

CAULMERT LIMITED

Engineering, Environmental & Planning

Consultancy Services

Protreat Limited

LOXWOOD CLAY PIT DEVELOPMENT

Water Chapter

Prepared by:

Caulmert Limited

14 Farrington Way (Unit 3), Eastwood Link Business Park, Eastwood, Nottingham, NG16 3BF

Tel: 01773 749132

Fax: 01773 746280

Email: sarahvenning@caulmert.com

Web: www.caulmert.com

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Project Manager: Sarah Venning

Caulmert Limited: 14 Farrington Way (Unit 3), Eastwood Link Business Park, Nottingham, NG16 3BF

Tel: 01773 749132

Author	Sarah Venning	Date	19 th September 2020
Reviewer	Jon Clark	Date	28 th September 2020
Approved	Sarah Venning	Date	11 th May 2021

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1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Caulmert Ltd (Caulmert) was appointed by Protreat Limited on behalf of Loxwood Clay Pit limited (the Client) to carry out a Water Features Survey and Water Chapter to in relation to the proposed clay extraction and restoration from an area of former commercial forestry plantation on the old Pallinghurst Estate, Loxwood, Sussex. This chapter is a combined review of the baseline Water Environment (Hydrology, Hydrogeology and Flood Risk) in relation to the Site and the potential implications as a result of the Proposed Development

1.1.2 The site is location is presented Figure 1. The site covers approximately 8 Ha within an area of commercial woodland and recent plantation. The landholding of LCP extends beyond the application area..

1.1.3 The proposed development includes:

- Construction of a recycling process building
- Recycling activities associates with a recovery operation for construction and demolition waste;
- Extraction of clay and siltstone
- Restoration of the void with fines / residues from the recovery operations.
- Restoration of the site to mixed deciduous plantation with a small fishing lake for community use.

1.1.4 The maximum inputs/outputs from the site proposed are:

- Circa 12,500 tonnes clay/ siltstone (approximately 9600 m³)
- Circa 25,000 tonnes construction materials for treatment and recovery: of which
 - 12,500 tonnes recycled product
 - 12,500 tonnes for restoration.

1.1.5 The duration of the operations at the site is anticipated to be 34 years. The extraction and restoration will occur in a phased manner with restoration being completed as soon as practicable on a phased sequential basis.

1.1.6 The above proposed development hereinafter referred to as the 'Proposed Development'.

1.2 Study Area

1.2.1 The Study Area comprises:

- Site boundary as indicated in Red on Figure 1.
- Groundwater and surface water within 1km of the perimeter of the site boundary
- Private water abstractions within 1 km of the site boundary
- Licensed groundwater abstraction within 1km.

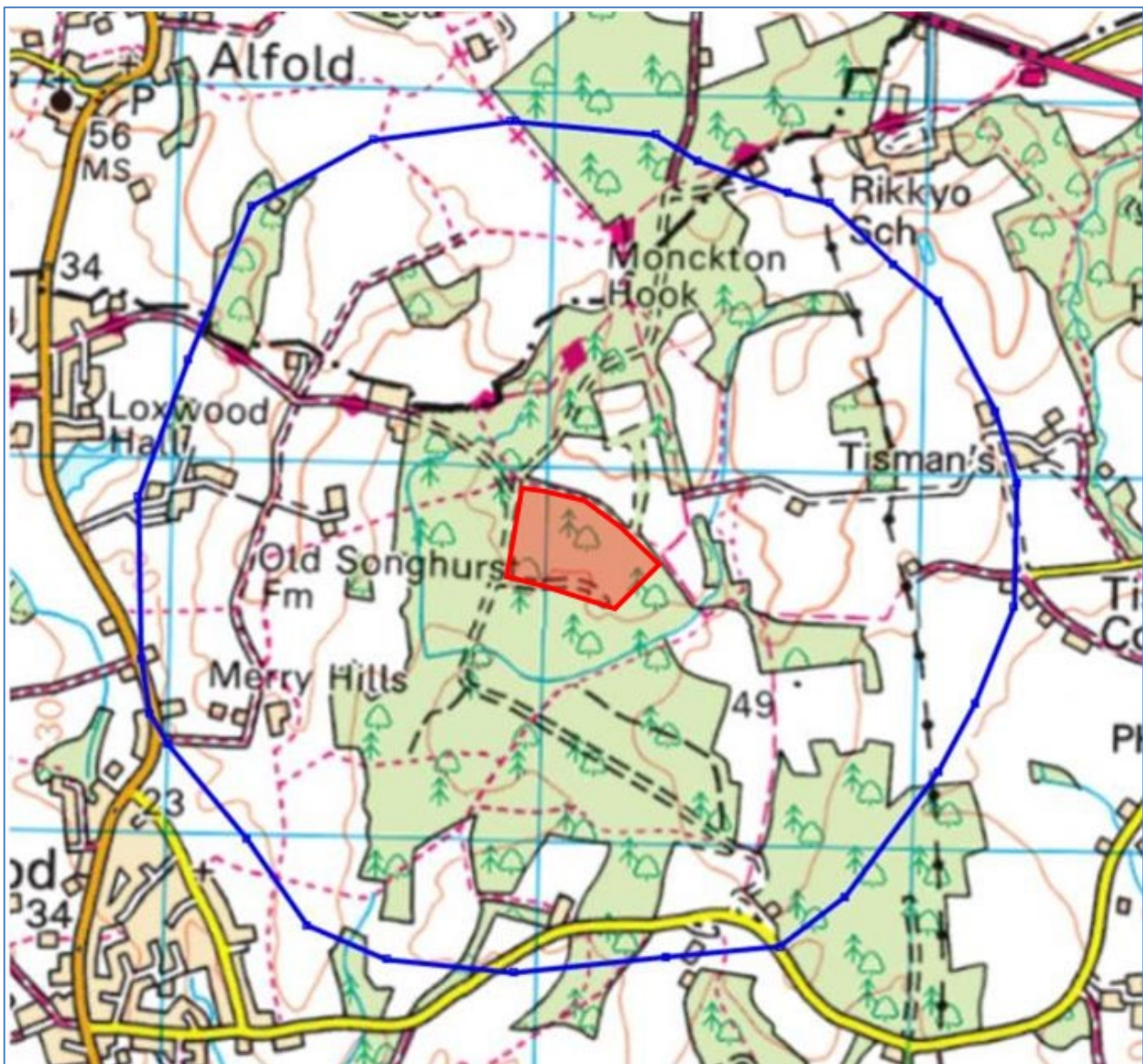


Figure 1 – Site location and Study Area

2 POLICY AND GUIDANCE

- 2.1.1 The National Planning Policy Framework and its accompanying Planning Policy Guidance on the Department for Communities and Local Government website: <http://planningguidance.planningportal.gov.uk> has been used in the production of this report.
- 2.1.2 In addition, a number of legislative and national guidance documents relating to the regulation control and sustainable preservation of the water environment have been referred to in the production of this report. In particular consideration has been given to the Water Framework Directive and the Environment Agency's Groundwater Protection Policy but other sources are included below:
- *EU Water Framework Directive (Directive 2000/60/EC)*
 - *Environment Agency Catchment Data Explorer 2016-Severn River Basin District*
 - *British Geological Survey 2020-Geology of Britain viewer*
 - *Environment Agency Groundwater Protection Policy and Practice 2013*
 - *Environment Agency Groundwater Protection Position Statement March 2017*
 - *Private Water Supply Regulations 2009*
 - *Environmental Impact Assessment (EIA) Regulations 2017 (HMSO, 2017).*
- 2.1.3 The Water Framework Directive (WFD) was transposed into English law in December 2003 through the Water Environment Regulations 2003 which came into force in January 2004. The Groundwater Regulations 2009 transpose certain elements of Directive 2000/60/EC, the Water Framework Directive (WFD), as they relate to groundwater and Article 6 of Directive 2006/118/EC, the '2006 Groundwater Directive', a 'daughter' Directive of the WFD. The Groundwater Regulations 2009 include for the assessment of all non-hazardous and hazardous substances defined by each member state. The Groundwater Regulations have since been transcribed into the Environmental Permitting Regulation (England and Wales) 2010 with specific reference to Section 20.
- 2.1.4 The development activities will need to conform to existing legislation in England with regard to changes in abstraction, discharges and/or engineering works.
- 2.1.5 In addition, the national guidance produced by the Environment Agency, Groundwater Protection: Principles and practice GP3 (April 2013) and policy statement (2017) have been used in the production of the document.

NATIONAL PLANNING POLICY

- 2.1.6 The National Planning Policy Framework (NPPF) published in February 2019 sets out planning policy for England. It places a general presumption in favour of sustainable development, stressing the importance of local development plans and states that the planning system has a role in minimising pollution. The effects, including cumulative effects, of pollution on health or amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Local planning authorities should focus on whether the development itself is an acceptable use of the land and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes.

SCOPING OPINION

- 2.1.7 The requirements of the scoping opinion document produced by West Sussex County Council in April 2020 has been incorporated into the information included within this document. For clarity, the relevant sections are transposed below:

“Hydrogeology

- 4.46 *As noted in the response from the EA, while the aquifer is designated as unproductive, the Weald Clay is not a homogenous unit, but has numerous member units which have the potential to “bear groundwater and act as baseflow supplies to local water features”. While the risk to groundwater is low there is evidence of spring activity around the site, and numerous surface water features.*
- 4.47 *A basic hydrologic risk assessment should therefore be provided.*
- 4.48 *Pollution control measures to mitigate impacts on groundwater should be clearly set out in the submission, including measures to ensure inert waste is clean and uncontaminated, and to ensure the safe, secure storage of materials, chemicals, fuels, oils and hazardous materials which could pose a risk to controlled waters if any spillage occurs.*

Hydrology

- 4.49 *The Flood Risk Assessment prepared to inform the ES should be undertaken in accordance with the West Sussex LLFA policy for the Management of Surface Water. The assessment of impact on the water environment must be prepared to consider all aspects of the development (mineral extraction, recycling facility, and restoration phases), and should consider surface water and ground water.*

- 4.50 *As noted in the response from WSCC Drainage, the proposed development site incorporates the catchment for a section of the Wey and Arun canal, with significant flow paths feeding the canal (Figure 1). The canal has been associated with historic flooding so the Hydrology section of the ES, as informed by the Flood Risk Assessment and Drainage Strategy, must demonstrate that the approach being taken with regard to tree removal and stripping of topsoil would safeguard against any increases in surface water flow routes from the development area to the downstream catchment.*
- 4.51 *Property flooding has occurred to properties in Burley Close to the south-west of the site so the ES must demonstrate that it would not result in increased flood risk to properties at Burley Close, as well as other properties adjacent to the Loxwood Stream.*
- 4.52 *The EA's comments are noted in relation to the potential need for an abstraction licence is dewatering is required. If this is the case, it should be clarified in the submission, and relevant mitigation measures managed through other regulations identified.*
- 4.53 *Consideration of surface water drainage should include potential impacts on public rights of way as a result of both the operational area, and the new access road."*

3 ASSESSMENT METHODOLOGY

3.1 Approach

- 3.1.1 The assessment of the development has been undertaken on a qualitative approach based on professional judgement and statutory guidance. The assessment includes a desk study review of all existing information for the site and its immediate surrounds, the prediction of the potential effects on the geology, hydrology and hydrogeology and the assessment of the likely significance of those effects with regards to magnitude of the effects and the sensitivity of the receiving environment. The assessment utilises the source pathway receptor principle as referenced in Environment Agency, Groundwater Protection: Principles and practice GP3. The Environment Agency continues to use the source pathway receptor approach to environmental risk assessments. In order for there to be an effect, all three elements must be present.
- 3.1.2 Potential sources have been identified through the review and collation of baseline data and includes the size, nature and duration of the proposed development relative to the environmental setting.
- 3.1.3 The receptors which comprise the water resources themselves are also considered within the baseline setting below.
- 3.1.4 The pathways comprise the mechanisms which allow a potential effect to occur. These are reviewed as part of the excavation works, the recovery operations and the post closure (long term) situation.
- 3.1.5 The potential impacts to the baseline setting as identified above have been assessed with regard to the excavation, restoration and post closure stages of the development as well as the potential for accidents such as spillage of hazardous substance (fuel hydraulic oils etc.). The review takes into account the magnitude of the impact, the spatial extent of any impact, the likely frequency of the impact, the duration of the impact and the sensitivity of the receiving environment. Mitigation measures have been considered as part of the development as described below.
- 3.1.6 The assessment of the significance of the potential effects of the development on the water environment is based on the magnitude of the effect and the sensitivity of the receiving water body. The magnitude, severity and significance criteria are described in Tables 1-3 below. The matrices are based on indicative criteria presented below.

Table 1 Definition of Criteria

Magnitude of Potential Effects	Guideline Criteria
High	Fundamental change to hydrological / hydrogeological conditions resulting in temporary or permanent consequential change
Medium	Detectable change to hydrological conditions resulting in non-fundamental temporary or permanent consequential changes.
Low	Detectable but minor changes to hydrological/hydrogeological conditions but the underlying characteristics or quality of the baseline situation would be similar to preoperational conditions.
Negligible	Unquantifiable/unqualifiable change in the hydrogeological conditions which is barely distinguishable and approximates to the 'no change' situation including water quality

3.1.7 Sensitivity criteria have been developed for the assessment of the sensitivity of the baseline environmental setting. These indicative criteria are broadly based on the importance of the groundwater / surface water as a resource and the ecological status of any habitat present.

Table 2 Receptor Sensitivity

Sensitivity category	Sensitivity Criteria
High	SSSI, SAC, SPA or watercourse / wetland of particular ecological value, high vulnerability groundwater for example principal aquifer
Medium	Watercourse / wetland of particular ecological value, moderately vulnerability groundwater for example Secondary aquifer
Low	Low vulnerability groundwater present for example Secondary B aquifer. Environment responds in minimal way to effect such that only minor changes are detectable
Very Low	No significant groundwater, water courses or aquatic habitats present

3.1.8 A significance matrix has been developed to provide a consistent approach for the assessment of the magnitude of the potential effect and the sensitivity of the baseline environmental setting. The guideline criteria for the sensitivity category are presented in Table 4 below.

Table 3 Significance Matrix

		Sensitivity			
		Very Low	Low	Medium	High
Magnitude of potential effect	High	Minor	Moderate	Major	Major
	Medium	Minor	Minor	Moderate	Major
	Low	Low	Minor	Minor	Moderate
	Very Low	Low	Low	Minor	Minor

Table 4 Significance Criteria

Significance	Definition	Guideline criteria
Low	No detectable change to the environment	No effects on drainage patterns, surface or groundwater quality or aquatic habitats
Minor	A small detectable change to the environment	Localised changes in drainage patterns or groundwater flow or changes resulting in minor reversible effects on groundwater and surface water quality or aquatic habitats
Moderate	A larger but non fundamental change to the environment	Changes in water quality or quantity affecting part of a catchment or groundwater of moderate vulnerability, or changes resulting in loss of conservation value to aquatic habitats or designated areas
Major	A fundamental change to the environment	Changes in water quality or quantity affecting widespread catchments or groundwater reserves of strategic significance, or changes resulting in substantial loss of conservation value to aquatic habitats and designations

4 BASELINE CONDITIONS

4.1 Environmental Setting

4.1.1 The development site is located on the old Pallinghurst Estate in an area of existing woodland/scrub located 1.5km to the east/ north east of the village of Loxwood. The national grid reference for the centre of the site is TQ 0550 3200

4.1.2 Access to the site is through a dedicated access road following exiting forest tracks.

4.1.3 The site is a roughly rectangular in shape and covers an area of 8 ha. The site is bounded to the north by a public footpath linking with the Sussex Border Path to the west. The western southern and eastern boundaries are formed by existing woodland tracks. The surrounding area comprises both natural and commercial forestry plantation. Mix arable land is present beyond the woodland boundaries.

