

Roman Fields, Purbrook

784-B038823

Minerals Assessment

Dandara Limited

January 2023

**Document prepared on behalf of Tetra Tech Environment Planning Transport Limited.
Registered in England number: 03050297**



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DOCUMENT CONTROL

Document:	Minerals Assessment
Project:	Roman Fields, Purbrook
Client:	Dandara Limited
Project Number:	784-B038823
File Origin:	\\\\lds-dc-vm-101\Data\Projects\784-B038823 Campdown\

Revision:	1	Prepared by:	Gemma Allan
Date:	January 2023	Checked by:	Chris Muir
Status:	Issued	Approved By:	Michael Jones
Description of Revision:			

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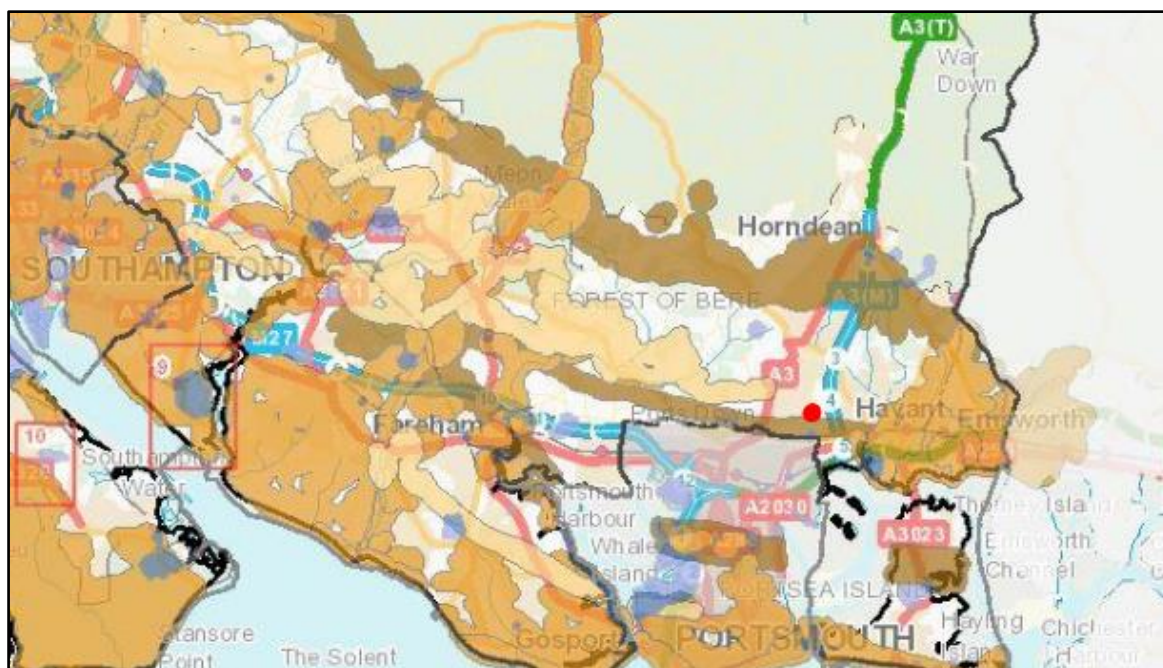
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1.0 INTRODUCTION

- 1.0.1 Tetra Tech has been instructed by Dandara Limited to prepare a Minerals Assessment to inform a planning application for a residential-led development at a site referred to as Roman Fields, Purbrook, to the north of Portsmouth in Hampshire.
- 1.0.2 The proposed development is for 628 dwellings. A layout plan of the proposals is included as a Drawing in the Appendix. The built development would be in the southern and central areas of the site, with an open field in the northern part of the site. Large Sustainable Drainage Systems (SuDS) are proposed in the south and southeast of the site. A smaller SuDS is proposed in the centre of the site. The SuDS would also comprise public open space and further areas of public open space are proposed in the northeast of the proposed developable area of the site.
- 1.0.3 Hampshire County Council's (HCC) Minerals and Waste Plan Online Map shows the southern part of the site is within a Minerals and Waste Consultation Area (MWCA) for Superficial Brick Clay. This is shown on Figure 1 below. The site location has been indicated by a red dot.

Figure 1 – Hampshire County Council Minerals Safeguarding Area – Extract from HCC Online Map



- 1.0.4 The Brick Clay MWCA is indicated by the thin pale-brown area which extends east to west across this part of Hampshire.
- 1.0.5 The purpose of this report is to assess the most suitable method of management of any identified clay resource at the site. To undertake this assessment the reported geology of the site has been assessed as well as a review of the site setting, which identifies potential constraints that would impact upon the viability and

practicability of any future mineral extraction. This includes nature conservation features and existing built development in the vicinity of the site.

- 1.0.6 The appraisal also includes a review of minerals safeguarding planning policy. This information has been used to determine the most suitable approach for minerals extraction based on the available information.
- 1.0.7 This scope of this report has been prepared in accordance with Policy 15 of the Hampshire Minerals and Waste Plan (HMWP). This and other policy considerations, that have helped scope this report, are described in the following section.

2.0 MINERALS PLANNING POLICY

2.1 MINERALS SAFEGUARDING

2.1.1 The safeguarding of non-renewable resources, such as minerals, is a key aspect of sustainable development. Paragraph 210 of the National Planning Policy Framework (NPPF), which was last updated in July 2021, obliges Mineral Planning Authorities to define Mineral Safeguarding Areas (MSA) and Minerals Consultation Areas (MCA) when preparing local plans.

2.1.2 MSAs are produced to define known locations of specific mineral resources of local or national importance and to ensure these resources are not needlessly sterilised by non-mineral development, though MSAs carry no presumption that the resource will be worked.

2.1.3 HCC's Interactive Map shows the southern part of the site is located within a Brick Clay MWCA.

2.1.4 HCC adopted a Minerals and Waste Plan in October 2013 which includes Policy 15 on the safeguarding of mineral resources. It states: -

"Hampshire's ... brick-making clay resources are safeguarded against needless sterilisation by non-minerals development, unless 'prior extraction' takes place...."

Safeguarded mineral resources are defined by a Mineral Safeguarding Area illustrated on the Policies Map.

Development without the prior extraction of mineral resources in the Mineral Safeguarding Area may be permitted if: -

- a) it can be demonstrated that the sterilisation of mineral resources will not occur; or*
- b) it would be inappropriate to extract mineral resources at that location, with regards to the other policies in the Plan; or*
- c) the development would not pose a serious hindrance to mineral development in the vicinity; or*
- d) the merits of the development outweigh the safeguarding of the mineral..."*

2.1.5 Appendix C of the HMWP provides an explanation as to how the Plan policies will be implemented. In relation to Policy 15 it states: -

"...In terms of prior extraction, a realistic judgement about the likelihood of the mineral being worked in an environmentally acceptable way will be made in areas where development is proposed within the MSA. The minerals planning authority will not seek to prevent development where it is unlikely that extraction of the mineral would occur in the future. Where mineral deposits are believed to exist but detailed geological information is not available, the existence or otherwise of a potentially workable resource may need to be established by the developer before any application for development that might sterilise the potential deposit is determined."

- 2.1.6 A draft Partial Update HMWP, dated October 2022, is currently out for consultation. Policy 15 has been carried forward into the draft plan.

