" Backhoo excavator (JCB 3CX type)	Sheet 1 of 1			
Samples & Tests	Description of Strata (Levi	h / Goology Legend			
1.10 Ш1 1.60 В1	CERVITE Rough grass over, firm, dry, brown and dark brown, slightly sondy, slightly gravelly, slightly organic silt, with rare roots and rootets. Gravel is modium to coarse, angular flint. Firm, dry, light brown, slightly sondy, gravelly Sit T. Gravel is fine to coarse, rounded to angular flint and quartzile,				
Pit Stability: Gene Groundwater: Not Plan of Trial Pit: A 3.0 A D	General Remarks:	Surface Lievelon Level 86.493 mAOD All dimensions in motres Log Scale 1:25			

Date Completed; Method Used: Samples & Yests Depth Type & No Value	22/06/2020 180° Backhoe excavetor (JCB 3CX type)			TP102	
· · · · · · · · · · · · · · · · · · ·			Sheet 1 of 1		
		Depth / (Level)	Gnolesy	legend	
	 TOPSOIL. Rough grass over, firm, dry, brown, slightly sandy, slightly organic silt, with rare medium to coarse, subrounded to subangular filmt and quartitie gravel and rootlets. Firm, dry, light brown, slightly sandy, gravelly SiLT. Gravel is fine to coarse, rounded to angular filmt and quartitie. Medium density, brown to red brown, very clayey GRAVEL. Gravel is fine to coarse, rounded to subangular filmt and quartitie. 1.50 m: Large pockets of gravelly clay. 	- 0,30 - (4* 62) - (33.32) - (33.32) 			
	Firm, rod brown, gravelly to vory gravelly CI,AY, Gravel is fine to coarso, subangular to rounded quartzite and flint. Fore cobbios.	- 1.05 (M4.27) - 2 - 2 - 2.70 - 2.70 - 3 - (83.02) 	KESGRAVE CATCHIVENT SUBGROUP		
Pit Stability: Gena Groundwater: No Plan of Trial Pit:	erally stable throughout t encountered General Remarks: Trial pit terminated at 2.90m bgl.	AII		22 mAOD	

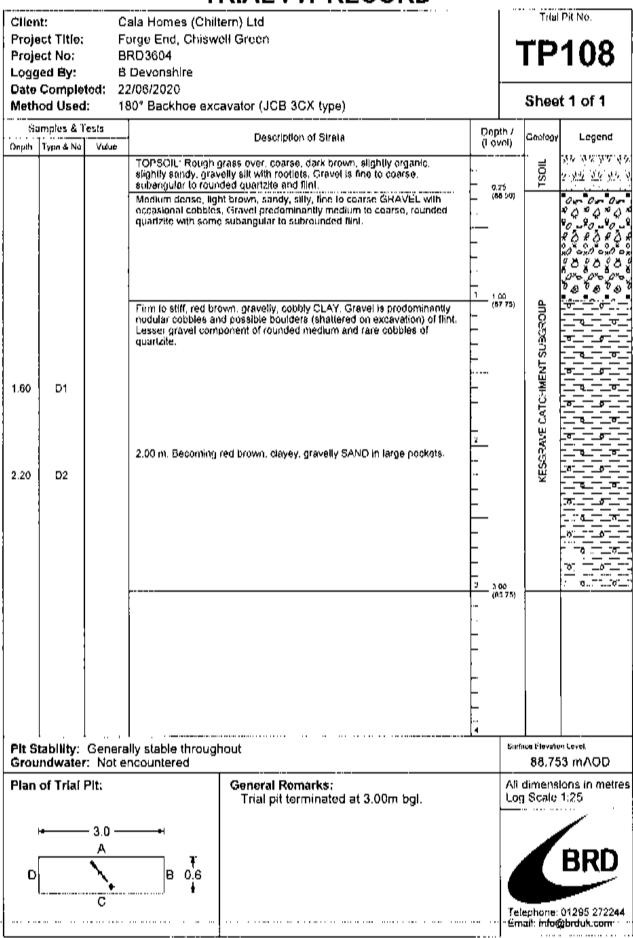
Clien		Cala Homes (Ch	niltern) Ltd			inal	Pit No
•	et Title:	Forge End, Chis	well Green		-	тп	402
	ect No: Jed By:	BRO3604				I۲	103
	Completed:	8 Devonshire 22/06/2020			1.		
	od Used:		0° Backhoe excavator (JCB 3CX type)				
Su Dayth	Imples & fests		Description of Strata	De, (Le	pth / wel)	Goology	Legend
Depin			h grass over, firm, dry, brown, slightly sandy, skohliv	,			<u> </u>
		Eirm, dry, light br	h grass over, firm, dry, brewn, slightly sandy, slightly rare medium to coarse, subrounded to subangular (lint ivel, with rootlets and roots to 5mm diamotor, own, slightly sandy, gruvelly SILT. Gravel is fine to to angular film and quartzite.		125 85.31)	ISCIL	<u>, xo, xo</u> yo. xo x xo xo xo x x yo xo xo x x yo yo
1.10	ום	Firm to stiff, rud t rounded to subar	prown, elightly gravely CLAY. Gravel is tine to medium, ngular quartzite and film.		.80 84 79)	SUBGROUP	**************************************
2.20	22	light groy brown i) gravel and with some black manganese molling and nolling. beent. Manganese specks less frequent and no light			KESGRAVE CATCHRENT SUBGROUP	
					20 17.36)		
Pit Sta Grour	ability: Gen ndwater: No	erally stable through t encountered	ghout		Eu/la	ica Elevatio 85,56	n Lovol 4 mAOD
Plan q	of Trial Pit:		General Remarks: Trial pit terminated at 3.20m bgl.				ons in metre
-]a	3.0 A C	В 0.6			Tele	phone:	BRD

Client: Project Title: Project No: Logged By:	Cala Homes (Chiltern) Ltd Forge End, Chiswell Green BRO3604 B Devonshire			104
Date Completed: Method Used:	22/06/2020 180" Backhoe excavator (JCB 3CX type)		Shee	et 1 of 1
Samples & Tests Depth Type & No Valu	Description of Sirala	Depth ((Level)		Legend
	TOPSOIL: Rough grass over, coarse, dark brown, slightly organic, slightly sandy, very gravelly Silt with reetlets. Gravel is fine to coarse, subangular to rounded quarizite and first.		TOPSOIL	20 20
	Medium dense, light brown, very silty GRAVEL. Gravel is fine to coarse, subangular to rounded flint and quartate. 0.80 m: Undulating strata divide.	(AN,02 		0 - 0 - 0 2 - 2 - 2 2 - 2 - 2 2 - 2 - 2 2 - 2 - 2
	Firm to stiff, red brown mottled black manganese in parts, very gravely CLAY. Gravel is medium to coarse to cobbles of subangular to subrounded flint, and a lesser amount of medium to coarse, rounded quartale.	(80.72		
1.20 81		-	SUBGRCU	
1.80 D1	1.50 m: Less manganese motiling and slight reduction in gravel. Sandy gravely clay in pockets. Quartzite size increase to cobbles.	- - -	TCH-MENT	0
	2,00 m; Flint occasionally up to nodular boulder size, Officult to exervate.	2	KESCRAVE CATCHMENT SUBGROUP	
) 	,	
		- -		
Pit Stability: Gen Groundwater: No	arally stable throughout t encountered		atiáon Einvái 86.5	
Plan of Trial Pit:	General Remarks: Trial pit terminated at 3.00m bgi.		li dimens og Scale	aons in meta 1.25
H= 3.2 A	—— В 0.6			BRD

Cile		Ċ	ala Romes (Chi				·····)		Pit No.		
	ect Title:		orge End, Chisw								
-	oct No:		RD3604					ТΡ	105		
	ged By:		Devonshire								
1	Comple		2/06/2020					Ohaa	11.011		
Meth	iod Usoc	1 ; 14	80° Backhoe exc	avator (JCB 3CX	type)			Snee	tiof1		
Depth	amples & 1 Type & No	h		Description of	Strata		Depth / (Level)	Goology	Logend		
	TOPSOI stightly s		slightly sandy, ven	grass over, coarse, da y gravelly sill with rooth ided goartzite and flint	rk brown, slightly organic, ets. Gravel is fine to coars	ic, '	- 0 30	CFSOIL	र्थक रुक रुक रुक इ.स. २क रुक रु इ.स. २क रुक रुक		
			modium to coarse	to cobbles, subangula	clayey GRAVEL. Gravel r film (cobbles dominant s m to coarse rounded quat	size	- (112 94) - - - - - - - -	KESGRAVE CATCHMENT SUBGROUP			
			excavation. 1.60 m: Face B: P(slightly gravelly sill angular and crush- 1.60 m: The pocke depth towards con 1.60 m: Chalk boo- coarse with occasi- the chalk. 2.29 m: Chalk acro- Structureless CHA some surfaces, sill	acket of soft, white, sin . Chalk gravel is very if es easily with light fing its approximately 0.6r ire of the pit. oming very gravelity sill onal cobbles. Some light as whole pit from abou- LK: Excavated as whill	n wide initially, expanding . Chaik gravel angular, fir phi brown mottling to surfa /e. e. with red brown staining t to cobbles of angular. m	ncy of edito	- 2.30 (99 00) - (99 00) - (97 00) -	CHALK			
			lly stable through scountered	10Ut	<u> </u>		56	face Florence 86-19	* (.***) 7 mAOD		
	of Triat i						i Lo nai the	All dimensions in metres Log Scale 1:25			
ם		C	B 0.6					ephone:	D1205 272244 (brduk,com		

Project No: E Logged By: E	orge End, Chiswell Green RD3604 Devonshire		TP	106
•	2/06/2020 30° Backhoe excavator (JCB 3CX type)		Shee	t1of1
Samplos & Tests Depth Type & No Volue	Description of Strata	Depth / (Level)	Geology	Legend
	TOPSOL: Rough grass over, coarse, dark brown, slightly organic, slightly sandy, gravelly silt with rootlets. Gravel is fine to coarse, subangular to rounded quartitle and film.		TCFSOIL	<u>1995 - 1995 - 1995 - 1</u> 1995 - 1996 - 1995 - 1 1997 - 1996 - 1995 - 1 1997 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 19
	Medium dense, light brown, sandy, silty, find to coarso GRAVEL with occasional cobbles. Gravel predominantly medium to coarso, rounded "" quartizite with some subangular to subrounded flint.	- (87.70)		0 - 0 - 0 - 0 * 0 * 0 * 0 * 0 * 0 * 0
	0.80 m. Red brown, sandy pockets.	-	- -	808080 808080 808080
1.40 D1	Firm red brown, gravelly to very gravelly CLAY. Grave) is fine to coarse with occasional cobbles of rounded quartille and subrounded to cubangular flint.	1 10 (A7 19)	KESGRAVE CATCHMENT SUBCROUP	
2,20 D2	2.20 m: Face A/B: Pockets of white structured chalk around nodules of fint. 2.40 m: Gravel cobbles increasing in size. Chalk pocket expanding out from the corner diagonally on faces A and B and towards centre of pit.	_	×	
	2.69 m: Chalk across pit from above. Structureless CHALK. Excevated as slity gravel to cobbles of angular. Iow to medium density chalk and some flint gravel. Chalk occasionally has dark black specking, or fight orange brown staining to surface. (CIRIA Grade Dc)	2,70 (85.50) 3,10 (85,19)	CHALK	
		_		
Pit Stability: Genera Groundwater: Not 6	Ily stable throughout	50	irlace Elevand 88.28	an Level 35 mAOD
Plan of Trial Pit:	General Remarks: Trial pit terminated at 3.10m bg!.		ll dimens og Scale	ions in motre 1:25
H 3.0 ··· A				BRD
	B 0.6		6	

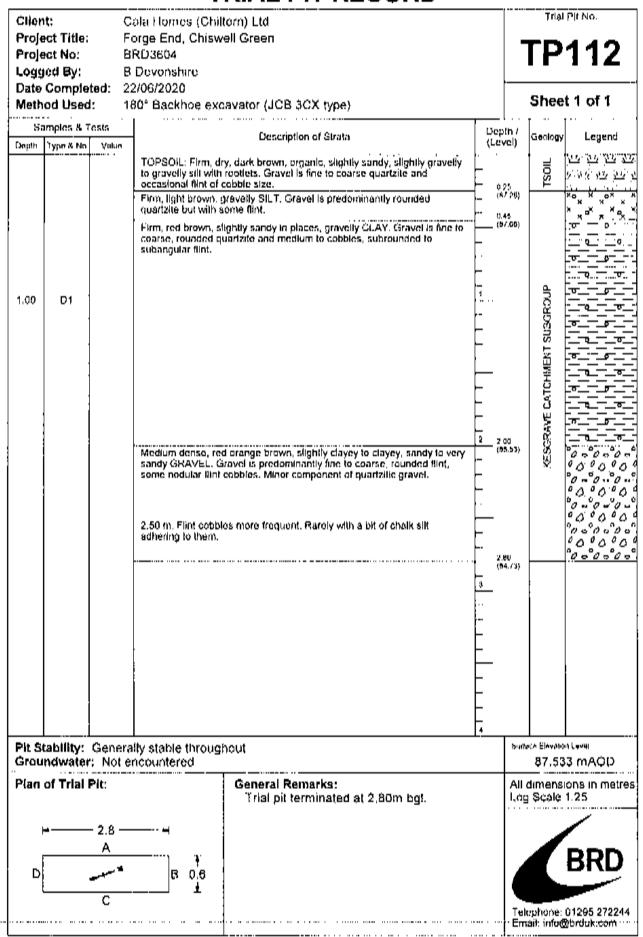
Clien			a Homes (Chi					Tr(s)	PitNo.
-	oct Title: ect No:		ge End, Chisv D3604	/ell Green			-	ΤÞ	107
-	jed By;		evonshire						107
	Complete		6/2020						
	od Used:		* Backhoe ex	cavator (JCB 3CX type)				Shee	t1of1
	Type & No	ts Volue		Description of Strata		Dep (Lev		Geology	Legend
1.20	<u>Туµо & №</u>		Addium dense, ro obangular to rou Addium dense, lig with occasional of obcounded flint. Addium dense, ro ounded to suban	grass over, coarse, dark brown, slightly o y gravelly slit with rootlets. Gravel is fine t ided quartzite and fini. In brown, sandy, very clayey. fine to coar obbles. Gravel is tounded quartzite and so obbles. Gravel is tounded quartzite. d brown, sandy, very clayey GRAVEL. G gular flint and quartzite.	lo'coarse, ise GRAVEL ubangular (o		25 0,03) 00 90 918)	ESGRAVE CATCHMENT SUBGROUP TSOIL	
		2	:,00 m ⁻ Occasion	al flint cobbles.		2 	20 7.18)	KESGRA	V V
Pit St Groui	ability: Ge ndwater: f	eneraliy Not enc	stable throug ountered	hout			tiurfa	90.17	n avet 7 mAOD
Plan i	of Trial Pit	:		Genoral Remarks: Trial pit terminated at 3.00m	bgl.			dimensi Scale	ons in metre 1:25
F	2	. 8 · · ·…·	···- -						
		<u>}</u>	B 0,6						BRD
	(2							- 01296 272244 9brduk.com



Clien			ala Homes (Chiltern) Ltd			Trial	Pit No.
-	ect Title:		orge End, Chiswell Green		-	ГD	109
	ect No: Jed By:		RD3604 Devonshire				109
	Comple		2/06/2020				
	od Used		80" Backhoe excavator (JCB 3CX type)			Shee	t1 of 1
	imples & T		Description of Strata		1	Geology	Legend
Doplin	Type & No	Value		(Le	vel)		86.86.86.8
			TOPSOIL: Rough grass over, Coarso, dark brown, slightly organic, slightly sandy, slightly gravelly Silt with rontlots. Cravel is fine to coarso, subangular to rounded quarizito and flint, Firm, dry, light brown, very gravelly SiL 1. Gravel is predominantly	- - - °	.25 (7.04)	TSCIL	**************************************
			Founded quartzite, but some subrounded to subangular flint. Firm to still, rod brown with some black manganese specks, very gravelly CLAY Gravel is medium to cobbles of subrounded to subangular flint and charse, rounded gravel. Desiccated in upper 300mm.		,4'. (n,84)	0.	
1.00	D1 B1					GSCRAVE CATCHMENT SUBGROUP	
			2.00 m: Face C: Pocket of structureless chalk partially worked into suffounding clay. White gravelly sitt. Gravel is fine occasionally coarse, white chalk. With depth expanding to face D.			CORPUE CAN	0 0 0 0 0 0 0 0 0 0 0 0 0 0
			2.60 m: Chalk across whole pit except FACE D. Chalk gravel in size but with slight rounding.		00 4 40)		o
			Structureless CHALK: Excavated as very silly gravol/very gravolly Sill T, No black specks. Rare filmt nodular cobbles. Occasional light orange brown staining to surfaces. (CIRIA Grado Dc)	3	20	CHALK	
					A.OU)		
				Ļ.			
Pit St. Srour	ability: ndwater	Genera : Not e	lly stable throughout ncountered	•	Surfa	ce Elevation 87.29	2 mAOD
	of Trial F		General Remarks: Trial pit terminated at 3.20m bgl. Rounding of initial chalk suggestive of sliv reworking of chalk surface. B 0.6	ght		limensi Scale	ons in metre
D		<u>``</u>	B 0.6			phone: (D1295 2722

Project No: Logged By: Date Completed:	BRD3604 B Devonshire 22/06/2020			110	
Method Used:	180° Backhoe excavator (JCB 3CX type)		Shee	nt1 of 1	
Samples & Lesis	Description of Strata	Depth / (Level)	Goology	Logond	
	TOPSOIL: Rough grass over, firm, dry, dark brown, organic, very gravely silt. Gravet is fine to medium occasional cobbles, subangular fint and rounded quartzite with rootlets.	0.75	1831	e ve ve v ev ve ve	
	Firm, dry, brown, graveliy to very gravely SiLT, Gravel is fine to coarse, subangular to rounded quartzito and firm.	(NM 27)		* <u>.</u>	
	Firm to sliff, red brown, slightly gravelty CLAY. Gravel is coarse to cobble, subangular fluit.	(98.02)		0 0.	
	First and because which the originality by some organity (1) AM with repretation of cost	1 1 00 (07 52)			
1.20 D1	Firm, red brown, slightly gravelly to very gravelly CLAY with pocket of red brown, gravelly sand. Gravel is fine to coarso occasionally cobble of subangular to rounded flint and quartzite.	- - -	SUBSROUP		
	1,50 m: Clayoy GRAVEL in pockols.	–	ENTS		
	1.70 m: Rounded quantzite gravel dominant.	_	CATCHNENT		
		2	ð W		
		-	KESGRAVE		
	2.40 - 2.90 m ⁻ Faco C: Large pockot of white chaik sill matrix around	-			
	nodular cobbles to bouldors of flint.			o-	
		F		/ /	
		3 10			
		(85.42)			
		<u> </u>			
Pit Stability: Gen	erally stable throughout	* Sur	foca Clavalia		
Groundwater: No Plan of Trial Pit:	General Remarks:	 All	88.516 mAOD All dimensions in metr		
	Trial pit terminated at 3.10m bgl.	LO	g Scale	1:25	
⊷— 2.8 م					
	■ В 0.6			BRD	