4.1.4 The topography is characterised by gently undulating land with elevations between 42 and 46 mAOD.

4.1.5 There are no statutory designated sites within 1km of the site, with the nearest statutory designated site is Sidney Wood SSSI located approximately 3km to the west of the site boundary.

4.1.6 The nearest residential properties are:

- Old Songhurst Farm (and associated buildings) 500m west of the site
- Songhurst House, 780m west/ southwest of the site.

4.2 Site History

4.2.1 The site sits on an area of woodland that was felled and replanted in 2007 in accordance with the felling licence and scrub vegetation colonised the young plantation since that time. Mature trees have been identified outside of the proposed excavation area and these are detailed within the ecological assessment.

4.2.2 To the west of the woodland, two fishing ponds with sluice gates were developed between 1898 and the 1912 OS maps for area. By 1960, these are no longer present and there is shown to be marshy ground. The stream is also no longer shown within this valley but is marked flowing south from the sluice of the former fishing pond.

4.2.3 The remaining areas are shown to be woodlands from 1800s to date.

4.3 Geology

Regional Geology

- 4.3.1 The solid regional geology beneath the site comprises the Weald Clay Formation. beds¹.
- 4.3.2 The Formation is described as “Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones.”² Regionally the Formation is up to 460m thick in the Guildford area, 122m thick at Hythe, 240m south of Maidstone and 180m thick at Eastbourne.
- 4.3.3 The thickness of the Weald Clay at the site is unproven however, the nearest published geological log is at Tichbourne Inn Alford, which when constructed in 1888 indicated 380 feet of clay above the Paludina Marble, thus confirming a significant thickness of present.
- 4.3.4 In addition, the Geological map presents the outcrops of a sandstone member some 600m to the west of the site at the nearest point and 300m to the east of the site.
- 4.3.5 Superficial deposits: The site is not located on any superficial deposits. The nearest deposits are located and constrained within the valley to the west of the site.

Local Geology

- 4.3.6 A ground investigation was undertaken by Geotechnical Engineering limited in June 2017. This comprised a series of boreholes undertaken across the wider landholding. Borehole BH09 and BH10 are located within the proposed site development area and borehole BH08 is located to the south east corner. The borehole records are included in Appendix 1 for record.
- 4.3.7 The site investigation recorded surface water ingress issues during the construction of BH08 and BH09. No groundwater strikes were reported as apart of the investigation both onsite and across the wider landholding.
- 4.3.8 Geotechnical Engineering Ltd³ described the geology as:

“firm to stiff clay, being locally gravelly and often silty. The gravel generally represented drilling

¹ British Geological Survey (BGS) England and Wales (Sheet No. 301 - Haslemere, 1:50,000 dated 1981)

² BGS Lexicon of named Rock units

³ Geotechnical Engineering Limited IRT01V1309/06/17JH Ref 33137

disturbed thin bands of siltstone that were recovered in a non-intact state. The clay was often extremely closely fissured.

Below 3-4m depth, the clay tended to become stiff and very stiff. The clay tended towards mudstone or contained stiff/very stiff clay and extremely weak mudstone lithorelicts.

Distinct siltstone bands and rare sandstone bands up to 400mm thick were observed throughout. These appeared to be discrete, subordinate features but presented an increased resistance to dynamic sample drilling methods”

4.4 Hydrogeology Baseline

- 4.4.1 The Weald Clay Formation underlying the site is defined as unproductive strata⁴. By definition these are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow⁵
- 4.4.2 The sandstone members identified on the geological map to the west of the site are shown to be Secondary A Aquifer. These have been defined as ‘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. These are generally aquifers formerly classified as minor aquifers.’
- 4.4.3 The site is not located within a source protection zone and there are no groundwater source protection zones within 1km of the site.

Groundwater Quality

- 4.4.4 Baseline research has not identified any groundwater quality concerns, in relation to any local activities, that may be predicted.

Abstractions and Private Water Supplies

- 4.4.5 There are no licensed groundwater abstractions within 1 km of the site boundary.
- 4.4.6 The Private Water Supply Regulations 2009 place an obligation on Local Authorities to register and inspect private supplies Horsham District Council, Waverley District council and District Council have confirmed that they do not monitor any private water supplies within 1km radius of the boundary of the site. Communication are included in Appendix 2.

⁴ DEFRA: Magic Maps – Landscape - Aquifer designation map (bedrock)

⁵ Environment Agency webpages Aquifer definitions

Local Hydrogeology

- 4.4.7 The ground investigation undertaken by Geotechnical Engineering Limited did not identify any presence of groundwater within the top 4.6m within the site area. Therefore, there is no evidence that any locally persistent groundwater body is present within the proposed excavation boundaries within these depths.
- 4.4.8 It is noted that subordinate sand bands were detected within the landholding without any discernible water strike being recorded.
- 4.4.9 Therefore, it is concluded that there is no evidence for any groundwater within these clay deposits.

4.5 Hydrology Water Features and Flood Risk Baseline

- 4.5.1 A water feature survey was undertaken in July 2020 to address the scoping opinion point 4.46. This indicated that the surrounding area of the site is characterised by surface water drains and channels through the woodland. A detailed report is presented in Appendix 3 with a summary of significant featured presented below.
- 4.5.2 The area surrounding the site is characterised by gentle slopes with the exception of a deep valley containing an unnamed drain to the west of the site. The points of inspection are presented on Figure 3 with a photo log and detailed description included in Appendix 3. A summary of the significant features is presented below. The key points investigated included:
- Drains from the site
 - Drains through the woodland
 - Main drain along western woodland boundary
 - Pond to north east
 - Track crossing points of drain(s)
 - Point of Drain crossing Loxwood Road to south of site
 - No evidence of any springs within close proximity to the site.

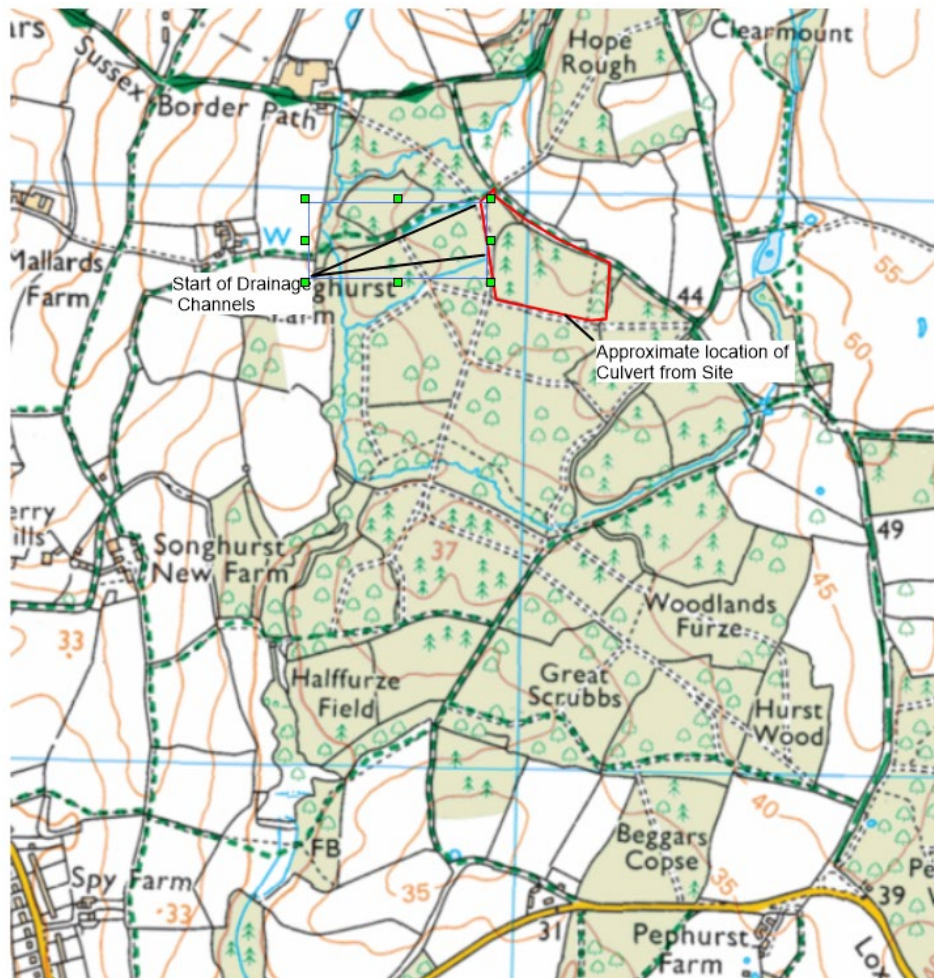


Figure 2: Culverts arising from the development site

- 4.5.3 Whilst the major forest tracks have shallow drainage channels along the boundaries, there were no apparent discharge points from the site other than a culvert (location 12 Water Feature Survey) beneath the road to the south of the site and a second culvert on the western boundary (location 32 /33 on Water Feature Survey). This western culvert discharged into a steep sided (vertical) narrow (<0.5m) flat bottomed channel which initially ran straight. It is considered that this is likely to be a man-made channel.
- 4.5.4 The two drainage channels that arise to the west of the Site are deeply incised and dry at the time of inspection. Shallow standing water was observed in over deepened hollows/pools and other erosional features. The banks of the drainage channels are near vertical.
- 4.5.5 Erosional features comprising over deepened pools and steep eroded sides are common throughout the drainage channels
- 4.5.6 There are two ponds to the east of the site. One pond is located 1000m to the east is situated on a slight ridge crest and is at a higher elevation to the site. Therefore, this pond is not considered further with respect to the surface water flows at the site.

- 4.5.7 The second pond is located approximately 500m from the site boundary. A platform had been built on the edge of the platform (Location 22). No flow was observed in the culvert feeding the pond nor any flow in the drainage channel discharging from the pond. The base of the pond was exposed in the northern area. This area was devoid of vegetation which may suggest that standing water is frequent in this area.
- 4.5.8 The main drainage channel in the west was traced from the confluence with the drainage channel arising in the west to the foot bridge along the southern boundary of the woods. This main drainage channel is present within a deep localised valley which is not apparent from the regional OS contours. It is estimated that the base of the valley is 5-8m below the ground level in the adjacent fields and woodland in a relatively steep sided valley (Image 37/38)
- 4.5.9 This drainage channel was dammed in the 1900s⁶ and evidence of the sluice system remains in place. These structures have some significant erosion features around the concrete footings. The base of the valley is relatively flat and in the former fishpond locations the course of the drainage channel is braided, meandering and littered with woodland debris. Water was only observed in erosional features with the majority of the channel being dry and firm underfoot.
- 4.5.10 All drainage channels arising from the woodlands were dry at the time of inspection. No springs were identified.
- 4.5.11 A further pond was identified to the south of the woodland. All drainage channels flowing towards the pond were dry and the base of the pond was exposed in places indicating low water levels.
- 4.5.12 A large dry channel (potentially historical track) was identified from this pond travelling in a south westerly direction (See image 51/52). The purpose of this channel track is unknown however it was considered to be a barrier to surface flow in a southerly direction.
- 4.5.13 Overall the water feature survey concluded that the drainage channels were ephemeral with no flow during the dry summer months. The presence of numerous erosional features suggests that flow is characterised by high energy short duration events such as flash flood. This would concur with the permeability geological setting resulting in rapid runoff rather than infiltration into underlying soils.

⁶ Historic OS Map dating 1912 indicates two fishing lakes in this area.

4.6 Flood Risk

- 4.6.1 A proportionate summary Flood Risk Assessment is provided at Appendix 4.
- 4.6.2 The Environment Agency has developed a Flood Map which shows the risk of flooding in England for different return period events. Flood Zones assume that no defences are present and so where defences do exist, they are only indicative of the potential flood.
- 4.6.3 Based on the Environment Agency’s indicative Flood Map, **the Site is located is within Flood Zone 1** and, therefore, classified as a **low risk of flooding** according to the National Planning Policy Guidance, where the annual probability of flooding is considered to be < 1 in 1000. The Site does not lie within close proximity to any rivers or other controlled surface waters.

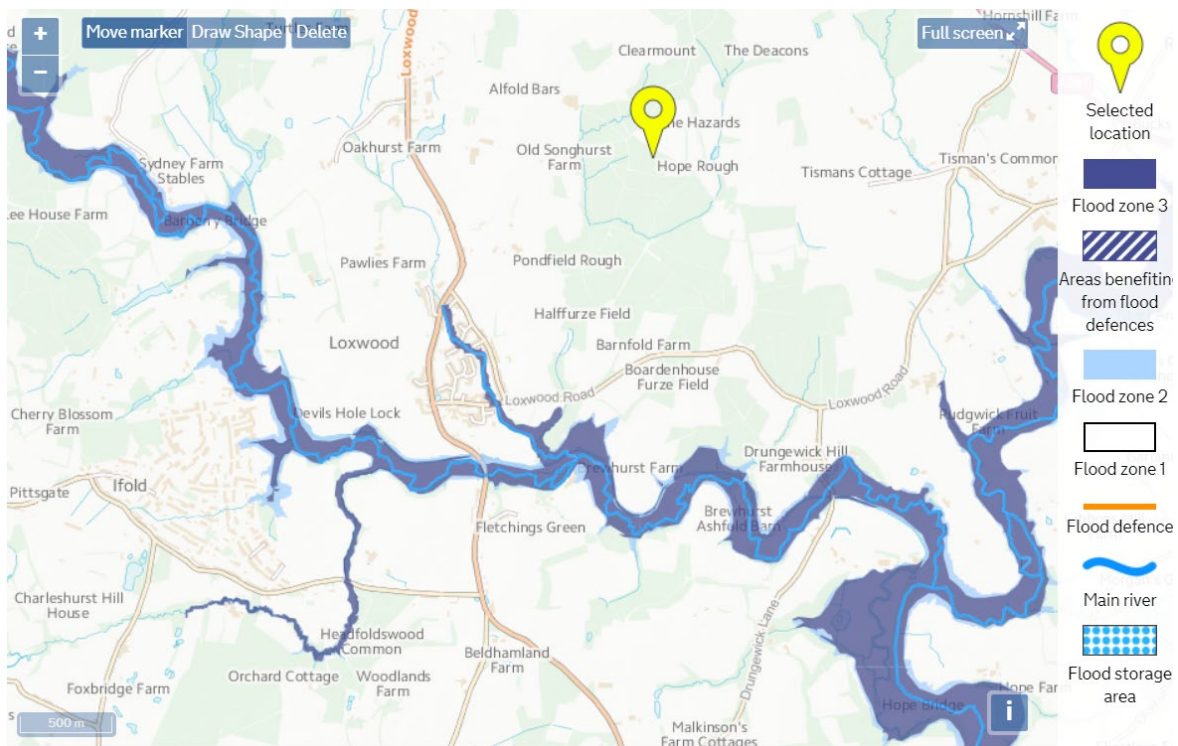


Figure 3: Flood Risk Map – Rivers- Environment Agency web-data.



Figure 4: Flood Risk Map –Surface Water- Environment Agency web-data.

4.6.4 In relation to surface water flooding (as a result of rainfall events), the Site is at a Very Low risk of flooding. There is a very small area of land just beyond the eastern extent of the mineral extraction area which is at a high risk of flooding and a very small point beyond the south western corner of the site boundary at a Low risk of flooding (likely associated with extreme rainfall events). These areas are coincidental with much localised topographic low points and would not pose a constraint to development.

5 DEVELOPMENT

5.1 Phasing

5.1.1 The screening and scoping opinion report produced by Protreat Limited indicates the following provisional phasing:

“The proposal is to extract the clay/siltstone at a rate of up to 12,500 tonnes per annum; with a total of 400,000 tonnes extracted over a total development period of 33 years.

25,000 tonnes of construction materials for treatment of which it is estimated 12,500 tonnes will be used for restoration and 12,500 tonnes recycled.