2.2 MINERAL PRODUCTS ASSOCIATION AND PLANNING OFFICERS' SOCIETY MINERALS SAFEGUARDING PRACTICE GUIDANCE (2019)

- 2.2.1 In April 2019 the Mineral Products Association and the Planning Officers' Society published a Minerals Safeguarding Practice Guidance document. Paragraph 4.22 states: -

'...in order to demonstrate compliance with minerals safeguarding policies... developers will be required to provide sufficient information to enable the Minerals Planning Authority and Local Planning Authority to consider the potential effect of non-exempt development in MSAs/MCAs on mineral safeguarding, and the viability of prior extraction of mineral ahead or in conjunction with the non-mineral development.' Paragraph 4.23 goes onto state that *'such information should be in the form of a Minerals Resource Assessment.'*

- 2.2.2 The guidance document includes detailed information on the requirements of Minerals Resource Assessments. Paragraph 4.24 states that the required information includes: the type of mineral resource thought to be present, the economic value and viability of the mineral and potential options for prior extraction. Table 2, on Page 17 of the document, also sets out matters to address in Mineral Resource Assessments, which includes a review of constraints to mineral extraction and a detailed list of requirements is provided in Annex 1. The guidance document has been considered in the preparation of this assessment.

- 2.2.3 Paragraph 4.37 of the guidance document states: -

"The maximum amount of extraction should be encouraged to minimise the amount of resource sterilised and with associated potential financial benefits to the site owner and developer."

- 2.2.4 Paragraph 4.39 proceeds to state that: -

"It may be concluded that only a portion of material may be extracted, prior to and during the development, through site preparation and incidental to groundworks. This may be suitable for on-site use but also some may require to be exported. Incidental extraction of small amounts of mineral, for example as part of site preparation or digging of foundations, is likely to be considered as ancillary to or even enabling of the non-minerals development and not normally require separate/standalone planning permission for mineral extraction. Use of materials on-site, and export of excess, could be addressed through the terms of the permission and associated conditions or legal agreements."

2.3 ANALYSIS

- 2.3.1 This section has identified that there is a clear framework of planning policy in respect of minerals safeguarding. This policy is designed to ensure that valuable mineral resources are not unnecessarily sterilised, and that where non-mineral development is permitted that due consideration is given to ensuring that appropriate investigations are undertaken to establish if any viable mineral deposits can be recovered as part of the development process (from full prior extraction to incidental extraction).
- 2.3.2 However, the planning policy also acknowledges the presence of physical and environmental constraints and the limitations they might place on mineral extraction. The policy is also flexible in allowing effective sterilisation where the merits of the development outweigh safeguarding (for example if there is an overriding need for quick delivery of the proposed development that would be compromised by any delay to facilitate mineral extraction in full or in part).
- 2.3.3 There is clear guidance both for local planning authorities and developers in respect of progressing potential development where issues of minerals safeguarding are present.

3.0 GEOLOGICAL SITE SETTING

3.1 DESIGNATIONS AND INFORMATION CONTAINED IN THE HMWP

- 3.1.1 As described in Sections 1 and 2, HCC's Online Map shows that the southern part of the site coincides with a Brick Clay MWCA.
- 3.1.2 The HMWP provides information on the minerals that are found in the district, including clay and Paragraph 6.15 states: -

'Hampshire also has resources of clay, some of which plays an important role in supplying two local brickworks at Michelmersh and Selborne. Therefore, these resources are also safeguarded.'

- 3.1.3 It is however understood that Selborne brickworks has since closed, and this is confirmed in Section 5.3 of HCC's 2020 Annual Monitoring Report (AMR) which was published in April 2022.

3.2 SUPERFICIAL DEPOSITS

- 3.2.1 The British Geological Survey (BGS) Geology of Britain Viewer website indicates the south of the site is underlain by Head Deposits, which comprises clay, silt, sand, and gravel. There are no recorded superficial deposits in the north of the site. This is shown in the Figure 2 below.

Figure 2: Annotated Extract from the BGS showing Superficial Geology



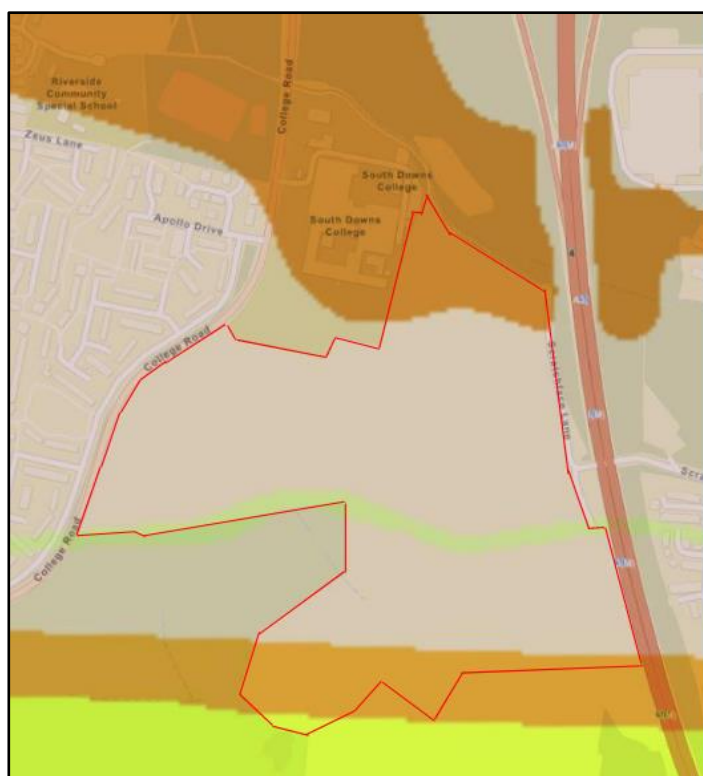
3.3 BEDROCK GEOLOGY

3.3.1 The BGS website shows the site is predominantly underlain by London Clay Formation, which comprises clay, silt, and sand. This is shown in grey in Figure 3 below. A narrow strip of Bognor Sand Member dissects the London Clay formation and is shown in pale green. The north of the site is underlain by Wittering Formation, which comprises sand, silt, and clay. This is shown in dark brown. Part of the south of the site is underlain by the Lambeth Group, which comprises clay, silt and sand. This is shown in a lighter brown colour. The very southern tip of the site is shown to be underlain by the Portsdown Chalk Formation and this is shown in green. An annotated extract from the BGS website showing the Bedrock Geology is shown below.

3.3.2 To summarise from north to south: -

- The Wittering Formation is shown in brown;
- The London Clay Formation is shown in grey;
- The Bognor Sand Member is shown in pale green;
- The Lambeth Group is shown in lighter brown; and
- The Portsdown Chalk Formation is shown in bright green.

Figure 3 – Annotated Extract from the BGS showing Bedrock Geology



3.3.3 Through comparison of a broader area of the BGS mapping and HCC's online map the safeguarded Brick Making Clays are within the Lambeth Group.