Clien		Cala Homes (Chiltern) Ltd			T().	al Pit No.	
r -	et Title:	Forge End, Chiswell Green			T	4 4 4	
	oct No:	BRD3604			▏▋┣	111	
	ed By:	B Devonshire					
	Completed: od Used:	22/06/2020	() () () () () () () () () () () () () (Sheet 1 of 1		
		180° Backhoe excavator (JCB 3		. .	<u>-</u>		
	imples & Tests	Descriptio	n of Strata	Dep (Let	h/ Goolog	y Logend	
36µ81	Type & No Value	TORSON : Barrah tratat mura flore ef	an daala kaasaa aasaa ka kiistata	(Let		<u> 25 26 88 8</u>	
		TOPSOIL: Rough grass over, firm, d gravely silt. Gravel is find to modium and rounded quartaile with rootlets.	occasional cobbles, subangular flint	- 	12OIL	6.2.6 8.6 8.6	
		Medium denso, light brown, vory silly predominantly roundod quartzilo and	/ GRAVEL. Gravel is fine to coerse. some rounded to subangular filmt.	···· (#	ະ ທາງ	0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -	
		Medium denso, red brown, slightly sa to coarse, predominantly rounded qu subangular flint.	andy, clayey GRAVEL. Gravel is fine article and subrounded to	- - -	ESGRAVE CATCHMENT SUBGROUP	00000000000000000000000000000000000000	
		Firm, red brown, gravelly to very grav sand pockets. Gravel is predominant subangular flint and rare medium to o	ly medium to coarse to cobbles,	, 1.: (8	VE CATCHME	0	
		 1.90 m: Large nodular cobbles of flin chalk slit around them. 		2 	KESGRA		
		2.30 m: Face B: Large pocket of whit chalk gravel with rounded edges. Sig edges of pocket.				O	
		2.60 m: Chalk pocket expanding tow present. Chalk gravel becoming tine brown staining or black specking to s	to coarso, angular with some orange				
		\2.89 m: Chalk across whole pil. Structureless CHALK: Excavated as fine to coarse, occasionally cobbles of with extensive orange brown statining (CIRIA Grade Dm towards Dc)	of white, low to medium density chalk r	a, (*	non) 2000		
Grour	ndwater: Not					76 mAOD	
Plan d P	of Trial Pit: 3.0 - A	Chalk initia	h arks: minated at 3,10m bgl, illy had slight rounding suggest ig of the upper surface.	ive	All dimens Log Scale	/	
٥	<u>}</u>	6 0,6 1			6	BRD	
						: 01295 27224/ @b/duk.com	



Cliont:		Cala Homes (Chiltern) Ltd			Trial	Pit No.
Project ' Project '		Forge End, Chiswell Green		-	Гр	112
Project .ogged		BRD3504 B Devonshire			1 1	113
	mpleted:	23/06/2019				
Nethod	-	180" Backhee excavator (JCB 3CX type)			Shee	t 1 of 1
Sampl	les & Tesis	Doscription of Strats	Qep		Goology	Legend
hipth Typ	e & No Value		(Lé	vėl)		36 36 36
		TOPSOIL: Firm, dry, dark brown, organic, slightly sandy, slightly gravelly slit with rootlats. Gravel is fine to coarse quartzite and occasional find of cobble size.	- o	.25 (7.54)	1.SCIL	2 22 22 23 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
		Firm, dry, light brown, gravelly SILT becoming slity GRAVEL with depth. Gravel is fine to coarse, rounded quartzite, and fine to coarse, subrounded to subangutar flint, increasing to cobble size with depth.	'" 	17.237		**************************************
		Firm, red brown, very gravelly CLAY. Gravel Is fine to course, rounded quartzite, and fine to course to cobble, subrounded to subangular flint. Clayey sand partings and small pockets in places.		00 10.81)	CESCRAVE CATCHMENT SUBGROUP	v v v v
		Loose to medium dense, orange brown, gravelly SAND. Gravel is fine to coarse, rounded quartzile and line to coarse subrounded to subangular flint. 2.20 m. Face B/C corner: kregular pocket of white silty gravel chaik. Some of the chaik has rounded edges. 2.50 m. Bécoming gravelly clayey SAND/gravelly sandy CLAY. Chaik wédge continues to base of pit about 0.5m wide.	() 	70 5 56)	ARADSEN	
			, (n ,	4.CRI)		
lt Stabi	lity: Gene	rally stable throughout encountered		SUITE	Co Elevador No 7 7 6	
	rial Pit:	General Remarks:		A.# .		
an or I		Trial pit terminated at 3.10m bgl.			Scale 1	ons in metr 1 25
 0	2.8 - A	B 0.6				BRD
	с	· · · · · · · · · · · · · · · · · · ·				01295 27224 brduk.com

Client: Project Title: Project No: Logged By: Date Completed:	Cala Homos (Chilto Forge End, Chiswel BRD3604 B Devonshire 23/06/2019				1114
Date Completed: Method Used:		vator (JCB 3CX type)		Shee	t 1 of 1
Samplos & Tosla Depth Type & No Velu		Description of Strata dark brown, organic, slightly sandy, slightly gravelly rel is fine to coarse quarizite and occasional flint of	Lepti (Leve		Legenc <u>30. 34-34</u> 2-34-34-35
	coarse, rounded qua	brewn, silly, fine to coarse GRAVEL with occasional top of horizon. Gravel is predominantly fine to rizite, and some subangular to subrounded flint.	- (A)		2020 2020 2020 2020 2020 2020 2020 202
	subangular flint.	rown, slightly clayey, slightly sandy, fine to coarse LES. Gravel is rounded quartzite and subrounded to hilly sandy, gravelly CLAY. Gravel is fine to coarse,	-		
	rounded (e subangul	ar quartzite and tint, small pockets of chalk matrix around nodular	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Groundwater: No	erally stable throughout oncountored				12 mAOD
Plan of Trial Pit:	B 0.6	General Remarks: Trial pit terminated at 3,00m bgl,		All dimens Log Scale	BRE

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Client:	Cala Homes (Chiltern) Ltd		Triai	Pit No
Project Title:	Forge End, Chiswell Green			
Project No:	BRD3604		I۲	115
Loggod By:	B Devonshire			
Date Completed:	23/06/2019		Charl	:1 of 1
Method Used:	180° Backhoe excavator (JCB 3CX typo)		Şneel	
Sampins & Tosta Depth (Type & No – Velu		Depth / (Level)	Geology	Legend
	MADE GROUND/TOPSOIL: Frinblo, dark brown gravelly sill with rootlets. Gravel is fine to coarse with occastonal cobbles of rounded quartzite and subrounded timi. Rare brick fragments to whole bricks, fragments of plastic, fragment of electrical wire and a single fragment of larmae. Extraneous materials likely pushed into natural topsoil. Loose to medium density, light brown, very silly, time to coarse, subrounded to subangular GRAVEL of thirt and quartzile.	0,15 (00 23) (05.43)	KESGRAVE CATCHMENT SUBGROUP	
	2.10 m: Occasional Jargo pockets of red brown clayey sand. Gravel bocoming prodominantly flint includos some cobbles.		KESGRAVE CA	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Pit Stability: Gene Groundwater: Not	raily stable throughout encountered	Suite	ica Elevation 89.384	
Plan of Trial Pit: 	General Remarks: Trial pit terminated at 3.10m bgl. Pit extended to check there is no made		dimensio i Scale 1	ns in metres

Project Title: Project No:	ala Homes (Chiltern) Ltd orge End, Chiswell Green RD3604 Dovonshire				P116		
Date Completed:	3/06/2019 80° Backhoe excavator (JCE	3 3CX type)		Sheet 1 of 1			
Samplos & Tosts Depth Type & No - Value	Descri	ption of Strata	Dep (Lov	th / Goole	gy Legen		
<u>Conth</u> Lype & No Value	YOPSOIL: Firm, dry, dark brown, rootlets. Gravel is fine to coarse o size 0.30m: Pil terminated on light bro	organic, slightly sandy, gravelly slit with juartzite and occasional flint of sobble wn, gravelly slit.			<u>- 76 96 8</u> 5. 86 96 <u>6. 86 76</u>		
			₹.				
			-				
Groundwater: Not				•••••	789 mAO[
Plan of Trial Pit:	Trial pit	temarks: terminated at 0.30m bgl, terminated when natural ground No suspected ACM identified,	I	All dimensions in metri Log Scale 1:25			
	B 0.6				BR		

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Clier			ala Homes (Chil				Tual	Pit No.
	ect Title:		orge End, Chisw	vell Groon		_		A A 🖘 🗌
Proje	ect No:	в	RD3604				I۲	117
Logg	ad By:	В	Devonshire			'		
Date	Comple	ted: 23	3/06/2019					
Meth	od Usec	I: 18	80" Backhoe exc	cavator (JCB 3CX type)			Shee	t1of1
Se	amples & T					1. 	l	l · · · - · · -
Depth	Type & No	Value		Description of Strate	Dep (Lev	vel)	Geology	Legend
			TOPSOIL: Firm, d	v. dark provet, organic, slightly sandy, gravelly silt with	·····	•· •· •• ·	3	मने जेन मने थन
			rootiota Cravel is	ry, dark brown, organic, slightly sandy, gravelly sit with find to coarse quartzito and occasional flint of cobble	F		05-01	6.99 84.94 9
			9/24)		. o.	30	ġ.	Sec. 14 89 84
			0.30m: Pill termine	tod on light brown gravelly silt.	L (8	7.46)		
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Dit Ce	abilita	General	lly stable through	hout		Surle	ca Elevator	
Grou	ndwater.	: Not er	ncountered	INVER.				9 mAOD
	of Trial F			General Remarks:		All		
Plan	orinain	-16.		Trial pit terminated at 0.30m bgl,			Scale '	ons in metres. 1:25
				Trial pit terminated when natural ground			· · ·	
۲		· 8.0 —	Ì	proven. No suspected ACM identified,				
		A						
[N	в 0.6					BRD
D		<u>\</u>	B 0.6					
L			, i 🗰					
		-						1295 272244
						Ema	0: (nfo@	brduk.com

Clien		~			I		Trial	Plt No.	
	n: ect Title:		ala Homes (Chil orge End, Chisw						
-	ct No:		RD3604			T	P	11	Q.
	jed By:		Devonshire				•		U.
	Comple		3/06/2019						
	od Used			avator (JCB 3CX type)		5	Shee	t 1 of	1
Se	amples & 7	esis		Description of Strata	Бер	th/	Suctory,	1.00	lenti
Depth	Туро & No	Value			(1.0)	/ol) `		. 02 *****	kana Xaorana
			is fino to coarse, re flint, Raro brick fra	TOPSOIL; Firm, dry, organic, very gravely sitt. Cravel bunded quartizite and some subangular to subrounded gments up to whole brick in size. Couple of glass ingle fragment of ceramic. Extraneous materials	 0:	10	MGTS		
1			worked in from ab-	ght brown, very silly GRAVEL. Gravel is fine to coarse,	(H)	^{,20})	К	40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
			\oredominantly qua	ritzito with some flint.	181 	2.645		<u> </u>	<u></u>
					17				
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					3				
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					F				
					-				
Pit S	tability:	Genera	∐ illy stable througi	havt	4	Surface	a Elevalia		
Grou	ndwater	: Not e	ncountered	····			88.08	2 mA(סכ
Plan	of Trial I	Pit:		General Remarks: Trial pit terminated at 0.30m bgl. Trial pit terminated when natural ground			mensi Scalo		metres
		- 7.5		proven. No suspected ACM identified.					
D		A	в 0.6					BR	D
		С	. .			Telep	hone	01295 2	272244
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Ciler	nt:			ិកស្ដ	Pit No.			
	oct Title:		orge End, Chiswe	ell Green				440
	ect No:		RD3604				I٢	119
	ied By:		3 Devonshire					
	Comple		3/06/2019				*	
Meth	od Used	1: 1. 	80° Backhoe exc	avator (JCB 3CX type)			Snee	t1of1
h	I ypn & No			Description of Strata	Dep (Let	ath / vel)	Goology	Legend
	.,,,		TOPSOL: Very or	wolly sill. Single large fragmont of rubber mat.			+	<u> 25 25 25 25</u>
		i			F		105501	2 22 22 22 3
1					<u> </u>	(30 (7.81)	2	<u>i in 1998 in 1999</u>
	1		0.30m: Pit terminar	ed on light brown, gravolly sill,	- "	1.014		
					E			
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Pit St	ability:	Genera	lly stable through	out	_ [4 	Eurfa	Lo Elevator	
			ncountered				88,11	2 mAOD
Plan d	Plan of Trial Pit: General Remarks: Trial pit terminated at 0.30m bgl.						timens) Scale	ons in metres 1:25
Trial pit terminated when natural ground proven. No suspected ACM identified.								
$\begin{array}{c c} & & \\ \hline \\ \hline$								
								BRD
Þ		X	B 0.6					
		6				Tek	phone:	01295 272244
								brduk.com

Clien				A Homes (Chiltern) Ltd.			6	lorcholo	No.
Proje	ect Title: ect No:		BRŌ	e End, Chiswell Green 3604			N	/S	01
	ied By: Comme		N Kir 16/03						<u> </u>
Date	Comple	ted:	16/03	3/2020			Sh	eet 1	of 2
	od Used		_	lowless Percussive Sampling Rig	, r		, .L		,
Sa Depth	Imples & Type & No		Water	Description of Strata		epth / evel)	Legend	Gaology	Installats /Backfi
0.20	IJ			TOPSOIL: Grass over dark brown, gravelly, sandy c frequent rootlets. Gravel of fine to coarse, subangul: subrounded fint.	-		44 94 93 7 97 97 97 7 97 97 97	IS	
				Firm, reddish brown, gravelly, sendy CLAY, Gravel of coarse, subangular to subrounded first and chalk.	of line to	0.00 (89.07)	- 0 - 0		
<u>0.70</u>	JZ						o _ o		
1.00	SPT	17 N		Reddish brown, gravelly, very sandy CLAY / very cla SAND, Gravel of fine to coarse, subangular filmt. 1.00 m: SPT: 2,3/3,4,5,5	1.a 1yey	1, (3(3 (600, 317)			
1.60	Dı								
2.00	SPT	30 N		Medium dense, reddish brown, slightly clayey, very g SAND, Gravel of tine to cearse, subangular flint. 2.00 m: SPT: 6,6/10,7,6,7	graveliy	2.00 {67.37}		SCRAVE CATCHMENT SUBGROUP	
2.50	08							SGRAVE CATCH	
3.00	571	27 N		3.00 m: SPT: 6.7/6,8,7,8 3.00 - 4.00 m: 70% récovery.				X	
				Stiff, brown, sandy, vory gravely CLAY, Gravel of fin coarse, subangular flint,	10 to	3 40 (#5,47)			
4.00	SPT	10 N		4.00 m [.] SPT: 3,2/2,2,3,3 4.00 - 5,00 m [.] 50% recovery.	<u>n.v</u>				
			<u> </u>			4.5/D			<u> 1955</u>
	e rai Ren rehole te		ted a	t 5.45m bg).	tara Elevation (love) 89.37 mAl	30			
					dimensions in g Scale 1:25	i metre			95 27224·

Client: Project Project Loggod Date Co	t Title: t No: 1 By; ommer	F B N nced: 1	orgi RD: Kir 6/03					/S	
Date Co Method			Vind	/2020 owless Percussive Sampling Rig			Sh	eet 2	of 2
	piesă ir	eats	Nater -	Description of Strata		Depth / (Level)	Legend	Geology	Installation /Bockbill
	ga A No SPT	Volue 10 N	5	Continued from 3.40m: Stilf, brown, sandy, very CLAY. Gravel of fine to coarse, subangular film. 5.00 m: SPT: 1, 1/0,4,4,2				KESGRAVE CATCHMENT	
					0.0 	-			
Genera Borel			ed a	t 5.45m bgl,	Sulfare Elevatoric Leva 89,37 m/ All dimonsions Log Scale 1:25	in metros		BR	35 272244 Juk. com

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Proje Logg	ect Title: ect No: ed By:	: * B N	org RD Kir	A Homes (Chiltern) Ltd. e End, Chiswell Green 3604 nber			Borehole WS	
Date	Comple od Used		6/0;	3/2020 3/2020 Iowless Percussive Sampling Rig			Sheet 1	of 2
Sa Dopth	mplos & i Type & No	-	Water.	Description of Strata	Dopih (Level	/ L.og4	and Goology	Installation /Bockfill
0.40	J1		-	TOPSOIL: Grass over dark brown, gravelly, sandy day will frequent rootlots. Gravel of fine to coarse, subangular to subrounded filmt.		ল কল ই.ল. সা ই.ল. সা	<u>र रह</u> <u>र रह</u> हर्जन्द्र 1082011	
				Firm, orange brown, gravelly, very sandy CLAY. Gravel of fine to coarse, subangular to subrounded film.				
0,90 1,00	J2 SPT	8 N		Firm, reddish brown, gravelly, sandy CLAY. Gravel of fine course, subangular to subrounded film.	1.0 1.0 (88.4	12)		
1.20	171			1.00 m: SPT: 1.1/1.2,2.3	 			
				1.50 - 1.60 m: Wet, gravelly sand.	· · · · · · · · · · · · · · · · · · ·		ENT SUBSR	
2.00	SPT	ΡN		2.00 m; SPT; 1.1/1.2.1.1 2.00 - 3.00 m; 60% rocovery.			KESGRAVE CATCHIVENT SUBGROUP	
3.00	5PT :	5 N		3.00 m: SPT: 2, 1/2,1,1,1	<u></u> 			
3.70	()2			Structureless CHALK recovered as off white, gravelly clay Gravel of weak, fine to coarse, subangular to subrounded chalk and fine to coarse flint. Orange staining on surfaces (CIRIA Grade Oc)	3.50 (85.0	2) [P] [F] [P] [F] [P] [F] [P] [F] [F] [F] [F] [F]	· · · · · · · · · · · · · · · · · · ·	
4.00	SPT	ΝĢ		4.00 m: SPT. 1,1/1,2,3,3	[4,q 	ישריין איייישיי ישריייישיי ישריייישיייי ישרייישייייישייייישייייישיייישיייישיייישיייי		
<u> </u>	ral Ren	1arker		Surface Lia		ہ ہ ۔ ر		
Bo	rchole te rchole ir	orminate)d a with		.42 mAOD		BR	D
	· • • •			All dime Log Sca	nsions in mo ile 1:25	Te	lephone: 012 null: info@bro	

	6/03/2020		SI	heet
Method Usod: Samples & Tests	Vindowless Percussive Sampling Rig	Depth /		- <u></u>
Depth Type & No Value	Description of Strate	(Level)	Legend	Gnoto
5.00 SPT 12 N	Continued from 3.50m; Structuroloss CHALK recovered as off white, gravelly day, Gravel of weak, fine to cearse, suberguiar to subforunded chalk and fine to cearse fint. Orange staining on suffaces. (CIRIA Grade De) 5.00 m; SPT; 2.3/3.3.3			

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Cllen				A Homes (Chiltern) Ltd.		1	Soreholo	No.
Proje	ct Title: ct No:	1	BRŌ	e End, Chiswell Green 3604			21	03
	ed By: Commo			nber Aranao		♥		5
	Comme			3/2020				· · <u> </u>
fleth	od Ųseo	y: , , , , , , , , , , , , , , , , , , ,	Wine	lowless Percussive Sampling Rig		St	neet 1	of 2
Sé epih	mples & T Type & No	Tests Value	: Valer	Description of Strata	Depth / (Level)	Legend	Geology	histolfalk /Oackfij
.20	J1		1	TOPSOIL: Grass over dark brown, gravely, sandy clay. Gravel of fine to coarse, subangular to subrounded flint. Frequent roottets.	-	n me on e	<u>۲</u>	
				Firm, reddiab brown, slightly sandy, gravelly CLAY, Gravel of fine to coarso, subangular to subrounded flint.	(0.5 6.4)			
.60	J2 SPT	9 N				0 0		
				3.00 m ⁻ SPT ⁻ 1,2/2,2,2,3 3.00 m ⁻ No SPT recovery. 1.00 m ⁻ Recomps more sandy with depth.	- - - -		IBGROUP	
70	D1						HMENT SU	
00	SPT	2 N		2.00 m: SFT: 1,0/1,0,1,0 2.00 - 3.00 m: 30% recovery. 2.00 m: No SPT recovery.	· · · · · · · · · · · · · · · · · · ·		KESGRAVE CATCHMENT SUBGROUP	
50	02						Ϋ́	
00	SPT	3 N		3,00 m ⁻ SPT; 1,1/1,0,1,1 3,00 - 4,00 m: 50% recovery.				
				Structuroless CHALK recovered as off white, gravelly clay, Gravel of weak, fine to coarse, subangular to subroundod chalk and fine to coarse flint, Orange staining on surfaces (CIRIA Grade Dc)	3 50 (62 43)			
o	SPT	9 N		4.00 m: SPT: 1,1/1,1,4,3 4.00 m: Becoming moist.	<u>40</u> 	······································	CPACK	
	oral Rem	arke:		Surface Flovator	4.50)		
			ed a		mAOD		BR	
				All dimension Log Scale 1	ons in metre 1.25		ine 017	95 272 2 4