Restoration will be progressive, on a phased basis with the site eventually being returned to a deciduous forestry plantation at similar levels to the predevelopment landform.

5.2 Water Management

5.2.1 Localised groundwater has not been identified within the upper 4.6m at the site. Due to the nature of the clay deposits, significant groundwater ingress to the void it not considered likely. Water management will be dominated by the potential for surface water runoff to enter the void. Mitigation measures such as maintaining existing drainage channels around the perimeter of the site, minimising the open void areas and the construction of dedicated surface water storage lagoons will be employed to reduce the volume of water entering the excavations. Discharge of surface water from the site will be limited to green field runoff or better in line with current Planning Guidance.

5.2.2 Silt settling ponds will be constructed to minimise the transport of silt offsite. Water collecting in the base of the excavations will be pumped to these silt settling ponds prior to discharge. A secondary and temporary silt pond may be constructed in the base to maximise the potential to remove silt from the surface water discharge.

5.2.3 In order to minimise the volume of water entering the site, existing drainage network surrounding the site periphery will be maintained.

5.2.4 The site is not suitable for a soakaway due to the nature of the ground.

5.3 Restoration and post closure

5.3.1 The site will be restored progressively using fines and residues from the recovery operation which will be regulated by the Environment Agency Environmental Permitting system. The nature and quality of the fill material permitted to be placed at the site will be reviewed by the Environment Agency as part of the permitting process. Only inert materials will be used in the recovery operation and as such do not have the potential to generate a leachate which could pose a risk of harm to the surface water and groundwater

environment.

- 5.3.2 Topsoils stripped from the site will be used in the final restoration layers.
- 5.3.3 The restoration will return the site to current ground levels final restoration as a deciduous plantation.

6 ASSESSMENT OF SIGNIFICANT AND RESIDUAL EFFECTS DURING OPERATION

Groundwater flow and control

- 6.1.1 No groundwater has been identified within the upper 4.6m of the Weald Clay which would suggest that the adjacent woodland is not sustained by a shallow groundwater body. Therefore, the potential impact from the site on groundwater levels is considered to be negligible due to the absence of a water table. Due to the nature of the deposits, it is unlikely that a significant groundwater body would be encountered during the extraction operations to a maximum of 10m depth.
- 6.1.2 Fuel and oil storage for mobile plant etc. will comply with The Control of Pollution (Oil Storage) (England) Regulations 2001 and associated guidance on Oil Storage Regulations for Businesses issued by the Environment Agency (August 2020). Storage tanks will be suitably double-bunded or comprise integral bunded tanks. Spill kits will be kept in close proximity to the filling points in case of accidental spillages. Standard operating procedures will be employed for the refuelling and maintenance of any plant. This may comprise, for example, the use of spill trays and catch pits. As such, any operations at the Site will adhere to strict management practices in relation to fuels and potential accidental spillages. The low permeability afforded by over 100m of in situ Weald Clay will form a barrier against any vertical migration of potential contamination enabling the management and remediation of any spills.

Surface water flow and control

- 6.1.3 The hydrology of the area is dependent upon surface water flows and recharge via precipitation events. The erosional features observed across the wider woodland would suggest that these are high intensity short duration events, most likely typified by flash flooding via runoff from clay rich areas.
- 6.1.4 Management of the surface water around the perimeter of the site will prevent any additional water entering the void.
- 6.1.5 . The Site is located in Flood Zone 1 (low risk of flooding). The proposals will likely lead to on-site catchment increasing (during the operational period and upon restoration), with run off from within the development boundary being captured via the site's surface water

management system. During the operational period, excavation itself will prevent any lateral runoff from the site to surrounding areas.

- 6.1.6 The excavation will be operated in a phased manner. It is envisaged that three areas will be open at any one time comprising, an area of excavation, an area of backfilling and an area for the storage of surface water during storm events. The latter will be pumped to a silt settling lagoon prior to discharge. This operational approach and consequential landform will effectively ensure that the Site cannot lead to an increase in overall surface water run-off from the Site, either during extraction operations or during restoration activities, thus will not increase flood risk elsewhere off site.
- 6.1.7 The depth of the excavation at circa 4.5-10m would be sufficient to capture site runoff under extreme storm events.
- 6.1.8 The discharge from the site to the surrounding drainage network will be via a dedicated discharge point. The rate of discharge will be managed in accordance with greenfield run-off rates as required by Planning Guidance.
- 6.1.9 Paragraph 4.53 within the scoping opinion also advises that “Consideration of surface water drainage should include potential impacts on public rights of way as a result of both the operational area, and the new access road”. There access road is existing and other than minor maintenance, no change is proposed, therefore there is no change in the potential impact on public rights of way from the existing situation. As indicated above the Site drainage from the operational area will be managed as indicated above.

Placement of restorations soils

- 6.1.10 No placement of recovered soils will be into standing water. If necessary, any standing water in the base of the void will need to be abstracted prior to the restoration process. This water would be discharged via the siltation pond.
- 6.1.11 The placement of recovered soils potentially could result in an increase in fines within any water accumulating in the base of the void. Due to the nature of the recovered soils, no significant contamination which could impact on water quality would be anticipated. This water would be abstracted as part of the quarrying operations and discharged via the silt pond. Additional drainage channels may be required in the base of the excavations to divert and surface water away from the recovered soils.

Table 5: Summary Table of Significant and Residual Risks During Operation

Hazard	Receptor and sensitivity	Pathway	Risk Mitigation	Magnitude of effect	Probability Consequence	Overall risk
Groundwater flow and quality	no groundwater encountered V. low -	Low permeability clay	Non required	Negligible	Negligible	None
Surface water discharge	Surface water – ephemeral streams - low	Via site discharge	<p>Site design to capture all surface water within its boundary. Surface water to be discharged via silt ponds in accordance with greenfield runoff rates.</p> <p>Water abstraction from the base of the void will be manual via a pumped sump to the silt ponds. The total discharge from the site will be limited to greenfield runoff rates, consequently abstraction of water in the base of the quarry may be limited during storm events</p> <p>Maintaining of peripheral drains will prevent offsite runoff reaching the</p>	<p>Low.</p> <p>Discharge of stored storm water would occur over a longer duration resulting in water in drainage channels for a longer period</p>	Probability of any flooding is considered to be very low due operational limitations to greenfield runoff. Please see flood risk Assessment	Low risk of flooding from discharge form site.

Hazard	Receptor and sensitivity	Pathway	Risk Mitigation	Magnitude of effect	Probability Consequence	Overall risk
			site.			
Accidental Fuel spills leaks	Surface water	Via site drainage and surface water system	Fuel storage, supply and maintenance works will be undertaken in compliance with the current regulations and guidance. Best practise operations will be included within the company's environmental management plan.	Potential impact of oil in the surrounding surface water is considered to be high	Collection of surface water to a central discharge point will allow visual monitoring of the quality of the water moderating the potential for uncontrolled emissions from the site	V. low risk of contamination
Contamination of Restoration soils	Surface water	Via Site drainage	Soils to be placed as part of the recovery operation will be regulated via the recovery operation permit. Contaminated loads will be required to be rejected from site prior to processing and therefore the potential contaminated fine to be present in the residue fines is considered to be low. Where (if) present the contaminated material is likely to represent a small rogue fraction of a load and therefore in the overall site restoration it is considered to be a very small proportion restoration material	Probability of contaminated material being deposited is considered to be low. Where contaminant is present, the volume and concentration are unlikely to represent a significant risk	Surface water emissions are managed and the potential for an uncontrol emission is considered to be low. Combined with the potential low magnitude of effect the residual risk is considered low	Low

Hazard	Receptor and sensitivity	Pathway	Risk Mitigation	Magnitude of effect	Probability Consequence	Overall risk
Silt runoff	Surface water	Via Site Drainage	An appropriately sized silt pond will be constructed and maintained such that there is no unacceptable discharge from the site. Silt on access roads will be managed in accordance with industry best practise.	Low The site is in a clay rich environment. Standing water was observed to have high sediment loading naturally within the environment	The probability of silt being released from the site is low. In combination with the natural environment the overall sensitivity of such an impact is low	Overall impact low

7 ASSESSMENT OF SIGNIFICANT AND RESIDUAL EFFECTS FOLLOWING RESTORATIONGroundwater

- 7.1.1 The geological setting of the site is such that there is no discernible groundwater body at an elevation which would be affected by the proposed development. Therefore, there is no significant or residual risk to the groundwater environment.

Surface Water Flow

- 7.1.2 Upon restoration, the re-establishment of a managed plantation is not considered to be any different from the existing situation. The construction of a small fishing pond may allow the balancing of additional water during storm events which may serve to improve the existing situation.
- 7.1.3 It is recognised that the local area is dominated by clay geology resulting in high runoff rates and high intensity short duration flood events, however it is considered that the Proposed Development is not vulnerable to, or at risk of flooding and is appropriate for the location and will not increase flood risk elsewhere, during the operational period or upon restoration

Table 6: Summary of Significant and residual effects following Restoration

Hazard	Receptor and sensitivity	Pathway	Risk Mitigation	Magnitude of effect	Probability Consequence	Overall risk
Surface water discharge	Surface water – ephemeral streams - low	Via site discharge	Restoration of the site to existing ground levels. Therefore, no change in potential runoff to deciduous woodland with fishing pond.	Low. No change for pre-operational conditions with additional advantage of any balancing effect offered by the fishing pond	Low – re-establishment of pre-operational conditions	Low risk of flooding from discharge from the site.

8 CUMULATIVE EFFECTS

- 8.1.1 There are no other mineral extraction operations in close proximity to the Site. Therefore, it is considered that there are no cumulative impacts on groundwater.
- 8.1.2 The Proposed Development is not considered to increase surface water flow rates, and it is therefore considered there will be no cumulative adverse effect on surface water drainage.

9 SUMMARY AND CONCLUSIONS

9.1 Statement of Significance Summary

- 9.1.1 This assessment has reviewed the potential impacts during the operations, mineral excavation and restoration, with a number of proposed mitigation and incorporated design measures in order to avoid adverse effect on the Water Environment in line with the Scoping Opinion paragraphs 4.46-4.53. At each stage of the development, the overall risks are considered to be low. Therefore, the Proposed Development is not expected to pose a risk to groundwater or surface water at the Site. No significant adverse effects are predicted which could pose a constraint to development.
- 9.1.2 The Site is not located in a hydrologically sensitive area and local watercourses or controlled waters are unlikely to be significantly adversely affected by proposals in relation quality or flows. It is not considered that there are any hydrological constraints to development. In relation to paragraph 4.46 of the Scoping Opinion, a water feature survey has been undertaken and no evidence of any groundwater emissions was identified. As a consequence, paragraph 4.52 of the Scoping Opinion (abstraction licence) does not apply.
- 9.1.3 The Site lies within a **Flood Zone 1 risk** area and, therefore, classified as a **low risk of flooding** according to National Planning Policy Guidance. The surface water discharge from the site will be limited to greenfield runoff in reflection of the hydrological environment.
- 9.1.4 The Proposed Development is not vulnerable to, or at risk of flooding and is appropriate for the location and will not increase flood risk elsewhere, during the operational period or upon restoration.

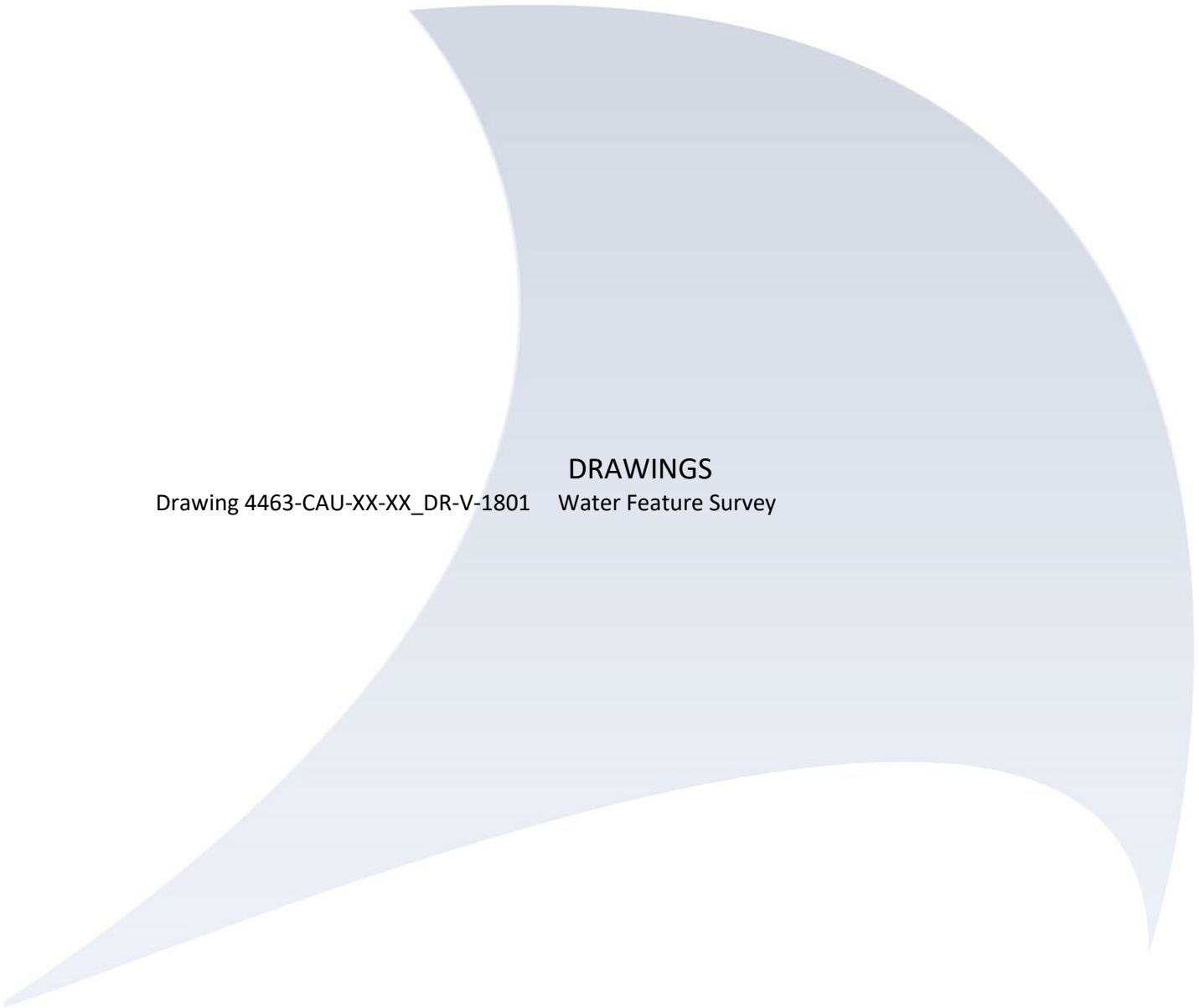
9.2 Compliance with Legislation and Policy

- 9.2.1 The assessment has been undertaken in compliance with Groundwater Protection: Principles and practice GP3 (April 2013). The Report has identified potential sources of contamination during the construction, operation and aftercare period of the development, and identified any potential receptors with respect to the hydrogeological and hydrological regime. No residual risks have been identified in respect to either the hydrogeological or hydrological regime applicable to the Site. Further investigations, mitigation and assessment is not considered required.