3.4 RSK GEO-ENVIRONMENTAL SITE ASSESSMENT 2016

- 3.4.1 Geo-investigation works were completed by RSK in 2016 for a previous planning application at the site. The 2016 report states that the exploratory holes revealed that the site is underlain by a variable thickness of topsoil over Head Deposits with Bognor Sand Member and Lambeth Group also encountered at shallow depths.
- 3.4.2 The eighteen borehole logs have been summarised into tables and are included in Appendix A. An Exploratory Hole Location Plan has also been included in the Appendix.
- 3.4.3 The eighteen boreholes were constructed to depths of between 3m and 3.45m.
- 3.4.4 The descriptions in the borehole logs include references to made ground within the topsoil at BH1 – BH7. Boreholes BH1 – BH7 were in the northwest of the site. Topsoil was recorded with no made ground at boreholes BH8 – BH18 (except BH16). The topsoil ranged between 0.2m and 0.35m thickness.
- 3.4.5 Head Deposits was generally encountered beneath the topsoil / made ground. Head Deposits were recorded between the topsoil/ made ground to the base of the boreholes at fourteen locations (1,2,3,4,5,6,7,9,10,11, 15, 16, 17 and 18). The base of the borehole was either at 3m or 3.45m. In BH8 the Bognor Sand member (which comprised very silty clayey sand) was encountered between the topsoil and the base of the borehole and in BH12 the Bognor Sand Member was encountered below a 1.4m band of Head Deposits.
- 3.4.6 The Lambeth Group was encountered at BH13 and BH14 beneath Head Deposits at depths of 1m and 1.1m respectively. The clays were encountered to the base of the boreholes. As previously described it is considered likely that these are the clays that are safeguarded by HCC.
- 3.4.7 The predominant strata classification of the Head Deposits was also clay, and the clays were generally described as sandy. The clay was also described as silty and gravelly in some of the strata descriptions. Sand was the predominant strata description in three boreholes (BH8, BH12 and BH15) and contained either clays, silts or clays and silts. The sandier strata were found in the southern part of the site, within or close to the Head Deposits as indicated by the BGS (see Figure 2, page 6).
- 3.4.8 Made ground was recorded in borehole 7 and was 1.2m thick. Excluding made ground within the topsoil, no other made ground was encountered in the site investigation works. Summary tables of the borehole logs are provided below. Head Deposits, the Lambeth Group and the Bognor Sand Member have been abbreviated as HD, BSM and LG.

Table 1 – Summary of RSK Borehole logs

Borehole Record	BH1		BH2		BH3		BH4		BH5		BH6	
	Made Ground (topsoil)	0.35	Made Ground (topsoil)	0.35	Made Ground (topsoil)	0.3	Made Ground (topsoil)	0.3	Made Ground (topsoil)	0.3	Made Ground (topsoil)	0.3
Strata 1	Slightly sandy CLAY (HD)	3.10	Sandy CLAY (HD)	2.65	Slightly sandy, gravelly CLAY (HD)	0.6	Sandy, slightly gravelly CLAY (HD)	0.7	Silty CLAY (HD)	3.15	Slightly sandy CLAY (HD)	3.15
Strata 2					Slightly sandy CLAY (HD)	1.10	Slightly sandy CLAY (HD)	1				
Strata 3					Slightly sandy, silty CLAY (HD)	1.45	Sandy silty CLAY (HD)	1				
Total depth		3.45		3		3.45		3		3.45		3.45

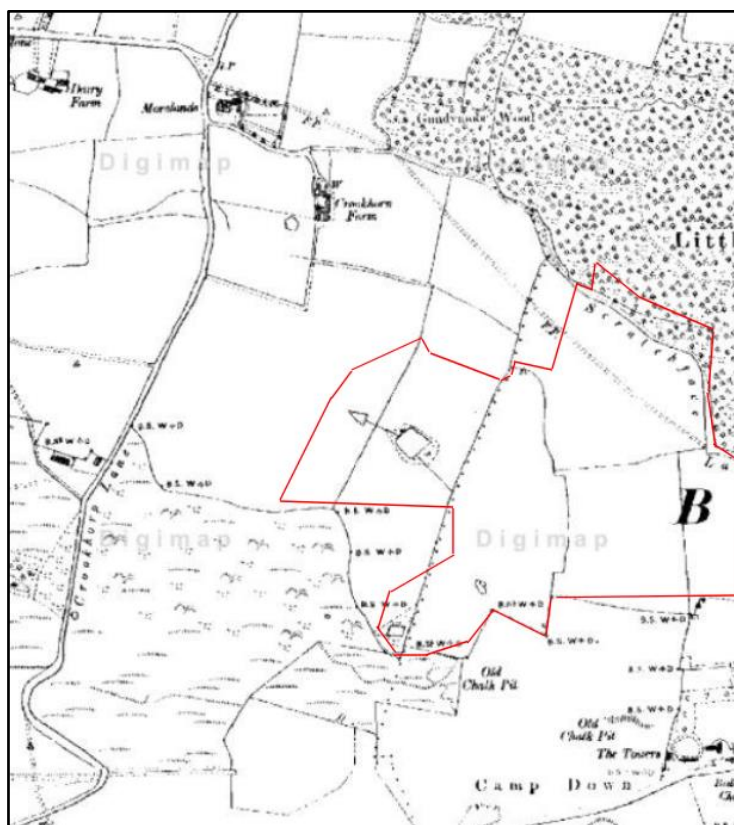
Borehole Record	BH7		BH8		BH9		BH10		BH11		BH12	
	Made Ground (topsoil)	0.3	Topsoil	0.2	Topsoil	0.35	Topsoil	0.3	Topsoil	0.2	Topsoil	0.3
Strata 1	Made Ground (clay)	1.2	Very silty, clayey SAND (BSM)	3.25	Silty CLAY (HD)	3.1	Slightly gravelly, silty CLAY (HD)	2.7	Sandy Gravelly CLAY (HD)	0.3	Sandy CLAY (HD)	1.4
Strata 2	Silty CLAY (HD)	1.5							Sandy Silty CLAY (HD)	2.95	Silty SAND (BSM)	1.3
Total depth		3		3.45		3.45		3		3.45		3

Borehole Record	BH13		BH14		BH15		BH16		BH17		BH18	
	Topsoil	0.3	Topsoil	0.3	Topsoil	0.3	Slightly sandy, silty CLAY (HD)	3.45	Topsoil	0.25	Topsoil	0.25
Strata 1	Slightly sandy, silty CLAY (HD)	0.7	Slightly sandy, gravelly CLAY (HD)	0.8	Very sandy, slightly gravelly CLAY (HD)	0.7			Slightly sandy CLAY (HD)	3.2	Sandy, silty CLAY (HD)	3.2
Strata 2	CLAY (LG)	2.45	Slightly gravelly CLAY (LG)	1.9	Clayey SAND (HD)	2.45						
Total depth		3.45		3		3.45		3.45		3.45		3.45

3.5 HISTORICAL MINERAL WORKINGS

- 3.5.1 Historical mapping indicates that a chalk pit was located adjacent to the southern boundary of the site. ‘Old Chalk Pit’ is annotated on the below OS map from 1860. Mapping up until 1910 shows the symbol for a quarry site. It is not known for sure whether the quarrying activity extended into the application site, although no evidence of this was found in the ground investigation works.

Figure 4 – Extract from Digimaps Historical Mapping Service



4.0 THE SITE

- 4.0.1 The site is around 25ha and comprises two large fields with dispersed trees and hedgerows. Much of the site is bordered by hedgerows and trees. The site generally slopes from west to east. An aerial image of the site is shown below.

Figure 5 – Google Maps Aerial Screenshot



- 4.0.2 As shown in the above image, the A3 is located to the east of the site beyond a narrow stretch of woodland. The woodland becomes thicker to the northeast of the site and to the southeast of the site, albeit to a lesser extent. Scratchface Lane is located within the narrow stretch of woodland to the east and extends around the site to the north.
- 4.0.3 Havant and South Downs College is located to the north of the site. College Road abuts the western boundary of the site and beyond College Road are houses within Widley.
- 4.0.4 Portsmouth Golf Course is to the southwest of the site. An open field and area of scrub land is to the southeast of the site.