Deph Type & No Value S Description of stated (1 cVrf) Utypend Gene 4.50 U3 U3 Continuod from 3,50m: StructureIness CHALK recovered as of weak, fine to contain, subangular to submunded chalk and fine to contain. Creade Do) If # 1 # 1 # 1 # 1 # 1 # 1 # 1 # 1 # 1 #		od Used: imples & Test		lowless Percussive Sampling Rig	Depth /	Lacand	a
	4.50	Type & No V	Valuo 😤	off white, gravoily clay, Gravel of weak, fine to coarse, subangular to subrounded chalk and fine to coarse flint. Orango staining on surfaces. (CIRIA Grade Do) 5,00 m: SP1: 2,2/2,2,1,2	(1 civni)		

Clier				N Homes (Chiltern) Ltd.			Boroholo	No.
	ect Title: ect No:			e End, Chiswell Green 3604		1	VS	^
Logig	jod By:	N	l Kir	nbor		V	V Q	04
Date	Comme Comple od User	ted: 1	6/03	3/2020		SI	veet 1	of 2
	ioa User imples &			lowless Percussive Sampling Rig		r ¹	I · · ··	···· ·
inpih (Туро К №	-	N256	Description of Strata	Depth / (Level)	Legend	Geology	fradalintica /(tagktij
0.30	<u>ا</u> ر ا			TOPSOIL: Grass over dark brown, gravelly, sandy clay. Gravel of fine to coarse, subangular to subrounded film and chalk. Frequent rootlets.	- - - -	<u>28</u> <u>28</u> 28 2 22 28 28 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1	
				Firm to stiff, orange brown, slightly gravelly, slightly sandy CLAY. Gravel of fine to coarse, subangular to sobrounded flint.	(04.53)	0. 		
0,70	.12				 1.0 1 160	oo	•	
1.00	SPT	12 N		Stiff, reddish brown, slightly sandy CLAY with black specks and rare flint gravel. 1,00 m; SPT: 1,2/3,3,3,3				
1.60	01				 		- - - -	
2.00	SPT	15 N		2.00 m: SPT: 1,3/2,4,4,5	<u>2.0</u> 		GRAVE CATCHARNT SUBGROUP	
2,80 3.00	D2 SPT	12 N		3.00 m: SPT: 2,2/2,3,3,4			AESORAVE (
3.70	ŬĴ			Stiff, reddish brown, slightly gravelly, very sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint.			- - -	
4.00	SPT	13 N		4,00 m; SPT: 1,2/3,3,3,4	<u>a.u</u>			
					4 50			
Bo Bo	eral Ren rehole te rehole in ver,	erminate	ed a with	t 5.45m bgt. 50mm pipe, gas tap and flush metal	a tava) 3 mAOD		BR	D
ιų,	v.;,,			All dimensi Log Scale		Teloph	ano: 012: nfo@brd	 95 272244 luk.com

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n	/el e	IVG	ave	av	ira	Giri	6		<u>5</u>								3		<u>×</u>		iras	ve	ci -	10	c 1	lir	n	c	t	0 (00	51	se	, 5		with	-,- 0	Sign	110			91		CII				().					0										KESGRAVE CATCHUSAT			
c	m I c				liu ve	ave	lediu irave	Mediu Grave	Mediu Grave	Mediu Girave	Mediu Girave	Mediu Girave	Mediu Girave	Mediu Girave	현 Mediu Grave	Mediu Girave	Mediu Girave	Mediu Grave	Mediu Grave	Aediu irave			 1	m I G	n d o 1	de tir	n			nsr e f	nse, e to	nse, re e to c	nse, rec e to co	nse, redd e to coar	Da nse, reddisi e to coarse	Dose	Doseri) nse, reddish bro e to coarse, sub	Descripti nse, reddish browi e to coarse, subar	Doscription nse, reddish brown, e to coarse, subang	Description (ase, reddish brown, s e to coarse, subangu	Description of nse, reddish brown, slig e to coarse, subangular	Doscription of Sinse, reddish brown, slight e to coarse, subangular (Description of Stra ase, reddish brown, slighliy e to coarse, subangular to a	Description of Strata ase, reddish brown, slighliy gr e to coarse, subangular to sul	Description of Strata ase, reddish brown, slightly grav e to coarse, subangular to subro	Description of Straia ase, reddish brown, slightly gravell e to coarse, subangular to subrow	Description of Strata ase, reddish brown, slightly gravelly i e to coarse, subangular to subround	Description of Strata ase, reddish brown, slightly gravelly SA e to coarse, subangular to subrounded	Description of Strata nse, reddish brown, slightly gravelly SAN e to coarse, subangular to subrounded fi	Description of Strata ase, reddish brown, slightly gravelly SAND, e to coarse, subangular to subrounded flint	Description of Strata ase, reddish brown, slighliy gravelly SAND, e to coarse, subangular to subrounded flint	Description of Strata ase, reddish brown, slightly gravelly SAND, e to coarse, subangular to subrounded flint	Doscription of Strata nse, reddish brown, slightly gravelly SAND, e to coarse, subangular to subrounded flint	Description of Strala	Description of Strata ((ise, reddish brown, slightly gravelly SAND, e to coarse, subangular to subrounded flint 5 o	Description of Strate (I en ise, reddish brown, slightly gravelly SAND) (I e to coarse, subangular to subrounded flint (I =	Description of Strata Depth (Level) Decorrection of Strata Depth (Level) Decorrection Depth (Level)	Description of Strata Description Description Description Description Description Descript	Description of Strata Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth / ((.cvcl) Depth	Description of Strata nse, reddish brown, slightly gravelly (SAND) e to coarse, subangular to subrounded flint 1: 2,4/5,5,5,6 1: 2,4/5	Description of Strata Peepin / 4.egu Peipin / 4.egu	Description of Strata Description Description of Strata Description De	Description of Strats Description Des	Description of Strata Description Description of Strata Description Descriptio	Description of Strata The coordinate for subrounded filing 1: 2,4/5,5,5,6 Description of Strata a coordinate for subrounded filing 1: 2,4/5,5,5,6 Description of Strata a coordinate for subrounded filing a coordinate f	Dosoription of Strata Toosoription of Strata se, reddish brown, slightly gravelly SAND. e to coarse, subangular to subrounded flint 1: 2,4/5,5,5,6 1: 2,4/5,5,5,6 1: 2,4/5,5,5,6	Description of Strata Description Descriptio

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	et nue: et No:			e End, Chiswell Groon 3604			۸۱	JC.	05
Logg	ed By:	ſ	N Kir	nber				0	05
	Commo								···
	Comple od Used			3/2020 Iowless Percussive Sampling Rig			Sh	neet 1	of 2
·	imples & "						T	L	1
Onplh	Type & No	,	Wate:	Description of Strata		Depth / (Level)	Legend	Gnotogy	Instellatio /Backfill
, ,				TOPSOIL: Grass over dark brown, gravely, sandy Gravel of fine to coarse, subangular to subrounder	çîny,		<u> N 10 N 10 N 10</u>		70733
				 Gravel of fine to coarse, subangular to subrounder Frequent rootlets. 	t ljúší,		to the second	ŝ	
0,30	JI					_	$(\overline{\sigma, \psi}, (\overline{\sigma, \psi}, (\overline{\sigma, \psi}, \overline{\sigma, \psi},$		変換
				Fire to still, or how here you provally populy (1)	A.Y.	0.40 (55.36)	<u></u>		法经济
0,50	J2			Firm to sliff, orange brown, vory gravelly, sandy CI Gravel of fine to coarse, subangular to subrounder	i tlint,				Reference
						-			1252
						_	╞╼╼╼		0000
0.90	D1					_			
1,00	SPT	13 N				1.0			
				1.00 m: SPT: 2,3/3,3,4,3		-			
		i i				-			
						-	<u> </u>		163 <u>16</u> 3
									-93-9
		}					<u> </u>		2633
							<u>[</u>	ŝ	2622
2.00	SPT	12 N		Firm to stiff, orange brown, gravely, very sandy CL	~~	2.0 (63.79)	······································	GRAVE CATCHMENT SUBGROUP	送送
2.10	D2			Gravel of fino to coarse, subangular to subrounded	f flint.	_		BE	
				2.00 m: SP1: 2,2/3,2,3,4		-		IS I	
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						-		SGR	である
3.00	SPT	9 N		3.00 m: SP1: 1,1/2,2,2,3		30		KES	868
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						-			60350
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4.00	SPT	5 N		4.00 m. SPT. 1,1/1,1,2,1		4,0			
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	ral Ren				urfacø i lavallan i.				
Boi	ehole te	erminat	ed a	t 5.45m bgl.	85.78 (nAOD		PD	5
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				A	dimensior	ns in metre	as 💭		
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							Email: In	lo@brd	uk.com

Client: Project Title: Project No: Loggod By: Date Commer	encod: 15/03 BRD N Kir	nber 3/2020		W	505
Date Complet Method Used:	d: Wind)/2020 owless Percussive Sampling Rig		Shee	t 2 of 2
Samples & To Outh Type & No		Description of Strata	· Depth / (Level)	Legend Geo	logy /(inc)
4.50 D3	9 N	Continued from 2.00m: Firm to stiff, orange brown, gra very sandy CLAY. Gravel of fine to coarse, subangular subrounded flint.			
			6,46 (n0,53)	· <u> </u>	}22 52
			70		
			F		
General Rem Borehole te		sutary at 5,45m bgl.	Elevator Leval 85.78 mAOD		BRD
		All di Log s	mensions in metres Scale 1:25		

Ciler Proje	nt: act Title:	:		A Homes (Chiltern) Ltd. e End, Chiswell Green			orahola	
Proje Log <u>e</u> Date	ect No: jed By: Comme	enced:	BRĐ N K)r 17/0	3604 nber 3/2020				06
	Comple od Usee			3/2020 Jowless Percussive Sampling Rig		St	icet 1	of 2
Se Dapth	Type & No	l'ests Volue	Werer W	Description of Strata	Depth / (Level)	tegend	Geology	installatio /Backfill
0.30	۲L			MADE GROUND/TOPSOIL: Grass over dark brown, gravelly, sandy clay. Gravel of fine to coarse, subangular to subrounded flint, charcoal, brick fragments and clinker.	0.40		MG/TS	
0.45	J2 טוני			Firm, brown, gravelly, sandy CLAY, Gravel of fine to coarse, subangular to subrounded flint. Modium donse, orange brown, slightly clayoy, sandy GRAVEL of fine to coarse, subangular to subrounded flint. Stiff, orange brown, gravelly, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint.	(64.04) 0.50 (64.04) 0.70 (04.34)			
1.00	SPI	17 N		1.00 m: SPT: 3,3/5,4,4,4	<u>10</u>	0 0	SUEGROUP	
1.50 2.00	J3 SPT	11 N		2.00 m: SPT: 4,4/4,3,2,2 2.00 m: Secorres very gravelly,		0 0 0 0 0 0	KESGRAVE CATCHMENT SUBGROUP	
	je					0	KE	
3.00	SPT	BN		Structureless CHALK recovered as an off white, clayey gravel. Gravel of weak, low density, fine to coarse, aubrounded chalk. Orange staining on surfaces and black specks. (CIRIA Grade Dč) 3.00 m: SPT: 2,2/3,2,1,2	2.20 3.0 (82.14)			
3.40	62						CHALK	
4.00	SPT	א טו		4,00 m: SPT: 3.2/3.2,2.3	4.0			
Bo Bo	eral Ren rehole te rehole ir /er.	ermina	ited a d with	t 5.45m bg). 50mm pipe, gas tap and flush metal	4.50 Lovel mAOD		BR	D B
				A∦ dimensio Log Scale 1		_		 95 272244 uk.com

	Comple od Usec			3/2020 Iowless Percussive Sampling Rig			St	neet 2	of 2
	Type & No		Vialer	Description of Strata		Dopth / (Level)	Legend	Goology	instaliati /Bockfi
5.00	SPT	Value 15 N		Continued from 2,90m; Structuroless CHALK recoving off white, clayey gravel, Gravel of weak, jew den to coarse, subrounded chalk, Orange staining on su and black specks. (CIRIA Grade Do) 5.00 m; SPT: 3,2/3,2,4,6	isity, fino urfacos	(Levei) - - - - - - - - - - - - - - - - - - -		CHARK	
Bo Bo	oral Ren irohole ti irohole in ver.	erminat	ed a with	it 5.45m bgt. 50mm pipe, gas tap and flush metal 	aface Lievation M 85.04 r Il dimension	nAOD		BR	D

Proje Logg Date	ect Title: ect No: jed By: Commo	ncod:	₽org BRD N Kii 17/0	nber 3/2020				Sorehole	
	Comple od Usec			3/2020 Iowless Percussive Sampling Rig			St	neet 1	of 2
Sa Depth	itype & No	Fosts Value	Vater	Description of Sirala		Dopth / (Levol)	Legend	Geology	installation /Bockfill
0.20	J1			TOPSOIL: Grass over dark brown, slightly grave clay. Gravel of fine to medium, subangular to su film. Frequent rootlets	hrounded	- D.20 - D.20 - (80.75)	গুল <u>গুল হল</u> ল বল হল হ লন হল হল	TOPSOIL	
0.60	.12			Firm, reddish brown, very gravelly, sandy CLAY specks. Gravel of fine to coarse, subangular to flint.	with black subrounded	-	0 		
1.00	5PT D1	15 N		1.00 m: SPT: 2,2/3,3,5,4				ESGRAVE CATCHNENT	
2.00	SPT	4 N		2.00 m: SPT: 2,2/1,1,1,1 Structuroloss CHALK recovored as off while, cli Cravel of weak, low density, off white, fine to co	etse.	2 0 2 0 2 0 2 0 2 0 0 2 0 0 4 (Åd, 76)			
2.80	D2			subrounded chaik and occasional subangular fl Orange staining on surfaces and black specks. Dc)	nt grave). (CIRIA Grado		······································		
3.00	SPT	7 N		3.00 m: SP1: 1,2/2,1,2,2 3.00 - 4.00 m: 70% recovery.		<u></u>		CHALK	
4.00	қрт ,	7 N		4.00 m: SPT: 1,2/2,1,2,2 4.00 - 5.00 m: 60% recovery.		4 0. 			
В0 60	rehole ir	ərmina	ted a d with	t 5.45m bgl. 50mm pipe, gas tap and flush metal	Surface Cinvation 87.05	<u>ونه</u> ۱ ۳AOD		BR	(D
CO	/er.				All dimensio Log Scale 1			ne: 012:	

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	ect No:			3604			N I	VS	07
.ogg	ed By:	N	Kir	nber			♥		
	Comme Comple	nced: 1 ted: 1		3/2020 3/2020					
Moth	od Useo	t: V	Vind	owless Percussive Sampling Rig			Şł	ieet 2	of 2
	Imples & ` Type & No		Water	Description of Strata		Depth / (Lovel)	Legend	Goology	Installatio /Backful
5.00	5P1	23 N		Continued from 2.30m. Structuraless CHALK re off white, fine to coarse, subrounded chalk and occ subangular flint gravel. Orange staining on suff black specks. (CIRIA Grade Do) 5.00 m: SPT. 2,4/5,6,5.7	covered as nsity, off casional aces and			CHALK	
Bo Bo	eral Ren prehole t prehole in ver.	erminate	ed a with	nt 5.45m bgl. 5 50mm pipe, gas tap and flush metal	Surfuce Flovaton I 87.05	nval mAOD		BR	ـــــــــــــــــــــــــــــــــــــ
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	oct Title: oct No:			ge End, Chiswell Green 33604			14	IC	00
	ed By:			inber				72	80
Date	Comme						··· · ····		.
	Comple od Usec						Sh	ieet 1	of 2
			_	dowless Percussive Sampling Rig			<u>, </u>	1	
Se Depth	mples & T Type & No					Depth / (Lovol)	Legend	Geology	, Installan /Backfi
0.20	fL			MADE GROUND/TOPSOIL: Grass over dark brown grevelly, sandy clay. Gravel of fine to coarse, suban subrounded flint, charcoal and brick fragments. Free rootlets.	gular to quent	 (00.20)		NGTS	
				Medium dense, orange brown, slightly clayey, grave / sandy GRAVEL. Gravel of fine to coarse, subangul subrounded film.	larto				
0.80	J2			fine to coarse, subangular to subrounded fint.					
1.00	SPT	16 N		1.00 m. SPT. 1,3/3,3,4,8					
1,90	D1 SPT	42 N		Medium donae, reddish brown, slightly clayey, grave SAND, Grovol of fine to coarse, subangular to subro filmt,	ounded	(67.18) - - - - - - - - - - - - - - - - - - -		SUBGROUP	
				Medium dense, reddish brown, slightly clayoy, sandy GRAVEL of fine to coarso, subangular to subroundo 2.00 m: SPT: 7,8/8,10,12,12	y od filmi.	- - - -		KESGRAVE CATCHMENY (
2.80	εL			Stiff, reddish brown, very gravelly, sendy CLAY.		2.70 (05.96) -		KE9G	
3.00	SPT	15 N		3.00 m: SPT. 4,4/3,4,4,4 3.00 - 4.00 m: 60% recovery.		<u>3.0</u> - - - -			
3.70	D2					-			
1.00	SPT	1 N		4.00 m; SPT; 2,1/0,1,0.0 \4.00 - 5,00 m; 45% (acovery. Structureless CHALK recovered as off white, elayey Gravel of weak, lew density, fine to coarse, subangui subrounded chalk. Orange staining on surfaces and occasional flint gravel, (CIRIA Grade De)	gravel.	4 0 4.10 (84.50) - -		CHALK	
George	and De-	an a	_	······	iace blovation Le	4.60	:	/	- ()
	ral Rem ehole te		ted 4	at 5.45m bg),	88.66 r				D
					dimonsion 9 Scale 1:2			BR ne: 0129 fo@brd	 95 27224

Project Title: F Project No: E	Forge E BRD36 N Kimb	Homes (Chiltern) Ltd. End, Chiswell Green i04 xer				orehole /S(
Date Completed:	17/03/2				Sh	eet 2	of 2
Samples & Tests Dopth Type & No Volue	Maler	Description of Strate		Depth / (Level)	legend	Geology	Installation /(tackfill
5.00 SP1 13 N	C O S	Continued from 4,10m: Structureless CHALK recover off white, clayey gravel, Gravel of weak, low density, coarse, subangular to subrounded chalk, Orange sta surfaces and occasional flint gravel, (CIRIA Grade Di 5,00 m: SPT: 2,1/1,2,5,5	fine to atning on a)	5.0 5.0 6.45 (93.21)		CHALK	
			• • • • •	7.0 			
General Remarks: Borehole termina	ited at !	5.45m bgl.		mAOD		BR	95 272244

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Ciler				A Homes (Chiltern) Ltd.				lorchole	No.
Proje Logg Date	ect Title: ect No: jed By: Comme Comme	enced:	BRÐ N Kir 17/0	e End, Chiswell Green 3604 mber 3/2020 3/2020					09
Meth	Comple od Used	di:	Wind	lowless Percussive Sampling Rig			St	neet 1	of 2
	Type & No		Vialer	Description of Strata		Depth / (Level)	Logend	Geology	Installatio /Backfill
0.20	J1			MADE GROUND TOPSOIL: Grass over dark brown, gra sandy clay, Gravel of floe to cearse, subongular to subrounded flint, charceal and brick fragments.	welly.	- - - - 0.40 - (!!!0,02)		MGTS	
0.50	J2 SPT	17 N		Firm, moist, orango brown, gravelly, sandy CLAY Gravel firm to coarse, subangular to subrounded flint. Black spe	l of ocks.	- (IIII,62) 		Gup	
1.10	D1			1.00 m: SPT: 2,2/3,4,5,5		- - - - - - - -		CESCRAVE CATCHMENT SUBGROUP	
1,90 2,00 2.30	J3 SPT DZ	8 N		2.00 m: SPT: 3,2/2,2,2,2		2.0 <u>2.60</u> <u>(03.02)</u>		KESGX	
3.00	SPT	GN		Sliff, dark brown, gravelly, sandy CLAY, Gravel of fine to coarse, subangular to subrounded flint. Structuroless CHALK recovered as eff white, clayoy grav Gravel of weak, low density, fine to coarse, subangular (subrounded chalk with occasional flint. Orange staining r surfaces. (CIRIA Grade De) 3.00 m: SET: 2,2/3,1,1,2	velty.	(03,02) - 2,00 - (03,62) - - - - - - - - - - - - -			
3.50	D3				- - -	- 		CHALK	
4.00	577	91		4.00 m: SPT: 2,2/3,2,2,2 4.00 ⊭ 6.00 m: 60% recovery.		<u>40</u>	······································		
	eral Ren rehole te		ted a	tt 5.45m bgl. 8		4.98 avet пАОД		BR	D
				All dim Log Sc	ensior cale 11	18 in metri 25	felepho Email: I	ne: 012 na@brd	95 272244 luk.com