10 ABBREVIATIONS / ACRONYMS:

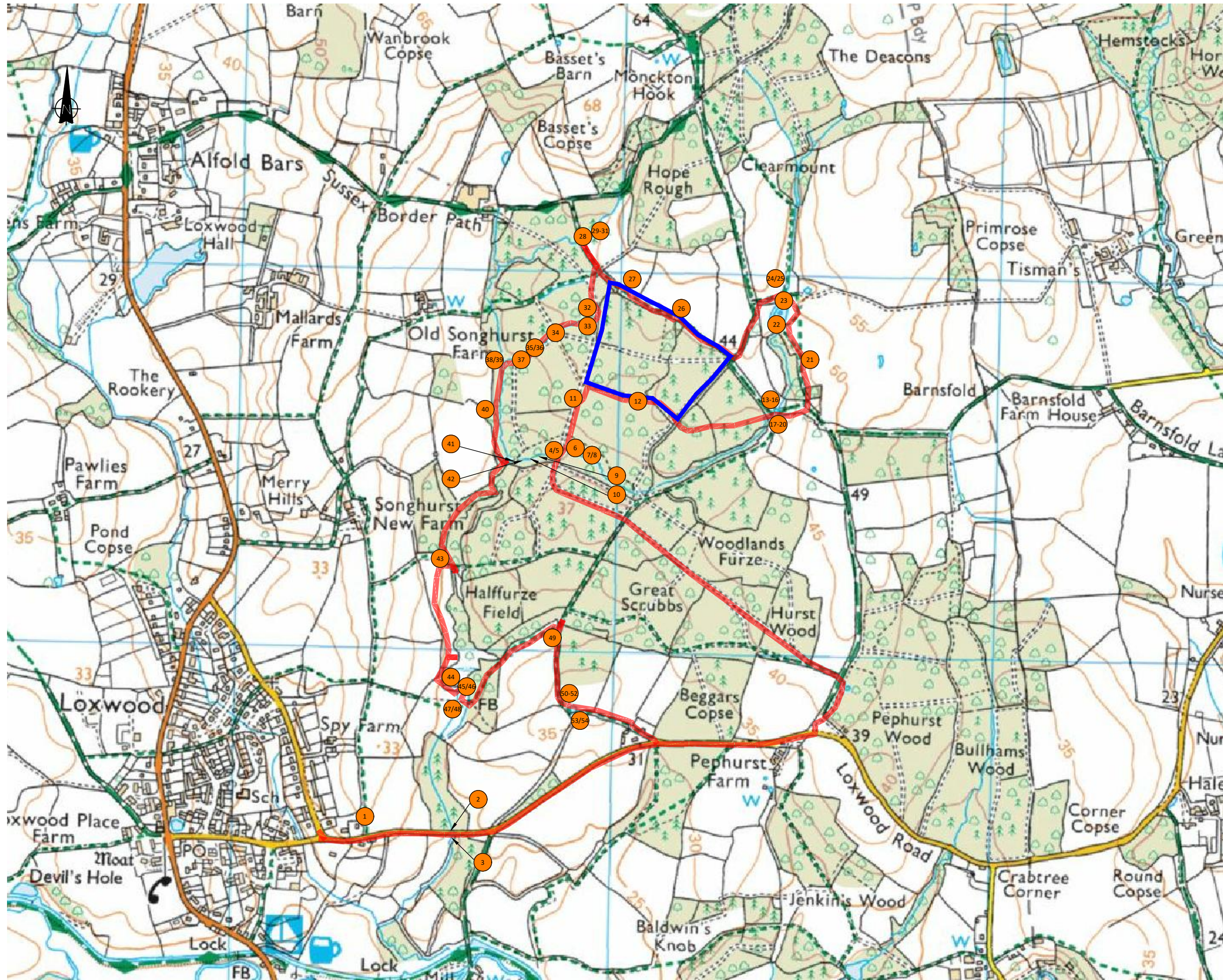
For the avoidance of confusion, abbreviations used within the report have the meanings detailed below:

AONB	Area of Outstanding Natural Beauty
BGS	British Geological Survey
EA	Environment Agency
EIA	Environmental Impact Assessment
ES	Environmental Statement
FRA	Flood Risk Assessment
mAOD	Metres Above Ordnance Datum
NPPF	National Planning Policy Framework
SAC	Special Area of Conservation
SuDS	Sustainable Drainage Systems
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
WAC	Waste Acceptance Criteria
WFD	Water Framework Directive



DRAWINGS

Drawing 4463-CAU-XX-XX_DR-V-1801 Water Feature Survey



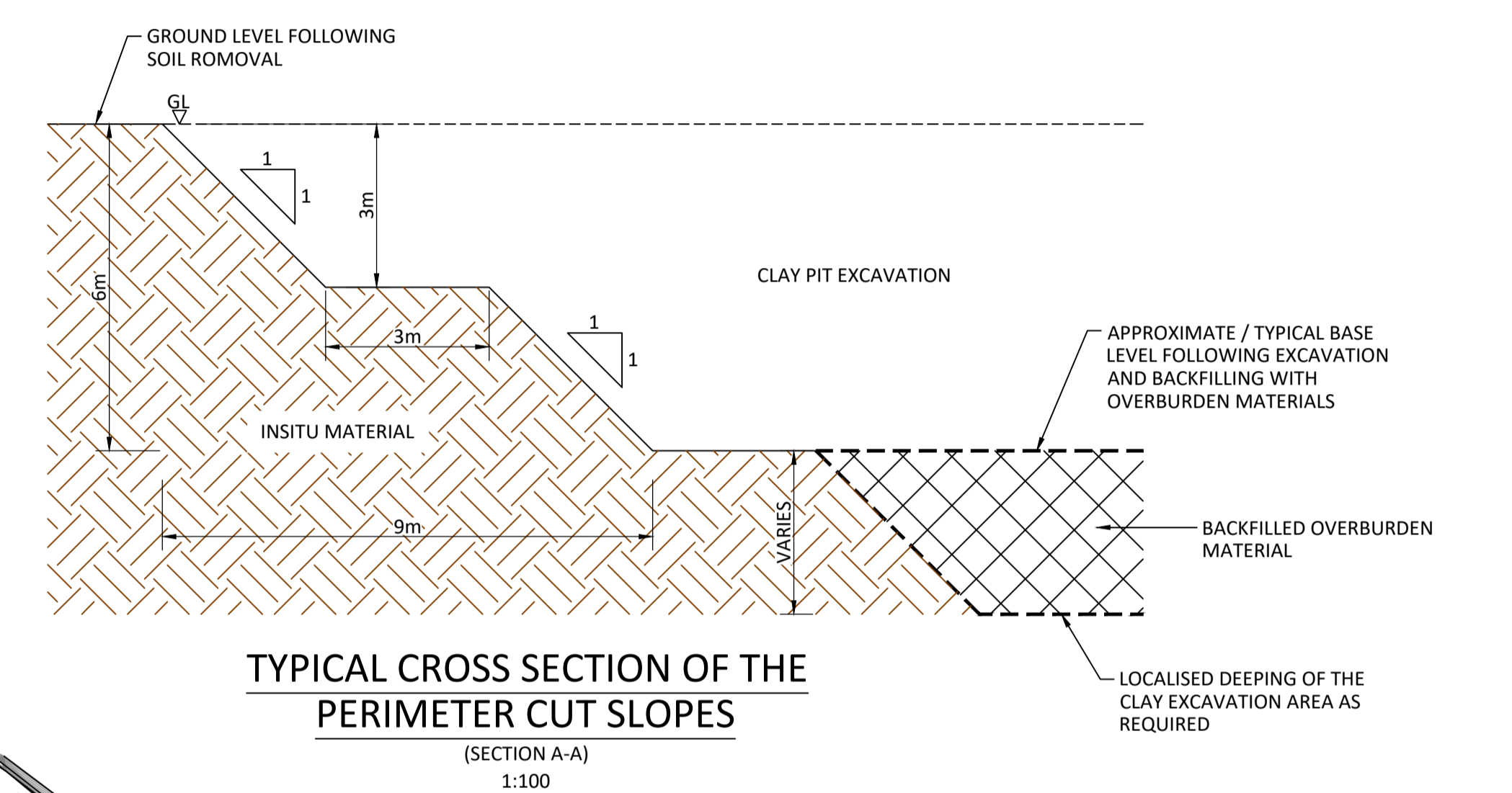
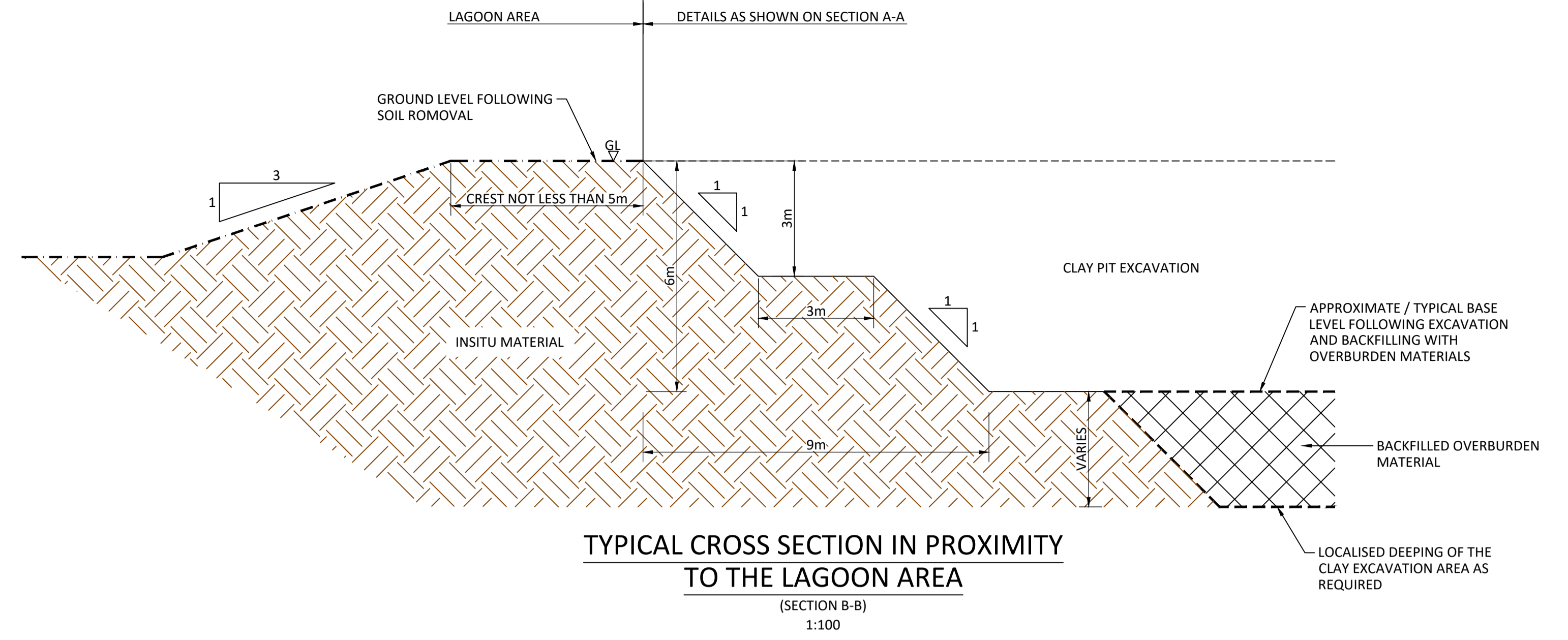
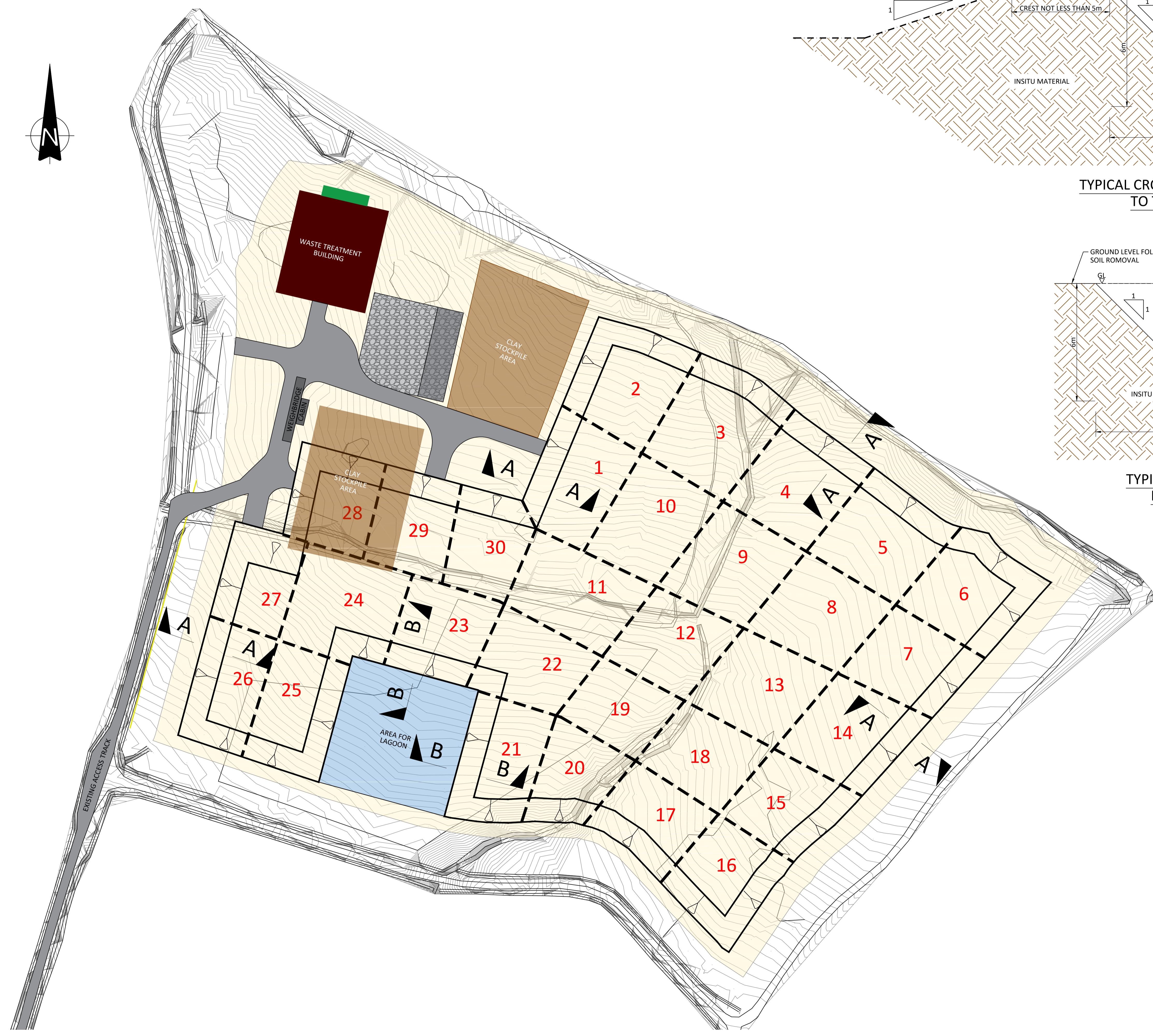
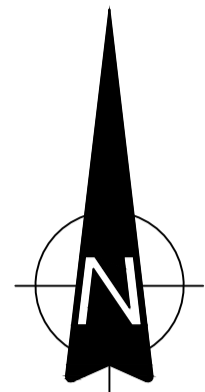
LEGEND

- 26 OBSERVATION POSITIONS
- PROPOSED DEVELOPMENT SITE

P01	ISSUED FOR INFORMATION	EJD	SV	SV	23.09.20
REV	MODIFICATIONS	BY	RE	AP	DATE
PURPOSE OF ISSUE FOR INFORMATION					STATUS S2
CLIENT: LOXWOOD CLAY PIT LTD					
PROJECT: LOXWOOD CLAY PIT					
TITLE: WATER FEATURE SURVEY					
DESIGNED BY	DRAWN BY	REVIEWED BY	AUTHORISED BY		
EJD	EJD	SV	SV		
DATE	SCALE @ A3	JOB REF:	REVISION		
22.09.2020	1:10,000	4463	P01		
DRAWING NUMBER 4463-CAU-XX-XX-DR-V-1801					