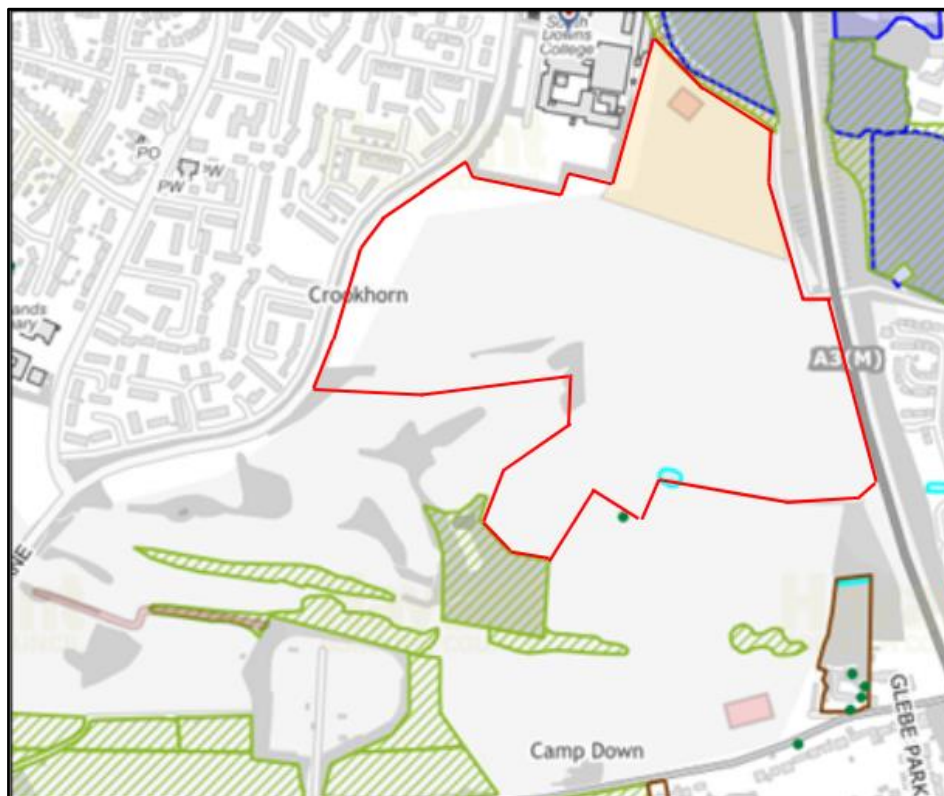
4.1 ENVIRONMENTAL SITE SETTING

- 4.1.1 The environmental setting of the site in respect of ecological and other environmental designations, as well as the presence of existing built development and other land uses all have the potential to constrain the physical extraction of mineral.
- 4.1.2 The extraction of surface as well as deeper mineral deposits requires the removal of overlying surface soils and vegetation and the winning of mineral deposits can impact on hydrogeological and hydrological water flows.
- 4.1.3 Any extraction within the water table would likely require de-watering activities which could, for example, give rise to hydrological and ecological considerations. Consent would be required from the Environment Agency (EA) to allow for the water collected from the pumping exercise to be discharged into the local watercourses.
- 4.1.4 In addition, although quarrying operations are subject to stringent controls in respect of issues such as noise generation and dust management it would be expected that appropriate stand-offs and buffers would be maintained between mineral working and existing built development and ecologically sensitive areas.
- 4.1.5 This section of the report identifies environmental designations and existing land uses that might impact upon the ability to extract mineral from within the footprint of the site. It should be noted that each of these topics have been considered in detail in their own dedicated reports.

Ecological Designations

- 4.1.6 As described above, there are dispersed trees and hedgerows within the site, mainly around its perimeter. Havant Borough Council's Interactive Map shows there are Tree Preservation Orders (one single tree and one group) on trees on the southern boundary of the site. The single tree is indicated by a green dot and the group of trees is indicated by a blue circle.
- 4.1.7 Some of the land to the south of the site is locally designated as a Site of Important Nature Conservation (SINC).
- 4.1.8 An extract of the Havant Interactive Map is shown below.

Figure 6: Havant Interactive Map Aerial Screenshot



- 4.1.9 DEFRA's interactive MAGIC website, which is managed by Natural England, shows there are no Statutory Designated ecology sites within or near to the site's boundary. The MAGIC website shows there is deciduous woodland around parts of the site's northern, eastern, and southern boundaries.

Hydrology

- 4.1.10 There is a small pond, related to Portsmouth Golf Course, adjacent to the southern boundary of the site.

Hydrogeology

- 4.1.11 RSK's Geo-environmental Site Assessment states: -

'The site has been classified by the EA website to overlie a:-

- secondary A aquifer: permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers; and*
- 'unproductive' strata: low permeability with negligible significance for water supply or river base flow.'*

The soils beneath the site are classified as having LOW (L) leaching potential.'

- 4.1.12 RSK's Geo-environmental Site Assessment indicates that the site lies within zone 1 and 1c of the groundwater Source Protection Zone.

Flood Risk

- 4.1.13 The Flood Map for Planning service, which is managed by the Environment Agency, shows that the site is located within a Flood Zone 1, which is land with the lowest probability of flooding from rivers and the sea.

Landscape and Public Rights of Way

- 4.1.14 The site is not located within an area designated for its landscape value such as an Area of Outstanding Natural beauty (AONB) or a National Park.
- 4.1.15 Hampshire County Council's interactive Public Right of Way (PRoW) map shows there is a single PRoW that cuts through the north of the site. This is shown on the diagram below. The pink lines indicate public footpaths, and the green lines indicate Bridleways.

Figure 7: Hampshire County Councils Illustrated PRoW Map



Cultural Heritage and Archaeology

- 4.1.16 Havant Borough Councils Interactive Map shows that the northern field within the proposed site contains an Archaeology Area of importance (yellow shading) and great importance (red shading). These features are shown in Figure 6. There is also an Archaeology Area of great importance to the south of the site to the west of Listed Buildings which are outlined in brown. The Historic England map indicates that the Scheduled Monument in the north of the site is a Roman Villa. This is also illustrated on HCCs PRoW map as shown above and the EnviroCheck report provided by RSK's Geo-environmental Site Assessment.

4.2 EXISTING BUILT DEVELOPMENT AND INFRASTRUCTURE

- 4.2.1 As described previously the site is within a residential area and the MAGIC website shows that the site is within a 'Built-Up-Area'.

Utilities

- 4.2.2 The appended Exploratory Hole Location Plans shows that a foul sewer underlies the northern part of the proposed developable area of the site (see plan in conjunction with the Planning Layout drawing). Overhead electricity cables cross the northern part of the site although this area is not proposed for development.