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			'Yaler				· · · · ·				—	-			-	-	_	
tlay bai aini	iñ wh nars Irang	alf cai Qri			17 N	1			SPT	S			SPT	SP			D	5.00
c Li te	r a M	w аг аг	Cont off w Coan Oran 5.00	Cont off w coar Qrar	off w coan Qran	Aluo S Gort off w Coate Crar 7 N 5.00	Valuo S Cont off w cast ()rar 17 N S.00	Value Control	Valuo	T 17 N 5.00	VPE & No Valuo S Cont SPT 17 N 5.00	Type & No Value SOT 17 N	Valuo E Cont off w Coar Orar 17 N 5.00	T 17 N 5.00	Vituo SPT 17 N 5.00	Type & No Valuo S Gent SPT 17 N 5.00	Type & No Value S Cont off w Coar SPT 17 N 5.00	SPT 17 N 5.00

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Cilen				A Homes (Chiltern) Ltd.			E	Boreholo	No.
Proje Logg	ect Title: ect No: ect By: Comme		BRĐ N Kir				V	VS	10
Date	Comple od Usec	ted:	17/0;	3/2020 Iowless Percussive Sampling Rig			St	neet 1	of 1
Sa Depth	mples & Type & No		Vlater	Description of Strata		Depih / (Level)	Legend	Geology	Installation /Usckhil
0.10	ιL			MADE GROUND TOPSOIL. Grass over dark brown sandy clay. Gravel of fine to coarse, subangular to subrounded flint and charcoal.	n, gravelly,	- 0.00		MIGTS	
0.40	J2			MADE GROUND: Firm, orange brown, slightly grav sandy CLAY. Gravet of fine to coarse, subangular t Subrounded flint and charcoa).	veliy, o	- 0,00 (67,91) - 0,50 (67,71)		MG	
o.90	וט			Firm to stiff, orange brown with groy mottling, slight CI AY. Bare fine to modium, subangular to subrour gravel,	lly sandy nded Illint	- - -		• • •	
1.00	SPT	1Ű N		1.00 m: SPT: 1,2/3,3,4,6	-	<u>1.0</u> 			
t.60	02			Stiff, orange brown, gravelly, sandy CLAY, Gravel e coarse, aubangular to subrounded flint. Occasional spocks,	of line to I black	- 1,813 - (80,01) 		(ESGRAVE CATCHWENT	
.00	SPT	46 N		Medium denso, orange brown, slightly clayey SAN(flint gravel and black specks, 2.00 m: SPT: 7,8/10,11,12,13	-	- 1 RD (06 41) 		KESGRAM	
40	03					- - -		e 1	
70 .80	D4 SPT	>50 N		Dense, brown, slightly clayey, gravelly SAND. Grav to coarse, subangular to subrounded flint. Occosion urange brown sand pockets. 2.80m: Sampler bouncing.	nal smali		 0		
				2.80m: SPT: 10,15 for 50mm / 20.15,15 for 45mm	-	- -			
					-	-			
					-	-			
					-	- -			
						-			
Bo Bo	rehole ir	ermina	i ated a d with	t 2.80m bgł due to refusal. n 50mm pipe, gas tap and flush metal	/dece Clevellon I.v 88.21 r			BR	D
CO	/er.				li dimension og Scale 1:2			012:012	 95 272244

Clien				A Homes (Chiltern) Ltd.			E	kiroholu	No.
Proje _ogg Date	ct Title ct No: ed By: Comme	f f nced: 2	BRĎ: N Kir 22/08				W	S1	01
	Comple od Use			3/2020 Jowless Percussive Sampling Rig			Sh	eet 1	of 2
	mpios & Type & No	1	Yaler	Description of Strata		Depth / (Levol)	Legend	Geology	inataliatia /Baçkji
		*	· • • · · · · · · · · · ·	IOPSOIL: Grass over dark brown, slightly gravelly, clay. Gravel of tine to coarso, subangular to subrou quartrite and timi. Erequent rootlets.	inded i r	- 0.20 (60.93)	999 999 999 91 <u>919 91</u> 9 92 2921 10	2	
				Brown, ftable, gravelly, very sandy CLAY. Gravel o coarse, subangular to subrounded filmt, quartzite an	nd chalk.	- - 0.70			
				Stiff, reddish brown, gravelly CLAY. Gravel of fine to subrounded first and quartzite.		(85.4 <u>3)</u>			的资源
.00 .20	SPT D1	14 N		1.00 m: SPT: 3,3/2,5,3,4	-	<u>10</u> -			
					- - - - -	-		KESCRAVE CATCHMENT SUBSROUP	
.00	SPT	10 N		2.00 m: SP1: 2,2/3,4,5,6		20		AVE CATCH	
90	PEN	3.25/2.25		2.30 m: Hecomes vory gravelly.		- - - -	0 0	KESGR	
.00 .10	SPT D2	kg/cm² 17 N	,~F	3.00 m: SP1: 6,3/4,4,5	-	<u>40</u> .	°		
	-			Sinucturoloss CHALK recovered as off white and bi gravelly clay. Gravel of weak, the to coarse, suban subrounded chalk and occasional flint, (CJBIA Grav	ngularito de Do)	- (53.53) 		V	
.00	SPT	5 N		Sinuctureless CHALK recovered as off white, grave with pockets of brown clay. Gravel of what, fine to subangular to subrounded chaik and occasional fill Grade De) 4.00 m: SP1: 2,2/2,1,1,1	ally clay coarse.	4.0 4.00 (63.13) 		CHALK	
	arai Rer		1		arteco Elevation L				<u>natria.</u>
			ted a	it 5.45m bgl.	87,13 (πΑΦΟ		BR	D
				A.	II dimensior og Scale 1::	is in motro 25	Telepho		95 27224 Juk.com

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Proje Logo Date Date	ect Title: oct No: jod By: Comme Comple	F B N snced: 2; ted: 2;	org RD Kir 2/06	5/2020			W	Soroholo S1	01
	ind Used amples & I			lowless Percussive Sampling Rig		Depth /	<u> </u>	,	····
	Тура & No		Water	Description of Strata		(Level)	Legend	Geology	Installation /Backfill
5.00	SP1.	14 N	4	Continued from 4.00m: Structureioss CHALK ro off white, gravelly day with pockets of brown day weak, fine to coarse, subangular to subrounded occasional finit. (CIRIA Grado Do) 5.00 m: SPT: 1,3/2,3,5,4	iv. Gravel of	9.45 (B1.08)		C-HALK	
Gene	rał Rem	arks:			Surface Flevelion	0,0			
			d a	t 5.45m bgl.		mAOD		BR	 95 272244

	Comple			3/2020 3/2020		51	Sheet 1 of		
	od Use			owless Percussive Sampling Rig	· · · ·				
Sa Depih	Type & No	<u> </u>	valer	Description of Strata	Depth / (Level)	Legend	Geolo		
	<u></u>			MADE GROUND TOPSOIL: Grass over dark brown, gravelly, sandy clay. Gravel of fine to coarse, subungular to subrounded flint, quartzite, charcoal and brick fragments. Frequent rootlots, Brown, friable, gravelly, very sandy CLAY. Gravel of fine to			NGTS		
1.00	SPT	12 N		coarse, subengular to subrounded fimi. Stiff, reddish brown, slightly gravelly, slightly sandy CLAY. Cravel of fine to coarse subangular to subrounded fint. 1.00 m: SPT: 3,2/2,2,3,5	0.10 10 (99.40)		<u> </u>		
1.80 1.80 2.00	PEN D1 SPT	2.5/2.25x2 kg/am³ 24 N		Medium dense, reddish brown, very clayey SAND. 2.00 m: SPT: 4,6/6,7,7,5 Stiff, reddish brown, vory gravelly CLAY. Gravel of find to coarse, subangular to subrounded flint.	2,6 2,00 (57,36) 2,10 (87,26)	0.0	GRAVE CATCHMENT SUBGROUP		
2.80 2.80 3.00	PEN D2 SPT	2.5/3.5x2 kg/cm² 22 N		3.00 m: SP1: 3,3/4,5,6,7			KESGRAVE CAT		
3.95 4.00	PEN SPT	3.0/2.5x2 kg/cm³ 10 N		Modium donse, reddish brown, very clayey SAND. Siliff, reddish brown, very gravelly CLAY. Gravel of fine to coarse, subangular to subrounded filmt. 4,00 m; SPTT 2,3(3,3,2,2) 4,00 - 5,00 m; 60% recovery,	3.50 (55.70) - - - - - - - - - - - - - - - - - - -				
Gon	oral Roa	marks:		Surfaco Elovanos	4 mAOD	<u> </u>	÷		

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Clier Proje Proje Logo Date Date	ect Title: ect No: jed By:	: F(B N nced: 2: tod: 2:	org/ RD Kir 2/06 2/06	A Homes (Chiltern) Ltd. 5 End, Chiswell Green 3604 nber 5/2020 5/2020 lowless Percussive Sampling Rig			W	Sorehole S1	02
S	unples & T	Tests	raler	Description of Strata		Depth /	Legend	Goology	Instaliotion
	Tγµe & No PEN SPT			Description of Strate Continued from 3.90m; Stiff, reddish brown, very CLAY, Gravel of fine to coarse, subangular to su fint. 5,00 m; SPT; 2,2/2,2,1,1	gravelly broundod	(LOVUI)	L.egend	KESGRAVE CATCHMENT	
Gen Bo	e ral Ren rehole ti	narks: erminate	tJ ≥dia		Surface Flavorine 89.364 All dimensio Log Scale 1	ns in metre	Telepho	BR one: 012 nfo@brd	95 272244

Method	mpleted Used:		6/2020 dowless Percussive Sampling Rig		Sheet '			
	es & Testi e & No V	niue S	Description of Strata	Depth / (Level)	Legend	Gnole		
	' , , , , , , , , , , , , , , , , , , ,		TOPBOIL: Grass over dark brown, slightly gravelly, sandy clay, Gravel of fine to coarse, subangular to subrounded flint. (Frequent rootlets, Brown, friable, gravelly, sandy CLAY, Gravet of fine to coarse, subangular to subrounded flint.					
1.00 S	IPT 1	9 N	Shiff, reddian brown, vory gravelly, sandy CLAY, Gravel of fine to coarso, subangular to subrounded flint. 1.00 m; SPT; 2.4/4.6.4.5	0 nc) (87 51)				
1.70 P	EN 2.75/ kg	2.25x2 /cm²	1.60 m: Very sandy,			SUBGROLP		
2.00 S	ו דיזי ו	4 N	Slift, reddiah brown, silly CLAY with grey silty pockets Ihroughout, 2.00 m: SPT: 1,2/3,3,4,4	2.0 2.00 (80.31)		CATCHMENT SUBC		
	⁵¹				×			
2.70 P	EN 2. kji	5x3 /cm²	Vory stiff, reddish brown, gravelly, slightly sandy CLAY. Gravel of fine to coarse, subangular to subrounded filnt.	(85.81)		KESGRAVE		
3.00 S	PT 4	1 N	3.00 m: SPT: 5,6/7,10,11,13	<u>.</u>				
			Vory stiff, reddish brown, very graveily, eandy CLAY, Gravel of fino to coarse, subangular to subrounded flint, Becomes eandlor with depth	3.20 (A0.11)	0			
3.70 P		3.25x2 /cm²	Stiff, raddish brown, slightly gravelly, very sandy CLAY. Gravel of fine to coarso, subangular to subrounded film. Natural black specks (possibly manganese deposits).	3.70 (A= 61)		- -		
4.00 S	PT 2	0 NI	4.00 m; SPT; 2.3/5.5.5.5	<u></u>	0 0 0 0	- 12 -		
General	Remari	(\$:	l]	<u> </u>		

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Proje Logg	ect Title ect No: jed By:	: Fi B	org RD Kir	A Homes (Chiltern) Ltd. e End, Chiswell Green 3604 nber s/2020				S1	[№]
Date	Comple od Use	eted: 22	2/06	5/2020 Iowless Percussive Sampling Rig			Sh	eet 2	of 2
Si Depth	Imples &	Tests	Water	Description of Strata		Depth / (Level)	t Legend	Geology	Installation /(Sucktill
4.50	יאס גע <u>יי</u> 102		<u></u>	Continued from 3.70: Sliff, reddish brown, slightly very sandy CLAY. Grave) of fine to coarse, suban subrounded film. Natural black specks (possibly n	gravelly, oular to		<u> </u>	 12	6868K
4.70	PEN	2.5/2.25/3, kg/cm*	þ	subroundéd film. Natural black specks (possibly n deposits).	ก็สกตุลกese	-	0	CHARE	
5.00	SPT	19 N		5.00 m: SPT: 3,3/5,5,4,5		<u>.</u>	0. 	E CAL	
						-	0	RESORAVE CATCHNENT	
							,c. 0	Q	
						-			
						-			
						<u>6.0</u>			
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	eral Ren		 // -	t 5.45m bgl.	Surface Elevation 1 88.31				
00		onninere		_				BR	D
				ť	All dimonsion Log Scale 1:	ns in metre 25	Telepho	ne. 012:	95 272244
							Email: k	nfo@brd	uk.com

Clien				A Homes (Chiltorn) Ltd.				lorehole	No.
Projo Logg	et Title et No: ed By; Comm	E	3RŌ V Kir	e End, Chiswell Green 3604 mber 5/2020			W	S 1	04
Date	Comple od Use	eted: 2	2/00 Vinc	5/2020 Iowless Percussive Sampling Rig			Sh	eet 1	of 2
	Inples &		Nase'	Description of Strata		Depih / (Lovol)	Legend	Goology	instaliatio /Back//
				MADE GROUND TOPSOIL: Grass over dark brown gravely, sandy CLAY. Gravel of the to coarse, sub subrounded flint and charcoal. Frequent rootlets.	n, slightly angular lo			MGTS	法法
				Brown, friable, gravelly, sandy CLAY, Gravel of fine coarse, subangular to subrounded flint and quartzil	: to C,	- (66.51) 			
1.00	142	11 N		Stiff, reddish brown, slightly gravelty, slightly sandy Gravel of fine to coarso subangular to subroundod quartzite. 1.00 m: SPT, 4,3/3.2,3,3	CLAY. Nint and	1.0 1 00 (05 111) 			
1.40	D1 PEN	2,5/2,25x	N					Δ.	
2.00	SPT	kg/cm² 19 N		Stiff, reddish brown, very gravelly, sandy CLAY, Gra fine to coarse, subangular to subrounded flint, 2.00 m: SPT: 2,3/4,5,4,6	10 10/4	2.0		NT SUBGROUT	
2.70 2.80	D2 PEN	3.5/3,25x	2	Stiff, reddish brown, slightly gravelly, slightly sandy Gravel of fine to coarso subangular to subrounded quartzite. Natural black spocks (possibly monganes deposits).	flint and	- 2 50 (#4 31) -		SGRAVE CATCHMENT SUBGROUP	
3.00	SPI	kg/cm* 23 N		Stiff, reddish brown, very gravelly, sandy CLAY, Gra fine to coarse, subangular to subrounded Rint, 3.00 m: SPT, 5,3/5,6,5,7	avel of	(// / / / / / / / / / / / / / / / / / /		К. Х	
4.00	SPT	29 N		4.00 m: SPT: 6,6/5,5,10,9					
	eral Rer rehole t		 ed a	su st 5.45m bg),	nlace Cleveloon (86.805	 avel mAOD		BR	D D
					l dimensio og Scale 1:			ne: 012	 95 27224-

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Client:		ç	AL	A Homes (Chiltern) Ltd.			۴	loropale	No.
Project Ti Project No				e End, Chiswell Green 3604				C 4	
Logged B				nber			- VV	21	04
Dato Com	menco	1: 2 2							
Date Com		23	2/08	5/2020			SE	ieet 2	of 2
Method U		<u></u>	-	owless Percussive Sampling Rig			,	,	
Samples			Water	Description of Strata		Depth /	Legend	 Geology	Installatio
Depth Type &	No Vel	ue				(Levol)			/Brockfill
5.00 SP	Г 24	N		Continued from 3.00m Stiff, reddish brown, very grave sandy CLAY, Gravel of tine to coarse, subangular to subrounded film. 6.00 m: SPY: 3,6/5,7,7,5		 (61.34) 		KESGRAVE CATCHMENT	
Seneral R Borehok	emarks > termin	ate	d a		а Песабол Leu 86.805 гл	ur ,		BR	D
					mensions Scale 1.25			no: 012: nfo@brd	 95 27224- uk.com

Depth / (Level) ed flint. 	1 1
(Level) ridy ed flint	10 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 0 1
ed flint	10 10
(of	SGRAKE CATCHIZENT SUBGROUM
2.00	
n of (%). ntzite.	
clay. 2.70 ded (95.2 specks. 3.0	
17 17 - 17 - 17 - 17 1 1 1 1	¥
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e Eleverion (nusl:	
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Clien		¢		A Homes (Chiltern) Ltd.		[Borehota	No.
Proje Proje	ict Title: ict No:	; F F		a End, Chiswell Green 3604				05
Logg	ed By:	1	4 Kir	nber			3	UQ
	Comme			6/2020 3/2020				
	Comple od Usec			over a second to the second seco		Sł	neet 2	of 2
	mples & T Type & No	• · · · · •	Water	Description of Strata	Depin / (Level)	Legend	Geology	Instaliatio /Back9N
5.00	Sh.	18 N		Continued from 2.70m: Structureless CHALK recovered as off white, gravelly clay, Gravel of weak, fine to coarse, subangular to subrounded chalk and occasional first. Orang staking and black specks. (CIRIA Grade Dc) 5.00 m: SPT: 1.4/5.5.4,4				
Gene	ral Rem	harks:			0.0	1		
			ed a		13 mAQD		BR	D
				All dimens Log Scale	ions in motre 1:25	Telepho		95 272244

Proje Logg Date	ect Title: ect No: ed By: Comme	Fa Bi N nced: 22	orge RD: Kin 2/06				W	S 1	06
	Complet od Used			5/2020 Iowless Percussive Sampling Rig			SI	neet 1	of 2
	imples & T Type & No	asta Velue	" aler	Description of Sirata		Depth / (Lovol)	Legend	Ceology	lostaliali /Backfi
		-		TOPSOIL: Grass over dark brown, slightly gravel clay. Gravel of fine to coarse, subangular to subre and guardzite. Frequent roottets.	ly, sandy aunded flint		<u> </u>	2 2	
				Stiff, reddish brown, slightly gravelly becoming gr sandy CLAY. Gravel of fine to coarse, subangula- subrounded flint.	avelly, r to	(88.00)			
1,00	SPT	20 N		Siliff, reddish brown, very graveliy, sandy GLAY, C fine to conrse, subangular to subrounded fiint, Na spocks (possibly manganoso deposits),	Gravel of Itural black	 1.0 (60 (88 10)		SUBGROUP	
1.30	D1			1.00 m: SPT: 3,4/6,5,5,4		-		E E	
1,90 2.00	DZ SPT	23 N		2.00 m: SP1: 3,8/7,7,5,4			а а а а а а а а а а а а а а а а а а а	KESGRAVE CATCHIN	
3,00	SPT	11 N		Structureless CHALK recovered as off white, grav Gravet of weak, the to coarse, subangular to sub chalk and occastenal flint, Orange staining (CIR) Dc) 3.00 m: SPT: 2,2/3,2,3,3	rounded			1 1 1 1	
4.00	SPT	5 N		4.00 m: SPT: 1,2/1,2,1,1				NUMO NUMO	
	e ral Rem rehole te		ed a	nt 5.45m bgl,	Sorface Elevation 89.104	4.50 MAOD		BR	NET SET
					All dimensio Log Scale 1:		Telepho		 95 27224