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NOTES

1. SURVEY AND CONTOUR DETAILS ARE TAKEN FROM SURVEY INFORMATION SUPPLIED BY PROTREAT LIMITED ON 16/02/2021 REF:20409-3D.DWG

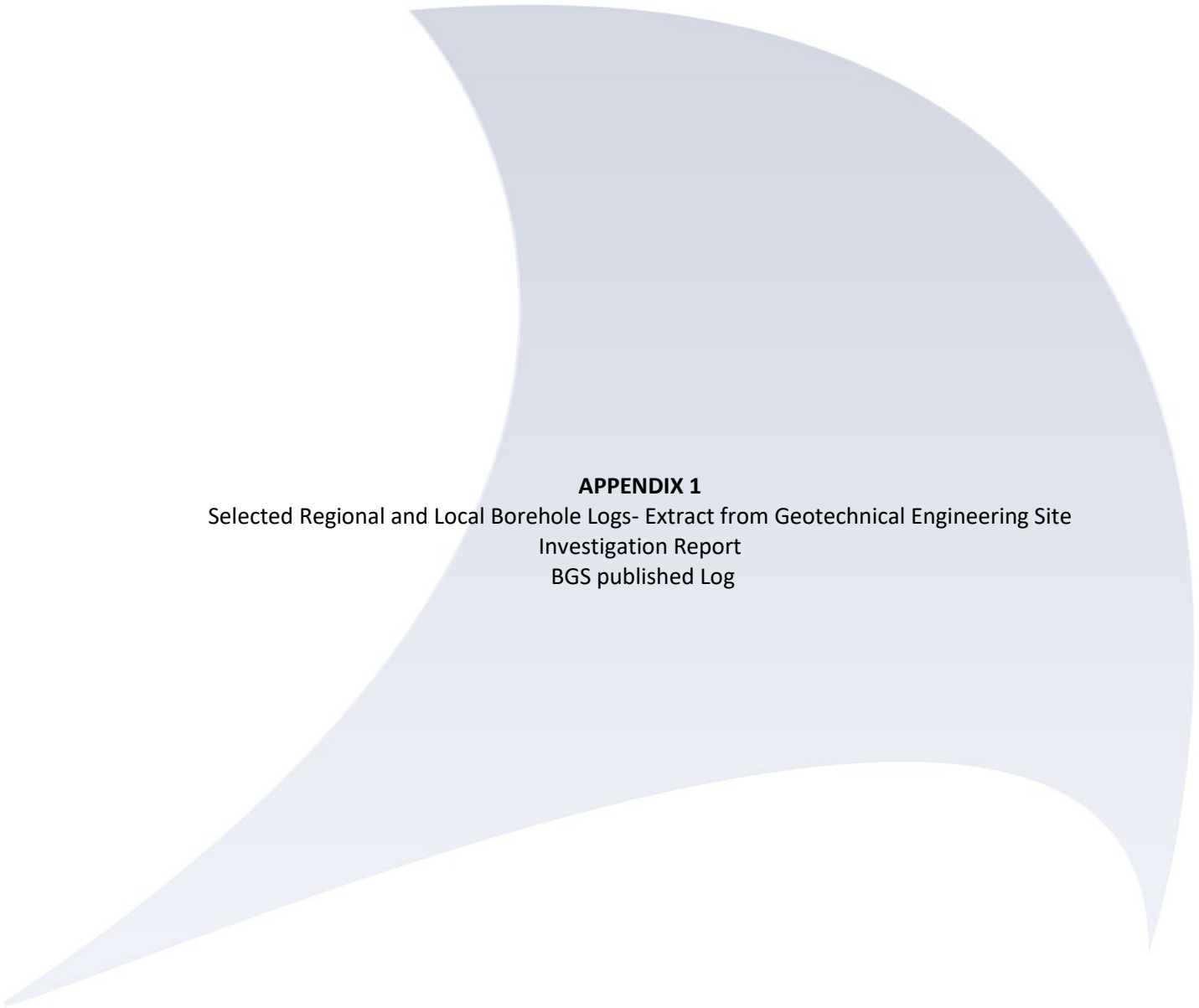
LEGEND

- PROPOSED DEVELOPMENT AREA FOR WASTE TREATMENT, CLAY EXTRACTION AND RESTORATION
- EXISTING CONTOURS (SEE NOTE 1)
- AREA DESIGNATED FOR LAGOON DEVELOPMENT
- ACCESS TRACK AND INTERNAL ROADS
- WEIGHBRIDGE AND WEIGHBRIDGE CABIN
- WASTE TREATMENT BUILDING
- WELFARE AND OFFICE UNITS (STACKED)
- AREAS PROPOSED FOR CLAY STOCKPILES
- TEMPORARY STORAGE AREA AND ACCESS FOR CONTAINERISED SCREENED FINES FROM THE WASTE TREATMENT
- TYPICAL LINE OF SECTION
- CLAY PIT PERIMETER SLOPE AREA
- PROPOSED EXTRACTION AND RESTORATION PHASE NUMBER
- APPROXIMATE BOUNDARY BETWEEN EXTRACTION AND RESTORATION PHASES

P01	ISSUED FOR INFORMATION	DA	JRC	JRC	21.04.21
REV	MODIFICATIONS	BY	RE	AP	DATE
PURPOSE OF ISSUE					STATUS
FOR INFORMATION					S2
CLIENT:					
PROTREAT LIMITED					
PROJECT:					
LOXWOOD CLAY PIT					
TITLE:					
PROPOSED SITE LAYOUT					
DESIGNED BY	DRAWN BY	REVIEWED BY	AUTHORISED BY		
JRC	DA	JRC	JRC		
DATE	SCALE @ A1	JOB REF:	REVISION		
21.04.2021	1:750	4788	P01		
DRAWING NUMBER					
4788-CAU-XX-XX-DR-C-1800					

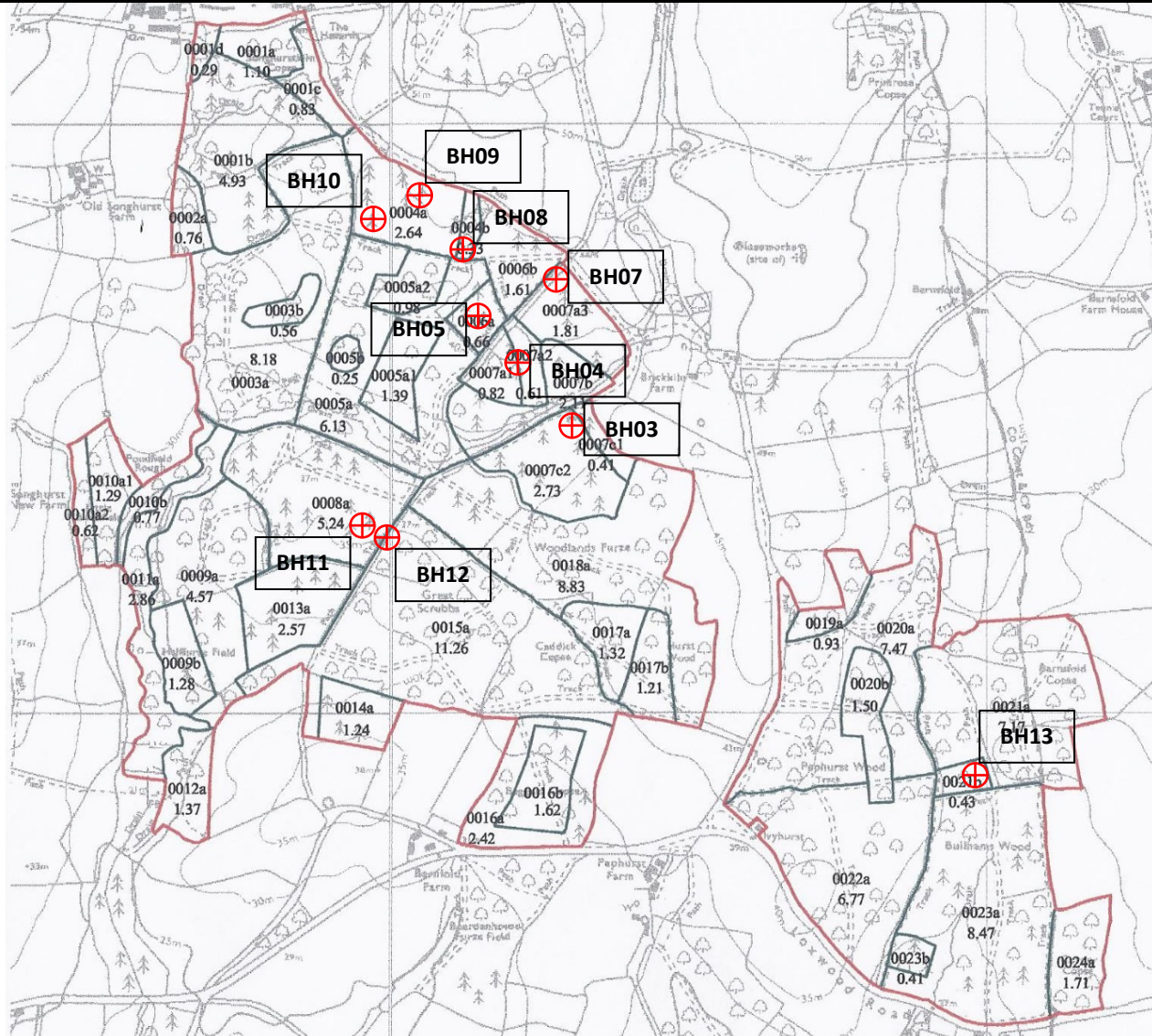
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APPENDIX 1

Selected Regional and Local Borehole Logs- Extract from Geotechnical Engineering Site
Investigation Report
BGS published Log



Key

⊕ Borehole

Geotechnical Engineering Limited
EXPLORATORY HOLE LOCATION PLAN

CLIENT LOXWOOD CLAY PITS LTD
 SITE LOXWOOD CLAY PITS
 SCALE UNKNOWN

CONTRACT	FIGURE
33137	1

BOREHOLE LOG



CLIENT LOXWOOD CLAY PITS LTD

BH08

SITE LOXWOOD CLAY PITS

Sheet 1 of 1

Start Date 6 June 2017

Scale 1 : 50

End Date 6 June 2017

Depth 4.60 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
06/06/17 0900hrs	1L	0.00 - 1.00	Nil				Vegetation over soft brown slightly sandy CLAY. Abundant rootlets.	0.15		
							Firm orangish brown mottled bluish grey locally dark purple slightly sandy CLAY.	0.70		
	2L	1.00 - 2.00	1.00				Stiff bluish grey mottled orange slightly gravelly CLAY. Gravel is subangular and subrounded fine siltstone lithorelicts. 1.35m: Light grey silt parting (2mm). 1.50m: Light grey silt parting (2mm). 1.60 - 1.80m: Stained dark purple.	1.95		
	3L	2.00 - 3.00	2.00				Greyish yellow slightly clayey gravelly fine SAND. Gravel is subangular and subrounded fine to coarse lithorelicts of sandstone.	2.15		
	4L	3.00 - 4.00	2.00				Stiff bluish grey mottled orangish brown CLAY with rare pockets (up to 5mm) of light grey silt. Frequent relict rootlets. 2.55 - 2.60m: Dark purple subangular fine siltstone gravel.	2.70		
							Very stiff fissured greenish brown becoming orangish brown CLAY. Fissures are randomly orientated extremely closely spaced stained dark orange locally dark purple. 2.90 - 3.00m: Dark purple subangular fine siltstone gravel. 3.30 - 3.35m: Very weak orangish brown siltstone recovered as subangular fine and medium siltstone gravel.	4.40		
06/06/17 1150hrs Dry	6L	4.40 - 4.60	2.00				Extremely weak locally very weak light greenish grey SILTSTONE recovered non intact as silty angular to subrounded fine to coarse siltstone gravel. Borehole completed at 4.60m.	4.60		x x x x x x
								{8.00}		

EQUIPMENT: Geotechnical P45 Slope Climbing rig.
 METHOD: Dynamic sampled (113mm) 0.00-4.00m, (98mm) 4.00-4.40m and (74mm) 4.40-4.60m.
 CASING: 128mm diam to 2.00m.
 BACKFILL: On completion, hole backfilled with bentonite pellets 4.60-0.00m.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks
0.00	Nil	NA	20	Standing water on ground surface prior to drilling.

	CONTRACT	CHECKED
	33137	CT

Geotechnical Engineering Ltd. Tel. 01452 527743 33137 MASTER.GPJ TRIAL\JH.GPJ GEOTECH2.GLB 12/07/2017 14:34:33 DP MM

BOREHOLE LOG



CLIENT LOXWOOD CLAY PITS LTD

BH09

SITE LOXWOOD CLAY PITS

Sheet 1 of 1

Start Date 6 June 2017

Scale 1 : 50

End Date 6 June 2017

Depth 4.60 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend
06/06/17 1200hrs	1LB	0.50 - 0.80					Vegetation over soft brown silty CLAY. Abundant rootlets and frequent roots (up to 10mm diam).	0.20		X
	2L	0.80 - 1.80	0.80				Firm bluish grey mottled orange CLAY. Frequent relict rootlets.	1.30		
	3L	1.80 - 2.80	1.80				Stiff orangish brown slightly sandy slightly gravelly CLAY. Gravel is subangular and subrounded fine and medium lithorelicts of very stiff clay to extremely weak mudstone.	1.45		
							Stiff bluish grey mottled orange CLAY. Frequent relict rootlets.	1.60		
	4L	2.80 - 3.80	1.80				Stiff light yellowish grey mottled greenish grey silty CLAY. 1.75 - 1.80m: Weak dark purple locally dark orange siltstone recovered non intact as angular fine to coarse siltstone gravel.	1.90		
Stiff fissured greenish brown CLAY. Fissures are randomly orientated extremely closely spaced stained orange.							2.60			
5L	3.80 - 4.60	1.80				Stiff fissured greenish brown gravelly CLAY. Gravel is angular to subrounded fine to coarse lithorelicts of extremely weak siltstone. Fissures are randomly orientated extremely closely spaced stained orange. 3.00 - 3.10m: Silty.	4.60			
06/06/17 1430hrs Dry							Borehole completed at 4.60m.			
								{8.00}		

EQUIPMENT: Geotechnical P45 Slope Climbing rig.
 METHOD: Hand dug inspection pit 0.00-0.80m. Dynamic sampled (113mm) 0.80-1.80m, (98mm) 1.80-2.80m, (74mm) 2.80-3.80m and (64mm) 3.80-4.60m.
 CASING: 128mm diam to 1.80m.
 BACKFILL: On completion, hole backfilled with bentonite pellets 4.60-0.80 and soil arisings 0.80-0.00m.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks	AGS	CONTRACT 33137	CHECKED CT
0.80	Nil	NR	20	Encountered at 0.80m in inspection pit.			

