

Appendix 13.3

Ground Gas Risk Assessment

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Ground Gas Risk Assessment

at

Land east of Westergate, Chichester, West Sussex PO20 3RD

for

CALA Homes

Reference: 19522/GGRA/Rev1.0

June 2022

Control Document

Project

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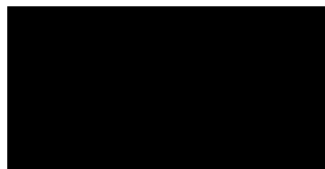
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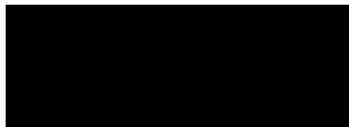
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Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.



Commission

Soils Limited was commissioned by CALA Homes to undertake a Ground Gas Risk Assessment on land at Land east of Westergate, Chichester, West Sussex PO20 3RD. The scope of the investigation was outlined in the Soils Limited quotation reference Q24788, dated 9th June 2021.

This document comprises the Ground Gas Risk Assessment (GGRA) and incorporates the results, discussion, and conclusions to this intrusive works.

This GGRA must be read in conjunction with:

- Preliminary Investigation Report (PIR) undertaken by Soils Limited, Report ref: 19522/PIR, dated September 2021
- Main Investigation Report (MIR) undertaken by Soils Limited, Report ref: 19522/MIR, dated September 2021

It is understood that CALA Homes is able to place full reliance on the above referenced reports which serve to inform the ground model upon which the discussions, conclusions and recommendations of this risk assessment are based.

Limitations and Disclaimers

This Ground Gas Risk Assessment relates to the site located at Land east of Westergate, Chichester, West Sussex PO20 3RD and was prepared for the sole benefit of CALA Homes (The "Client"). The report was prepared solely for the brief described in Section 1.1 of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in Quotation Q24788, dated 9th June 2021 accepted by the client in their Purchase Order Q24788, dated 8th July 2021.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

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The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

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If the term “competent person” is used in this report or any Soils Limited document, it means an engineering geologist or civil engineer with a minimum of three years post graduate experience in the understanding and application of the appropriate codes of practice.

Within the report reference to ground level relates to the site level at the time of the investigation, unless otherwise stated.

Exploratory hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sample borehole implies the specific technique used to produce an exploratory hole.

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All works are undertaken in the context of, and in compliance with, BS8485:2015+A1 2019 and LCRM (EA 2021) and all other pertinent planning, standards, documentation and guidance appropriate to the site at the time of production which may include, but are not necessarily limited to, documents provided by BS/CEN/ISO, NHBC, AGS, CIEH, CIRIA, SoBRA and CLAIRE.

The investigation, analysis or recommendations in respect of contamination are made solely in respect of the prevention of harm to vulnerable receptors, using where possible best practice at the date of preparation of the report. The investigation and report do not address, define or make recommendations in respect of environmental liabilities. A separate environmental audit and liaison with statutory authorities is required to address these issues.

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Section I Introduction

I.1 Objective of Investigation

Soils Limited was commissioned by CALA Homes to undertake a Ground Gas Risk Assessment to supply the client and their designers with information regarding the Ground Gas conditions prevalent on the site, to assist in informing the design of Ground Gas protection measures, where required.

The investigation was to be undertaken to understand the ground conditions and to quantify the Ground Gas conditions present on site in line with current guidance. The investigation was to be made by means of borehole well installations with subsequent monitoring visits over time to measure the insitu Ground Gas concentrations and flow rate.

Full reliance has been placed on the previously completed reports and investigations which have contributed to the forming of the ground model. These include;

- Preliminary Investigation Report (PIR) undertaken by Soils Limited, Report ref: 19522/PIR, dated September 2021.
- Main Investigation Report (MIR) undertaken by Soils Limited, Report ref: 19522/MIR, dated September 2021.

I.2 Location

The site was located at Land east of Westergate, Chichester, West Sussex PO20 3RD and had an approximate O.S Land Ranger Grid Reference of SU 94104 04798.

The site location plan is given in Figure 1.

I.3 Site Description

The site comprised agricultural fields and grassland with no structures noted within the site boundary. The site was covered with a variety of vegetation including mature trees along line field boundaries, the open areas being completely overgrown in some areas with ruderal growth. The field to the southwest of the site was cropped and occasional dirt tracks were noted running across the site.

The site was generally undulating with dips of <5° towards the water courses running approximately west to east through the centre of the site, and north to south along the eastern boundary. The slope of the wider aspect was down to the southeast and east.

The surrounding area comprised residential with gardens to the north and west, and agricultural fields to the south and east.

An aerial photograph of the site and its close environs has been included in Figure 2.

1.4 Proposed Development

The proposal comprised redevelopment of the site from farmland to housing with gardens and areas of open recreational space. At time of writing only a speculative plan has been provided for the development and this report must be reviewed and revised in relation to actual site-specific proposals if it is to be presented as evidence in pursuit of a planning application. All conclusions and findings in this report will therefore be essentially generic in nature and should be viewed in this light.

In compiling this report reliance was placed on drawing number 00163_CALA_CN_01, dated October 2020 and was prepared by the client. The recommendations provided within this report are made exclusively in relation to the scheme outlined above and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

Development plans provided by the client are presented in Appendix C.

1.5 Anticipated Geology

The 1:50,000 BGS map showed the site to be located upon bedrock of the London Clay Formation with various overlying superficial deposits recorded across the site area, as described below.

The site had a water course running through its centre from west to east, feeding into another water course which ran north to south along the eastern site boundary. Alluvium was recorded adjacent to both water courses, with Raised Beach Deposits evident to the central northwest. To the north of these deposits Head was noted and to the south, River Terrace Deposits are also present. Made Ground was noted on the south eastern boundary as a Railway embankment

1.5.1 Made Ground

Made Ground comprises material that has been placed by man or spread by man. It can comprise demolition material from former structures on the site or imported material placed to raise levels. Its composition can be very variable both laterally and with depth and may contain putrescible matter and voids.

1.5.2 Alluvium

Alluvium is the most recent river or estuarine deposit and generally comprises silty clays usually with an appreciable organic content. Lenses of sand and gravel are also commonly found, as are pockets of peat.

The BSI Code of Practice for Foundations, BS8004: 1986, Clause 2.2.2.3.4 Peat and organic soils, includes the caveat that 'all these soils are highly compressible, and even lightly loaded foundations will be subject to considerable settlements over a long period if placed on them. For this reason, these soils are not suitable for carrying the loads for important structures'.

1.5.3 Head

Head deposit are drifts produced by solifluxion, the downslope movement of debris outwash during the periglacial period, and characteristically comprise poorly sorted sands gravels and chalk of local derivation.

1.5.4 Raised Beach Deposits

Raised Beach Deposits consist of shingle, sand, silt and clay. Beach deposits may be in the form of dunes, sheets or banks, now above the level of the present shoreline as a result of earth movement or a general fall in sea level.

1.5.5 River Terrace Deposits

The rivers Test and Itchen have deposited extensive spreads of River Terrace Deposits in the Southampton area, representative of ancient floodplains. In total, eleven terraces have been recorded. The River Terrace Deposits consist predominantly of gravels made up of subangular to subrounded flints with a significant sand component locally with lenses of silt, clay or peat.

The five highest terraces have appreciable clay content. Poorly sorted, clayey and sandy silts and silty clays overlie the 1st, 3rd, 5th and 6th terraces and locally at above terrace gravels.

1.5.6 London Clay Formation

The London Clay Formation in the Hampshire region comprises silty and sandy clay, clayey and sandy silt, silty sand; sporadic claystones and thin beds of flint pebbles. The formation includes the Bognor Sand, Whitecliff Sand, Durley Sand, Portsmouth Sand and Nursling Sand Members. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the London Clay Formation rests on the Lambeth Group.

Section 2**Site Works****2.1 Intrusive Site Works**

The intrusive project site works were designed to provide information on the ground conditions for the proposed residential development. The intended investigation, as outlined within the Soils Limited quotation (Q24788, dated 9th June 2021) and subsequently documented within Soils Limited report ref: 19522/MIR, dated September 2021, comprised the following items:

- Service clearance via GPR/EMF
- 28No. windowless sampler boreholes (WS01 to WS28)
- 28No. dynamic probe (DPSH) (DP01 to DP28)
- Installation of 9No. combined soil gas and groundwater monitoring wells
- 30No. in-situ CBR tests using TRL DCP probe (DCP01 to DCP30)
- Geotechnical laboratory testing
- Contamination laboratory testing
- 6No. winter groundwater monitoring visits.

Nine windowless sampler boreholes (WS01, WS06, WS09, WS12, WS16, WS17, WS19, WS23, WS28) were backfilled with gravel and bentonite following the installation of monitoring wells. The remaining boreholes were backfilled with gravel.

All exploratory hole locations have been presented in Figure 3 and Figure 4.

Following completion of site works, soil cores were logged and sub-sampled so that samples could be sent to the laboratory for both contamination and geotechnical testing.