Proje Logg Date Date	nt: ect Title: ect No: ged By: Comme Comple lod Useo	F B N ncod: 2 ted: 2	org RĎ I Kir 2/00 2/00	A Homes (Chiltern) Ltd. e End, Chiswell Green 3604 mber 3/2020 5/2020 fowless Percussive Sampling Rig			W	^{101ehole} 1 S1 100ct 2	06
· · · · · · · · · · · · · · · · · · ·	mpios & T		V alter	Description of Strate)apih / Level)	Lagend	Goology	Installation /Backfill
0.000	SPT	Value 13 N		Continued from 4.50m; Structureless CHALK recovered of white, gravely of weak, find to coarse, subangular to subrounded chalk and occasional flint. Ore attaining. (CIRIA Grado DG) 6.00 m; SP1: 1,0/2,2,3,6	45				
i									
	eral Rem reheie te			t 5.45m bgl. 89	9.0 Isyston Level 9,104 m/ ensions i			BR	Þ
				Log Sc	ale 1:25			no: 0129 fo@brdi	5 272244 .k.com

Date Co				3/2020 3/2020		0	4 4
Method	Used:	<u>w</u>	ind	owless Percussive Sampling Rig			neot 1
Sample Dopth Type	es≗lest a&Na}∖	s /olun	Water	Description of Strata	Depth / (Lovol)	Legend	Coology
a.20 .	.11			MADE GROUND TOPSOIL: Grass over dark brown, gravely sandy clay, Gravel of fine to coarse, subangular to subrounded flint, quartzite charcoal and brick fragments. Frequent rootlets.			NGTS
	J2			MADE GROUND: Brown, gravelly, sandy clay, Gravel of fine to coarse, subangular to subrounded flint, quartrite, charcoa	-/ 0.30 (15.12) 0.40 (15.02)		
0.50	J3			land brick fragmonts. Brown, fnable, gravelly, very sandy CLAY. Gravel of fine to coarse, subangular to subrounded film and quartzlie.	Έ		
	97 2	4 N		Very stiff, orange brown, slightly gravelly, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint and quartzite. Natural black specks (possible manganeso deposite). 1.00 m: SPT: 3,3/4,4,6,10	0 80 (// 4 07)		
				Very stiff, orango brown, very gravelly, slightly sandy CLAY, Gravel of fine to coarse, subangular to subrounded flint and quartete.			
2.00 S	iP'T 1	IR N		2.00 m. SPT. 3,4/3.4,5,6 2.00 - 3.00 m: Dark arange brown and natural black specks (possibly manganese deposits).			GRAVE CATCHIVENT SUBGROUP
3.00 5	, T. J.	16 N		3.00 m. SPT: 3,4/3.5,3.5			KESGRAVE CATCH
4.00 S	י דיזא	14 N		4.00 m: SPT: 4,3/3,3,3,5 4.00 - 5.00 m: 60 % recovery. 4.10 - 4.50 m. Little gravel content.			e
General				t 5.45m bgl. 85.4			/

Proje Logg	ect Title ect No: jed By:	:	Forg BRD N Kii	A Homes (Chiltorn) Ltd. e End, Chiswell Green 3604 mber			Borehele	No
Date	Comme Comple od User	stod: 🔅	23/0	6/2020 6/2020 Jowless Percussive Sampling Rig		SI	heet 2	of 2
	mples & Type & No	Tests	Water	Description of Strate	Depth / (Level)	Legend	Goology	installation /Backfil
5.00	SPT	GN		Continued from 1.50m: Stiff, orange brown, very gra slightly sandy CLAY. Graver of fine to coarse, subar- subrounded film and quartrite. 5.00 m: SPT: 2,2/2,2,1,1	velly, (jular to		KESGRAVE CATCHMENT	
					7 0 			
	rai Rem ehole te		ed a	t 5.45m bgl.	CA Elevation Level. 85.42 mAQD			
				All c 1.og	limensions in mutre Scale 1:25		BR ne: 0129	

	Complet d Used			5/2020 Iowless Percussive Sampling Rig		St	eet
	iples & T ype & No	OSts Vojun	Water	Description of Strata	Depth / (Level)	Legond	Geol
0.20	J1		-	MADE GROUND TOPSOIL. Grass over dark brown, slightly gravelly, sandy CLAY. Gravet of fine to coarso, subangular to subrounded flint, quartzite and charcoal. Frequent rootlets and a root.	6.30 (66.33) 0.40		NGTS
				Brown, gravelly, very sandy CLAY, Gravel of fine to coarse, \subangular to subrounded flint, guartzite and chalk, \\$8ff, grange brown, gravelly, slightly sandy CLAY, Gravel of fine to coarse, subangular to subrounded flint.	- (00,21) 		
1.00	SPT	27 N		1.00 m: SPT: 3,2/4,4,6,13	<u>1.0</u>		
				Stiff, orange brown, vory gravelly CLAY. Gravel of fine to coarse, subangular to subrounded filmt and quartzite. Natural black specks (possibly manganuse deposits).			SUBGROUP
2.00	SPT	18 N		2.00 m: SPT: 7,4/5,5,3,5	<u>-</u>		KESGRAVE CATCHMENT SUBGROUP
2.50	D1						KESCAME
3.00	SPT	21 N		3.00 m: SPT: 3.3/4,5,5,7			
4.00	SPT	17 N		Structureless CHALK recovered as off white, gravelly clay. Gravel of weak, fine to coarse, subangular to subrounded chalk and occasional flint. Orange staining and blacks specks. (CIRIA Grade Dc) 4.00 m: SP1: 1,2/3,3,5,6	 	<u>, , , , , , , , , , , , , , , , , , , </u>	5
				4.00 m; s≌1; 1,2/3,3,5,6		······································	CHALK
	ral Rem		ad s	Surface Flevenen It 5,45m bgl, 86.605	mAOD		

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Clier				A Homes (Chiltern) Ltd,			F.	loroholo	No,
	oct Title: oct No:			e End, Chiswell Green 3604			1	S 1	08
Logg	ed By: Comme	N	Kır	nber				J	00
Date	Comple od Usec	tod: 2	3/0(3/2020 3/2020 Iowless Percussive Sampling Rig			St	eet 2	of 2
	aropies 6 1	leats	aler	Description of Strata		Depth /	, Legend	Geology	inavailation
Deplh	Type & No	Value	-	Continued from 3,80m; Structureless CHALK reco	overád ás	(Level)	-י <u>ייי</u> ייי		/Unckill
5.00	SPT	17 N		Continued from 3.80m: Structureless CHALK rect off white, gravelly clay, Gravel of weak, fire to con- subangular to autorounded chalk and occasional f statuting and blacks specks. (CIRIA Grade Dc) 5.00 m: SPT: 1,2/3,5,5,4	લા કલ્પ્			CHAIK	
	eral Rem rehole te		d a	t 5.45m bgl.	3.::(ac+ Slavenon (86,605	.Avel		BR	D
				/ L	All dimension .og Scale 1:	ns in metres 25		ne: 012: 10@brd	95 272244 Uk.com

	complet			5/2020 5/2020			
Metho	d Usod	: V	Nind	owless Percussive Sampling Rig	···	Sr	eet
San Dopth T	pies & Io ype & No	CSIS Valua	Water	Description of Strata	Depth / (Level)	Legend	Geolo
				MADE GROUND TOPSOIL: Grass over dark brown, slightly gravelly, sandy clay. Gravel of fine to coarse, subangular to subrounded film, quartizite and charcoal.			MGTS
0.40	JI			Brown, slightly gravelly, sandy CLAY. Gravet of fine to coarso, subangular to subrounded flint.	0.30		
				Stiff, reddish brown, gravelly, sandy CLAY with very gravelly pockets. Gravel of fine to coarse, subangular to subrounded flint and quartzite. Natural black specks (possibly manganese deposits).	- 0.50 (#8.00) -		
1.00	SPT D1	29 N		1.00 m: SPT: 3,7/9,9,7,4	1.0	0	4
115454				Stiff, reddish brown, very gravelly, slightly sandy CLAY. Gravel of fine to coarse, subangular to subrounded film. Natural black specks (possibly manganese deposits).	1.10 (87 au)	0 0 0	IT SUBGROU
2.00	SPT	8 N 5 N		2.00 m: SPT: 1,2/2,2,2,2			KESGRAUE CATCHMENT SUBGROUP
				Structureless CHALK recovered as off white, gravelly clay. Gravel of weak, fine to coarse, subangular to subrounded chalk and occasional flint. Grange staining. (CIRIA Grade Dc) 3.00 m: SPT: 1.1/1.1.1,2			CHALK
4.00	597	4 N		4.00 m: SPT: 1,1/1,1,1,1	40		
	ral Rem abole te		L . L	at 5.45m bgl.	I 450 Alaver 3 mAOD		

Client: Project Title: Project No: Logged By: Date Commences	Forg BRD N Kii	A Homes (Chiltern) Ltd. e End, Chiswell Green 3604 mber 6/2020			109		
Date Completed; Method Used:	23/0	3/2020 Jowiess Percussive Sampling Rig	Shee	Sheet 2 of 2			
Sampios & Tests Depth Type & No Var	5 Waler	Description of Strate	Dopth / (Level)	Logond Gre	instaliatio /Bockfill		
5.00 SPT 12		Continued from 3.00m: Statelureings CHALK recovered as off white, gravelly clay. Gravel of weak, fing to coarso, subangular to subrounded chalk and occasional flint. Crao- stanning, (CIRIA Grade Do) 9.00 m: SPT: 1,2/2,2,4,4					
General Remarks Borehole termin		-	503 mAOD		SRD		

Date	Comple	ted: 2		3/2020 3/2020			reet
	od Used		_	lowless Percussive Sampling Rig			
St Depth	mples & T Type & No	ests Value	, Jaler	Description of Strate	Dop(h / (Level)	Legend	Gerale
0.10	J1		+ <u>-</u>	TOPSOIL: Grass over dark brown, slightly gravelly, sandy CLAY, Gravel of fine to coarse, subangular to subrounded Lifth and quartzite. Frequent rootiels.	020	<u>a sa sa</u> s <u>se se se</u>	1s
				Brown, friable, gravely, very sandy GLAY. Gravel of line li coarse, subangular to subrounded fiint and quartrite			2
				Firm, orange brown, gravelly, sandy CLAY. Gravel of fine coarse, subangular to subrounded first and quartzite.			
1.00	SPT	8 N		Firm, roddish brown, gravelly, very sandy CLAY, Gravel of	1.0 1,00 (07.54)		
				Find to coarse, subangular to subrounded flint and quartail 1.00 m: SP1: 2,2/2,1,2,3			SUBGROU
							CESCRAVE CATCHMENT SUBGROUP
1.90 2.00	D1 SPT	GN		5till, reddish brown, very gravolly, sandy CLAY, Gravel of	7.0 2.00 (00,54)		GRAVECA
				fine to coarse, subangular to subrounded flint. 2.00 m: SP1: 1,2/2,2,1,1			NEX -
3.00	SPT	6 N		Structureloss CHALK recovered as off white, gravely clay	3.0 0.00 (05,54)		
				Gravel of weak, fine to coarse, subangular to subrounded chalk and occasional finit. (CIRIA Grade Dc) 3.00 m: SPT: 1,0/1,1,1,2		· ᡎ ^{. ᡎ} . ᡎ . ^ᡎ . ᡎ . <u>ᡎ </u> ·	E I 4
						┝╺┲╵┍╵ ┍┲┲╺┲┙╌┲╴ ┍┲┲┍┲┲	
4.00	SPT	12 N		4.00 m; SPT; 2.2/3.3.3.3	<u>.</u>	··········	
				- 4.00 m. or 1. 2.2/3.3.3.3	-	······································	l I I
					<u></u>		1
	erai Ren rebole is		od a		.537 mAOD		

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Clien	t: ct Title:		CA For	A Homes (Chiltern) Ltd. e End, Chiswell Green				3oráhole			
Proje Logg	ict No: led By: Commo		BRI N K	3604 mber			W	S1	10		
Date	Comple od Usec	ted:	23/(Wir	6/2020 Jowless Percussive Sampling Rig			Sł	Sheet 2 of 2			
Sa Oopth	Type & No			Description of Strata	Dopth (Leve	17 9)	Legend	Geology	(ostaljako /BackRi		
5.00	5PT	17 N		Continued from 4.50m: Structureless CHALK recovered a off white, gravolly clay. Gravel of weak, tine to coarse, subangular to subrounded chalk and occasional fint. (CIF Grade DC) 5.00 m: SPT: 1,3/3,4,4,6							
	ral Rom rehole to		ted		ivation Level .537 mAO[>		BR			
				All dimo Log Sca	nsions in m ale 1:25	otros		me: 012	 95 272244		

Cllen				A Homes (Chiltern) Ltd.		H	prohale	No.
rojo .ogg	ct Title: ct No: cd By: Comme	E	3RĐ: V Kir	e End, Chiswell Green 3604 nber 5/2020		W	S1	11
)ato	Comple od Usec	eted: 2	3/06	owless Percussive Sampling Rig		Sh	eet 1	of 2
	mples &] Type & No		Water	Description of Strata	Depth / (Lavel)	Legand	Goology	instaliatio /Backfil
				TOPSOIL: Grass over dark brown, slightly gravelly, sandy clay, Gravel of fine to coarse, subangular to subrounded fint and quart2ite. Frequent rootlets.	- F	<u>612 979 976</u> 6 <u>876 976 9</u> 9 6 976 976 97	s	
				Brown, friable, gravelly, sandy CLAY, Gravel of fine to coarse, subangular to subrounded filnt, quartzitu and chalk.	0.00 (67,42) 0.50			
				Stiff, orange brown, gravolly, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint and quartizite.	(#7.22)			
0.80	17				1.0 t no			
00	SPT	16 N		Stiff, reddish brown, very gravelly, sandy CLAY. Gravel of fine to coarse, sobangular to subrounded finit and quartizite. 1,00 m; SPT; 2,3/4,3,4,5	(#0.72)	<u> </u>	CROLP	
1.30	131					0 0	CESCRAVE CATCHIVENT SUBGROUP	
							SATCHIN	
.00	SPT	12 N			2.0	<u> </u>	RAV5(
				2.00 m: SPT: 4,4/3,3.3,3			KESG	
								ŻŻ
					2,00			
3.00	SP (11 N		Structureless CHALK recovered as off white, gravely day. Gravel of weak, fine to coarse, subangular to subrounded chalk and occasional fint. (CIRIA Grade Do) 3.00 m: SPT: 2,1/2,3,2,4	30 (94,62)	┍╺┍╺┍ ┶ ┶		
						rrrr rrrrr	CHALK	
4.00	SPT	11 N			40	┲┶┍╼┲┙ ┲╼┍╼┲╸┙	Ð	
	arı			4.00 m: SPT. 1,1/2.3,3,3		<u>, 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</u>		
	e ral Ren rehole t		ed a	it 5.45m bgl. 87.7	19 mAOD			
					uons in metre		BR	
		100 11 11 11 11 11		Log Scale				05 27224

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Proje	t: ect Title: ect No: od By: Comme		For BR N F	A Homes (Chiltern) Ltd. ge End, Chiswell Green 03604 mber 6/2020			51	^{№.}
Date	Comple od Used	ted:	23/	6/2020 dowless Percussive Sampling Rig		She	et 2	of 2
	implos & 1				Depth /			Installation
Copih	Туря & No	Vajue			Depth / (Lovel)	Legend C	нканду	/Backfill
5.00	ŞPT	12 N		Continued from 2.90m: Structureless CHALK record off white, gravely clay. Gravel of weak, the to coar subargular to subrounded chalk and occasional fil Grade Dc) 5.00 m: SPT: 2,2/2,3,4,3	rso. 🗖 🚽		CHALK	
	ral Rem rehole te		ted	at 5.45m bgl.	uface Clevellon Level 87.719 mAOD		BR	D
				Al Lo	I dimensions in metres og Scale 1:25		e: 0129)5 272244

Logg Date	ect No: jed By: Comme	N nced: 2	l Kin 4/06					W	S1	12
	Comple od Used		4/06/2020 /indowless Percussive Sampling Rig				Sheet 1 of 1			
	mpios & T Type & No	ests Value	aler	Description of Strate		00 (1)	pih / tvel)	Legend	Goology	instalinti /Gack/
0.20	J1			TOPSOIL : Grass over dark brown, gravelly, sandy Gravel of fine to coarso, suborgular to subrounder quartzite. Frequent roollets.	CLAY. I flint and		1.40	<u>ল কল কল</u> কল-কল কল ল-কল বল্ল-প এটা কল কল	4 10	
				Loose to medium dense, brown to orange brown, (SAND, Gravel of fine to coarse, subangular to sub Rint and quartzite,	gravelly rounded	-	(80.29) 1.70 (88.99)	0.0 .0 .0		
				Stiff, orange brown, gravelly, sandy CLAY. Gravel coarse, subangular to subrounded filnt and quarizi	of fine to ito,	F (1.90		•	
1.00	SPT	22 N	•	Medium dense, roddish brown, gravelly, very clayr Gravel of fino to coarso, subangular to subroundog quartzito, 1,00 m; SPT: 6.4/4.4.6.8	y SAND, d flint and		(60.79)	· · · · · · · · · · · · · · · · · · ·	auo Auo	
				Silff, roddish brown, gravolly, sandy CLAY. Gravol coarse, subangular to subroundod flint and quadzi	of lino to lte,		(30 (56 39)		INT SUBGROUP	
				Donso, roddish brown, gravelly, vory clayey SAND fine to coarso, subangular to subrounded flint and	, Gravel of quartzite		1 70 (H7.9%)		CATCHME	
2.00	SPT	42 N		2.00 m: SPT: 6,9/11,12,10,9		2.0			KESSANE CATCHMENT	
3.00	SPT	>50				3.0	5 OD (80 60)			
		N		3,00m: SPT: 7,11/10,14,14,12 for 60mm			(10 23)			
	oral Ren orehole to		ed a	t 3.00m bgl due to refusal.	iulace Llevabon 89.694		00			
					All dimensio .og Scale 1	:25	metro	Teleptu	BR	 95 27224

Projo Logg	t: ect Title: ect No: ed By: Comme	F E N	Forg 3RD N Kjr	A Homes (Chiltern) Ltd. s End, Chiswetl Green 3604 nber 5/2020				^{sorehole} 'S1	13
	Comple od Used			3/2020 Iowless Percussive Sampling Rig			Sh	neet 1	of 2
	Imples & 1 Type & No	•	Water	Description of Strata		Depth / (Level)	Legend	Goology	Installailo /Backfill
				TOPSOIL: Grass over dark brown, gravelly, sond Gravel of fine to coarse, subangular to subrounds guartzite. Frequent rootlots.	y CLAY. ad flint and		7 77 77 7 7 77 77 7 7 7 77 77	IS	
0.30	l l l			Brown, Itiable, very gravely, sandy QLAY, Gravel coarse, subangular to subrounded flint and quarts	of tine to zite,	-			
				Still to very stiff, roddish brown, gravelly, sandy C Gravel of fine to coarse, subangular to subrounde quartzilo. Natural black specks (possible mangan deposits).	od flint and	0,50 (MG,99) 			
00.	SPT	24 N		1.00 m: SPT: 5,5/8,5.8,7		10		5	
1.20	Ľ١					-		CESSARYE CATCHMENT SUBGROUP	
2.00	SPT	14 N		Medium denso, reddish brown, slightly gravelly, c SAND. Gravel of fine to coorse, subangular to sul ffini. 2.00 m: SP1: 3,4/4,3,3,4		(85.69) 2.0		KESGRAVE CA	
.00	SPT	5 N				 			
				Structureloss CHALK recovered as off white, grav Grave) of weak, fine to coarse, subangular to sob chalk and occasional flint. (CIRIA Grade Oc) 3.00 m; SPT: 2.2/1.2.1.1 3.00 - 4.00 m: 40% recovery.				REWORKED CHALK	
.00	SPT	7 N		Stiff, dark brown, gravelly, sandy CLAY, Gravel of coarse, subangular to subrounded flint, Pockets o chalk, 4.00 m: SP1: 2,2/1,1,2,3 4.00 - 5.00 m: 40% recovery, 4.00 m: No SPT recovery,	l fine to of off white	<u>4.0</u> (03.43) 4,50	8 8 8 9 8 9	KCS	
	aral Ren rehole (e		ed a	t 5.45m þgl.	Sudato Elevanon L 87.492	mAOD		BR	n D
					All dimension Log Scale 1.		Telopho	ane: 017	95 27224 luk.com