BOREHOLE LOG



CLIENT LOXWOOD CLAY PITS LTD

BH10

SITE LOXWOOD CLAY PITS

Sheet 1 of 1

Start Date 6 June 2017

Scale 1 : 50

End Date 6 June 2017

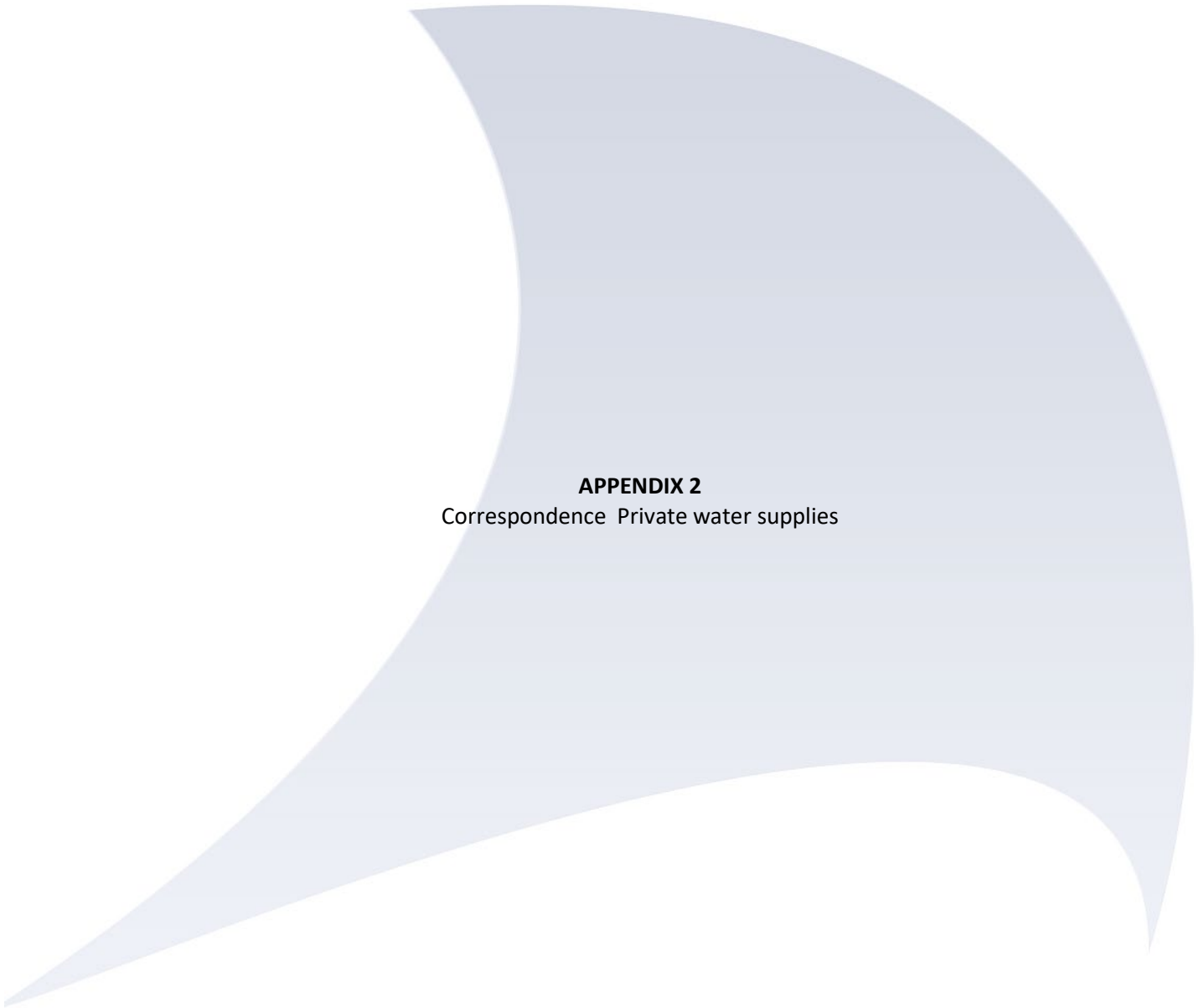
Depth 3.40 m

progress date/time water depth	sample no & type	depth (m) from to	casing depth (m)	test type & value	samp. /core range	instru -ment	description	depth (m)	reduced level (m)	legend	
06/06/17 1440hrs	1LB	0.50 - 1.20	1.20				Vegetation over soft brown slightly sandy CLAY. Abundant rootlets.	0.20			
							Firm bluish grey mottled orange slightly sandy CLAY.	0.80			
	2L	1.20 - 2.20					2.00	Firm bluish grey mottled orange locally stained dark purple sandy CLAY.			1.60
	3L	2.20 - 2.90					2.00	Stiff bluish grey mottled orange locally stained dark purple slightly sandy CLAY. Frequent relict rootlets.			2.15
06/06/17 1600hrs Dry	4L	2.90 - 3.40	2.00				Stiff fissured greenish grey mottled orangish brown CLAY. Fissures are randomly orientated extremely closely spaced stained dark purple and dark orange.	2.45			
							Very stiff fissured greenish grey gravelly CLAY. Gravel is angular to subrounded fine to coarse lithorelicts of extremely weak siltstone. Fissures are randomly orientated extremely closely spaced stained orange.	3.40			
							Borehole completed at 3.40m.				
								{8.00}			

EQUIPMENT: Geotechnical P45 Slope Climbing rig.
 METHOD: Hand dug inspection pit 0.00-1.20m. Dynamic sampled (113mm) 1.20-2.20m, (98mm) 2.20-2.90m and (64mm) 2.90-3.40m.
 CASING: 128mm diam to 2.00m.
 BACKFILL: On completion, hole backfilled with bentonite pellets 3.40-0.50m and soil arisings 0.50-0.00m.

EXPLORATORY HOLE LOGS SHOULD BE READ IN CONJUNCTION WITH KEY SHEETS

water strike (m)	casing (m)	rose to (m)	time to rise (min)	remarks		CONTRACT 33137	CHECKED CT
				Groundwater not encountered.			



APPENDIX 2
Correspondence Private water supplies

Alice Daly

From: Sarah Venning
Sent: 29 September 2020 15:32
To: Alice Daly
Subject: FW: Private water Supplies

From: Rachel.Hale <Rachel.Hale@horsham.gov.uk>
Sent: 04 September 2020 14:57
To: Sarah Venning <SarahVenning@caulmert.com>
Subject: Private water Supplies

Hi Sarah

We have no private supplies I this area

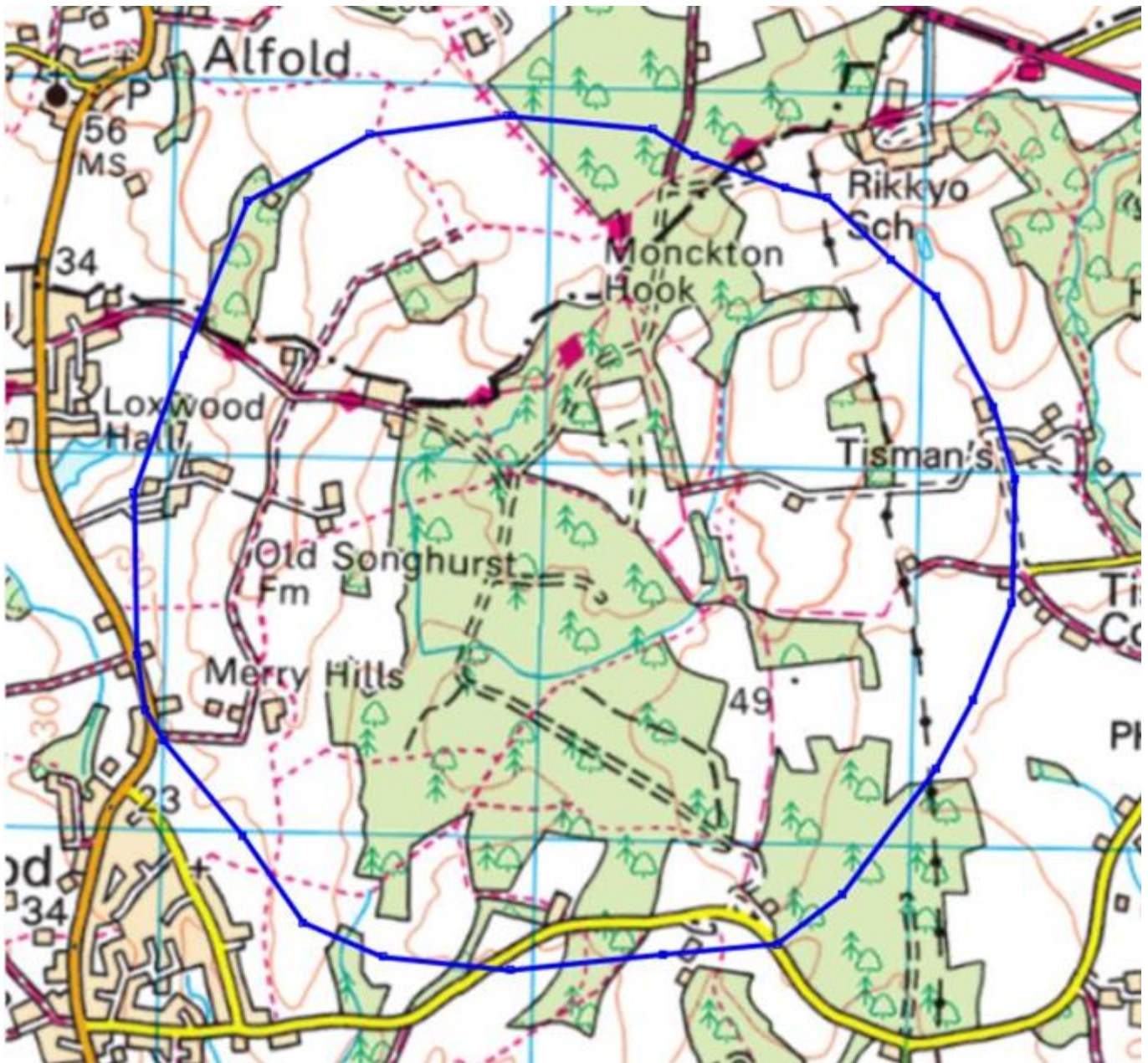
Kind regards

Rachel

From: Sarah Venning <SarahVenning@caulmert.com>
Sent: 03 September 2020 15:07
To: PublicHealth.Licensing <publichealth.licensing@horsham.gov.uk>
Subject: Private water Supplies

Hi

Please could you confirm whether you monitoring any private water supplies in the small area of your district within the blue boundary.



Many thanks
Sarah Venning



Sarah Venning

Principal Hydrogeologist
SarahVenning@caulmert.com
www.caulmert.com

Caulmert Limited

Mobile: 07585225462
Direct: 01773 305 043
Phone: 01773 749132
Extension: 4009

Nottingham Office • 14 Farrington Way, Eastwood Link Business Park • Eastwood, Nottinghamshire • NG16 3BF • United Kingdom



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The Environmental Health and Licensing team continues to provide a service during the current situation.

Please be patient as we are experiencing a high number of calls; the best and quickest way to contact us is via the email address below and we will get back to you as soon as possible.

Please check the website for the latest updates to our services.

Rachel Hale

Area Environmental Health Officer

Telephone: 01403 215422

Email: Rachel.Hale@horsham.gov.uk



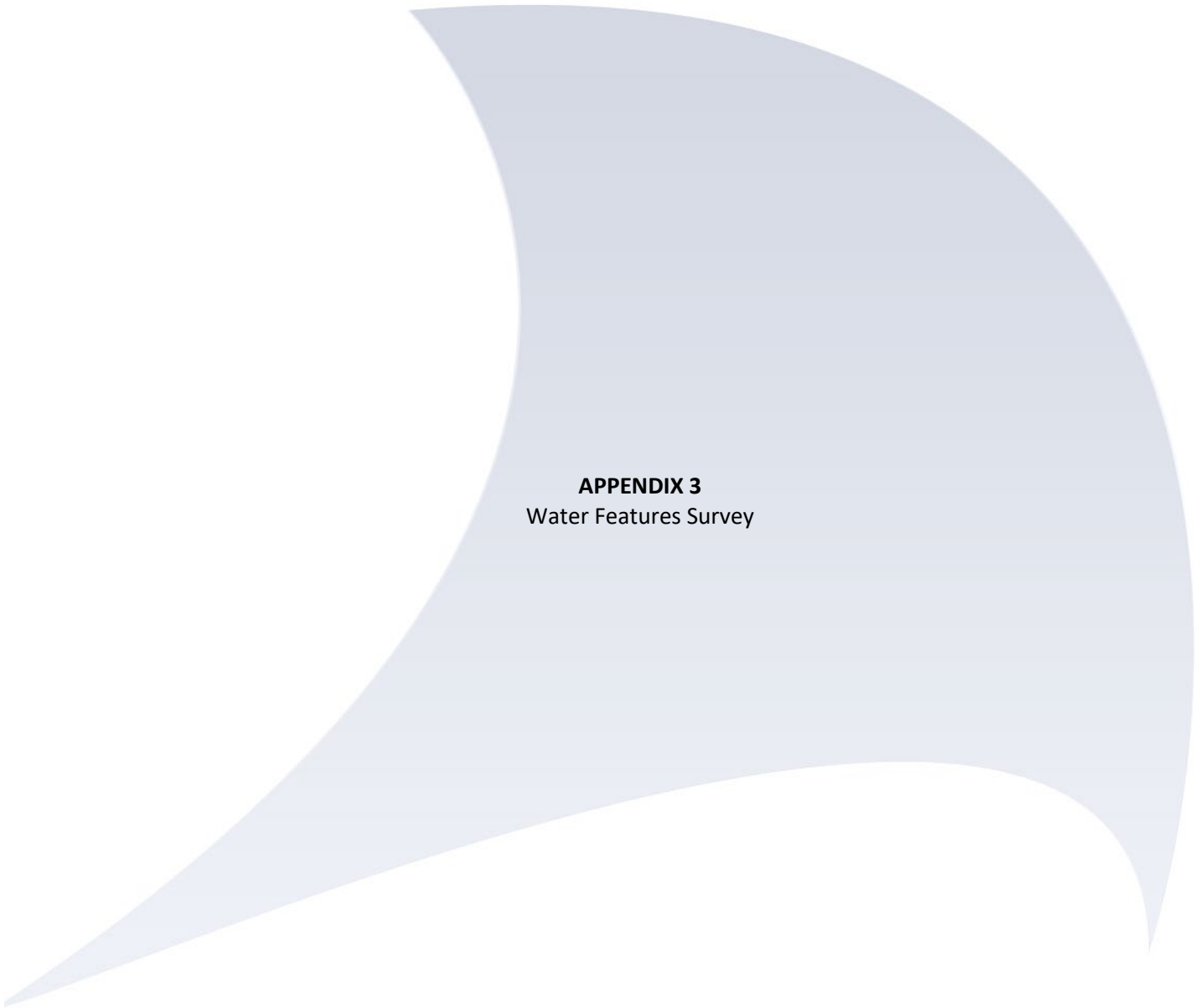
Horsham District Council, Parkside, Chart Way, Horsham, West Sussex RH12 1RL

Telephone: 01403 215100 (calls may be recorded) www.horsham.gov.uk Chief Executive: Glen Chipp

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APPENDIX 3
Water Features Survey



WATER FEATURES SURVEY – SITE WALKOVER 15 JULY 2020.



Dry conditions had occurred for a number of days prior to the site walk over.



Co-ordinates estimated from OS Map following GPS trace of walk over route.



ID	Image	OS NGR	Flow Conditions	Description
1		504338 131809	N/A	Photo taken looking north east towards the woodland from the footpath to the east of Loxwood. Note gentle slope of land
2		504588 131794	Dry	Upstream of Loxwood Road Bridge. Plant debris and petals in the base of the channel indicates flow had not occurred recently. Depth of channel estimated to be 1.5m deep by 2m wide within a broader valley.



ID	Image	OS NGR	Flow Conditions	Description
3		504588 131779	Still / Stagnant, No Flow	<p>Down stream of Loxwood Road bridge. A large stagnant pool of water. Water level was approximately 0.2m below the invert level of the concrete channel beneath the road. No flow beneath bridge. No flow in pool.</p> <p>In the far ground of the image, the channel is dry indicating no flow. Water body appears to be contained within erosional feature.</p>
4		504765 132515	Dry	Culvert beneath Woodland access track showing incised channel and construction of bridge.