2.2 Ground Gas Monitoring Well Installations

On dates between 14th and 20th July 2021 a single standpipe was installed in each of 9No. window sample borehole locations (WS01, WS06, WS09, WS12, WS16, WS17, WS19, WS23, WS28). The wells were installed to facilitate the ongoing monitoring of groundwater levels, Ground Gas concentrations and flow rates.

Full details of the monitoring well installations are presented within Appendix B.1 and a summary of the well installations is presented in Table 3.1.

Table 2.1 Summary of Well Installations

Item	WS01, WS06, WS09, WS12, WS16, WS17, WS19, WS23	WS28
Cover type	Standard tamper proof flush cover	
Head works	Gas tap with cone gas valve	

Item	WS01, WS06, WS09, WS12, WS16, S17, WS19, WS23	WS28
Pipe Work	33m OD HDPE Plain pipe for 0.00 to 1.00m then slotted to borehole base (2.50m to 5.00m bgl). Slotted section includes 12.1% 3mm slots with a solid end cap at base.	33m OD HDPE Plain pipe for 0.00 to 0.50m then slotted to borehole base (1.00m bgl). Slotted section includes 12.1% 3mm slots with a solid end cap at base.
Top seal	0.05 to 1.00m bgl (bentonite pellets)	0.05 to 0.50m bgl (bentonite pellets)
Filter pack	1.00 to base 3-5mm washed gravel.	0.50 to 1.00m bgl 3-5mm washed gravel.

Note(s): The depths given in this table are taken from the ground level on-site at the time of investigation.

Section 3 Ground Model

3.1 Ground Conditions

On dates between 14th and 20th July 2021 28no. windowless sampler boreholes (WS01 to WS28) were drilled, using a Premier Compact 110 rig and Dando Terrier rig, to depths ranging between 1.00m and 5.00m below ground level (bgl) at locations selected by Soils Limited using a development plan provided by the client.

A single standpipe was installed in 9No. window sample borehole locations (WS01, WS06, WS09, WS12, WS16, WS17, WS19, WS23, WS28) to allow for continued monitoring of both groundwater and soils gas, where present.

The maximum depths of exploratory holes have been included in Table 3.1.

All exploratory holes were scanned with a Cable Avoidance Tool (C.A.T.) and GENNY prior to excavation to ensure the health and safety of the operatives.

Table 3.1 Final Depth of Exploratory Holes

Trial Hole	Depth (m bgl)	Trial Hole	Depth (m bgl)	Trial Hole	Depth (m bgl)
WS01 (w)	5.00	WS11	4.00	WS21	2.60
WS02	4.00	WS12 (w)	3.60	WS22	2.00
WS03	1.00	WS13	2.70	WS23 (w)	2.50
WS04	3.00	WS14	4.00	WS24	4.00
WS05	2.40	WS15	4.00	WS25	2.50
WS06 (w)	4.00	WS16 (w)	3.65	WS26	2.20
WS07	3.00	WS17 (w)	4.00	WS27	2.40
WS08	3.00	WS18	4.00	WS28 (w)	1.00
WS09 (w)	2.50	WS19 (w)	3.00	-	
WS10	4.00	WS20	2.00	-	

Note: w - well installation

The soil conditions encountered were recorded and soil sampling commensurate with the purposes of the investigation was carried out. The depths given on the exploratory hole logs and quoted in this report were measured from ground level.

The soils encountered from immediately below ground surface have been described in the following manner. Where the soil incorporated an organic content such as either decomposing leaf litter or roots or has been identified as part of the in-situ weathering profile, it has been described as Topsoil both on the logs and within this report. Where man has clearly either placed the soil, or the composition altered, with greater than an estimated 5% of a non-natural constituent, it has been referred to as Made Ground both on the log and within this report.

For more complete information about the soils encountered within the general area of the site reference must be made to the detailed records given within Appendix B, but for the

purposes of discussion, the succession of conditions encountered in the exploratory holes in descending order can be summarised as:

Made Ground/Topsoil (MG/TS)
Alluvium (ALV)
Head (HEAD)
River Terrace Deposits (RTD)
London Clay Formation (LC)

The ground conditions encountered in the trial holes are summarised in Table 3.2.

Table 3.2 Ground Conditions

Strata	Epoch	Depth Encountered (m bgl)		Typical Thickness (m)	Typical Description
		Top	Bottom		
MG/TS	Anthropocene	G.L.	0.12-0.60	0.30	MG: Soft grey and orangish brown slightly clayey slightly sandy SILT with occasional rootlets. Locally with rare angular to sub-angular fine gravel. TS: Soft dark grey and brown silty CLAY with occasional rootlets. Locally with rare angular to sub-angular fine gravel.
ALV	Holocene	0.30-0.60	1.00 ¹ -2.60 (2.00) ³	1.50 (where proven) ²	Soft grey and orangish brown slightly sandy CLAY. Locally with pockets of fine to coarse sand, occasional gravel and black discolouration.
HEAD	Holocene	0.12-0.50	1.00 ¹ -4.00 ¹ (4.10) ³	2.20 (where proven) ²	Firm brown gravelly CLAY / clayey sandy GRAVEL with fine roots and rootlets. Locally silty and with pockets of sand. Gravel is angular to sub-angular fine to coarse flint.
RTD	Holocene	0.25-2.50	1.00-4.70 (4.90) ³	2.50 (where proven) ²	Orangish brown fine to coarse slightly gravelly SAND, locally sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint.
LC	Eocene	1.00-4.70	1.90 ¹ -5.00 ¹ (6.00) ³	Not proven	Firm dark grey silty CLAY with rare shell fragments and rare fine selenite crystals.
Note: ¹ Final depth of trial hole. ² Base of strata not encountered. ³ Inferred from the dynamic probes					

The superficial geology is complex and varies across the site area. Further details are included in the Main Investigation Report (MIR) undertaken by Soils Limited (Report ref: 19522/MIR, dated September 2021).

3.2 Groundwater

Groundwater was encountered within ten of the twenty-eight trial holes. The details are included in Table 3.3.

Table 3.3 Groundwater Monitoring During Site Works

Trial Hole	Depth to Water (m bgl)		Notes
	Strike	After Standing 20mins	
WS01	2.00	1.70	-
WS02	1.10	0.76	-
WS04	2.00	0.76	-
WS05	2.00	1.76	-
WS06	2.00	1.70	-
WS12	2.00	1.70	-
WS13	1.10	0.76	-
WS17	1.20	1.42	Seepage only.
WS19	2.00	1.55	-
WS21	1.10	1.10	No rise observed.

Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was conducted in July (2021), when groundwater levels should be falling towards their annual minimum (lowest) elevation, which typically occurs around September. The annual maximum (highest) elevation typically occurs around March.

Groundwater has been recorded in ten boreholes at depths varying between 0.76m and 1.70m bgl for short-term settled levels. Given the site has two water courses running through and alongside it and is situated between ~5m and ~10m AOD, shallow groundwater would be anticipated, particularly in the east of the site where the site lies directly adjacent to a water course and is lower. It is noted that the areas immediately adjacent to the water courses, through the centre of the site and along the eastern edge, comprise a flood zone with no residential development proposed in these areas.

Further groundwater monitoring for the winter (rising) period has now been undertaken, which should account for the worst-case groundwater levels. Groundwater levels are likely to have a significant impact on the proposed development and the recommendations made in the Main Investigation Report (MIR) undertaken by Soils Limited (Report ref: 19522/MIR, dated September 2021), must be reviewed accordingly.

Section 4 Ground Gas Monitoring

4.1 Conceptual Site Model

The Preliminary Investigation Report did not identify any potential sources of gas on or around the site. However, the investigation recorded soils with organic content as high as 13%, and Alluvium was present over significant parts of the site, particularly along the eastern side. Whilst the risk was considered low, this material does pose a possible soil gas risk to the site and precautionary gas monitoring was recommended in conjunction with the winter groundwater monitoring works.

An excerpt from the revised conceptual site model included within 19522/MIR, dated September 2021, as presented within Table 4.1.

Table 4.1 Preliminary Conceptual Site Model

Potential source (Ground Gas)	Pathway	Receptor	Risk ¹
Alluvium	Migration of gases through the permeable superficial deposits	End User Site Worker	Low
Note(s): ¹ = Risk is a function of probability and severity as defined fully within Soils Limited 19552/PIR, dated September 2021.			

4.2 Methodology

The gas monitoring regime was designed in accordance with the principals of CIRIA:C665:2007 and BS:8576:2013 to allow the resultant data to be considered in the context of potential protective options in accordance with BS:8485+A1:2019.

The gas hazard was assessed as being low and the proposed end use, residential houses, was assessed as being high (see CIRIA C665 Table 4.2 and Table 5.5a) and therefore a borehole spacing of 25 – 50m was considered appropriate.

The location, spread and individual response zones of the well installations were designed to target the identified potential sources and pathways, in accordance with BS:8576 and the initial CSM.

The monitoring frequency and period were designed in accordance with CIRIA C665 Table 5.5a and Table 5.5b based on the classification of the potential source and of the sensitivity of the receptor. A total of six monitoring visits were proposed at monthly intervals, over a period of six months to give the best chance of capturing the “worst case” scenario whereby the general atmospheric conditions are low and falling pressure.