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	oct Title oct No:			e End, Chiswell Green 3604				Q 1	14
Logg	ed By:			nber				J	
	Comple	enced: 2 sted: 2		5/2020					
Meth	od Uso	d: V	Vinc	owless Percussive Sampling Rig			, Sr	neet 1	of 2
	Imples & Type & No		Water	Description of Strata		Depth / (Level)	Legend	Geology	foxuilation /Uacktili
0.20	۲L			TOPSOIL: Grass over dark brown, gravelly, sand Gravel of line to coarse, subangular to subround quartzite.	y clay. ed flint and	- 0.00	8.9 <u>8.9 9</u> 9 89 89 9 8 9 9 8 9		
				Brown, friable, gravelly, sandy CLAY, Gravel of fr coarse, subangular to subrounded first and quart	ne to zite.	(00 00)		, ,	
				Stiff, reddish brown, gravelly, sandy CLAY, Grave coarse, subangular to subrounded, first and quar	el of fine to tzite.	(95.80)	00 0	*	
1.00	SPT	14 N		1.00 m: SPT: 1,3/3.3.3,5		<u>1.0</u>	0 0 0		
1.60	PEN	2.0/2.25×							
	"LN	kg/cm ²	1			1 PO 01 40)	10110	10	
2.00	SPT	20 N		Modium dense, reddish brown, alighily gravoly, o SAND. Gravel of fine to coarse, subangular to su filot nod quarizite. Z.00 m: SP1: 6,6/6,5,4,5	ayoy broundod			SCRAVE CATCHMENT SUBGROUP	
2.70	-			Sliff, reddish brown, gravelly, sondy CLAY. (Srave coarse, subangular to subrounded film and quart black specks (possibly manganese deposits).	l of fine to zite. Natural	- 2.50 (63.80) -		ECAT	
2,80 2,80	D1 PEN	3,0/2,75x kg/cm*	R	back specks (possibly manganese beposits).				SGRAU	
9.00 E	SPI	20 N		3.00 m: SPT: 5,5/4,4.6,6		3 <u>0</u> 		Ÿ	
4.00	SPT	20 N		4.00 m; SPT, 2.3/5.4.5.6		<u>∎.a</u> 	0 0		
		1				4 50		1	
	e ral Ren rehole to		ed a	t 5.45m bgl.	8uriac= Elevation 86,295			BR	2
					All dimensi¢ Log Scalo 1		Telopho	ono: 012	95 272244 Juk.com

Clion				A Homes (Chiltern) Ltd.				Borettolo	NG.
	et Title: et No:	E F		e End, Chiswell Green 3604				21	14
_០ឮឰ	ed By:	N	Kir	nber			* *	J	
	Comine			3/2020 5/2020					• • •
	od Usec			lowless Percussive Sampling Rig			Şł	neet 2	of 2
	mples & 7	1	Viater'	Description of Strata		Depth / (Level)	Legend	Geology	Instaltatio /Bockfill
onpth	Type & No	Value	1	Continued from 2.60m: Stiff, reddish brown, gravel	ly sandy	(LEVEN			645645
				CLAY. Gravel of fine to coarse, subangular to subr flint and quartzite. Natural black specks (possibly n deposits).	ounded nanganese		0 00	S S	
00	SPT	8 N		4.90 - 5.00 m: Dark brown in colour. Structureless CHALK recovered as off white, grave Gravel of weak, fine to coarse, subangular to subre chalk and occasional filnt. (CIRIA Grade Dc) 5.00 m. SPT. 1.1/2,1,2,3	elly clay. ounded	50 5.00 (01.30)	<u>р</u> и <u>р</u> и		
						, (60.05) - 			
						no.			
						7.0			
						 -			
						10			
						0.0			
	e ral Ren rehole t		ed s	at 5.45m bgl.	arteco Eloveron (86,295	mAOD		BR	D
					II dimensio og Scale 1:	ns in metre 25	Teleph		95 27224-

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Proje	it: oct Titlo: oct No: jed By:	; ł	Forg BRD	A Homes (Chiltern) Ltd, c End, Chiswell Green 3604 mber				'S1	[№]
Date Date	Comme Comme Comple	enced: 2 stod: 2	24/06 24/06					neet 1	
	anples &	Tuats	ialer -	Description of Strata		Depth /	Legend	Geology	Installatio
Dapih	Туре & No	Value	-			(Lével)	1. 20. 24		/Eleckill
				TOPSOIL: Grass over dark brown, gravuly, sandy day Gravel of fino to coarse, subangular to subrounded fir quartzito. Frequent rootlets. Brown, friable, gravelly, sandy Ct AY, Gravel of fine to coarse, subangular to subrounded flint and quartzito. Stiff, reddish brown, gravelly, sandy CLAY, Gravel of fi coarse, subangular to subrounded flint and quartzite.	n and	- 0.20 (07.02) - 0.40 - 0.40 - 00.021	6 <u>6</u>	ις, Γ	
0.80 1.00	J1 SPT	13 N		1.00 m ⁻ SPT: 2.2/3.3.3.4		- - - - 1.a -		LECROUP	
2.00	SPT	15 N		2.00 m: Becoming more gravelly and has natural black specks (possibly manganose deposits). 2.00 m: SPT: 2,3/3,3,5,4		- - - - - - - - - - - - - - - - - - -		KESCRAVE CATCHMENT SUBGROUP	
3.00	SPT	8 N		Structureless CHALK recovered as off white, gravely of Gravel of weak, fine to coarse, subangular to subround chalk and occasional flint. (CIRIA Grade Do) 3.00 m: SPT. 2,1/2.2,2,2	:lay. ied -			X	
4.00	SPT	13 N		4.00 m: ŠP1: 3,7/4,2,3,4 4.00 - 5.00 m: 70% recovery.		- - - - -		CHMK	
	eral Ren rehole te		ed a		87.216			BR	n usa.
				All di Log S	mension Scale 1:3	s in metro ?5	Tolopho	ne. 012	95 272244 WK.com

		/2020			
		2020 pwless Percussive Sampling Rig		SI	heet 2
Samples & Tests and Samples & Tests		Description of Strata	Depth / (Level)	Legend	Goolog
5.00 SPT 8 N	(88,	Continued from 2.90m: Structuroless CHALK recovered as off while, graveity clay, Cravol of weak. fine to coerse, subangular to subrounded chalk and occessional flint. (CIRIA Grade Dc) 5.00 m: SPT: 1.2/1.2.3.2			

Ciler			CAL/	A Homes (Chiltern) Ltd.			ŀ	lorchole	No.
Proje Logg Date	ect Title: ect No: od By: Comme Comple	nced: 2	8RÖ N Kir 24/00	e End, Chiswell Green 3604 πber 3/2020 5/2020					16
Meth	od Used	d:	Wino	lowless Percussive Sampling Rig			\$F	peet 1	of 2
S7 Dopth	Imples & 1 Type & No	-	Vater	Description of Strata		Dopth / (Levol)	Logend	Geology	Installatio /Backfill
0.30	.11	,		TOPSOIL: Grass over dark brown, graveliy, sandy dia Gravel of fine to coarse, subangular to subrounded to quartzile. Frequent rootlets. Brown, friable, graveliy, sandy CLAY. Gravel of fine is coarse, subangular to subrounded film and quartzite. Stiff to very slift, reddish brown, graveliy, sandy CLAY.	lint and	0.70 (05.95) — 0.50 (05.05)	<u>, 17, 17, 17, 17</u> 1, 17, 17, 17, 17 1 , 17, 17, 17, 17, 17 1 , 17, 17, 17, 17, 17 1 , 17, 17, 17, 17, 17, 17, 17, 17, 17, 17	TS	
1.00	SPT	13 N		Gravet of fine to coarse subangular to subrounded fil quartzite. Natural black specks (possibly manganese deposits). 1.00 m: SPT: 2,3/3,4,3,3	int and :	<u>,</u>		RT SUBGROUP	
2.00	SPT	22 N		2.00 m: SPT. 7.6/6,7,4.5	- - - - - - - - - - - - - - - - - - -			KESGRAVE CATCHMENT SUBGROUP	
3.00	SPT	10 N		Struchireless CHALK meovered as off white, gravelly Gravel of werk, fine to coarse, subangular to subrour chalk and occasional filmt, (CIRIA Grade De) 3.00 m: SPT: 3,2/2,2,2,4	/ clay. nded 30	2 AG (03 35) 			
4.00	хнт	8 N		4.00 m: SPT: 1,2/1,2,2,3		-		CHAIK	
	ral Rem				1 1. Se Flavation Lava 86.145 m				
80		srmmal	.00 8		dimensions Scale 1.25	in metre		BR	 95 272244

Client:		C	CALA	A Homes (Chiltern) Ltd.			H	orehole	No.
Projec Projec	t Titje:			e End, Chiswell Green 3604			14/	C 4	40
Logge				nber			VV	21	16
	conmo								
Date C	Comple	ted: 2	4/06	5/2020			Sh	eet 2	of 2
Metho	d Used	l: V		owless Percussive Sampling Rig			<u> </u>		<u> </u>
San	nplos & T	oste	Vaher	Description of Strata		Oepth /	Legend	Goology	Installatio
Dopin T	уре & No	Volue				(Level)			/8nck/il/
5.00	SPT	8 N		Continued from 2.80m: Structuroless CHALK recov off white, gravelly clay. Gravel of weak, fine to coar subangular to subrounded chalk and occasional filr Grade Dc) 5.00 m: SPT: 1,2/2,2,2,3	vered as	5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0		CHALK	
Gener	ral Ren	narkş:		5.	unaro Elevalon				
			ted a		ll dimensio	mAOD		BR	D
····				Lu	og Scale 1	:25 	Tolopho Email 1	no: 012 nio@brc	95 27 224 luk.com

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Projo Logg	it: act Title: act No: od By: Comme		Forg BRD N Kii	A Homes (Chiltern) Ltd. e End, Chiswell Green 3604 nber 7/2020				S1	No.
Date	Comple od Used	ted:	03/0	7/2020 fowless Percussive Sampling Rig			Sł	neet 1	of 2
,	Type & No	******	Water	Description of Strata		Depth / (Level)	Legend	Goology	instaliąto /eacklili
				TOPSOIL: Grass over dark brown, gravelly, sandy t Gravel of fine to coarse, subangular to subrounded quartzite. Frequent rootlets. Brown, friable, slightly gravelly, sandy CLAY. Grave coarse, subangular to subrounded first and quartzib Sliff, brown, very gravelly, slightly sandy CLAY. Gra	t flint and at of fine to te.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
1.00	ાપટ	13 N		Sliff, brown, very gravelly, slightly sandy CLAY. Gra to coarse, subangular to subrounded fint and quart 1.00 m: SPT: 6,5/4,2,3,4		<u>1 0.</u> 	······································		
2.00	SPT	20 N		Firm to stiff, orange brown, silty CLAY. Natural blac (possibly manganese deposits).	-	1.40 		SUBGROUP	
2.00	5r1	20 N		2,00 m: SPT: 3,4/4,4,5,7 Stiff, prange brown, gravelly, sandy CLAY. Gravel o coarse, subangular to subrounded flint and quarizity	si tine te o.	- - - - - - -		CESCRAVE CATCHAENT SU	
4.00	SPT	14 N		3.00 m: SPT: 2,3/3,3,4,4 Stiff, orange brown, sandy CLAY with rare quartzite		- 3.0 		NES/	
4.00	SPT	20 N		Medium dense, orange brown, gravelly, clayey SAN of fine to coarse, subangular to subrounded filmt and quartzite. 4.00 m ⁻ SPT ⁻ 5.7/8.8.5.5	ID. Gravet	- - - - - - -			
	rai Rem rehole te		ted a	t 5.45m bgl.	naon Elevation Le ጠላላ	vol		BR	D
					l dimension og Scale 1:2			ne: 012!	 96 272244

Date	Comple	nced: 0 ted: 0	3/01 3/01	//2020				neet
	od Usor Imples &		-	owless Percussive Sampling Rig	··)		, , , , , , , , , , , , , , , , , , ,	
	Type & No		Water	Description of Strata		Depth / (Level)	Legend	Goole
				Stiff, dark brown, silly CEAY with natural black speci (possibly manganosa deposits).	kB		<u></u>	KCS
5.00	SPT	14 N		Structureless CHALK recovered as off white, gravall Gravet of weak, fine to coarse, subangular to subrou chalk and occasional flint. (CIRIA Grade Dc) 5.00 m. SPT. 4.4/4,4.3,3	ly clay. unded	<u></u>		
						- - - 5.45		a Hara
								-
						60		
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1						- 		
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l						-		
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Gen	eral Ren	 narks:]	 	riaca Elevation I	0,0 •vel	.	
			ed a	tt 5.45m bgl.	mA	d0		E

Proje	t: oct Title: oct No: jed By:	: 	Forg BRD	A Homes (Chiltern) Ltd. e End, Chiswell Green 3604 nber				iorehole S1	^{№.}
Date Date	Comme Comple od Used	nced:(sted: (03/01 03/01				St	eet 1	of 2
	Imples & T Type & No	1	Water	Description of Strate		Depth / (Level)	Legend	Geology	instoliatio /Backfil
1.00	SPT	4 N		TOPSOIL. Grass over dark brown, slightly gravelly, sa clay. Gravel of fine to medium, subangular to subroun (fint and quartzite. Frequent rootlets. Brown, friable, slightly gravelly, sandy CLAY, Gravel o coarse, subangular to subrounded filet and quartzite, Stiff, brown, slightly gravelly, sandy CLAY, Gravel of fi coarse, subangular to subrounded filet. Firm, brown, sandy CLAY. 3.00 m: SP1: 1,1,71,1,1,1	deð í fino 10	0.05 			
:.00	SPT	5 N		Firm, light brown, sandy CLAY with occasional fine to subangular to subrounded filml and quartzite gravel. N black specks (possibly manganese doposils), 2.00 m; SPT: 2,2/1,1,1,2 Firm to sliff, orange brown, sandy CLAY with natural b specks (possibly manganese deposits).	latural	1 /0 20 2.10		KESGRAVE CATCHMENT SUBGRCUP	
3.DO	SPT	11N		3.00 m. SPT: 1,1/3,2,3,3	- - - - - - - - - - - - - - 			KESGRAV	
1.00	SPT	ΞN		4,00 m: SPT: 1,1/1,1,1,2		- - - - - - - - - -			
	e ral Ren rehole tr		ted a	it 5,45m bgl,	n Diavarion Li mA	n√o :		BR	Đ
					imensior Scolo 1 :	is in metri 25		nn; 012:	 95 27224

	ct Title:	C F	οrge	\ Homes (Chiltern) Ltd. e End, Chiswell Green			ehole No
Proje	ct No:	В	RĐ	3604		l WS	\$118
-ogg Jate	ied By: Comme	N nced: 0	- Kin 3/07	nbor 1/2020			
Date	Comple	ted: 0	3/07	//2020		Cha	et 2 of 2
Meth	od Usoc	<u>1:</u> V		owless Percussive Sampling Rig		She	
	mples & 1 Type & No		Mater	Description of Strata	Depth / (Level)	Legand Go	ology Institutio /UnckAl
5.0D	ser	4 N		Continued from 2.10m: Stiff, orange brown, sandy Ct natural black specks (possibly manganese deposits).	AY with -		
				5.00 m: SPT: 1,1/1,1,1,1			
					<u>7.0</u>		
					- <u>00</u> . -		
	eral Ren			 	ug Elevation Leval.		
			ệđ a	t 5,45m bgl.	MAOD		BRD
				All d Log	dimensions in metro Scale 1:25	Talaphone	. 01295 27224 @brduk.com ···

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Clien				A Homes (Chiltern) Ltd.			F	loroholo	No.
	ect Title: ect No:			e End, Chiswell Green 3604			144	CA	140
	ed By:			nber			VV	21	19
	Comme								
	Comple	ted: 0	3/07	7/2020			51	ieet 1	of 2
	od Used		_	lowless Percussive Sampling Rig	,				
	mples & T Type & No		Water	Description of Strata		Depth / (Level)	Legend	Goology	lostallaho /(tack/d
				TOPSOIL. Grass over dark brown, slightly gravelly (clay, Gravel of fine to medium, subangular to sub- filint and guartzite. Frequent rootlets.	y, sandy rounded	0.05			
				Brown, friable, gravelly, sandy CLAY, Gravel of fin cearse, subangular to subrounded flint and guadz	sto/ _	0.00	<u> </u>		
				Loose, light brown, very gravelly SAND. Gravel of coarse, subangular to subrounded flint and quartz	fine to site.		0. 0		
							0 '0		
1.00	SPT	14 N				. <u></u>	<u> </u>		
				Otange brown, gravelly, very clayey SAND / very or CLAY, Gravel of fine to coarse, subangular to aub flint and quartiztle.	sandy rounded				
				1.00 m: SPT: 3,4/3,3,4,4			·		
						.		SOUP	
							<u>`````````````````````````````````````</u>	SJBGF	ф, ф
.00	SPT	9 N		(1).4		.0 2.00	a∺	CESCRAVE CATCHAIENT SUBGROUP	
				Stiff, orange brown, slightly gravelly, sandy CLAY. fine to coarse, subangular to subrounded flint and Natural black specks (possibly manganeso dopos	t quartzite. 🛛 🕇	.		FICH3	<u>à à</u>
			Ì	2.00 m: SPT: 2,2/2,2,2,3	-		<u> </u>	AVE C	
						.	<u> </u>	55	
							<u> </u>	×	
a.00	SPT	4 N		3.00 to: SPT: 1,1/1,1,1,1	.3	0			
				3.00 - 4.00 m: 50 % recovery. 3.00 m: No SPT recovery.	-		<u> </u>		注 注
					F		<u> </u>		
							ъ		
							<u> </u>		
.00	SPT	8 N		4,00 m: SFT: 2,2/1,2,2,3	4	<u></u> 4,10	<u></u>		
				Sinuclureless CHALK recovered as off white, grav Gravel of weak, fine to coarse, subangular to subr	rounded	-,	<u>, , , , , , , , , , , , , , , , , , , </u>	ž	
				chaik and occasional fint, Some orange staining is and black specks. (CIRIA Grade Do)	n piacos	4,50		CHALX	
	ral Ren rehole te		ed a	t 5,45m bgl.	Burrace Eleveron Lo mA(vel			_
				-				BR	D
					MI dimension log Scale 1:2				95 272244

Client: Project Title: Project No: Logged By: Date Commence	Fo BF N (ed: 03)				'S1	
Date Completed: Method Used:		3/07/2020 /indowless Percussive Sampling Rig		Sh	eet 2	¢f
Sumples & Tests Depth Type & No Vi	5 /duo	Description of Strata	Depth / (Lovel)	Legend	Goology	ins /i
	9 N	Continued from 4.10m: Structurelos& CHALK recovered as off while, gravelly day. Gravol of weak, fine to coarse, subangular to subrounded chalk and occasional film. Some brange staining in places and black specks. (CIRIA Grade De) 5.00 m. SPT. 1.1/2.1,2.4	5.45		CHAIK	
General Remark		Syrjaca Elevans				 .
		ed at 5.45m bgl. n	hAOD	Telepho	BR	ຸ ຄ5

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Proje Loggi Date i	ct Title: ct No: ed By: Comme	nced:	Forg BRD N Kii 03/0					3arohalo /S1	^{№.}
	Comple od Usec			7/2020 Iowless Percussive Sampling Rig	St	neet 1	of 2		
	mples & Type & No	т	Description of Strata (Level)					Geology	fristajlatio /Backfil
1.00 2.00	SPT SPT	13 N 13 N		 TOPSOIL: Grass over dark brown, gravelly, sandy Gravel of fine to coarse, subangular to subrounded flint and quartzi coarse, subangular to subrounded flint and quartzi brown, gravelly, slightly clayey SAND. Gravel of fine coarse, subangular to subrounded flint and quartzi to coarse, subangular to subrounded flint and quartzile. Mudium dense, orange brown, gravelly, clayey SAND / very a Quartzile. Mudium dense, orange brown, gravelly, clayey SAND of m: SPT: 4.3/3.4.3,3 2.00 m: SPT: 4.3/3.4.3,3 2.00 - 3,00 m: 50% recovery. S0ff, orange brown, gravelly manganese deposits). 3.00 m: SPT: 1,2/3,3,4,3 3.00 - 4.00 m: 50% recovery. 	d filmt and o to to. Te to to. vol of fine tzite. andy ounded			KESGRAVE CATCHMENT SUBCROUP	
				Structureless CHALK recovered as off white, grave Gravel of weak, fine to coarse, subangular to subro chalk and occasional filmt. Some orange staining in and black spocks. (CIRIA Grado Do) 4.00 m: SPT: 1,1/1,1,1,2 4.00 - 5.00 m; 60 % recovery.	sunded 🗄	4:0		CHALK	
	ral Ren ehole te		ted a	it 5.45m bgl.	naca Clavation La mAi Il dimension og Scalo 1:2	ob ob s in metre		BR	D 95 272244