ID	Image	OS NGR	Flow Conditions	Description
5		504765 132515		Close up image of collection of debris within the culvert.
6		504775 132529	Dry	<p>Upstream of culvert, incised drainage channel. Channel was approximately 1.5m across and 0.5m deep at the location marked by clipboard.</p> <p>Channel contained large amount of woodland debris of a variety of sizes.</p>



ID	Image	OS NGR	Flow Conditions	Description
7		504786 132515	Dry	200m further upstream, channel less incised with maximum depth 0.3m
8		504755 132515		Channel down stream of culvert in sloping valley. The base of the channel was dry by soft. No water was observed in larger depressions. Channel narrower than upstream and more contained



ID	Image	OS NGR	Flow Conditions	Description
9		504760 132515	Still / Stagnant, No Flow	Standing water in pools down stream of culvert. Broad shallow channel approx. 1.2m wide can be observed
10		504745 132507	Dry	Drainage ditch meandering through valley.



ID	Image	OS NGR	Flow Conditions	Description
11		504882 132662	Dry	Image showing gentle slope with drainage channel at base.
12		505051 132669	Dry	Culvert under track from site. Concrete construction 35cm diameter discharging into channel into woods, Dry, no flow.



ID	Image	OS NGR	Flow Conditions	Description
13		505400 132662	Dry	610mm culvert beneath main footpath Dry
14		505400 132662	Still / Stagnant, No Flow	Over deepened base of channel adjacent to culvert. It is noted that despite there no being any flow, the standing water still contained as high concentration of silt.



ID	Image	OS NGR	Flow Conditions	Description
15		505400 132662	Dry	Natural drainage channel entering from the North. Mossey near vertical sides. No flowing water and heavily vegetated.



ID	Image	OS NGR	Flow Conditions	Description
16		505400 132662	Still / Stagnant, No Flow	<p>Vertical 1.2m clay walls exposed. No evidence of any laminations or siltstone bands near surface.</p> <p>Photo also indicated that root zone penetration of the vegetation is limited to the top soil area.</p> <p>Standing water in erosional feature in base.</p>
17		505412 132632	Dry	Upstream main channel crossing point.



ID	Image	OS NGR	Flow Conditions	Description
18		505412 132632	Still / Stagnant, No Flow	Down stream main channel crossing point Man-made channel
19		505412 132632	Dry	Looking down at channel at down stream side, large open channel with brick debris and scour features.



ID	Image	OS NGR	Flow Conditions	Description
20		505412 132632	Still / Stagnant, No Flow	Closer image of 19 above. Vertical banks can be observed with scour feature containing standing water.
21		505471 132787	N/A	Photo taken into south east towards the crest of the hill contain a small pond. This pond is approximately 10m above the Site.



ID	Image	OS NGR	Flow Conditions	Description
22		505441 132868	Still / Stagnant, No Flow	Pond to East/Northeast of site. Photo looking North west from corner of footpaths.
23		505426 132934	Dry	<p>Northern Edge of pond showing silty base and edge of pond. There is approximately a 1 drop from natural ground levels to the dry base of this area of the pond, indicating that water levels may increase and still be contained within this pond area.</p> <p>Note absence of vegetation suggest this area may be wet more often than dry.</p>



ID	Image	OS NGR	Flow Conditions	Description
24		505426 132956	Dry	Pond - inflow into pond dry
25		505426 132956	Dry	Collapsed brick lined culvert representing the inflow to the pond.



ID	Image	OS NGR	Flow Conditions	Description
26		505162 132912	N/A	Photo of slopes towards the site. Southerly direction
27		505015 132985	N/A	Forest track along Northern boundary. Very gradual slope



ID	Image	OS NGR	Flow Conditions	Description
28		504897 133088	Dry	Origin of drainage ditch to the north west of site. Shallow incised drainage channel that extends further north east towards Hope Rough.
28		504912 133103	Dry	10m north east of point 28 looking upstream of channel within woodland. Well defined boundaries. Photo 31 indicated erosional features within this area.



ID	Image	OS NGR	Flow Conditions	Description
30		504897 133088	Dry	Looking downstream of location 28. Incised channel meandering through trees. Steep sided and flat bottomed. 0-3m – 0.5m wide. Depth of channel estimated 0.5m.
31		504912 133103	Dry	Erosional feature by tree root. Significant scouring and erosion of sediment. Lots of woodland debris accumulated over scour feature including some sizable branches relative to the channel dimension. Channel estimate 0.5m. Scour feature dropped approximately 1m.



ID	Image	OS NGR	Flow Conditions	Description
32		504912 132897	Dry	Culvert under track on western boundary of site 210mm diameter rigid pipe.
33		504912 132897	Dry	Dry channel in woodland associated with culvert in location 32. Channel appeared very deep estimated 1.2m by 0.3m wide. Vertical sides and flat bottomed.



ID	Image	OS NGR	Flow Conditions	Description
34		504824 132824	Dry	
35		504765 132787	N/A	View northwest looking towards valley on western boundary of site. Note the relatively steep slope towards valley floor.



ID	Image	OS NGR	Flow Conditions	Description
36		504765 132787	N/A	View southwest looking towards valley on western boundary of site. Note the relatively steep slope towards valley floor.
37		504735 132779	N/A	View west of more moderate trackway into the base of the valley floor.



ID	Image	OS NGR	Flow Conditions	Description
38		504676 132757	Still / Stagnant, No Flow	<p>Confluence of the stream arising from north and the drainage channel associated with the site.</p> <p>Standing water associated with scour features. No flow.</p>
39		504676 132757	Dry	<p>Narrow incised channel joining at confluence above. Scouring and erosional features apparent in base.</p>



ID	Image	OS NGR	Flow Conditions	Description
40		504647 132632	Still / Stagnant, No Flow	Wider channel in base of valley, shallower channel with some undercutting on edges near vegetation. Dry with occasional puddles of standing water.
41		504721 132485	Dry	Former sluice and dam feature constructed circa 1900s as a fishing lake. Dam embankment appears missing at the eastern side of the sluice and the concrete footing appears to have been undercut by approximately 1m. This is considered clear evidence of a high intensive high velocity flood event, possible associated with the failure of the dam.



ID	Image	OS NGR	Flow Conditions	Description
42		504735 132485	Dry	<p>Just down stream the channel broadens and is braided in the base of a second former fishing lake. The main channel appears to be heavily laden with woodland debris.</p> <p>Channel not shown on OS map, however flow clearly continues down this valley feature.</p>
43		504529 132250	N/A	<p>Land on western boundary of valley indicating a very gentle to flat topography. Base of valley estimated to be between 5-8m from base to the field.</p>


ID	Image	OS NGR	Flow Conditions	Description
44		504559 131912	N/A	Down stream of second dam and image of collapsed culvert/sluice channel. The OS map indicates that the stream should appear from this location however no channel was apparent.
45		504603 131853	N/A	The dam embankment in the foreground indicates and estimated 3-4m between crest and apparent base of the bund. The embankment appeared intact along its length until the far eastern boundary

ID	Image	OS NGR	Flow Conditions	Description
46		504603 131853	Dry	<p>Far eastern edge of dam embankment indicating a deeply incised channel both through the embankment and upstream. This was dry with the exception of standing water in scour features.</p> <p>Brick structures were observed collapsed into the channel. The depth of the channel was estimated at 2m below the valley floor at this point.</p>
47		504618 131868	Still / Stagnant, No Flow	<p>View looking upstream from new footbridge</p> <p>Large scour feature and collapse of a brick work structure (possibly former footbridge).</p> <p>Stagnant water in scour feature no flow.</p>

ID	Image	OS NGR	Flow Conditions	Description
		504618 131868	Still / Stagnant, No Flow	<p>View looking down stream of footbridge</p> <p>Scour feature continues with over deepened channel and stagnant water. End of ponded water can be observed in the far ground of the image. No flow.</p> <p>Channel more that 3m wide and more than 1.5m deep below the footbridge.</p>
49		504750 132074	Dry	Unmarked drainage channel crossing the woodland.

ID	Image	OS NGR	Flow Conditions	Description
50		504868 131882	Still / Stagnant, No Flow	View south of pond to the south of the woodland Small pond <20m. fed by small drainage channel however dense undergrowth
51		504868 131882	Still / Stagnant, No Flow	View of southern extent of pond. Water level was below the established vegetation line. Expose bed was soft silt. No access to the water edge due to the ground conditions. Pond had very shallow sloping slides Top of slope approximately 0.5m above exposed base.

ID	Image	OS NGR	Flow Conditions	Description
52		504868 131882	Dry	
53		504897 131824	Dry	View south/south west of a sunk lane feature which also channel any overland flow form the surrounding areas. No access however feature appeared to be about 1.5m below surround land

ID	Image	OS NGR	Flow Conditions	Description
54		504897 131824	Dry	View down axis of lane/channel feature.



APPENDIX 4
Flood Risk Assessment

Caulmert Limited

Engineering, Environmental & Planning
Consultancy Services

ProTreat Limited

Loxwood Clay Pits

Clay Extraction and Site Restoration

Flood Risk Assessment

Prepared by:

Caulmert Limited

Unit 14 Ffordd Richard Davies, St Asaph Business Park, Denbighshire LL17 0LJ

Tel: 01745 530890

Email: contact@caulmert.com

Web: www.caulmert.com

Document Reference: 4463-CAU-XX-XX-RP-C-0300

November 2020

APPROVAL RECORD

Site: Loxwood Clay Pits

Client: ProTreat Limited

Project Title: Clay Extraction and Site Restoration

Document Title: Flood Risk Assessment

Document Ref: 4463-CAU-XX-XX-RP-C-0300

Report Status: **Final**

Project Director: Jonathan Sykes

Project Manager: Steve Barber-Bailey

Caulmert Limited: Unit 14 Ffordd Richard Davies, St Asaph Business Park, Denbighshire LL17 0LJ

Telephone: 01745 530890

Author	Steven Barber-Bailey	Date	19 th October 2020
Reviewer	Jonathan Sykes	Date	6 th November 2020
Approved	Steven Barber-Bailey	Date	30 th May 2021

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FIGURES

Figure 1: Location of the Site and of the Proposed Development

Figure 2: The Environment Agency's Fluvial Flood Map (September 2020)

Figure 3: The Environment Agency's Surface Water Flood Map Low Risk Scenario (September 2020)

TABLES

Table 1: Greenfield runoff rates

APPENDICES

Appendix 1 Correspondence with the Environment Agency, West Sussex County Council, and Chichester District Council

1.0 INTRODUCTION

1.1 Terms of Reference

- 1.1.1 Caulmert Ltd (Caulmert) was appointed by ProTreat Limited (PTL) in July 2020 to carry out a Flood Risk Assessment (FRA) on land near Loxwood in West Sussex. The FRA would accompany a planning application in support of clay extraction (the Proposed Development) and is to be presented as an Appendix to the Water Chapter of the application's EIA Water Chapter.
- 1.1.2 An FRA is required to support a planning application for the Proposed Development, and establishes the suitability of the site in relation to flooding. This assessment has been carried out in accordance with the requirements of National Planning Policy Framework (NPPF) and its accompanying Planning Policy Guidance.

2.0 CONTEXT AND SCOPE OF WORK

2.1 Requirement

- 2.1.1 In accordance with NPPF, a site-specific flood risk assessment must demonstrate that the proposed development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce the overall flood risk of the area.
- 2.1.2 Where appropriate, the following aspects of flood risk should be addressed by all planning applications in flood risk areas:
- The existing area liable to flooding;
 - The probability of flooding occurring now and over time;
 - The extent and standard of existing flood defences and their effectiveness over time;
 - The likely depth of flooding;
 - The rates of flow likely to be involved;
 - The likelihood of impacts to neighbouring areas, properties and habitats;
 - The effects of climate change;
 - The nature and currently expected lifetime of the proposed development and the extent to which it is designed to deal with flood risk.
- 2.1.3 Caulmert has carried out a Water Features Survey and Water Chapter in relation to the development site. The Water Chapter is a combined review of the baseline Water Environment (Hydrology, Hydrogeology and Flood Risk) in relation to the Site and of the potential implications as a result of the Proposed Development. This flood risk assessment draws on pertinent sections of the Water Chapter where appropriate.

2.2 Limitations

- 2.2.1 Some of the aspects considered in this study are subject to change with time. Therefore, if the development is delayed or postponed, consideration should be given to reviewing such issues to confirm that no changes have taken place, either at the site, with flood prediction, or within legislation.
- 2.2.2 The FRA is based on the end use specified in the text. If this end use is changed then consideration should be given to re-visiting the findings of this document to ensure that they remain valid.

3.0 SOURCES OF INFORMATION

3.1 Previous Studies

- 3.1.1 There has been no previous site-specific FRA prepared for the site according to the Chichester District Council and the West Sussex County Council planning application online viewers.

3.2 Further Information

- 3.2.1 Requests for further information of the development site were made from the Environment Agency, West Sussex County Council, and Chichester District Council. Copies of correspondence with these bodies is attached as Appendix A.
- 3.2.2 The Environment Agency (EA) publishes long term flood risk information on a UK Government web site <https://flood-warning-information.service.gov.uk/long-term-flood-risk>. This provides broad scale guidance on flood risk from Rivers and Sea, Surface Water, and from Reservoirs.
- 3.2.3 Reference has also been made to data sources held by BGS, by MAGIC.defra.gov.uk, and through ad-hoc internet searches.

4.0 SITE DESCRIPTION

4.1 Location and Details

- 4.1.1 The site of the Loxwood Clay Pit is 1.8km to the northeast of Loxwood and 3.7km to the west of Rudgwick, within the Low Weald. The development site is located on the old Pallinghurst Estate in an area of existing woodland/scrub located 1.5km to the east/northeast of the village of Loxwood. The national grid reference for the centre of the site is TQ550327.
- 4.1.2 Access to the site is through a dedicated access road following exiting forest tracks. The site is roughly rectangular in shape and covers an area of approximately 7.54ha. The site is bounded to the north by a public footpath linking with the Sussex Border Path to the west. The western southern and eastern boundaries are formed by existing woodland tracks. The surrounding area comprises both natural and commercial forestry plantation. Mix arable land is present

beyond the woodland boundaries. The principal details of the Site are provided below, and in Figure 1.

Site Name	Loxwood Clay Pits
Site Plan Area	7.54 hectares
Purpose of development	Clay Extraction and Site Restoration
Existing land-use	Woodland and Scrubland
OS NGR	505091E, 132776N
Country	England , NPPF applies
Local Planning Authority	Chichester District Council West Sussex County Council
Other Authorities	Environment Agency

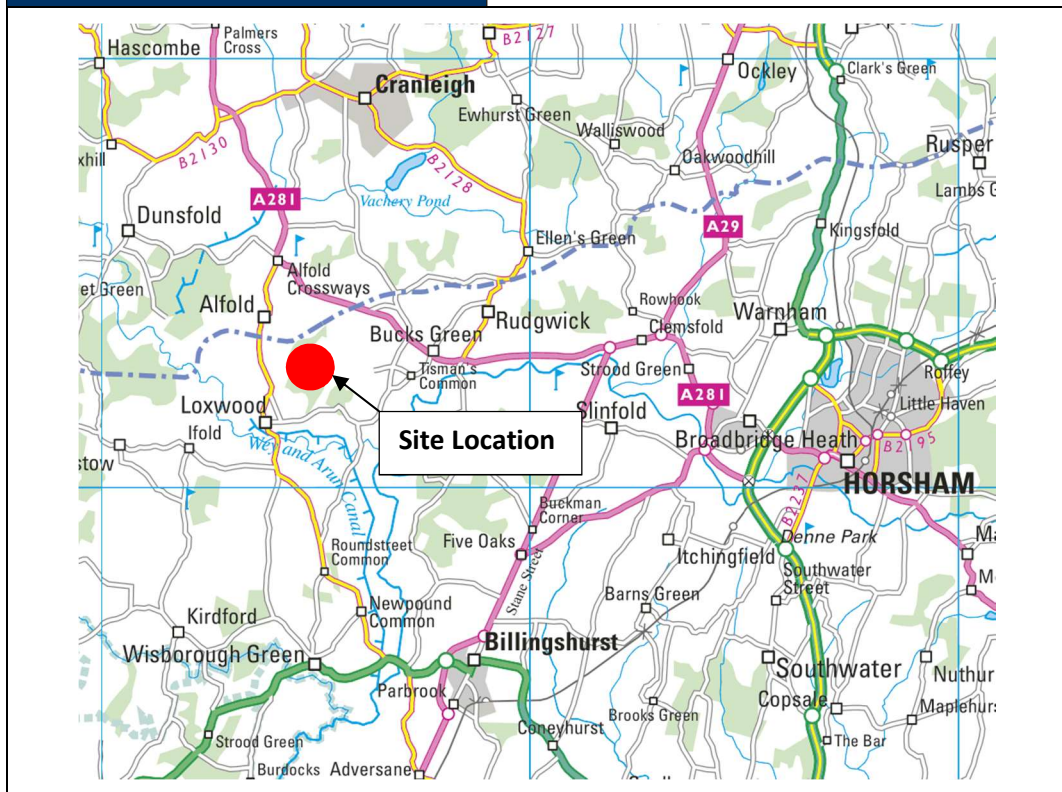


Figure 1: Location of the Site and of the Proposed Development

4.1.3 The site crosses the 48m contour line at its highest elevation. The site slopes gently from the northeast to the southwest, falling to the 40m contour, suggesting a gradient of 1:32 at its steepest extent.