The initial monitoring visit was conducted a minimum of seven days after construction of the borehole to allow for the gas within the well to reach equilibrium.

4.3 Equipment used

The well installations were monitored using a Gas Data GFM 435 (serial number 11555) equipped with flow meter, methane, LEL, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide sensors.

The gas meter is calibrated and serviced on an annual basis with certification available on request. Details of the gas meter used on each visit has been recorded on the raw data included within Appendix B.2.

4.4 Ground Gas Monitoring Results

Ground Gas measurements were taken of methane, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide as well as flow rates, ambient pressure, differential pressure and groundwater level, where possible.

However, due to the shallow groundwater encountered across much of the site, monitoring through the winter months was largely impractical to avoid compromising the equipment. Limited monitoring data was retrieved during the first and second programmed visits but due to water being drawn into the gas meter, further attempts were aborted due to the consistently high groundwater table.

Where undertaken, ambient pressure was recorded at each location prior to connecting the gas meter to the well installation. Once connected to the borehole the tap was opened and a flow reading was taken, once a steady flow reading had been recorded peak and steady Ground Gas readings were taken.

A summary of the gas monitoring results collected is presented in Table 4.2. Full groundwater data has been presented separately in Table 4.3.

Further discussion on the findings and groundwater issues is presented in Section 5.

Table 4.2 Ground Gas Monitoring Results

Date (Baro Trend)	Exploratory Hole	CH ₄ (%/v)	CO ₂ (%/v)	O ₂ (%/v)	H ₂ S (ppm)	CO (ppm)	LEL (%)	sp (mb)	Flow (lit)	Dp	H ₂ O (m hg)
26/10/21 (Rising)	WS01	<0.1	0.3	20.8	<1	<1	<2	1010	<0.1	<1	1.31
	WS09	<0.1	0.2	20.7	<1	<1	<2	1010	<0.1	<1	0.92
	WS12	<0.1	<0.1	21.1	<1	<1	<2	1010	<0.1	<1	1.41
	WS16	<0.1	0.2	20.7	<1	<1	<2	1010	<0.1	<1	0.61
	WS17	<0.1	0.2	21.1	<1	<1	<2	1010	<0.1	<1	0.53
	WS19	<0.1	1.1	20.0	<1	<1	<2	1010	<0.1	<1	1.21
17/11/21 (Rising)	WS17	<0.1	<0.1	20.9	<1	<1	<2	1025	0.3	1	0.63
<i>Minimum</i>		<0.1	<0.1	20.0	<1	<1	<2	1010	<0.1	<1	1.41
<i>Maximum</i>		<0.1	1.1	21.1	<1	<1	<2	1025	0.3	1	0.53

Note: Published barometric pressure trend data were obtained for each monitoring visit (data from weatheronline.co.uk).

Table 4.3 Groundwater Records

Exploratory Hole	Well Depth (m bgf)	Date					
		26/10/21	17/11/21	16/12/21	12/01/22	17/02/22	11/03/22
WS01	5.00	1.31	1.58	1.32	0.87	1.22	1.27
WS06	4.00	0.01	GL	GL	GL	GL	GL
WS09	2.50	0.92	1.09	0.65	GL	GL	0.45
WS12	3.60	1.41	1.48	1.38	1.25	1.28	1.42
WS16	3.65	0.61	0.64	0.60	GL	0.27	GL
WS17	4.00	0.53	0.63	0.53	0.22	0.30	GL
WS19	3.00	1.21	1.40	1.24	1.17	1.16	0.45

Note: Installs in WS23 and WS28 could not be located. GL = Ground level

Section 5 Summary and Conclusions

5.1 General

As noted previously, the site is situated between ~5m and ~10m AOD, with shallow groundwater recorded throughout the winter monitoring period and within each of the boreholes at depths ranging between ground level (or above), and 1.58m bgl. As such, gas monitoring was impractical during most of this period.

The Preliminary Investigation Report did not identify any potential sources of gas on or around the site, although the previous investigation recorded soils with organic content as high as 13%, and Alluvium was confirmed over significant parts of the site, particularly along the eastern side. This was considered a source of low risk and precautionary gas monitoring was advised in conjunction with the winter groundwater monitoring.

However, given the strata was generally waterlogged it cannot have any significant potential to generate gas, as all degradational activity will be anaerobic by default. In addition, most gas is not soluble.

5.2 Summary of Results

Ground gas data was recorded within some boreholes during the first and second monitoring visits, as highlighted above. The highest concentration of carbon dioxide recorded was 1.1% and methane was recorded below the instrument detection limit (0.1%). Maximum flow was noted to be 0.3l/hr. In addition, there was no indication of trace gasses that would usually be associated with active gas generation and/or migration.

Whilst limited, in a precautionary context these results (and the elevated water table significantly restricting potential generation) do not indicate any elevated concentrations that would be of concern in the context of BS 8485:2015+A1:2019 and / or suggest that anything other than a Characteristic Situation 1 (CS1), where no gas protection measures are deemed necessary, would be appropriate and reasonable for the site.

5.3 Conclusions

Based on the nature of the sources identified both on-site and in the updated CSM, the high groundwater table and the limited monitoring data recorded, the residual risk from ground gases at the site is now deemed to be very low to negligible and no further works are deemed necessary on the basis of this limited precautionary monitoring.

However, if an actual risk is considered present, it may be necessary to undertake further confirmatory monitoring during summer months i.e. at such times as groundwater levels are anticipated to be falling and the Alluvium may not be as waterlogged. Visits should also ideally be targeted towards capturing low and falling pressure events, where possible, for full compliance with current guidance (CIRIA 665).

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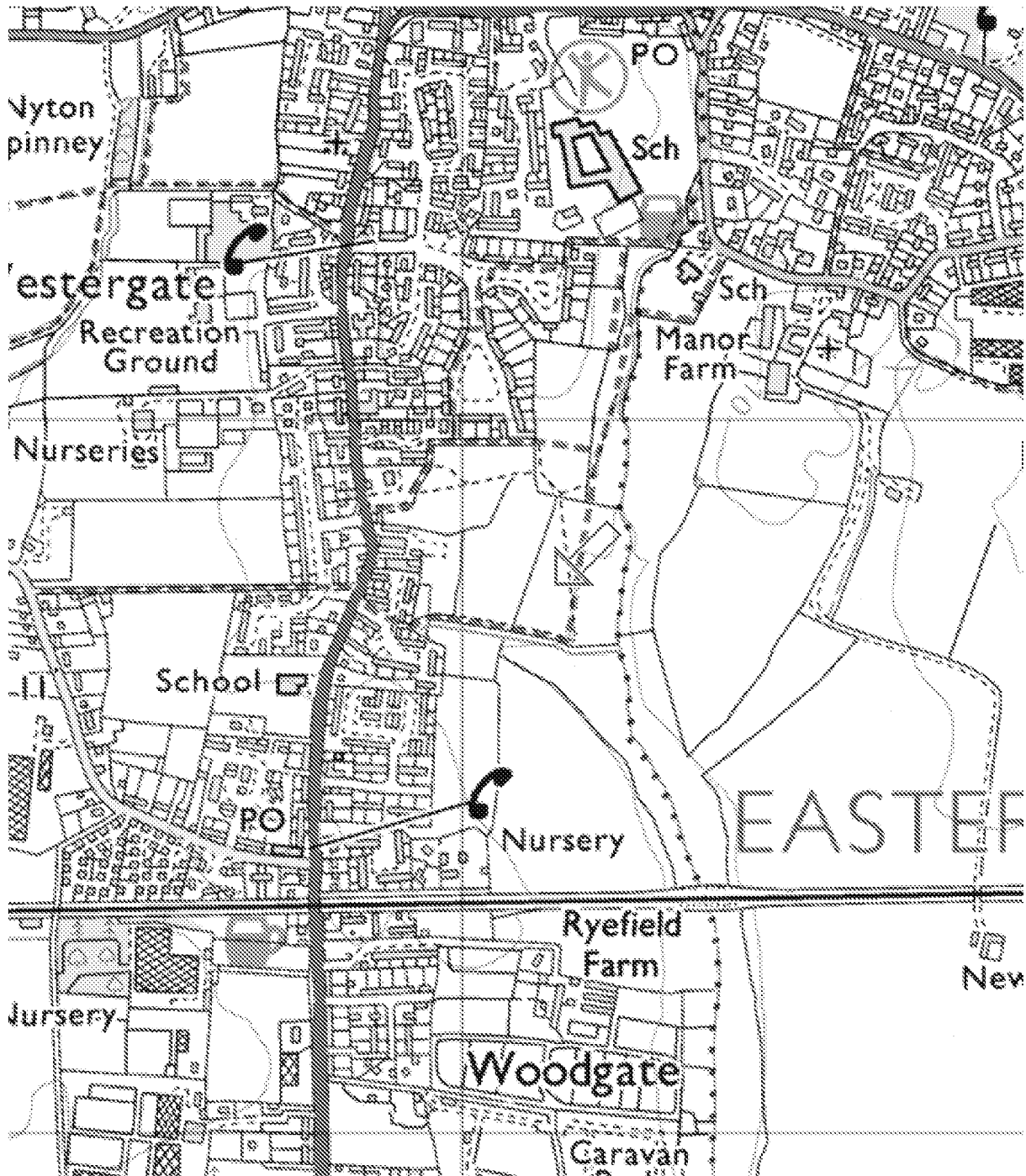