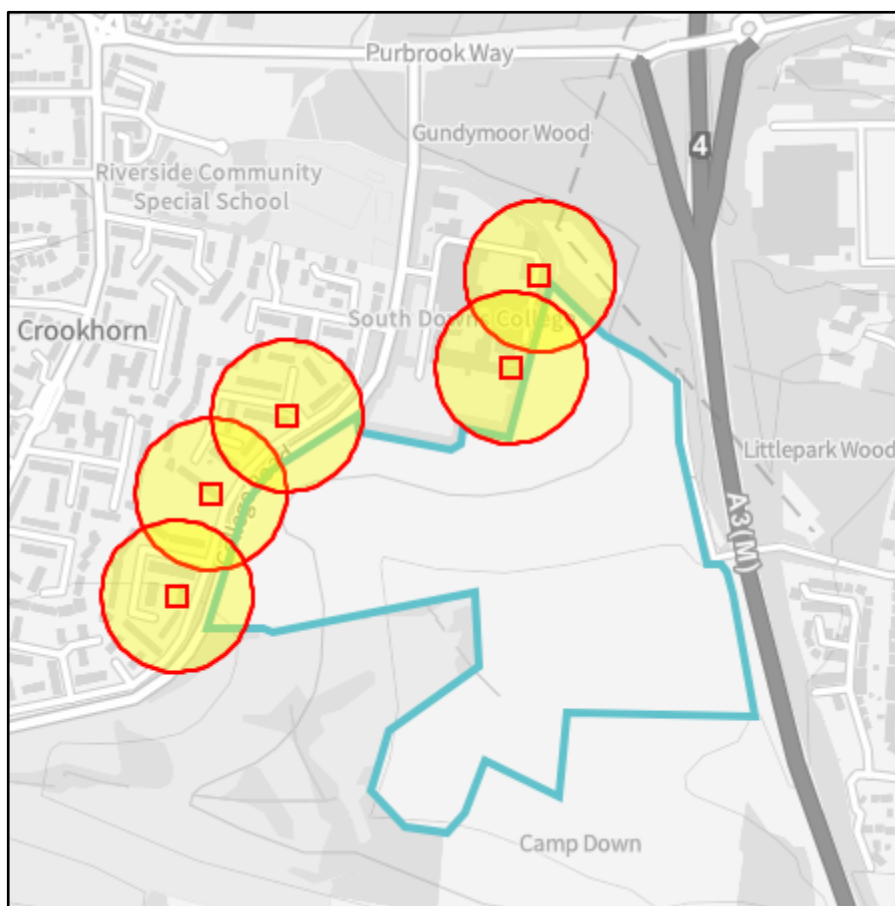
Access

- 4.2.3 As previously described the site borders the A3, which provides access to and from the north. The M27 and A27 are also in fairly close proximity to the south and provide access to the west and east respectively. The site is seemingly well located to the strategic road network, but the use of the suitability of the local road network would require further evaluation regarding any future mineral's extraction.

Separation Areas

- 4.2.4 The environmental setting of the site and the existing built environment, has the potential to constrain the physical extraction of the underlying mineral resource.
- 4.2.5 Paragraph 5.15 of the HMWP states that '*mineral extraction and inert waste recycling sites to have a minimum buffer zone of 100 metres, where appropriate, from the nearest sensitive human receptors, such as homes and schools, though this distance will be reviewed on a case-by-case basis*'.
- 4.2.6 This assessment has used a 100m buffer zone from sensitive land uses for indicative purposes and to provide a positive indication of the potential mineral resource that could be recovered.
- 4.2.7 The below exercise has shown that the western part of the site could be constrained from future minerals extraction.

Figure 8: MAGIC Extract showing Site Boundary (blue) with 100m Buffer Zones from Housing (red)



- 4.2.8 As shown in the attached layout plan there are trees and hedges located within the site and along its boundary. Small buffer zones, i.e. for root protection, would likely also to be required around the landscape/ planting features which are to be retained.

Summary

- 4.2.9 This section has described the environmental site setting, as well as existing built development, that could impeditment the extraction of mineral reserves that are identified within the footprint of the site.
- 4.2.10 Pertinent to the consideration of any minerals working at the site is the nature of the immediate site surroundings. Residential properties border the western part of the site. Mineral operations tend to be located more rurally further from away from urban areas.
- 4.2.11 It is considered likely that if this site was promoted for minerals extraction through a Minerals Plan process it would be scoped out at an early stage.

5.0 ANALYSIS

- 5.0.1 There is a clear framework of planning policy in respect of minerals safeguarding. This policy is designed to ensure that valuable mineral resources are not unnecessarily sterilised, and that where non-mineral development is permitted that due consideration is given to ensuring that appropriate investigations are undertaken to establish if any viable mineral deposits can be recovered as part of the development process (from full prior extraction to incidental extraction).
- 5.0.2 Hampshire Council's Interactive Map shows that the southern part of the site is within a Brick Clay MWCA.
- 5.0.3 Recent geological assessment indicates that the site is predominantly underlain by Head Deposits to depths of at least 3.45m. The Lambeth Group, which coincides with HCC's Brick Clay MWCA, was encountered in two boreholes (BH13 and BH14) around 1m below ground level. Given that BH12 and BH15, were located near to these two boreholes, and did not encounter the Lambeth Group (to depths of 3m and 3.45m respectively) the site works suggest that the Lambeth Group that extends beneath the site is either very narrow or is at varying depths across the site. The BGS (see Figure 3) does however indicate that the Lambeth Group is very narrow at the site.
- 5.0.4 It is considered highly likely that the working of what would be a relatively small quantity of mineral would not be commercially viable. In general, clay workings require vast resources. The site is also around 35 miles from Michelmersh Brickworks. The transportation cost of moving a relatively small amount of material is a consideration.
- 5.0.5 In respect of other considerations, policy clauses of HMWP 15 are discussed further in this section. HMWP 15 is set out in section 4 of this report and the information that informs this section has been described in the preceding sections of the report.

5.1 B - IT WOULD BE INAPPROPRIATE TO EXTRACT MINERAL RESOURCES AT THAT LOCATION, WITH REGARDS TO THE OTHER POLICIES IN THE PLAN; OR...

- 5.1.1 Whilst the HMWP does specify a minimum 100m buffer zone will be required, it is known that when allocating sites for minerals extraction MPA's will often discount sites if they are located close to areas or lines of housing, such as the case with this site.
- 5.1.2 The retention of trees and implementation of root protection zones would also reduce the potential workable area. The underlying foul sewer could also complicate and restrict mineral extraction at the site.
- 5.1.3 As described in section 4 the site is partly located in a Secondary A aquifer: the groundwater within this aquifer could be a sensitive receptor.

- 5.1.4 Any deep level mineral extraction would likely require restoration through the importation of material with similar characteristics to what would be extracted, which could be considered impracticable.
- 5.1.5 The Lambeth Formation was encountered around 1m below ground level meaning there would be overburden material to manage.
- 5.1.6 The narrow nature of the safeguarded clays may also make an extensive or deep level mineral extraction impracticable, and it is certainly questionable as to whether it could be deemed appropriate.
- 5.1.7 A deeper level of mineral extraction would likely require a full planning application subject to Environmental Impact Assessment. The site would likely require restoration through the importation of material following or simultaneous to the extraction of the resource. This could be over a number of years and would cause considerable delay to the housing development.

5.2 C. THE DEVELOPMENT WOULD NOT POSE A SERIOUS HINDRANCE TO MINERAL DEVELOPMENT IN THE VICINITY; OR

- 5.2.1 The land surrounding the north, east and west of the site is already developed and a golf course is located to the south. Part of the land to the south of the site has also previously been worked for minerals. It is therefore considered that the proposals would not cause a hindrance to minerals development in the vicinity as it is very unlikely to be feasible anyway.