Date (nced: 0	3/07							
Pate (Metho	Comple od Used	ted: 0: I: Vi		7/2020 Iowless Percussive Sampling Rig				Sheet 2 of 2		
	mples & 7 Type & No	'ests Value	valer	Description of Sirala	Depth / (Level)	Legend	Geology	installata /Bock/d		
5.00	SPT	12 N		Conlinued from 4,00m: Structureless CHALK recovered off white, gravelly clay. Stravel of weak, tine to coarse, subangular to subrounded chaik and decessional flint. So orango statining in places and block specks. (CIRIA Grad Dr) 5.00 m: SPT: 1,2/2,3,3,4	as	· · · · · · · · · · · · · · · · · · ·				
	eral Ron Tehole te		ed a	at 5.45m bgł.	ntAC	- 0		BR	Ð	

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Proje Logg Date	et Title et No: ed By: Comme	; F E N anced:0	org IRD I Kir 3/07					21
	Comple od Used			7/2020 Jowless Percussive Sampling Rig		SI	ieet 1	of 2
5a Depih	mples & Type & No		Waler	Description of Strata	Dep(h / (Lovel)	Legend	Geology	Instatistic /Backfill
				TOPSOII : Dark brown, slightly gravolly, sandy clay, Gravel of \fine to coarse, subangular to subrounded flint and quartzito. Brown, friable, gravelly, sandy CLAY. Gravel of fine to coarse, subangular to subrounded flint, quartzite and chalk.	010	51/ <u>51/ 51/</u> 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ST.	
1.00	SPT	7 N		Elrm, erange brown, gravelly, sandy GLAY, Gravaj of Boo lo coarse, subangular to subrounded fliot and quarizito. 1.00 m: SET: 1,1/2,1,2,2				
Z, DD	SPT	ŝΝ.		Loose to medium dense, orange brown, gravelly, clayey SAND. Gravet of fine to coarse, subangular to subrounded flint and quarizite. 2.00 m: SPT: 1,2/3.2.1,2	2.0 2.00	8 8 0 0 0 0 0 0 0 0 0 0 0 0 0	CESCRAVE CATCHMENT SUSCROUP	
3.00	SPT	12 N		Sliff, orango brown, gravolly, sandy CLAY, Gravel of fine to coarse, subangular to subrounded flint and quartzite. 3.00 m: SPT: 1.1/3.2.3,4	2.00 3.0 		· · ·	
4.00	SPT	10 N		4.00 m [.] SP f: 3,4/3,3,2,2 4.00 - 5.00 m: 50% recovery.	4.0			
	ral Ren rehole to		ed a	t 7.45m bgi.				
				All dimensio Log Scale 1			BR pne: 012 nto@bro	95 272244

Client: Project Title	e: Fo	NLA Homes (Chiltern) Ltd. orge End, Chiswell Green			ale No.
Project No: Logged By: Date Comm Date Compl	: N henced: 03	RD3604 Kimbor //07/2020 //07/2020		WS	
Method Use	ed: W	indowless Percussive Sampling Rig	· • · · · · · · · · · · · · · · · · · ·	Shee	2 of 2
Samples & Copin Type & N		Description of Strata	Oepth / (Level)	Legend Gool	ogy Installat /Backf
5.00 SPT 6.00 SPT	10 N 11 N 10 N	Stiff, orange brown, slightly gravelly, very sandy CLA clayey SAND. Gravel of fine to coarse, subangular to subrounded flint and quartale. 5.00 m: SPT: 2,3/3,2,2,3 6.00 m: SPT: 2,2/2,3,2,4 7.00 m: SPT: 2,2/2,3,2,3			
General Re Borehole		d at 7,45m bgl.	ica (itivation (avel: mAOD		RD
			dimensions in metre Scale 1:25		1295 272

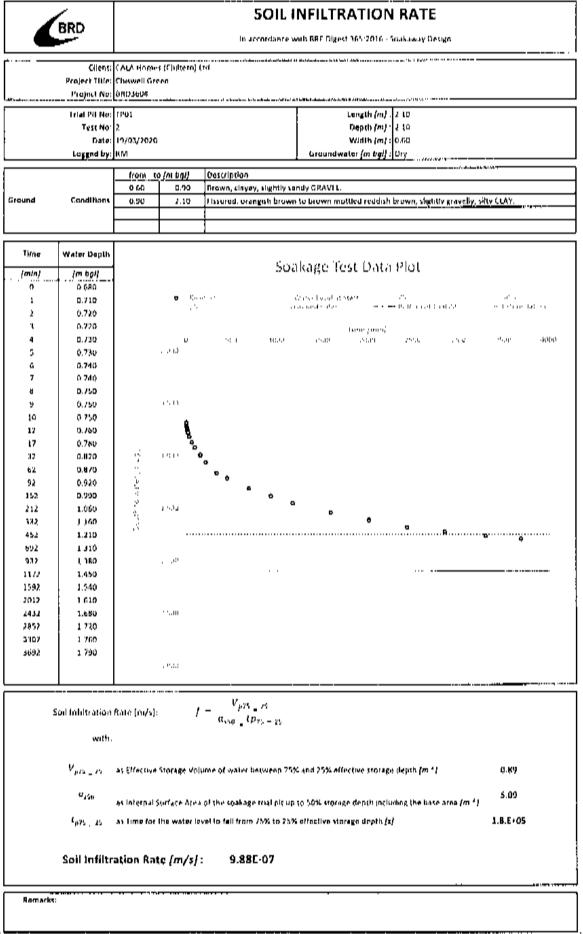
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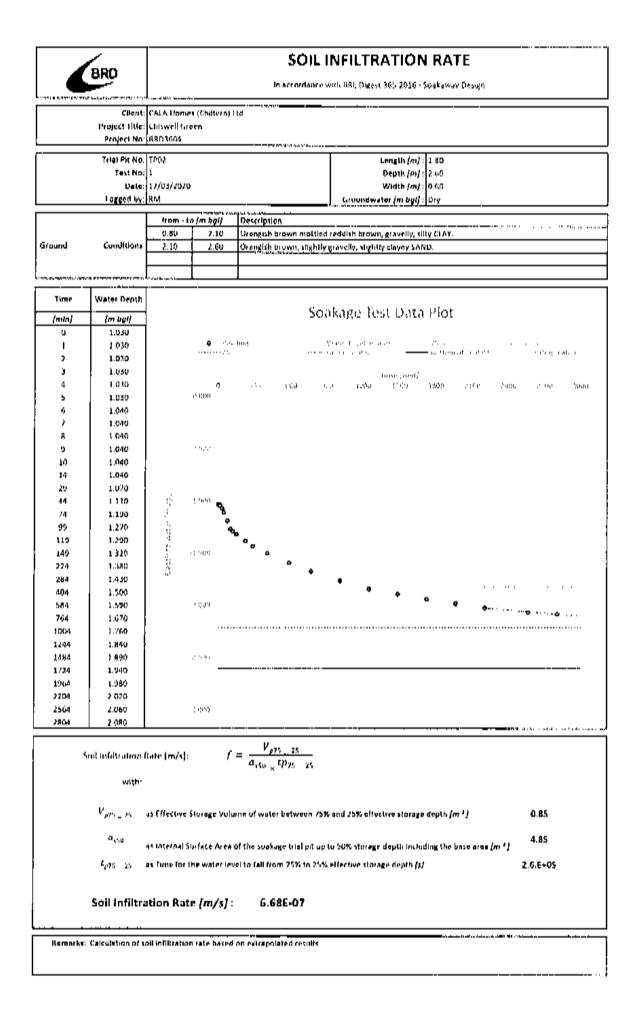
Date	ed By: Comme Comple	enced: C)3/0	nber 7/2020 7/2020					22		
Meth	od Use	d: V	Nine	lowless Percussive Sampling Rig			Sł	Sheet 1 of 2			
Se Depth	Imples & Type & No		. faler	Oescription of Strata		Depth / (Level)	Legend	Goology	installatio /Backfill		
	SPT			MADE GROUND TOPSOIL: Dark brown, slightly gra sandy clay. Gravel of fine to coarse, subangular to subrounded filmt, quartzite and charcoal. Loose, brown, grownly SAND, Gravel of fine to coars subangular to subrounded filmt and quartzite.] 30.	 1.0_1.00		5			
1.00	18 N		Stiff, orange brown, gravelly, sandy CLAY, Gravel of coarse, subangular to subrounded fint and guarizite, black specks (possibly manganese deposits), 1.00 m; SPT: 3,3/4,5,4,5	fine to . Natural	··· ·· ··		KESGRAVE CATCHMENT SUSSROUP				
2.00	SPT	24 N		Medium dense, brown, gravelly SAND, Gravel of fino course, subangular to subrounded flint and quartzite. (2.00 m: SPT: 4,5/4,4,7,9 Sliff, orango brown, very gravelly, sandy CLAY, Grav to coarso, subangular to subrounded flint and quartzi hatural black specks (possibly manganese deposits)	el of fine	2.0 2.00 - 2.20 		KESGRAVE			
3.00	SPT	12 N		Stiff, dark brown motiled off while, gravelly, sandy CE Gravel of fine to coarse, subangular to subrounded fil quartzite and chalk. 3.00 m: SPT; 3.3/3.2.3.4 Structuraless CHALK recovered as off white, gravelly Gravel of weak, fine to coarse, subangular to subrour chalk and occessional film. Some erange staining. (C) Grade Dc)	_AY.	<u>a 0</u> 3.00 					
1.00	SPT	10 N		4.00 m: SPT: 2,3/3,2,2,3	- - - -	- - - - - -		CHALK			
	ral Rem ehole te) ed a	svrte t 5.45m bgl,	ice Elevation Ele rmA			BR	533533 D		

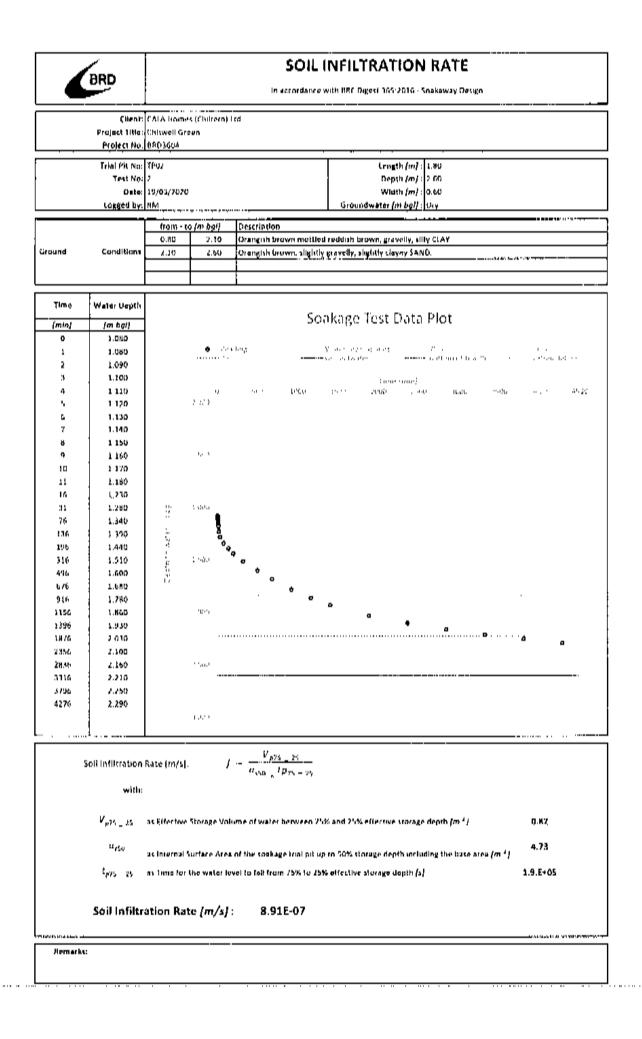
Client; Project Title: Project No: Logged By: Date Commenced	Forg BRD N Kii	A Homes (Chiltern) Ltd. je End, Chiswell Green 03604 mber 7/2020		Borohole			
Date Completed: Method Used:	03/0	7/2020 dowless Percussive Sampling Rig		Sheet 2 of 2			
Samples & Yosts Depth Type & No - Mai	Mater	Description of Strata	Dopth / (Lovel)	Legend Goology	frontailletto /Dackfill		
	.N	Structureloss CHALK recovered as off white, gravely Cravel of weak, fine to coarse, angular to aubongula and occasional film. Some orange staining, (CHRIA C Do) 5.00 m: SPT: 4.3/2.4.4.4	y clay. r chaik - chaik - - - - - - - - - -				
General Remark Borehole termi		at 5.45m bgl.	dimensions in metre g Scale 1:25	s Telephone: 012			

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	BRD				NFILTRATION RATE				
		In accordance with BRI; Digest 365-2016 - Spakaway Decign							
	Client: Project Title: Project No:	,		II.d					
	Trial Pit No:				Langth (m) : 2-10				
	Tast No: Dála:	1 17/0 <i>3/2070</i>			Depth (m) - 2.10 Width (m) - 0.60				
	Logged by:				Stroundweter (m tot) : Dry				
		from - tr	im hail	Querciption	· · · · · · · · · · · · · · · · · · ·				
ĺ		0.60	0.90	Brown, clayey, slightly sar	dy GRAVEL				
Ground	Conditions	0.90	2.10	Insured, orangish brown	to brown mottled reddish brown, stightly gravelly, si	RY CLAY.			
······		····		· ·					
Time	Water Depth			ن ^و بر م	kano Toet Data Olea				
[min]	(m bgi)			504	kage Test Data Plot				
0	0.800		a 197	ulus, s	and the adaptive of the				
7	D.1100				n weiter and the second s	e stranda - n			
3	0.800				same from (
4	0.800		n	tra con or		. 762 1050			
5	0.800		C (KI/I						
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ĸ	004.0								
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177 232	0,950	ing and and	- 500		P				
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352	1 120								
472	1.190		1000						
652 H37	1 250								
1012	1.360								
1192	1 410		1.500						
1497	1.470								
1792 2392	1.520								
2872	1.650		(m)						
						······			
Se	all Infiltration i	Rate (m/s):	ſ	$= \frac{V_{p75-25}}{a_{s50-s}} tp_{75-25}$					
	with:			ане у по из ка					
	$V_{\mu m} \equiv m$	as Effective S	lorage Voli	unia of water between 75%	and 25% effective storage depth $(m^{(\ell)})$	0.82			
	a ₁₅₀	as Internal Su	inface Area	of the sookage that on to	$_{2}$ 50% storage depth including the base area (m^{2}) .	4.77			
				vel to fall from 7554 to 2555.		2.5.0+05			
	Soil Infiltra	ition Rate	: [m/s] :	G.88E-07					
Nomerka:	Calculation of V	ed midle at com	rate based	on extrapolated results	- The train of the American States and the American States	W WARLOW & A. J. B			
						,			







4	BRD		SOIL INFILTRATION RATE									
	Ellent: Project Title: Project No:		e (Chilrein)	Lud								
	You Ph No:	¥603	T MY		Leogih (m	/:[1:00	· · · · · · · · · · · · · · · · · · ·					
	Tast No:	1 17/03/2020			Depth (m							
	Logged by.				Width (n) 0.60 Groundwater (m.bgi): Dry							
		troin - te	from to (in bal) Description									
Ground	Londitions	0.50	7.20		ottled reddish brown, gray covated on slightly sendy, "		unnul cabbing					
		2 20				·····						
Time	Water Depth						,					
[min]	[m bgl]			So.	akage test Dat	a Plot						
U L	1.400		• 50		Westwork a start	1.						
2	1.640				na nasale sto	Calculated Condition	Letter the contract of					
5 4	1 /60				Lines Arriva			. 1				
5	1 880		o nana	- 14		'n '	1.000 (M					
ů,	2 020											
Ĥ	2.120 2.200											
2	2.280		1.1.461									
10 17	2.360											
17	2.650	*										
		ta rate l'a ta	1.000									
		N.										
	'	ő	• 1.500 a									
		Ň	•									
			•									
			2 NOV 🖥									
			-									
			ě									
			2 500 P									
			1.000									
50 1	oli Intiltration I	tote (m/s}	ſ	$= \frac{V_{p75}}{a_{x50}} \frac{29}{e^{2}p_{r1}} + \frac{1}{29}$								
	with:											
	Kyon _ un	as Effective 1	Morega Volu	uma of water between 759	5 and 25% officitive store;	ze depth (m *)	0.74					
	AL	es internal Se	urinen Aren	of the soukage trial pit up	to 50% storage depth incl	luding the base area for	4.39					
				vel to fall from 75% to 25%			4.5.E+0Z					
	Soil Infiltra	ition Rati	e [m/s] :	3.72E-04								
Remarks:		-	LI									

4	BRD			SOIL INFILTRATION RATE In accordinge with BRI Digest 36%2016 - Soukeway Oesign	
		CALA Homes Chiswell Gre BR03604			
	Trial Oit No: Test No: Data: Logged by:	7 18/03/2020		Constit (n) 1 90 Depth (n) 2 70 Width (n) 2.00 Groundwater (n: byl) Drv	
Ground	Conditions	from - ro 0.50 2.20	(m hoi) 2.20 2.70	Description Liren, arangish Grown mattled roddish Brawn, gravally, sindy CLAY. Structureless CHALK, excavated as sindicity condy, alty GRAVEL with occasional collibles.	
Time /min/	Water Depih (m bai) 1 250			Soakage Test Data Plot	
L 7 3 4 5 7 8 9 10 12 14 16	1 430 1 540 1.640 1.760 1.970 2.070 2.130 2.770 2.300 2.410 2.520	letter and the		Set State Level of State (set	
			• •	• • • • • • • •	
S	oll inflitration with.		ſ	$= \frac{V_{p75+25}}{u_{s70+8}(p_{275+25})}$	
	V ₉₇₅ ₂₅ a ₁₅₉ (_{275 - 35} Soil Infiltr	as internal Si as Time for t ation Rat	urlace Ar o a be water lev © (m/s) :		
Kernarka:	· · · · · · · · · · · · · · · · · · ·				