Figure 1 – Site Location Map



Job Number
19522

Project
Land east of Westergate, Chichester, West Sussex
PO20 3RD

Client
CALA Homes

Date
June 2022



Figure 2 – Aerial Photograph

Project
Land east of Westergate,
Chichester, West Sussex PO20
3RD

Client
CALA Homes

Date
June 2022

Job Number
19522





Figure 3 – Trial Hole Plan – North

Project
Land east of Westergate, Chichester, West Sussex PO20 3RD
Client
CALA Homes
Date
June 2022
Job Number
19522



Figure 4 – Trial Hole Plan - South

Project
Land east of Westergate, Chichester, West Sussex PO20 3RD
Client
CALA Homes
Date
June 2022
Job Number
19522

Appendix A Standards and Resources

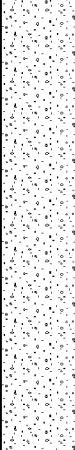
The site works and monitoring was undertaken in accordance with the following standards where applicable:

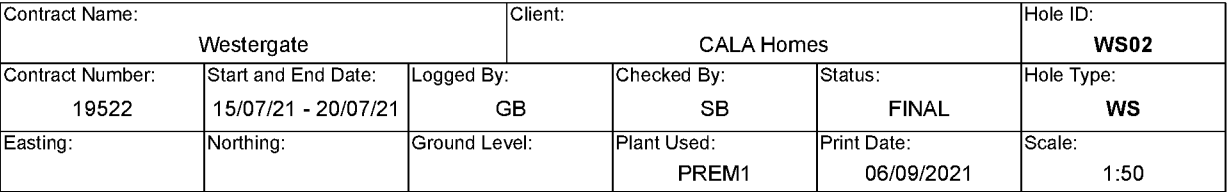
- BS 8485:2015+A1:2019
- BS 8576:2013
- BS 5930:2015+A1:2020
- NHBC Report Edition 04 2007 as updated
- CIRIA 665
- CIRIA 682
- CIRIA 735
- CLAIR RB17

Appendix B

Field Work

Appendix B.1 Engineers Logs

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS01					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.60	ES			(0.30)		Soft grey orange brown slightly desiccated slightly sandy slightly clayey SILT. Rare occasional rootlets. Rare fine angular to sub angular gravel. Rare fine brick fragments. MADE GROUND.								
				0.30										
1.10	ES			(1.10)		Soft orangish brown slightly desiccated slightly sandy CLAY. Rare rootlets. Rare occasional intermittent pockets of light orange brown fine to coarse sand. Rare fine angular to sub angular gravel. Rare fine black discolouration. RIVER TERRACE DEPOSITS						1		
1.50	D			1.40										
2.00	D			(3.30)		Fine to coarse orangish brown slightly gravelly SAND. Gravel is fine to coarse angular to sub angular flint. RIVER TERRACE DEPOSITS						2		
2.50	D													
3.00	D													
3.50	D													
4.00	D			4.70 (0.30)		Soft dark grey silty CLAY. Rare fine to coarse calcareous fragments. Rare fine selenite. LONDON CLAY FORMATION						3		
4.50	D													
5.00	D			5.00		End of Borehole at 5.00m						4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations				Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.40m bgl.					
Chiselling				Installation				Water Strikes						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	1.00	PLAIN	50	2.00			20	1.70	
					1.00	4.00	SLOTTED	50						
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														



Weather:	Termination:		Sheet 1 of 1
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Samples & In Situ Testing			Strata Details							Groundwater			
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/ Installation		
0.20	ES			(0.30)		Soft grey orangish brown slightly desiccated slightly sandy slightly clayey SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND.							
0.50	ES			0.30								Soft orange brown slightly desiccated slightly sandy CLAY. Rare rootlets. Rare occasional intermittent pockets of light orangish brown fine to coarse sand. Rare fine angular to sub angular gravel. Occasional fine black discolouration. RIVER TERRACE DEPOSITS	
1.00	ES			(1.30)		Soft orangish brown sandy gravelly CLAY. Gravel is fine to coarse angular to sub angular flint gravel. Occasional intermittent pockets of light orangish brown fine to coarse sand. Occasional fine black staining. RIVER TERRACE DEPOSITS						1	
1.50	D			1.60									
2.00	D			(0.70)		Soft orangish brown sandy gravelly CLAY. Gravel is fine to coarse angular to sub angular flint gravel. Occasional intermittent pockets of light orangish brown fine to coarse sand. Occasional fine black staining. RIVER TERRACE DEPOSITS						2	
2.50	D			2.30									
3.00	D			(1.10)		Fine to coarse light dark orangish brown slightly gravelly SAND. Gravel is fine to coarse angular to sub angular flint. RIVER TERRACE DEPOSITS						3	
3.50	D			3.40									
4.00	D			(0.60)		Soft dark grey silty CLAY. Rare fine to coarse calcareous fragments. Rare fine selenite. LONDON CLAY FORMATION							
				4.00									
						End of Borehole at 4.00m				4			
										5			
										6			
										7			
										8			
										9			
										10			

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.10			20	0.76	
RUN DISTRICT COUNCIL AL/11/24/OUT									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS03					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: DANDO		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Soft grey orangish brown slightly clayey slightly sandy SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND.								
0.50	ES			0.40										
				(0.60)		Soft orange brown slightly sandy slightly gravelly CLAY. Rare rootlets. Rare intermittent pockets of light orangish brown fine to coarse sand. Gravel is fine angular to sub angular flint. Occasional fine black staining. ALLUVIUM								
1.00	ES			1.00		End of Borehole at 1.00m						1		
												2		
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.00m bgl (base of hole).					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS04					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:								Sheet 1 of 1			
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Soft grey orangish brown slightly desiccated slightly sandy slightly clayey SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND.								
0.50	ES			0.30										
1.00	ES			(1.00)		Soft orangish brown slightly desiccated slightly sandy slightly gravelly CLAY. Rare rootlets. Rare occasional intermittent pockets of light orange brown fine to coarse sand. Gravel is fine angular to sub angular flint. Occasional fine black discolouration. RIVER TERRACE DEPOSITS						1		
1.40	D			1.30										
1.90	D			1.50		Fine to coarse orangish brown slightly gravelly SAND. Gravel is fine to coarse angular to sub angular flint. RIVER TERRACE DEPOSITS						2		
2.40	D			(1.50)										
3.00	D			3.00		End of Borehole at 3.00m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.30m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									2.00			20	0.76	
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS05					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Soft grey orangish brown slightly desiccated slightly sandy slightly clayey SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND. Soft grey orangish brown slightly sandy gravelly CLAY. Rare rootlets. Occasional rare intermittent pockets of light orangish brown fine to coarse sand. Gravel is angular to sub angular flint gravel. RIVER TERRACE DEPOSITS Fine to coarse dark orangish brown slightly clayey slightly gravelly SAND. Gravel is fine to coarse angular to sub angular flint. RIVER TERRACE DEPOSITS						1		
0.60	ES			(0.50)										
1.10	ES			0.80										
1.60	D			(1.40)		Soft dark grey sandy CLAY. Sand is fine to coarse. RIVER TERRACE DEPOSITS						2		
2.10	D			2.20										
2.40	D			2.40										
						End of Borehole at 2.40m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 0.80m bgl.					
Chiselling					Installation		Water Strikes							
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									2.00			20	1.76	
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS06					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Soft grey orangish brown slightly clayey slightly sandy SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND.								
0.60	ES			(0.40)		Soft grey orangish brown slightly sandy slightly gravelly CLAY. Rare rootlets. Rare occasional intermittent pockets of light orangish brown fine to coarse sand. Gravel is fine to coarse angular to sub angular flint. ALLUVIUM								
1.10	ES			0.80		Soft grey orangish brown slightly sandy CLAY. Rare rootlets to 1.5m BGL. Occasional intermittent pockets of light orange brown fine to coarse sand. ALLUVIUM						1		
1.60	D			(1.80)										
2.10	D											2		
2.50	D			2.60										
3.00	D			(1.40)		Soft dark grey slightly sandy CLAY. Occasional intermittent pockets of light grey fine to coarse sand. Rare fine calcareous fragments. Rare fine shell fragments. Rare fine selenite. LONDON CLAY FORMATION						3		
3.50	D													
4.00	D			4.00		End of Borehole at 4.00m						4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.50m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	1.00	PLAIN	50	2.00			20	1.70	
					1.00	4.00	SLOTTED	50						
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS07					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: DANDO		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Soft grey orangish brown slightly clayey slightly sandy SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND.								
0.50	ES			0.30										Soft to firm grey orangish brown slightly desiccated slightly sandy CLAY. Rare rootlets to 1.5m BGL. Occasional intermittent pockets of light orange brown fine to coarse sand. ALLUVIUM
1.00	ES			(1.50)		Soft grey orangish brown sandy gravelly CLAY. Gravel is fine to coarse angular to sub angular flint. Occasional intermittent pockets of light grey fine to coarse sand. RIVER TERRACE DEPOSITS						1		
1.50	D			1.80										
1.90	D			2.00		Soft grey orangish brown sandy gravelly CLAY. Gravel is fine to coarse angular to sub angular flint. Occasional intermittent pockets of light grey fine to coarse sand. RIVER TERRACE DEPOSITS						2		
2.40	D			(1.00)										
3.00	D			3.00		End of Borehole at 3.00m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.50m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS08					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: DANDO		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Soft grey orangish brown slightly sandy slightly clayey SILT. Rare occasional rootlets. Rare fine angular to sub angular brick gravel. MADE GROUND.								
0.50	ES			0.40		Firm grey orangish brown slightly desiccated sandy gravelly CLAY. Rare rootlets. Gravel is fine to coarse angular to sub angular flint. Occasional intermittent pockets of light orange brown fine to coarse sand. ALLUVIUM								
				(0.70)										
1.00	ES			1.10		Soft to firm grey orangish brown sandy CLAY. Rare rootlets to 1.5m BGL. Occasional intermittent pockets of light orangish brown fine to coarse sand. ALLUVIUM						1		
				(0.90)										
1.50	D					Firm orangish brown sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse flint. RIVER TERRACE DEPOSITS						2		
				2.00										
2.00	D													
				(1.00)										
2.50	D													
				3.00										
3.00	D					End of Borehole at 3.00m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.50m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS09					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: DANDO		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Soft grey orangish brown slightly sandy slightly clayey SILT. Rare occasional rootlets. Rare fine angular to sub-angular brick gravel. MADE GROUND.								
0.30				0.30										
0.50	ES			(0.40)		Firm grey orangish brown slightly desiccated sandy CLAY. Rare rootlets. Occasional intermittent pockets of light orangish brown fine to coarse sand. RIVER TERRACE DEPOSITS								
0.70				0.70										
1.00	ES			(0.60)		Firm grey orangish brown sandy gravelly CLAY. Rare rootlets to 1.30m bgl. Gravel is fine to coarse angular to sub angular flint gravel. Occasional intermittent pockets of light orange brown fine to coarse sand. Occasional fine black discolouration. RIVER TERRACE DEPOSITS						1		
1.30				1.30										
1.50	D			(0.60)		Fine to coarse dark orangish brown slightly gravelly SAND. Gravel is fine to coarse angular to sub angular flint. RIVER TERRACE DEPOSITS								
1.90				1.90										
2.00	D			(0.60)		Soft to firm dark grey sandy CLAY. Rare fine calcareous fragments. Rare fine shell fragments. Rare fine selenite. Occasional intermittent pockets of dark grey fine to coarse sand. LONDON CLAY FORMATION						2		
2.50	D			2.50										
						End of Borehole at 2.50m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.30m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