6.0 CONCLUSIONS AND RECOMMENDATIONS

- 6.0.1 It is considered that a full or deep level minerals extraction is not viable at the site. This is mainly due to the limited extent of the safeguarded clays that fall within the site. The site is also located approximately 35 road miles from Michelmersh Brickworks.
- 6.0.2 A cut and fill exercise will take place, and this will help determine the amount of material that would need to be exported off site. Materials and soils will also be encountered during the preparatory earthworks after levelling works are complete. In terms of any soils or materials (including safeguarded clays) that are encountered it is considered that the most suitable use would likely be as backfill material. Only very small quantities of clay would be encountered due to the extent of superficial deposits at the site.
- 6.0.3 To conclude it is not considered that a minerals extraction will be viable at the site. This report recommends that as much site derived material is reused on site as possible. This would have sustainability benefits as it could reduce the number of Heavy Goods Vehicle movements required for the site's construction as less material aggregate may be required to be brought into the site and less muck-away material would be exported from the site.

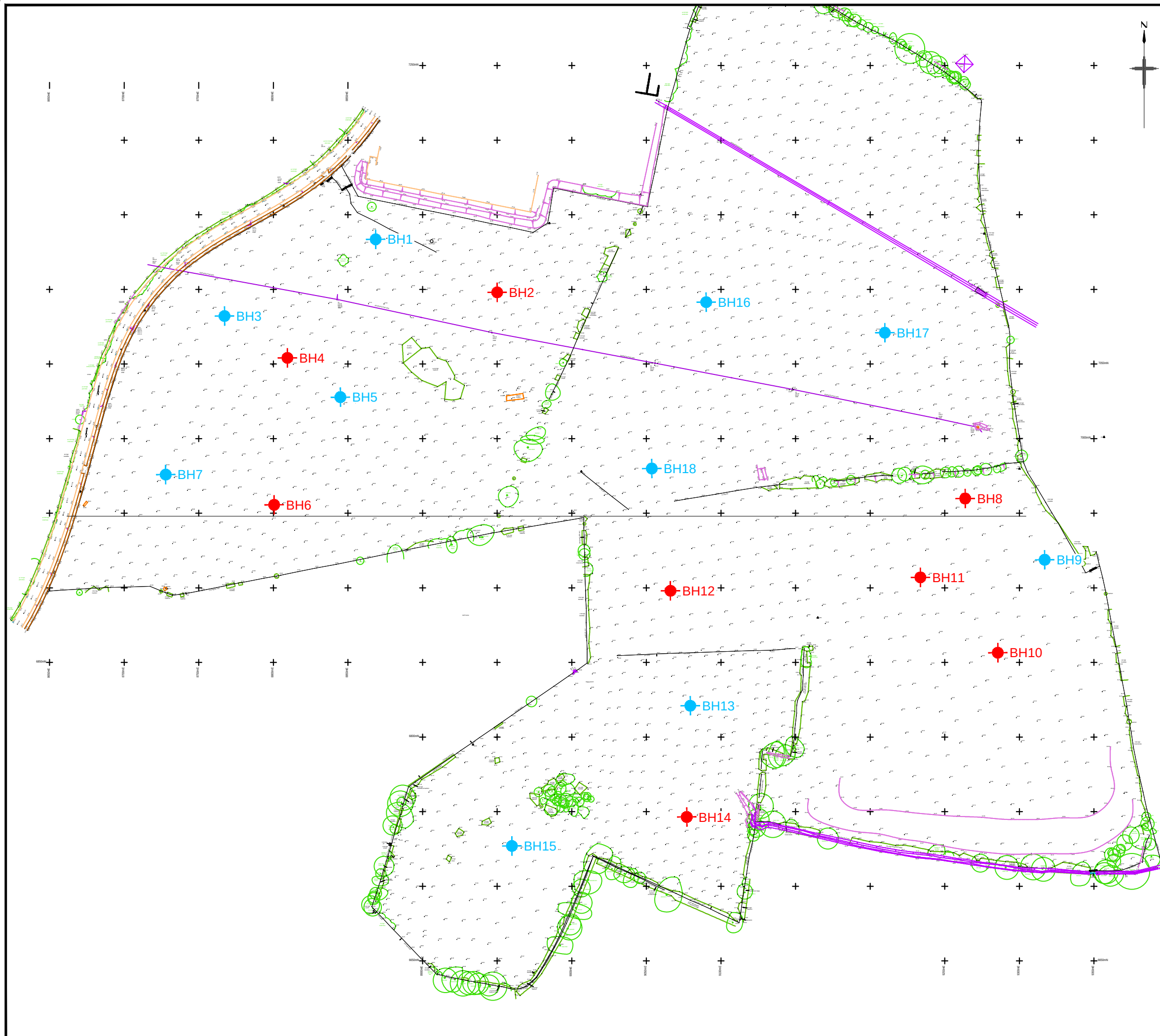
DRAWINGS

Sketch Layout – Drawing Number CB_62-265-001



CAMPDOWN, PURBROOK, PORTSMOUTH						628
SCHEDULE OF DWELLINGS						
REF	NAME	DESCRIPTION	SQ.FT	HEIGHT	NO	CALC
PRIVATE						
BLM	BLENHEIM	5 BEDROOM HOUSE	2249	2.0	6	13494
CHL	CHARTWELL	4 BEDROOM HOUSE	1564	2.0	4	6256
ROC	ROCKBOURNE	4 BEDROOM HOUSE	1394	3.0	10	13940
GOO	GOODWOOD	4 BEDROOM HOUSE	1489	2.0	19	28291
WOB	WOBRUN	4 BEDROOM HOUSE	1232	2.0	22	27104
PEN	PENHURST	4 BEDROOM HOUSE	1211	2.0	14	16954
OAT	OATHAM	4 BEDROOM HOUSE	1180	2.0	4	4720
SPA	SPARSHOLT	3 BEDROOM HOUSE	1394	3.0	13	18122
ASH	ASHLEY	3 BEDROOM TOWNHOUSE	1302	2.5	23	29946
WYK	WYCK	3 BEDROOM HOUSE	1247	3.0	15	18705
BLY	BLETCHLEY	3 BEDROOM TOWNHOUSE	1229	3.0	30	36870
GOS	GOSFORD	3 BEDROOM HOUSE	1039	2.0	51	52989
GOD	GOSFORD	3 BEDROOM HOUSE	1039	2.0	18	18702
PAR	PARHAM	3 BEDROOM TOWNHOUSE	1014	2.5	39	39546
FRO	FROGMORE	3 BEDROOM HOUSE	1000	2.0	8	8000
CHA	CHARLESTON	3 BEDROOM HOUSE	906	2.0	23	20838
LIP	LIPPEN	2 BEDROOM DUPLEX	989	3.0	8	7912
CHN	CHARLESTON	2 BEDROOM HOUSE + STUDY	906	2.0	26	23556
BIN	BNSTED	2 BEDROOM COACH HOUSE	794	2.0	13	10322
VYN	VYNE	2 BEDROOM HOUSE	757	2.0	11	8327
BLOCK A	2BFA	2 BEDROOM FLAT	772	3.0	42	32424
BLOCK B	2BFB	2 BEDROOM FLAT	767	3.0	12	9204
BLOCK B	2BFB	2 BEDROOM FLAT	765	3.0	12	9180
BLOCK C	2BFC	2 BEDROOM FLAT	761	3.0	3	2283
BLOCK C	2BFC	2 BEDROOM FLAT	759	3.0	3	2277
1BFA	1BFA	1 BEDROOM FLAT	566	3.0	8	4528
BLOCK C	1BFC	1 BEDROOM FLAT	559	3.0	3	1677
SUB TOTAL					440	466167
AFFORDABLE @ 30% +						
OAK	OAKHAM	4 BEDROOM HOUSE	1180	2.0	2	2360
MON	MONK	3 BEDROOM HOUSE	1039	2.0	13	13507
LAN	LANGSTONE	3 BEDROOM TOWNHOUSE	1014	2.5	7	7098
MAI	MAIDSTONE	3 BEDROOM HOUSE	1002	2.0	10	10020
TAU	TAUNTON	3 BEDROOM HOUSE	906	2.0	19	17214
GRA	GRATELEY	2 BEDROOM COACH HOUSE	794	2.0	13	10322
BED	BEDFORD	2 BEDROOM HOUSE	757	2.0	19	14383
BLOCK E	2BFE	2 BEDROOM FLAT	772	3.0	18	13896
BLOCK F	2BFF	2 BEDROOM FLAT	772	3.0	18	13896
BLOCK G	2BFG	2 BEDROOM FLAT	767	3.0	15	11505
BLOCK G	2BFG	2 BEDROOM FLAT	765	3.0	15	11475
BLOCK H	1BFH	1 BEDROOM FLAT	546	2.0	39	21294
SUB TOTAL					188	146970
GRAND TOTAL					628	613137