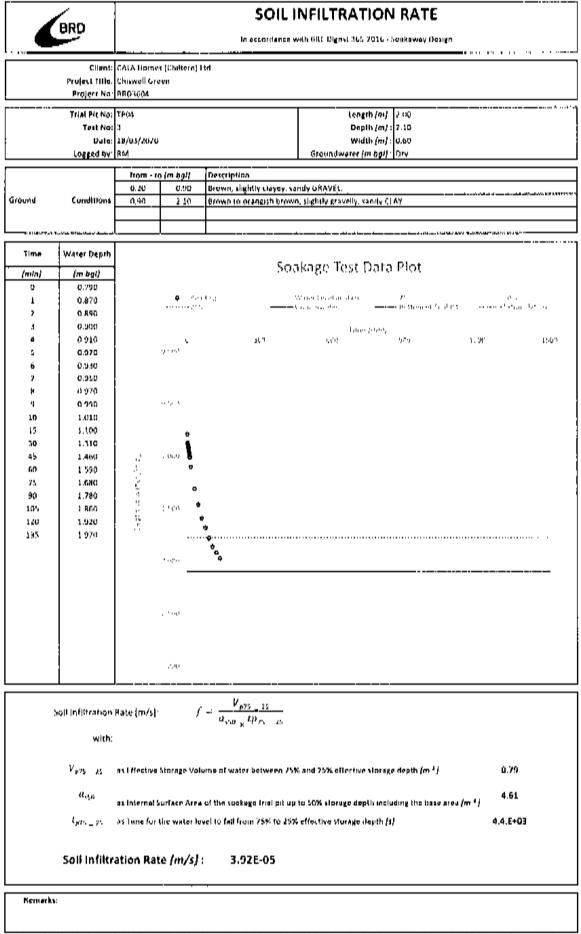
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4	BRD	SOIL INFILTRATION RATE							
		CALA Homes (Chil Chilwell Sceen BRD 1604	ultern) td.						
	Trial Pir No: Trial No: Date: Logged by:	18/03/2020	Length [m] : 1.90 Depth [m] : 2.70 Width [m] : 0.60 Groundwster [m Bp]] : Dry						
Ground	Conditions		bg// Description 2.70 Limit, or anglish brown moltied ruddish brown, gravelly, saridy CLAY. 2.70 Structureless CHARK, excavated as slightly sandy, silty GRAVEL with occarronal cobbles.						
Time (#No)	Water Depth (Arbyl)	. 1997	Soakage Test Data Plot						
0 1 3 4 5 6 7 8 9 10 12 14 16	1.280 1.440 1.550 1.640 1.750 1.850 2.500 2.120 2.280 2.410 2.540 2.640		E 105 objective from / B 105 objective / Decified Path De						
· • · • · · · · · · · · · · · ·		. 6.10	· · · · · · · · · · · · · · · · · · ·						
5	Soil (nhitration) ${ m with}:$		$f = \frac{V_{P^{25} = 25}}{a_{x50 = x}} p_{75 \leq 25}$ ge Volume of water between 75% and 25% effective storage depth [m f] 0.61						
	€ _{₽²⁶ - 25}		e Area of the Stakage Will pit up to 50% storage depth including the basis area (m *) 4.69 ater level to fail from 75% to 25% affective storage depth [s) 4.6.5+07 m/s] : 3.57E-04						
Nemarka	·,,-,-,,,		<u> </u>						

4	BRD				INFILTRAT	ION RATE	n	
	Project Title: Project No:			td.				
	Trial Pit No; Fest Na: Date, Logged by:	1 17/03/2020			Dept	h (m) : 2 00 h (m) : 2.10 h (m) : 0.60 h (gi) : 0:v	······	
			[m kg]]	Description				
Ground	Conditions	0,20	2 10	Brown slightly claycy, se Brown to orangesh brown		indy CIAY		
	Water Depth	[••••
[min]	[m byl]			Sor	nkage Jest D	Data Plot		
U 1 7	0.690 0.690 0.710		e 6.0		Weber fast fra Neud Versiantumb		e po Reference de la companya de la compa	ale heber
3 4 5	0.760 0.790 0.820		0 0701	a**	Luni Gra	fanal an t	12.0	1500
6 7 8 9	0.840 0.850 0.870 0.870		11100					
10 15 20 25 40	0.910 0.960 1.010 1.070 1.770		tioso 🏘					
55 70 85 100	1.340 1.490 1.530 1.500		ه ه ۱۹۹۹ و	۵ ٩				
135 130 145 260	1 670 1.770 1.770 3 810	.,	· 10.9	**************************************				
175 190 205	1.840 1.890 1.940		5 Mar					
			5 000					
5	oll infiltration with:	Kate (m/s):	ſ	$\simeq \frac{\mathcal{V}_{\mu\gamma_{2}\ldots,25}}{\mathcal{A}_{\mu\gamma_{2}\ldots\mu_{8}}}\mathcal{O}_{\gamma_{2}\ldots\mu_{5}}$				
	$\nu_{p^{p_{p}}=r}$	on tilluctivu	Storage Volu	une al water balwaen 757	% and 25% allective	storage depth (m *)	0.B	5
	Baran Kerin Lian			of the sonkage trial pit up vel to fall from 75% to 25%			ea (m *) 6.9.6-	
	Soil Infiltr	ation Rat	:e [m/s] :	2.51E-05				
Romatks								

....

6	BRD		SOIL INFILTRATION RATE								
		Chiawali Gre	c (Challern) I I								
	T-IAI Pit No: Tast No: Date: Logged by:	7 18/03/2020				Length (m) Depth (m) Width (m) Groundwatar (m bg))	. 2.10 0.60				
Ground	Conditions		2 /n bqi/ 0.70 2.10	Description Brown, slightly Brown to pran							
Time	Water Depth				Soa	kage Test Data	a Plot				
(min) 0 1 2	[m ±gl] 0.540 0.650 0.766		• 1994 • • • • • • • • • • • • • • • • • • •		v	Swette, son a at countervie	75 Teste ne v test Pa		u ' a t s		
3 4 5 0	0.800 0.820 0.840 0.860 0.860		0 .: (ref)	ĸ	JÖ	(מוניו) יחברו נישאי	านัย	1.80Î	1506		
я 9 10 14 19 34	0 890 0 910 0 470 1 030 1 710		1 700 1								
49 64 79 94 109	1.450 1.460 1.550 1.620 1.690		• • • •								
224 139 154 169	1.750 1.800 1.840 1.880		2006								
			1965								
			-010								
5	oil intification (with:	late (m/s) [.]	f :	$=\frac{V_{p75}}{a_{150}} \frac{1}{8} t p_7$	25 5 - 25						
		as Éffectivo S	torage Volur	ne of water bot	wron /576	and 25% effective slorag	u depth (m ¹ j	Ď.94			
						u 50% storage dupth inclu effective storage depth (s		(m *) 5.26 6.2.€+0	a		
	Soil Infiltra	tion Rate	c [m/s] ;	2.89E•	05						
Kemarke:											



BRD		SOIL INFILTRATION RATE					
	Client:	CALA Home	s (Claltern) U	J			
	Project Dile:		en				
	Project Na: BRD J604						
	Trial Fit No:				Length [m]		
	Test No:	1 17/01/2020			Depth (m) :		
	Logged by:				Width (m) : Groundwater (m bgi) :		
			1				
Ground	Conditions	<u>from - to</u> 0.70	2 00	Destription Grangish brown to brown, s	hghtly gravelly, ony CrAY	,	
							,
Time	Wale: Depth			rl.		al	
(mia)	(m t(pi)		Soakage Test Data Plot				
0 1	0,160 0.160		o Bar		en Kessen at intalli	16	ant -
2	0 160					Lemma but s	Constant Service
ā	D.160				(unit jame)		
4	0.160		17	602 (1D 954	the two	1960 2003 2000	2200 1000
5	0 160		0000				
6 7	0.160						
5	0.160						
9	0.160						
10	0.160		-				
17	0.160	2	4 N.A. 🔶				
37	0.160	/-	٦,				
47	0.490	in the second se	•				
62 77	0.580			•			
92	0.630	N.		0			
177	0.680	1:	1.500	° •			
182	0.750						
302	0,830	••					•
482	0.700						
667	0.950 0.950						
947 1142	1.020		1.51.2				
1442	1 050						
1742	1 070						
2042	1 090						
2342	1 100						
2627	1.120		/mo				
S	Sil Infiltration with	Rate [m/s]:	,	$\frac{V_{I}}{\alpha_{22}} = \frac{1}{2}$			
	$\nu_{\mu \pi \pi_{\mu} \mu \pi}$	as i ffoctive '	ilorage Volu	ne of water between 75% ar	nd 25% offective storege	depth (m * j	1.1Û
	8 ₁₅₀	as loternal 5	arlace Area c	f the testage trial pill up to !	50% storage dapih includ	ing the base area (m ¹)	5.98
	$t_{pT^{*}} \equiv r_{1}$	as Time for t	he water leve	r) to fell from 75% to 25% eff	fective storage depth [s]		4.6.E+05
	Soil Infiltra	ation Rati	e [m/s] :	3.99E-08			
Remarks:	Remarks: Calculation of soll infilmation rate based on extrapolated results.						

BRD	SOIL INFILTRATION RATE In incordance with BRC Organit 205(2016 - Soukaway Oreign			
Project 71ti	: CALA Romes (Chiltern) Ltd. : Chiwell Green : BRD3604			
frial Pil N Test N Dat Logged b	2 Depth (m) - 2.00 19/03/2020 Wildth (m) - 0.60			
Ground Candilion	frèm - to (m byl) Description 0 20 2.00 Orangish brown in brown, slightly gravelly, uity CLAY			
Thine Water Dept	Soakage Test Data Plot			
[min] [m bgl] 0 0 140 1 0.130 2 0.400 1 0.130 2 0.400 1 0.170 4 0.170 4 0.170 5 0.200 6 0.210 7 0.230 4 0.740 5 0.200 4 0.740 5 0.300 4 0.740 5 0.300 45 0.500 45 0.500 45 0.500 45 0.700 165 0.770 225 0.860 405 0.500 585 0.920 585 0.920 585 0.920 585 0.920 585 0.920 585 0.920 5925 1.400 1975 1.420 <td> Boarbay, Martineed of Sect. 2011. Provide a section of the interview of the interv</td>	 Boarbay, Martineed of Sect. 2011. Provide a section of the interview of the interv			
Soil infiltrations $V_{\mu\nu_{\mu}} = r_{\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$ $u_{\mu\mu}$	$a_{110} = cp_{75} + c_{25}$			

.....

BRD

Groundwater Monitoring Record

Forge End, Chiswell Green	CALA Homes (Chilters) Eld.		
Forge End, C	CALA Homes	BRD3604	
Project:	Client:	Project No: BRD3604	

• •••,• •,• • •	····	
	Commercia	
	Post purge groundwater level below top of stancpipe (m)	ANN ANN ANN ANN
	Amount pur ge d {}	NVA NVA NVA NVA
	Groundwater level below top of standpipe (m)	£666
	Groundwater level below ground surface (m)	
	Oty free product defected (mm)	• • • •
	Borehole depth {m)	3.83 4.12 4.04 2.78 2.78
, (Chičera) Eto	Monitoređ by (initials)	RM RM RM RM
CALA Homes (Chiftern) Eld. BRD3604	Date	24/03/2020 24/03/2020 24/03/2020 24/03/2020 24/03/2020
Client: CALA Hor Project No: BRD3604	Borefxole name	ws02 ws04 ws07 ws10



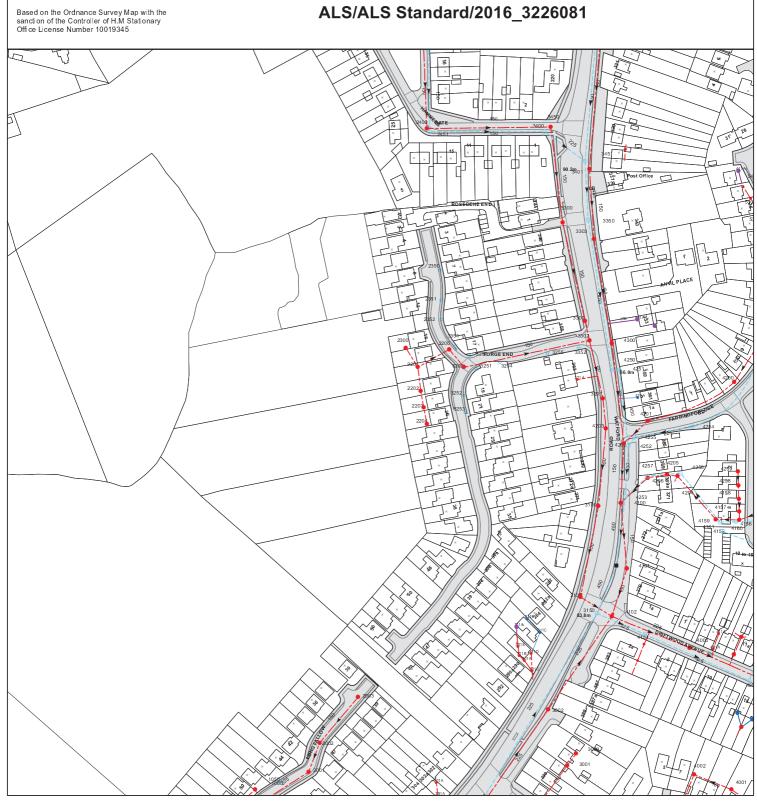
Appendix F

Thames Water Records



Meters 40 80

Scale:	1:6447	Comments:
Width:	1801m	
Printed By:	VBALAKRI	
Print Date:	06/01/2016	
Map Centre:	513098,204281	
Grid Reference:	TL1304SW	



0 10 20 40 60 80

Scale:	1:1789	Comments:
Width:	500m	
Printed By:	VBALAKRI	
Print Date:	06/01/2016	
Map Centre:	513250,204250	
Grid Reference:	TL1304SW	

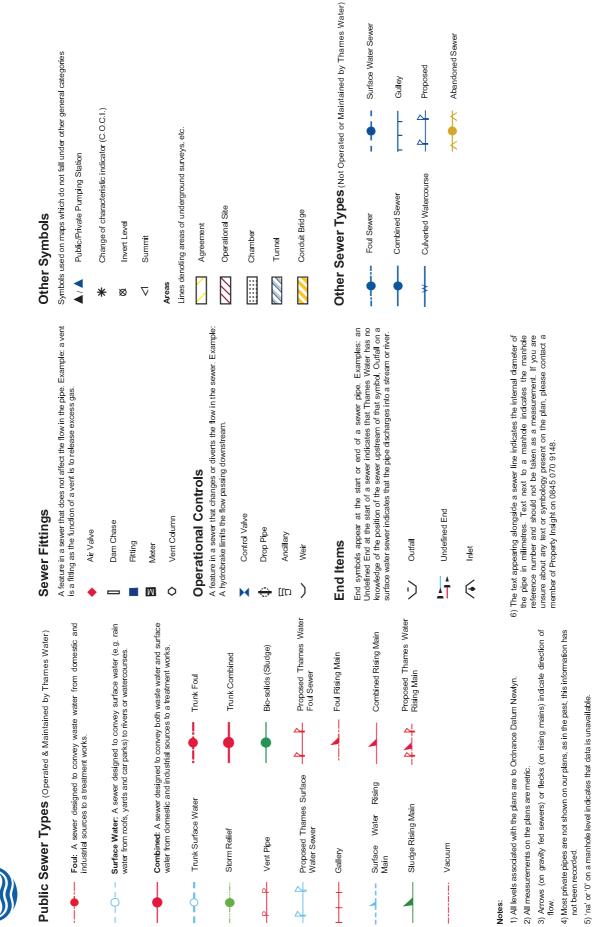
ALS/ALS Standard/2016_3226081

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
4050	83.17	80.91
401A		
411A		
4202	85.45	83.73
4101	83.98	82.38
4255	85.67	84.56
421A		
4201	86.05	84.78
431B		
4204	86.04	83.64
4254	87.15	85.74
4161		
4200	88.5	87
4259		
4158		
4157		
4002	85.86	84.8
3000	85.26	84.5
301C		
301A		
301 D		
301 E		
4151	83.23	81.31
311A		
4102	83.61	80.76
3101	84.18	81.18
3300	89.49	88.12
4401	90.24	89.5
441A		
3451	91.24	89.53
2451	93.25	91.95
2400	93.36	91.21
2450	95.19	94.13
2201	87.77	86.07
2203	87.04	86.2
2350	89.59	88.47
2352	88.49	87.15
3351	87.81	86.38
3200	87.35	85.93
3250	87.49	86.11
3254	87.18	85.73
321A		
3301	87.27	85.97
3100	84.82	83.22
4203	85.58	84.19
4300	86.76	84.81
4001		
40BB		
1000	85.55	83.79
2001	85.75	83.79
2003	85.45	84.15

REFERENCE	COVER LEVEL	INVERT LEVEL
4051		
4162		
4100	84.8	83.1
4253	84.89	83.49
4252	85.67	84.03
431A		
4206	85.43	83.46
4257	85.44	83.76
4205	85.51	83.6
4256	86	84.02
4159		
4152	85.34	83.49
4160		
4258		
4156		
201A		
3001	85.49	84.34
3002		
401B		
301B		
4000	83	80.68
411B		
311C		
311B		
3150	83.95	82.05
3303	88.92	87.6
3350	89.21	87.91
4400	90.63	90
3401	91.13	89.82
441B		
3450	92.26	91.02
3400	92.16	90.12
2300		
2202	87.26	86.23
2204	86.88	86.26
2351	88.93	88.06
2200	87.75	86
3252	86.98	85.52
3253	86.48	85.13
3251	87.31	85.59
3255	86.94	85.53
3352	86.84	85.64
3302	86.71	85.59
3201	85.91	84.5
4250	86.29	84.81
4251	86.57	84.77
40BC		
40BA		
1050	85.69	84.44
2002	85.81	83.94

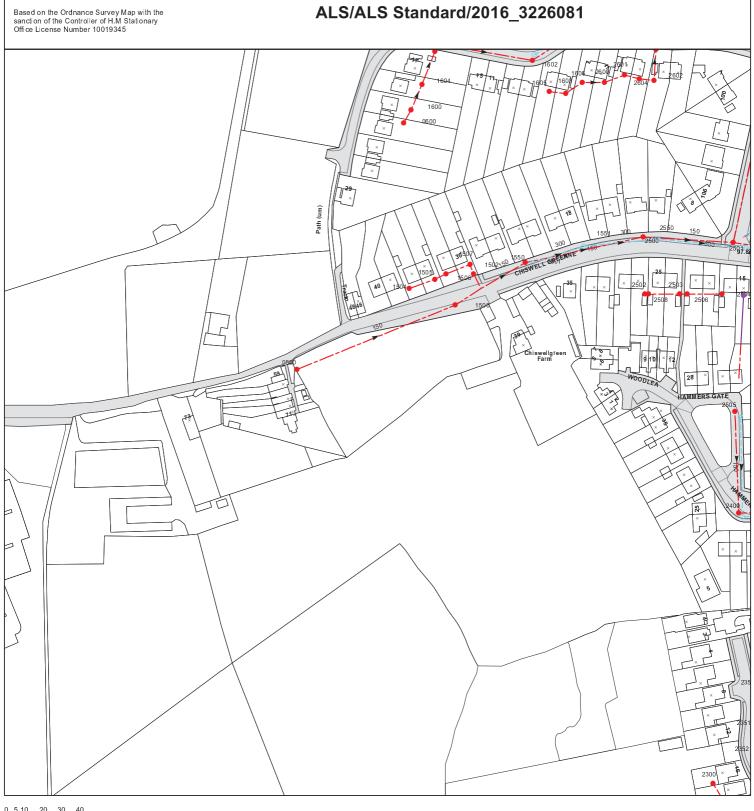
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified before any works are undertaken. Crown copyright Reserved



ALS Sewer Map Key

Thames Water <u>Thames Water Utilities Ltd</u>. Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T 0845 070 9148 E <u>searches@thameswater co uk</u> I <u>www thameswater-propertysearches co uk</u>

Page 6 of 9



^{0 5 10 20 30 40} Meters

Scale:	1:1451	Comments:
Width:	405m	
Printed By:	jgrosvenor	
Print Date:	12/01/2016	
Map Centre:	513085,204496	
Grid Reference:	TL1304SW	

ALS/ALS Standard/2016_3226081

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
2551	97.98	96.44
2550	99.72	98.27
2602	102.4	101.83
2400	93.36	91.21
2505	95.11	93.72
2504	97.56	96.66
2503	98.33	97.38
2508	98.71	97.83
0600		
1600	103.64	102.59
1505	101.72	100.27
1506	101.71	100.16
1507	101.64	99.94
1501	100.98	97.98
1550	100.71	99.41
1605	103.08	102.45
1606	102.8	102.2
2600	102.85	102
2604	102.71	101.89
0500	101.73	99.91

REFERENCE	COVER LEVEL	INVERT LEVEL
2501	98.09	96.39
2552	98.35	96.75
2451	93.25	91.95
2450	95.19	94.13
251A		
2502	98.77	97.87
2506	98.15	97.25
2300		
1504	101.73	100.48
1604	103.88	102.43
1601	104.13	102.32
1500	100.91	98.66
1502	101.38	99.71
1602	103.44	101.93
1650	103.46	101.96
1603	102.93	102.33
1551	100.49	98.99
2601		
2500	99.78	97.03

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified before any works are undertaken. Crown copyright Reserved



Appendix G

Site Proposals

LAND SOUTH OF HISWELL GREEN LANE ST ALBANS

APRIL 2022

Existing Woodland

FLOOD RISK ASSESSMENT AND



OUTLINE PLANNING APPLICATION





Pedestrian Access