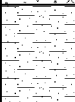
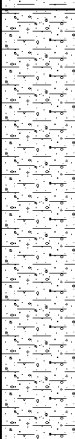
	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS10					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: DANDO		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing					Strata Details							Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.60)		Soft grey orangish brown slightly clayey slightly sandy SILT. Rare occasional rootlets. Rare fine angular to sub angular gravel. MADE GROUND.								
0.70	ES			0.60		Soft to firm grey orangish brown slightly sandy slightly gravelly CLAY. Rare rootlets. Gravel is fine to coarse angular to sub angular flint. Occasional intermittent pockets of light orange brown fine to coarse sand. ALLUVIUM						1		
1.20	ES			(1.40)										
1.70	D													
2.20	D			2.00		Firm dark grey orangish brown slightly sandy CLAY. Rare desiccated rootlets to 3.40m bgl. Occasional intermittent pockets of orangish brown fine to coarse sand. Occasional intermittent pockets of light grey fine to coarse sand. Rare fine selenite. LONDON CLAY FORMATION						2		
2.70	D			(1.40)								3		
3.30	D			3.40		Soft to firm dark grey sandy CLAY. Rare fine calcareous fragments. Rare fine shell fragments. Rare fine selenite. Occasional intermittent pockets of dark grey fine to coarse sand. LONDON CLAY FORMATION								
3.70	D			(0.60)										
4.00	D			4.00		End of Borehole at 4.00m						4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 2.00m bgl. Desiccated roots to 3.40m bgl.					
Chiselling					Installation		Water Strikes							
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS11					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: DANDO		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Soft grey orangish brown slightly clayey slightly sandy SILT. Rare occasional rootlets. Rare fine brick fragments. Rare fine angular to sub angular gravel. MADE GROUND.								
0.60	ES			(0.60)										
1.10	ES			0.90		Soft to firm dark grey orange brown slightly sandy CLAY. Rare desiccated rootlets to 2.10m bgl. Occasional intermittent pockets of light orangish brown fine to coarse sand. ALLUVIUM						1		
1.60	D			(1.40)										
2.10	D			2.30		Soft to firm dark grey sandy CLAY. Rare fine calcareous fragments. Rare fine shell fragments. Rare fine selenite. Occasional intermittent pockets of dark grey fine to coarse sand. LONDON CLAY FORMATION						2		
2.60	D			(1.70)										
3.10	D			4.00		End of Borehole at 4.00m						3		
3.60	D													
4.00	D											4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 2.10m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS12					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.30	ES			(0.60)		Soft to firm dark grey brown silty slightly gravelly CLAY. Occasional rootlets. Gravel is fine angular to sub angular flint. TOPSOIL								
0.70	ES			0.60 (0.60)		Fine to coarse angular to sub angular dark grey brown clayey flint GRAVEL. Rare rootlets. ALLUVIUM								
1.10	ES			1.20		Fine to coarse angular to sub angular light grey brown slightly clayey sandy flint GRAVEL. Occasional intermittent pockets of light orangish brown fine to coarse sand. ALLUVIUM								
1.60	D			(0.70)		Soft dark grey slightly sandy CLAY. Rare fine selenite. Occasional intermittent pockets of dark grey fine to coarse sand. LONDON CLAY FORMATION								
2.10	D			1.90 (1.10)		Soft dark grey brown silty CLAY. Occasional rare fine selenite. LONDON CLAY FORMATION								
2.60	D			3.00		End of Borehole at 3.60m								
3.10	D			(0.60)										
3.60	D			3.60										
Start & End of Shift Observations				Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.20m bgl.					
Chiselling				Installation				Water Strikes						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	1.00	PLAIN	50	2.00			20	1.70	
					1.00	2.20	SLOTTED	50						
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS13					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.50)		Soft dark grey brown silty CLAY. Occasional rootlets. Rare fine ash fragments. Rare fine to coarse angular to sub angular flint gravel. MADE GROUND								
0.60	ES			0.50 (0.50)		Soft dark orange grey brown slightly sandy CLAY. Rare rootlets. Occasional intermittent pockets of light orange brown fine to coarse sand. RIVER TERRACE DEPOSITS								
1.10	ES			1.00 (0.70)		Brown slightly sandy fine to coarse angular to sub rounded flint GRAVEL. Sand is fine to coarse. RIVER TERRACE DEPOSITS						1		
1.60	D			1.70		Soft dark orange grey brown slightly gravelly CLAY. Rare desiccated rootlets to 2.7m bgl. Rare fine calcareous fragments. Gravel is fine to coarse angular to sub angular flint. RIVER TERRACE DEPOSITS						2		
2.10	D			(1.00)										
2.70	D			2.70		End of Borehole at 2.70m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.00m bgl. Desiccated roots to 2.70m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.10			20	0.76	
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS14					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Soft dark orangish brown slightly gravelly silty CLAY. Frequent rootlets. Gravel is angular to sub angular flint. TOPSOIL								
0.60	ES			0.40		Soft to firm dark grey orangish brown slightly sandy CLAY. Rare rootlets. Occasional intermittent pockets of light orange brown fine to coarse sand. Rare fine angular to sub angular calcareous gravel. HEAD								
				(0.70)										
1.00	ES			1.10		Firm dark grey orangish brown slightly sandy CLAY. Rare desiccated rootlets to 4.50m bgl. Occasional intermittent pockets of light dark orange brown fine to coarse sand. Rare intermittent pockets of fine to coarse angular to sub angular calcareous gravel. Rare fine selenite. HEAD						1		
				(2.90)										
1.50	D					End of Borehole at 4.00m						2		
2.00	D													
2.50	D													
3.00	D													
3.50	D													
4.00	D			4.00										
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.50m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT



Contract Name: Westergate			Client: CALA Homes			Hole ID: WS15
Contract Number: 19522	Start and End Date: 15/07/21 - 20/07/21	Logged By: GB	Checked By: SB	Status: FINAL	Hole Type: WS	
Easting:	Northing:	Ground Level:	Plant Used: PREM1	Print Date: 06/09/2021	Scale: 1:50	