APPENDIX A - RSK 2016 GEO-INVESTIGATION EXTRACTS



LEGEND

- Borehole Location
- Borehole Location with Installation

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT
United Kingdom

Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client
RADIAN

Project Title
**CAMPDOWN,
WATERLOOVILLE**

Drawing Title
**EXPLORATORY HOLE
LOCATION PLAN**

Drawn ASC	Date 11.08.16	Checked ARJ	Date 11.08.16	Approved ARJ	Date 11.08.16
Scale 1:2500	Orig Size A3	Dimensions m			

Project No. 28720 - R01 (00)	Drawing File 28720 (R01-00) Fig 2.dwg
Drawing No. FIGURE 2	Rev. P1

Scale 1 : 2,500
0 20 40 60 80 100 120 140 160 180 200m



WINDOW SAMPLE LOG

Contract: Campdown			Client: Radian		Window Sample: BH1
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---		Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: (Firm) orange brown sandy slightly gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to medium of brick. (Topsoil)	(0.35)	
	0.50	2	D				Firm medium strength orange brown mottled grey slightly sandy CLAY. Sand is fine. (HEAD DEPOSITS)	0.35	
	0.50		V	c _r =66					
	1.00-1.45	1	SPT	N=10				(3.10)	
	1.10		V	c _r =66					
	1.50	3	D						
	2.00-2.45	2	SPT	N=16					
	2.50	4	D						
	3.00-3.45	3	SPT	N=23					
							... Below 3.00m bgl, high strength		
								3.45	
							Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH2
Contract Ref: 28720	Start: 02.08.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: (Firm) orange brown sandy slightly gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to medium of brick. (Topsoil)	(0.35)	
	0.50	2	D				Firm medium strength orange brown mottled grey sandy CLAY. Sand is fine. (HEAD DEPOSITS)	0.35	
	0.50		V	c _r =57					
	1.00		V	c _r =67					
	1.50	3	D					(2.65)	
							... Below 2.00m bgl, orange red brown mottled grey.		
	2.30		V	c _r =80			... Below 2.30m bgl, high strength		
	2.50	4	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH3
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick-ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey slightly sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (HEAD DEPOSITS)	(0.60)	
	0.60		V	c _r =45				0.90	
	1.00-1.45	1	SPT	N=11			Firm medium strength orange red brown mottled grey slightly sandy CLAY. Sand is fine. (HEAD DEPOSITS)	(1.10)	
	1.40		V	c _r =61					
	1.50	3	D					2.00	
	2.00-2.45	2	SPT	N=7			Firm medium strength orange brown mottled grey slightly sandy silty CLAY. (HEAD DEPOSITS)	(1.45)	
	2.30		V	c _r =41					
	2.50	4	D						
	3.00-3.45	3	SPT	N=7				3.45	
							Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH4
Contract Ref: 28720	Start: 02.08.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to medium of flint. (HEAD DEPOSITS)	(0.70)	
	0.80	V		$c_r=44$			Firm grey brown slightly sandy CLAY with occasional flint gravel. Sand is fine. Gravel is angular to subrounded fine to medium. (HEAD DEPOSITS)	1.00	
	1.40	3	D				... Between 1.20 and 1.25m bgl, gravel band with water.	(1.00)	
	2.40	4	D				... Between 1.90 and 2.00m bgl, gravel band with water. Firm orange grey brown mottled sandy silty CLAY. Sand is fine. (HEAD DEPOSITS)	(1.00)	
							Borehole terminated at 3.00m depth.	3.00	

Drilling Progress and Water Observations						General Remarks						
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	1. Groundwater was encountered between 1.20-1.25m 2. Borehole backfilled with arisings upon completion						
						All dimensions in metres		Scale:	1:25			
Method Used:	Tracked window sampling			Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight	Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH5
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick-ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium strength orange brown grey mottled silty CLAY. (HEAD DEPOSITS)		
	0.50		V	$c_r=67$					
	1.00-1.45	1	SPT	N=10			... Below 0.80m bgl, flint gravel with red orange clay band.		
	1.50	3	D				... Below 1.40m bgl, grey brown with occasional decomposed plant matter and flint gravel.		
	1.60		V	$c_r=60$				(3.15)	
	2.00-2.45	2	SPT	N=10					
	2.70	4	D						
	3.00-3.45	3	SPT	N=8					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH6
Contract Ref: 28720	Start: 02.08.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	D				Firm medium to high strength orange brown mottled grey slightly sandy CLAY. (HEAD DEPOSITS)	0.30	
	0.60		V	c _r =58					
	0.90		V	c _r =75					
	1.00-1.45	1	SPT	N=11					
	1.50		V	c _r =89					
	1.60	3	D				. . . At 1.60m bgl, single flint gravel, subrounded, coarse.	(3.15)	
	2.00-2.45	2	SPT	N=12			. . . Below 2.00m bgl, firm to stiff red orange brown grey mottled.		
	2.50		V	c _r =89					
	2.60	4	D						
	3.00-3.45	3	SPT	N=12					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Rootlets to 1.00m depth 3. Borehole backfilled with arisings upon completion			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH7
Contract Ref: 28720	Start: 07.09.16 End: 02.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				MADE GROUND: Grass over friable sandy gravelly CLAY. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Topsoil)	(0.30)	
	0.50	2	ES				MADE GROUND: Orange brown sandy slightly gravelly CLAY with occasional pockets of grey clay. Sand is fine. Gravel is angular to subrounded fine to coarse of flint. (Reworked Natural)	(0.70)	
	1.10-1.20	3	ES				MADE GROUND: (Firm) grey brown silty slightly gravelly CLAY. Gravel is subrounded to subangular fine to coarse of brick and clinker.	(0.50)	
	1.70	V		$c_i=35$			Soft becoming firm low strength orange brown mottled grey silty CLAY. (HEAD DEPOSITS)	(1.50)	
	2.30	4	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH8
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.00-0.20	1	ES				TOPSOIL: Light brown slightly clayey SAND. Sand is fine.	0.20	
	0.50	2	D				Dense orange brown very silty clayey fine SAND. (BOGNOR SAND MEMBER) ... At 0.60m bgl, single subangular coarse flint gravel.		
	1.00-1.45	1	SPT	N=38					
	1.30	3	D						
	2.00-2.45	2	SPT	N=41					
	2.50	4	D						
	3.00-3.45	3	SPT	N=40					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks						
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion						
						All dimensions in metres		Scale:	1:25			
Method Used:	Tracked window sampling			Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight	Checked By:	