Weather:	Termination:	Sheet 1 of 1
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Samples & In Situ Testing			Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation
0.20	ES			(0.50)		Turf over firm, slightly gravelly, silty CLAY. Gravel is fine to medium angular flint. Rare fragments of brick. Frequent fine roots and rootlets. MADE GROUND		
0.60	ES			0.50 (0.40)		Brown, clayey silty fine to coarse angular flint GRAVEL. Occasional rootlets. RIVER TERRACE DEPOSITS		
0.95	ES			0.90		Firm brown mottled blueish grey and yellow, CLAY with occasional white and yellow pockets of fine to coarse sand sized calcareous nodules. Becoming stiff at 1.70m bgl. Very rare rootlets to 1.00m bgl. Rare fine sand sized selenite crystal nodules at 2.50m to 4.00m bgl.	1	
1.20	D							
1.80	D			(1.60)		A pocket of fine to medium angular mudstone GRAVEL	2	
2.20	D							
2.80	D			2.50		A thin band of fine to medium orange SAND		
3.20	D			(1.50)		Firm brown grey silty CLAY with rare fine sand sized selenite crystal nodules. LONDON CLAY FORMATION	3	
3.80	D			4.00		End of Borehole at 4.00m	4	
							5	
							6	
							7	
							8	
							9	
							10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
RUN DISTRICT COUNCIL AL/11/24/OUT									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS16					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.30)		Turf over brown slightly gravelly, clayey SILT. Gravel is fine to medium angular flint. Frequent fine roots and rootlets. TOPSOIL								
0.50	ES			0.30		Whitish brown, clayey fine to coarse angular flint GRAVEL. Occasional fine roots and rootlets. RIVER TERRACE DEPOSITS								
0.80	ES			(0.70)										
1.20	D			1.00		Stiff to very stiff, brown mottled blueish grey and yellow friable CLAY with occasional white and yellow pockets of fine to coarse sand sized calcareous nodules to 2.00m bgl. Rare rootlets to 2.00m bgl. Very rare fine sand sized selenite crystal nodules. LONDON CLAY FORMATION						1		
1.80	D													
2.20	D			(2.65)								2		
2.80	D													
3.20	D											3		
3.50	D			3.65										
						End of Borehole at 3.65m						4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 2.00m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	1.00	PLAIN	50				0	0.00	Not Encountered
					1.00	3.65	SLOTTED	50						
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS17					
	Contract Number: 19522		Start and End Date: 16/07/21		Logged By: JC		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.30	ES			0.25 (0.33)		Wheat over brown, slightly silty, slightly gravelly CLAY. Gravel is fine to coarse angular flint. Frequent fine rootlets. TOPSOIL								
0.60	ES			0.58 (0.32)		Brown and orange, sandy gravelly CLAY. Sand is course. Gravel is fine to coarse angular flint. Frequent black silt spotting. Frequent fine rootlets. HEAD								
0.90	D			0.90 (1.00)		Brown and orange, slightly gravelly sandy CLAY. Gravel is fine to medium sub-angular flint. frequent fine black silt spots. Fine rootlets. HEAD								
				1.00		Brown and orange, sandy gravelly CLAY. Sand is course. Gravel is fine to medium angular flint. Frequent black silt spotting. Frequent fine rootlets. HEAD						1		
1.50	D			(1.00)		Orangish brown SAND. HEAD								
				2.00		Orange, brown SAND AND GRAVEL. Sand is fine to coarse. Gravel is fine to medium angular to sub-angular flint. Occasional coarse sub-angular flint. HEAD						2		
2.20	D			(0.50)										
2.60	D			2.50		Firm dark grey CLAY. HEAD								
				2.70		Orangish brown, brown SAND AND GRAVEL. Sand is fine to coarse, Gravel is fine to medium sub-angular flint. Occasional medium well rounded chalk clasts. HEAD						3		
				(1.10)										
3.50	D													
3.90	D			3.80		Firm dark grey silty CLAY. LONDON CLAY FORMATION						4		
				4.00		End of Borehole at 4.00m								
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.00m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					0.00	1.00	PLAIN	50	1.20			20	1.42	
					1.00	3.10	SLOTTED	50						
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														
ARUN DISTRICT COUNCIL AL/11/24/OUT														

	Contract Name: Westergate			Client: CALA Homes			Hole ID: WS18							
	Contract Number: 19522		Start and End Date: 16/07/21		Logged By: JC		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.50)		Wheat over brown, slightly silty, slightly gravelly CLAY. Gravel is fine to coarse angular flint. Frequent fine rootlets. TOPSOIL								
0.60	D			0.50 0.60		Brown, grey brown, sandy gravelly CLAY. Sand is course. Gravel is fine to coarse angular flint. Rare fine rootlets. HEAD								
				0.80		Brown, grey and orange, sandy, slightly gravelly CLAY. Gravel is fine to medium sub-angular flint. Rare fine rootlets. HEAD								
1.20	D			1.00		Brown and orange, sandy gravelly CLAY. Sand is course. Gravel is fine to medium angular flint. HEAD						1		
1.70	D					Orangish brown and grey mottled, slightly sandy, slightly gravelly CLAY. Gravel is fine to medium claystone. HEAD								
2.20	D			(2.00)		Orange brown, brown, slightly sandy slightly gravelly CLAY. Gravel is fine angular flint. Rare rootlets. HEAD						2		
2.70	D					Firm grey brown silty CLAY. LONDON CLAY FORMATION								
3.00	D			3.00 3.10		Firm grey brown silty CLAY. LONDON CLAY FORMATION						3		
3.50	D			(0.90)		Firm grey brown silty CLAY. LONDON CLAY FORMATION								
				4.00		End of Borehole at 4.00m						4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 3.10m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS19						
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS				
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50				
Weather:				Termination:				Sheet 1 of 1							
Samples & In Situ Testing				Strata Details								Groundwater			
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation		
0.15	ES			(0.30)		Turf over brown gravelly, clayey SILT. Gravel is fine to medium angular flint. Frequent fine roots and rootlets. TOPSOIL									
0.40	ES			0.30 (0.30)		Stiff, brown, gravelly silty CLAY. Gravel is fine to medium angular flint. Occasional fine roots and rootlets. RIVER TERRACE DEPOSITS									
0.80	ES			0.60 (0.30)		Brown, slightly silty, clayey fine to coarse angular flint GRAVEL. Rare rootlets. RIVER TERRACE DEPOSITS									
1.20	D			0.90 1.00 (0.60)		Whitish brown, slightly silty, sandy fine to coarse angular flint GRAVEL. Sand is fine to medium. RIVER TERRACE DEPOSITS						1			
1.80	D			1.60 (0.30)		Whitish brown, clayey very sandy fine to coarse angular flint GRAVEL. Sand is fine to coarse. RIVER TERRACE DEPOSITS									
2.20	D			1.90 (1.10)		Stiff grey silty CLAY. LONDON CLAY FORMATION						2			
2.80	D			3.00		End of Borehole at 3.00m						3			
														4	
														5	
														6	
														7	
														8	
														9	
														10	
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 0.90m bgl.						
Chiselling					Installation				Water Strikes						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
					0.00	1.00	PLAIN	50	2.00			20	1.55		
					1.00	1.70	SLOTTED	50							
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.															

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS20					
	Contract Number: 19522		Start and End Date: 16/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:			Termination:					Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.20	ES			(0.40)		Wheat over brown, slightly silty, slightly gravelly CLAY. Gravel is fine to coarse angular flint. Frequent fine rootlets. TOPSOIL								
0.60	D			0.40 (0.60)		Brown, sandy gravelly CLAY. Sand is course. Gravel is fine to coarse angular flint. Frequent fine rootlets. HEAD								
1.20	D			1.00 (0.60)		Orange SAND. HEAD						1		
1.70	D			1.60 (0.40)		Brown, sandy gravelly CLAY. Sand is course. Gravel is fine to medium angular flint. HEAD								
				2.00		End of Borehole at 2.00m						2		
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.00m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

ARUN DISTRICT COUNCIL AL/11/24/OUT

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS21					
	Contract Number: 19522		Start and End Date: 16/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.15	ES			0.20		Turf over brown slightly clayey, gravelly SILT. Gravel is fine to medium sub-angular to sub rounded flint. Frequent fine roots and rootlets. TOPSOIL								
0.30	ES			(0.30)		Brown slightly clayey, very gravelly SILT. Gravel is fine to coarse angular to sub angular flint. Frequent fine roots and rootlets. HEAD								
0.60	ES			0.50		Firm, orangish brown slightly sandy, very gravelly CLAY. Sand is fine. Gravel is fine to coarse sub angular flint. Occasional fine roots and rootlets. HEAD								
0.90	D			0.75		Soft orangish brown gravelly, very sandy CLAY. Sand is fine. Gravel is fine to coarse sub-angular flint. HEAD								
				1.00		Greyish brown, slightly clayey, gravelly fine SAND. Gravel is fine to medium angular flint. HEAD						1	▼	
1.30	D			(0.80)										
				1.80		Soft grey CLAY. A pocket of gravelly fine SAND at 2.30 to 2.50m bgl. Gravel is fine to medium sub angular flint. HEAD						2		
2.00	D			(0.80)										
2.40	D			2.60										
						End of Borehole at 2.60m						3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 0.75m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									1.10			20	1.10	
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS22					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL	Hole Type: WS				
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021	Scale: 1:50				
Weather:			Termination:							Sheet 1 of 1				
Samples & In Situ Testing				Strata Details							Groundwater			
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description					Water Strike	Backfill/Installation		
0.15	ES			0.20		Turf over brown slightly clayey, gravelly SILT. Gravel is fine to medium angular flint. Frequent fine roots and rootlets. TOPSOIL Stiff, brown, gravelly, very silty friable CLAY. Gravel is fine to medium angular flint. A pocket of very stiff CLAY at 0.70 to 0.80m bgl. Occasional fine roots and rootlets. HEAD								
0.30	ES			(0.60)										
0.60	ES			0.80		Stiff very gravelly CLAY. Gravel is fine to coarse angular flint. HEAD					1			
1.20	D			(1.20)										
1.80	D			2.00		End of Borehole at 2.00m					2			
											3			
											4			
											5			
											6			
											7			
											8			
											9			
											10			
Start & End of Shift Observations				Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 0.80m bgl.					
Chiselling				Installation		Water Strikes								
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS23					
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:				Sheet 1 of 1						
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.15	ES			(0.30)		Brown slightly clayey, gravelly SILT. Gravel is fine to medium angular flint. Frequent fine roots and rootlets. TOPSOIL								
0.30	ES			0.30		Stiff, brown, gravelly, very silty friable CLAY becoming slightly silty at 1.00m. Gravel is fine to medium sub angular to angular flint. Occasional fine roots and rootlets becoming rare at 0.80m bgl. Occasional black discolouration at 1.00 to 1.40m bgl. HEAD								
0.60	ES													
				(1.10)		Stiff very gravelly CLAY. Gravel is fine to coarse angular flint. HEAD						1		
1.20	D													
				1.40		Orangish brown silty fine SAND. HEAD								
1.70	D			(0.30)										
				1.70		End of Borehole at 2.50m						2		
2.10	D													
				(0.80)										
				2.50										
											3			
											4			
											5			
											6			
											7			
											8			
											9			
											10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 1.40m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

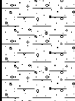


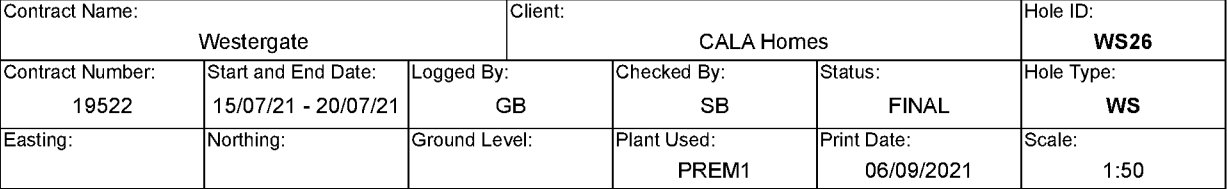
Contract Name: Westergate			Client: CALA Homes			Hole ID: WS24
Contract Number: 19522	Start and End Date: 15/07/21 - 20/07/21	Logged By: GB	Checked By: SB	Status: FINAL	Hole Type: WS	
Easting:	Northing:	Ground Level:	Plant Used: PREM1	Print Date: 06/09/2021	Scale: 1:50	

Weather:	Termination:	Sheet 1 of 1
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Samples & In Situ Testing			Strata Details					Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation		
0.10	ES			0.15		Dark brown gravelly CLAY. Gravel is angular, fine to medium. Abundant rootlets. TOPSOIL	1			
0.30	ES			0.40		Dark brown clayey silty GRAVEL. Gravel is angular to subangular, fine to coarse flint. Frequent rootlets. HEAD				
0.60	ES			(0.40)		Brown silty sandy clayey GRAVEL. Gravel is subangular to subrounded, fine to coarse flint. Sand is coarse to fine. Frequent rootlets. HEAD				
0.90	D			0.80		Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is subrounded, fine to coarse flint. HEAD				
1.00	D			1.00		Brown clayey silty sandy GRAVEL. Gravel is subangular to subrounded, fine to coarse flint. Sand is coarse to fine. Frequent rootlets. HEAD				
				1.10		Dark grey slightly mottled light brown slightly silty CLAY. Pockets of fine to medium sand. HEAD				
1.60	D									
2.10	D									2
2.60	D					(2.90)				
3.10	D									3
3.60	D									
				4.00	End of Borehole at 4.00m		4			
							5			
							6			
							7			
							8			
							9			
							10			

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: Rootlets to a depth of 1.10m.					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
RUN DISTRICT COUNCIL AL/11/24/OUT									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS25					
	Contract Number: 19522		Start and End Date: 16/07/21		Logged By: JC		Checked By: SB		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing				Strata Details								Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.30	ES			(0.40)		Wheat over brown, slightly silty, slightly gravelly CLAY. Gravel is fine to coarse angular flint. Frequent fine rootlets. TOPSOIL								
				0.40 (0.30)		Brown, sandy gravelly CLAY. Sand is coarse. Gravel is fine to coarse angular flint. occasional rootlets. HEAD								
0.80	D			0.70		Brown, grey and orange, sandy, gravelly CLAY. Gravel is fine to coarse sub-angular to well-rounded flint. Occasional fine rootlets. Rare fine black silt spotting. HEAD						1		
1.50	D			(1.20)										
2.00	D			1.90		Fine orange SAND. HEAD						2		
2.40	D			(0.50)										
				2.40		Fine orange slightly gravelly SAND. Gravel is fine to medium sub-angular flint. Rare fine rootlets. HEAD								
				2.50		End of Borehole at 2.50m								
												3		
												4		
												5		
												6		
												7		
												8		
												9		
												10		
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Fine roots and rootlets to 2.50m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														



Weather:	Termination:		Sheet 1 of 1
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Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
RUN DISTRICT COUNCIL AL/11/24/OUT									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					



Contract Name: Westergate			Client: CALA Homes			Hole ID: WS27
Contract Number: 19522	Start and End Date: 15/07/21 - 20/07/21	Logged By: GB	Checked By: SB	Status: FINAL	Hole Type: WS	
Easting:	Northing:	Ground Level:	Plant Used: PREM1	Print Date: 06/09/2021	Scale: 1:50	

Weather:	Termination:	Sheet 1 of 1
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Samples & In Situ Testing			Strata Details					Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/ Installation
0.10	ES			0.20		Soft dark grey slightly gravelly CLAY. Frequent rootlets. Gravel is angular to sub angular medium flint. TOPSOIL			1	
0.30	ES			0.40		Light brown slightly gravelly silty SAND. Sand is fine to coarse. Occasional rootlets. Gravel is sub angular medium flint. HEAD				
0.60	ES			(0.30)		Light brown silty clayey GRAVEL. Gravel is angular to subangular, fine to coarse flint. Occasional rootlets. HEAD				
0.80	D			0.70		Light brown slightly clayey silty SAND. Sand is fine. Occasional rootlets. HEAD				
				0.90		Light yellowish brown slightly clayey silty SAND. Sand is fine to medium. Rare rootlets. HEAD				
1.20	D					 Rare gravel subrounded, medium flint.				
				(1.10)						
1.70	D									
				2.00		Light yellowish brown mottled reddish orange slightly clayey very silty SAND. Sand is fine to medium. HEAD				
2.10	D			(0.40)						
		2.40		----- End of Borehole at 2.40m -----			2			
									3	
									4	
									5	
									6	
									7	
									8	
									9	
									10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks: Rootlets to a depth of 1.60m bgl.					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	Not Encountered
RUN DISTRICT COUNCIL AL/11/24/OUT									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					

	Contract Name: Westergate				Client: CALA Homes				Hole ID: WS28						
	Contract Number: 19522		Start and End Date: 15/07/21 - 20/07/21		Logged By: GB		Checked By: SB		Status: FINAL		Hole Type: WS				
	Easting:		Northing:		Ground Level:		Plant Used: PREM1		Print Date: 06/09/2021		Scale: 1:50				
Weather:				Termination:								Sheet 1 of 1			
Samples & In Situ Testing				Strata Details								Groundwater			
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation		
0.00	ES			0.12		Soft dark grey CLAY. Abundant rootlets. TOPSOIL						1			
0.20	ES				Dark grey slightly silty clayey GRAVEL. Gravel is subangular to subrounded, fine to coarse flint. Abundant rootlets. Reworked. HEAD										
0.50	ES				Dark grey slightly clayey GRAVEL. Gravel is sub angular medium to coarse flint. Frequent rootlets.										
0.60					Dark to light brown clayey GRAVEL. Gravel is fine to coarse. Occasional rootlets.										
0.90	D			(0.40)											
				1.00		End of Borehole at 1.00m									
														2	
														3	
														4	
														5	
														6	
														7	
														8	
														9	
														10	
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	No recovery 1.00m to 2.00m bgl.						
Chiselling					Installation				Water Strikes						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
												0	0.00	Not Encountered	
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.															