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH9
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick-ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint.	(0.35)	
	0.50	2	D				Firm medium to high strength orange brown mottled grey silty CLAY. (HEAD DEPOSITS)	0.35	
	0.50		V	c _r =65					
	1.00-1.45	1	SPT	N=7			... Below 1.00m bgl, occasional orange brown silty sand parting.		
	1.15		V	c _r =66					
	1.40	3	D						
	1.80		V	c _r =76					
	2.00-2.45	2	SPT	N=8			... Below 2.00m bgl, red orange brown grey mottled.		
	2.60	4	D						
	3.00-3.45	3	SPT	N=17					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH10
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint.	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of flint. (HEAD DEPOSITS)	0.30	
	0.50		V	c _r =52					
	1.30	3	D				... Below 1.00m bgl, red brown orange grey mottled and no gravel.		
	1.30		V	c _r =53				(2.70)	
	2.50	4	D						
	2.50		V	c _r =63				3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH11
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint.	0.20	
	0.40	2	D				Firm brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse of flint. (HEAD DEPOSITS)	(0.30) 0.50	
	0.70 0.80	3	V D	c _r =46			Firm medium strength orange grey brown mottled slightly sandy silty CLAY with occasional silty sand partings. (HEAD DEPOSITS)		
	1.00-1.45	1	SPT	N=8					
	1.50 1.60	4	V D	c _r =63					
	2.00-2.45	2	SPT	N=11			... Below 2.00m bgl, red orange grey brown mottled.	(2.95)	
	2.50 2.50	5	D V	c _r =64					
	3.00-3.45	3	SPT	N=13					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH12
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES	c _r =72			TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.40	2	D				Firm medium strength orange brown grey mottled sandy CLAY. (HEAD DEPOSITS)	0.30	
	0.50		V						
								(1.40)	
	1.40	3	D	c _r =65			Orange brown silty SAND. (BOGNOR SAND MEMBER) ... Below 2.00m bgl, slightly damp.		
	1.50		V					1.70	
	1.90	4	D						
								(1.30)	
	2.50	5	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH13
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.50	2	D				Firm medium strength orange brown mottled grey slightly sandy silty CLAY. Sand is fine. (HEAD DEPOSITS)	(0.70)	
	0.50		V	c _r =50					
	1.00-1.45	1	SPT	N=8			Firm medium strength red orange brown grey mottled CLAY. (LAMBETH GROUP) ... Below 1.00m bgl, red orange brown grey mottled.	1.00	
	1.50	3	D						
	1.50		V	c _r =65					
	2.00-2.45	2	SPT	N=10				(2.45)	
	2.70	4	D				... Below 2.50m bgl, becoming fissured with no sand.		
	3.00-3.45	3	SPT	N=16				3.45	
							Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH14
Contract Ref: 28720	Start: 03.08.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.60	2	D				Orange brown slightly sandy gravelly CLAY. Sand is fine. Gravel is angular to subangular medium to coarse of flint. (HEAD DEPOSITS)	(0.80)	
	1.30	3	D				Firm high strength red grey mottled slightly sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to rounded fine to coarse of flint. (LAMBETH GROUP)	1.10	
	1.60		V	c _r =>120			... Below 1.50m bgl, becoming stiff to very stiff with no gravel.	(1.90)	
	2.40	4	D					3.00	
							Borehole terminated at 3.00m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Borehole backfilled with arisings upon completion			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor		Drilled By:	Michael O'Shea	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH15
Contract Ref: 28720	Start: 07.09.16 End: 03.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick-ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Red brown grey mottled sandy CLAY.	(0.30)	
	0.50	2	D				Soft orange grey brown mottled very sandy slightly gravelly CLAY. Sand is fine. Gravel is angular to subangular fine to medium of flint. (HEAD DEPOSITS)	(0.70)	
	1.00-1.45	1	SPT	N=24			Grey high strength orange mottled clayey SAND with rare flint gravel and occasional band of clay. Gravel is angular to subangular fine to coarse. (HEAD DEPOSITS)	1.00	
	1.40	3	D						
	2.00-2.45	2	SPT	N=16			. . . Below 2.00m bgl, medium strength.	(2.45)	
	2.70	4	D						
	3.00-3.45	3	SPT	N=9					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)	1. Groundwater encountered between 2.00-2.50m 2. Gas and groundwater monitoring well installed to 3.00m depth.			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH16
Contract Ref: 28720	Start: 07.09.16 End: 04.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				Grass over firm medium strength orange brown mottled grey slightly sandy silty CLAY with occasional silty sand partings. Sand is fine. (HEAD DEPOSITS)		
	0.50	2	D						
	0.50		V	c _r =75					
	1.00-1.45	1	SPT	N=10			... Below 1.00m bgl, becoming sandy silty clay.		
	1.20		V	c _r =54					
	1.40	3	D						
	2.00-2.45	2	SPT	N=18					
	2.50	4	D						
	3.00-3.45	3	SPT	N=18					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Roots present to 0.80m 3. Gas and groundwater monitoring well installed to 3.00m			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH17
Contract Ref: 28720	Start: 07.09.16 End: 04.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Depth (Thick-ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Firm brown sandy gravelly CLAY. Sand is fine. Gravel is subangular to subrounded fine to medium of chalk and rare brick.	0.25	
	0.50	2	D				Firm medium to high strength orange brown slightly sandy CLAY. Sand is fine. Occasional mottled grey. (HEAD DEPOSITS)		
	0.50		V	$c_r=64$					
	1.00-1.45	1	SPT	N=10					
	1.20		V	$c_r=71$					
	1.30	3	D						
	1.60		V	$c_r=86$				(3.20)	
	2.00-2.45	2	SPT	N=13			. . . Below 2.00m bgl, occasional pockets of fine to medium sand.		
	2.40	4	D						
	3.00-3.45	3	SPT	N=13					
							Borehole terminated at 3.45m depth.	3.45	

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			



WINDOW SAMPLE LOG

Contract: Campdown		Client: Radian		Window Sample: BH18
Contract Ref: 28720	Start: 07.09.16 End: 04.08.16	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Progress		Samples / Tests			Water	Backfill & Instrumentation	Description of Strata	Depth (Thickness)	Material Graphic Legend
Window Run	Depth	No	Type	Results					
	0.10-0.20	1	ES				TOPSOIL: Brown grey mottled slightly sandy silty CLAY.	0.25	
	0.40	2	D				Firm medium strength orange brown grey mottled sandy silty CLAY. Sand is fine. (HEAD DEPOSITS)		
	0.50		V	$c_i=43$					
	0.80		V	$c_i=48$					
	1.00-1.45	1	SPT	N=9					
	1.20	3	D				... Below 1.00m bgl, red brown grey mottled, slightly sandy.		
	1.40		V	$c_i=70$					
	1.90		V	$c_i=75$					
	2.00-2.45	2	SPT	N=11					
	2.30	4	D						
	3.00-3.45	3	SPT	N=12					
								3.45	
							Borehole terminated at 3.45m depth.		

Drilling Progress and Water Observations						General Remarks			
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)				
						1. No groundwater was encountered 2. Gas and groundwater monitoring well installed to 3.00m depth			
						All dimensions in metres		Scale:	1:25
Method Used:	Tracked window sampling		Plant Used:	Archway Competitor+		Drilled By:	ADavidson	Logged By:	RSpeight
						Checked By:			