ARUN DISTRICT COUNCIL AL/11/24/OUT

Appendix C Calibration Certification

TEST DATE AND CONDITIONS	
Date	06/07/21
Atmospheric pressure	991mb
Ambient Temp	24.1°C
EnviroNics Serial No.	2518

GAS DATA LTD
Unit 4 Fairfield court
Seven Stars Estate
Coventry
CV3 4LJ, UK
+44 (0) 24 7630 3311



GFM435-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

INSTRUMENT DETAILS	
Serial No	Customer
11555	Safety Monitors Ltd

INSTRUMENT CHECKS			
Keyboard	✓	Pump Flow	500cc/min
Display Contrast	✓	Pump Flow @ -200mB	325cc/min
Clock Set / Running	✓	S/W Version	G435.0024/0004
Labels Fitted	✓	Recalibration Date	06/07/22

GAS CHECKS							
Calibration Gas		Instrument Gas Channels Read					
Gas Type	Applied Conc.	CH4 (%)	tol. (% vol.)	CO2 (%)	tol. (% vol.)	O2 (%)	tol. (% vol.)
N2	100%	0.0	0.0	0.0	0.0	0.0	+/-0.1
CH4	5%	5.0	+/-0.3	0.0	0.0	0.0	+/-0.1
	60%	59.9	+/-3.0	0.0	0.0	0.0	+/-0.1
CO2	5%	0.0	0.0	5.0	+/-0.3	0.0	+/-0.1
	40%	0.0	0.0	39.8	+/-3.0	0.0	+/-0.1
O2	20.9%	0.0	0.0	0.1	+0.1	20.8	+/-0.5

OPTIONAL GAS CHECKS								
Calibration Gas		Instrument Gas Channels Read						
Gas Type	Applied Conc.	Label	H2S	CO			Hexane	tol. (% vol.)
		Range	5000ppm	2000ppm			2%	
N2	100%		0	0			0	0.0
H2S	1500ppm		1500	0				+/- 5.0
CO	1000ppm		70	999				+/- 5.0
								+/- 5.0
Hexane	20000ppm						1.950	+/- 10.0

PRESSURE CHECKS							
Calibration Pressure		Instrument Pressure Channels Read					
Pressure @	Applied Pressure	Atmospheric [Ap] (mB)	tol. (mB)				
All Ports	Current Atmospheric	991	+/-2.0				
Ap Port (Internal)	+800mB(a)	798	+/-5.0				
	+1200mB(a)	1202	+/-5.0				

TEST DATE AND CONDITIONS	
Date	06/07/21
Atmospheric pressure	991mb
Ambient Temp	24.1°C
EnviroNics Serial No.	2518

GAS DATA LTD	
Unit 4 Fairfield court	
Seven Stars Estate	
Coventry	
CV3 4LJ, UK	
+44 (0) 24 7630 3311	

GFM435-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

FLOW CHECKS					
Calibration Flow		Instrument Flow Channels Read			
Applied Flow (l/hour)	Applied Pressure (Pa)	Flow [Flow] (l/hour)	tol. (l/hour)	Differential Pressure [Dp] (Pa)	tol. (Pa)
-30.0	-266	-30.7	+/-3.0	-283	+/-50
-3.0	-10	-3.0	+/-1.0	-12	+/-6
0.0	0	0.0	0.0	0	0.0
+3.0	10	3.0	+/-0.5	11	+/-3
+30.0	280	29.7	+/-3.0	281	+/-50
+60.0	836	60.3	+/-6.0	844	+/-130
+90.0	1621	90.9	+/-9.0	1673	+/-250

TEMPERATURE CHECK		
Calibration Temperature	Instrument Temperature Channel Read	
Applied Equivalent Temperature (°C)	Temperature [Temp] (°C)	tol. (°C)
-10.0	-10.0	+/- 2.0
0.0	0.0	+/- 1.0
30.0	30.0	+/- 1.0
60.0	60.0	+/- 1.0
100.0	100.0	+/- 1.0

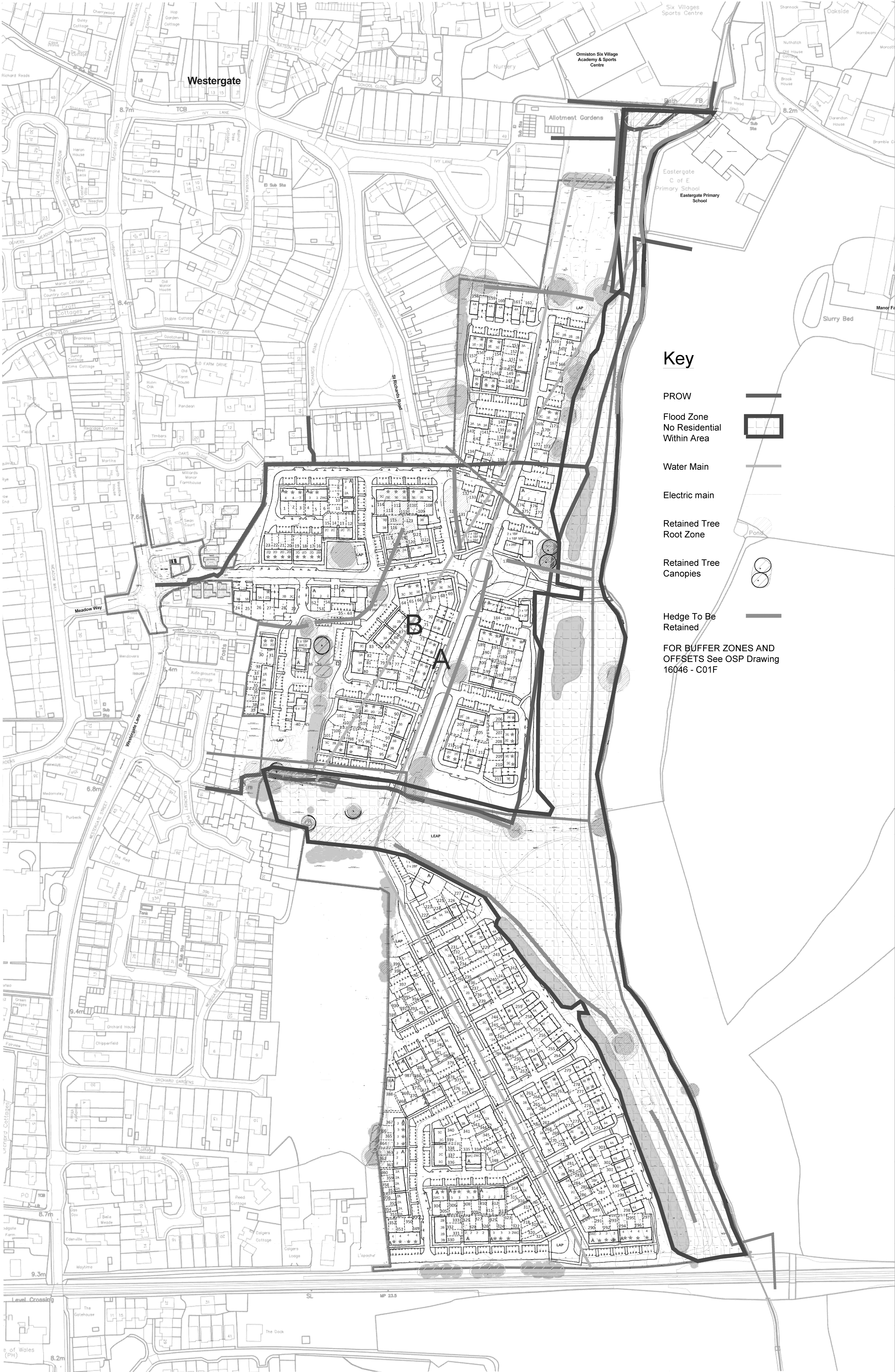
Notes:

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015, BS EN ISO 14001:2015 and BS EN ISO 45001:2018 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to: BS EN ISO 9001:2015
 BS EN ISO 14001:2015
 BS EN ISO 45001:2018

Appendix D

Proposed Development



Key

- PROW
- Flood Zone
No Residential
Within Area
- Water Main
- Electric main
- Retained Tree
Root Zone
- Retained Tree
Canopies
- Hedge To Be
Retained

FOR BUFFER ZONES AND
OFFSETS See OSP Drawing
16046 - C01F

Rev	Date	Description	Int
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Job title
LAND EAST OF
WESTERGATE

Drawing title
CONSTRAINTS PLAN

Status For Information

Scale 1:1000@ A0 Date OCT 20 Drawn LK

Dwg No. 00163_CALA_CN_01 Rev -

Soils Limited
Geotechnical & Environmental Consultants

**Newton House
Cross Road, Tadworth
Surrey KT20 5SR**



W soilslimited.co.uk