4.2 Water Features

4.2.1 The site falls within the Loxwood Stream drainage catchment as defined by the Environment Agency’s Catchment data Explorer. The catchment contains a relatively short watercourse rising in hills to the east of Haslemere via the Hambleton and the Chiddingfold Tributaries. The Loxwood Stream, shown as the River Lox on some mapping systems, outfalls to the River Arun

some 5km downstream of Loxwood. The mouth of the River Arun is the English Channel at Littlehampton.

- 4.2.2 There is a north-south watercourse that flows through Loxwood. The watercourse, labelled as Loxwood Stream on OS mapping, rises at Alford and has a catchment area of 3.7km² at Loxwood. The watercourse joins with an unnamed tributary 300m to the south of Station Road, and outfalls to the Loxwood Stream a further 350m distant.
- 4.2.3 Alongside the Loxwood Stream to the south of the site is the Wey & Arun Canal. This canal is hydraulically independent of the Loxwood Stream and is currently being restored by a local trust.
- 4.2.4 There is a network of ephemeral and seasonal drainage ditches that link the development site with the Loxwood Stream. The area around the site is characterised by surface water drains and channels through the woodland. The surrounding area is characterised by gentle slopes with the exception of a deep valley containing an unnamed drain to the west of the site. The key points investigated as part of the Water Chapter's site walkover visit included:
- Drains from the site;
 - Drains through the woodland;
 - Main drain along western woodland boundary;
 - Pond to north east;
 - Track crossing points of drain(s);
 - Point of Drain crossing Loxwood Road to south of site.

4.3 Geology

- 4.3.1 The BGS's online Geology of Britain Viewer describes the geology of the site. The bedrock comprises the Weald Clay Formation mudstone. There are no superficial deposits recorded across the site.
- 4.3.2 According to Soilscales, the site is wholly located within Soilscale 18. This is described as comprising slowly permeable seasonally wet loamy and clayey soils. Its soils offer 'impeded drainage' and as such may not be suitable for ground infiltration. No account is taken of existing made ground or quarry workings within this description.
- 4.3.3 According to Magic.defra.gov.uk the aquifer designation map shows the bedrock to be an unproductive aquifer. The groundwater vulnerability is stated as unproductive. It is not anticipated that groundwater protective measures would need to be taken by the application site.

4.4 Flood Zones

- 4.4.1 The EA Flood Map shows the risk of flooding in England for different return period events. Flood Zones assume that no flood defences are present and so where defences do exist the Zones are only indicative of the potential flood.

- 4.4.2 Based on the EA's Flood Map the Proposed Development site falls wholly within Flood Zone 1. This area designation is considered to be at very low risk (annual probability of less than 0.1%) of flooding from rivers or sea. An extract of the Flood Map is at Figure 2.
- 4.4.3 The areas of Flood Zone 2 and 3 closest to the site are associated with the Loxwood Stream. This watercourse loops some 2km to the south of the site, and are joined by the watercourse from Loxwood village centre. This watercourse is also indicated to be within Flood Zones 2 and 3 in a narrow strip along its length downstream from the B2133 Loxwood Road.

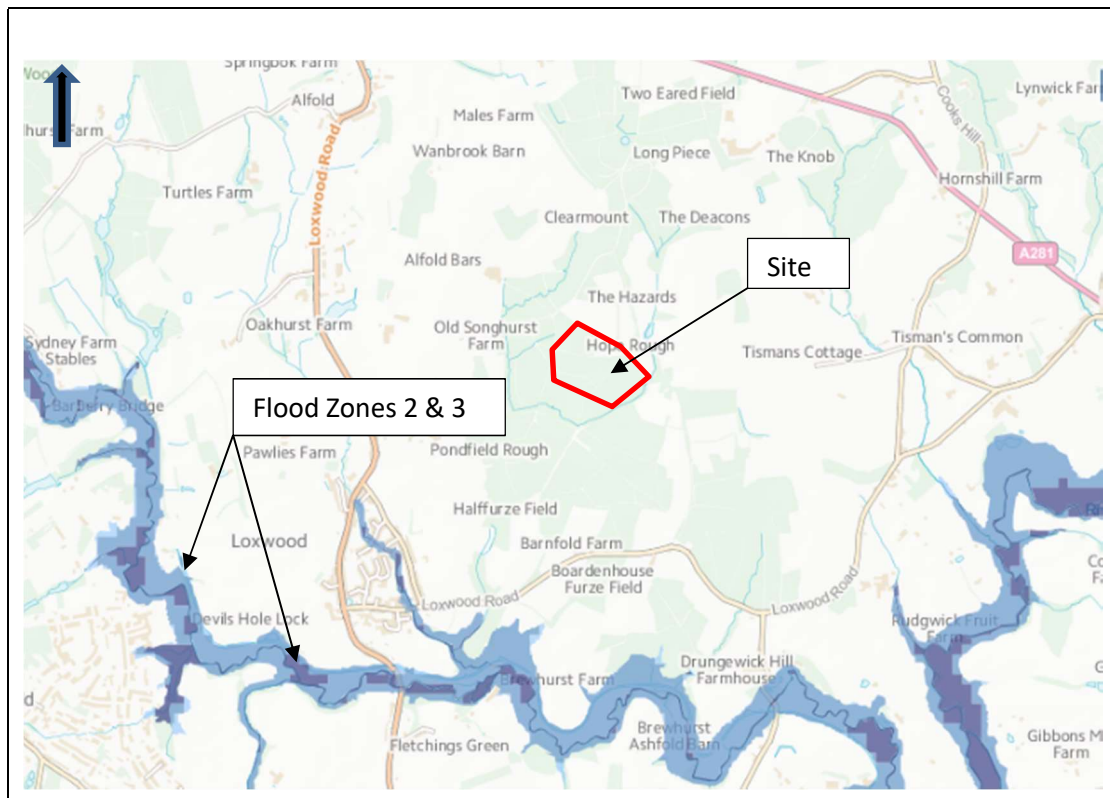


Figure 2: The Environment Agency's Fluvial Flood Map (September 2020)

- 4.4.4 Advice from the Flood Risk Management at West Sussex County Council reveal that Loxwood has historically flooded, and that the Parish Council is currently preparing a study to see if any local improvements can be made to reduce the risk of flooding in the village. It is understood that properties within the Burley Close, Oak Grove, and Guildford Road areas are susceptible to fluvial and surface water flooding.
- 4.4.5 The unnamed watercourse from the proposed development joins with the watercourse through Loxwood at a point downstream of the village. It is not considered that the unnamed watercourse from the development site area makes a significant contribution to flooding in the village. It is noted that contemporary hydraulic modelling undertaken for Loxwood Parish Council allows for flows from the unnamed watercourse, although outline flooding solutions are independent of this catchment's contribution.

4.4.6 Nevertheless the proposed development site should assess and implement a surface water management plan whereby there is no increase in flow velocity and flow quantity from the development site. Any such increase may have potential to affect flood risk within wider catchments.

4.5 Surface Water Flooding

4.5.1 The EA's indicative surface water flood risk map shows that there are areas within the site boundary that are at risk of surface water flooding. The areas generally correlate with the surface features on the ground and feature most prominently on the Low Risk Scenario, with flood depths up to 900mm.

4.5.2 An extract from the EA's online viewer for surface water flood risk is shown at Figure 3.

4.5.3 Information on flood risk in the area was requested from the EA as a Product 3 Request. Received information confirmed that the proposed development is within Flood Zone 1. Further, information from the EA show that the areas of surface water flood detailed on the online viewer coincide with areas of 1 in 1,000 year flood extents for surface water flood.

4.5.4 Information from Chichester District Council's Senior Engineer made similar reference to patches of surface water flooding within the development site. The Senior Engineer reasoned that there are existing drainage pathways through land at and around the development site that will need to be retained in their current state.

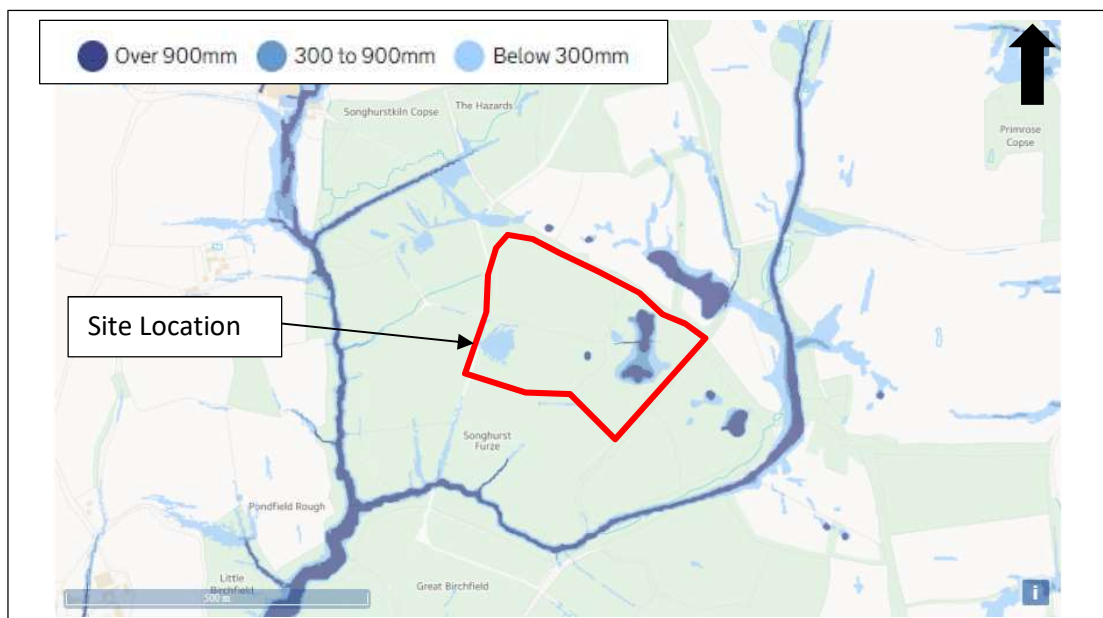


Figure 3: The Environment Agency's Surface Water Flood Map Low Risk Scenario (September 2020)

4.6 Flood Risk from Reservoirs

4.6.1 The EA map shows that the site is not at risk from reservoir flooding.

4.7 Groundwater Flooding

4.7.1 Groundwater flooding is caused by raised groundwater levels, typically following prolonged rain. High groundwater levels may result in increased overland flow flooding.

4.7.2 The Chichester District Council's SFRA noted that due to the large chalk bands across the district there is a significant proportion of land which is more likely to be affected by groundwater flooding. Information from West Sussex County Council Flood Risk Management states that the site is shown to be at a low risk of groundwater flooding. Based on the current JBA Groundwater Flood Risk Maps ground water is shown to be at least 5m below the ground surface.

4.8 Historic Flooding

4.8.1 There is reference to historic flooding near to the site in the Chichester District Council Level 1 Strategic Flood Risk Assessment. Reference is also made to fluvial flooding in Loxwood in September 1968.

4.8.2 There is no record of flooding at the development site based on an ad-hoc internet search.

5.0 CLIMATE CHANGE

5.1.1 Climate change has a significant effect on the frequency and intensity of rainfall events in Britain with commensurate impacts on flood risk. Climate change can affect the extent of flooding by increases in predicted flood flows as rainfall intensifies.

5.1.2 The National Planning Practice Guidance (NPPG) refers planners, developers and advisors to the EA guidance on considering climate change in FRAs. NPPG indicates the level of technical assessment of climate change impacts on fluvial flooding appropriate for new developments, depending on their scale and location.

5.1.3 The application site is wholly within Flood Zone 1 and so there is no requirement in NPPG to assess the impact of climate change in respect of risk of flooding to the development. Nevertheless, climate change will need to be considered in respect of surface water management for the proposed development as part of a detailed design.

6.0 DEVELOPMENT PROPOSAL & DRAINAGE STRATEGY

6.1 The Proposed Development

6.1.1 The Proposed Development is for the excavation of minerals from an area of land that has a current landuse of woodland and scrub. The development will also comprise a construction

materials recycling facility. The proposed operational area will extend to approximately 6ha within the 7.54ha redline boundary and generally comprises :

- An extraction area within the central part of the site;
- An area for stockpiling of spoil and overburden
- An area of stock storage
- Supporting weighbridge, site office and welfare facilities.

6.1.2 Access to the operational area will be via a dedicated access track to the Loxwood Road.

6.1.3 The development target is to extract approximately 400,000 tonnes of clay mineral from the site, to be used in brick making and in other construction products, over a 31 year period. Following the clay extraction the site will be sequentially restored with selected imported materials sourced from the on-site construction materials recycling facility.

6.1.4 A plan that shows the proposed site layout is available within the EIA's Water Chapter. This shows a series of 30 phases of extraction, with treatment facilities in the northwest of the site, and a surface water lagoon in the south.

6.2 Site Development Impacts on the Water Environment

6.2.1 Commentary on the possible effects that the proposed development may have on the local hydrology and hydrogeology is included in the main body of the EIA's Water Chapter. The commentary is not reproduced in this FRA.

6.2.2 To mitigate the risk of the development affecting the flood risk of new development, and that of third parties, sustainable drainage (SuDS) principles should be incorporated where practicable that reconcile the generated runoff with consented discharge limits.

6.2.3 The UK SuDS Greenfield runoff rate estimation tool can be used to estimate rates for specific locations. The existing Greenfield runoffs from the developable area of 7.54ha are set out in Table 1 below, which assume a SOIL type of 4. The estimated Q_{BAR} for the site is 41l/s.

Annual Event Probability	Rate (l/s)	Rate (l/s/ha)
1 in 1	35	4.6
1 in 30	94	12.5
1 in 100	131	17.4

Table 1: Greenfield runoff rates (HR Wallingford/uksuds.com)

6.3 Proposed Surface Runoff Management

- 6.3.1 The nature of the clay deposits, and reported low level of groundwater in sections of the site, suggests that significant groundwater ingress to the excavation it not considered likely. Water management will be dominated by the potential for surface water runoff to enter the quarried void. Mitigation measures such as maintaining existing drainage channels around the perimeter of the site, minimising the open void areas, and the construction of dedicated surface water storage lagoons, will be employed to reduce the volume of water entering the excavations.
- 6.3.2 Discharge of surface water from the site will be limited to no more than the Greenfield runoff rate in line with current Planning Guidance. Silt settling ponds will be constructed to allow solids settlement and so limit the transport of silt offsite. Water collecting in the base of the excavations will be pumped to these silt settling ponds prior to discharge. A secondary and temporary silt pond may be constructed in the base to maximise the potential to remove silt from the surface water discharge. In order to minimise the volume of water entering the site, existing drainage networks surrounding the site periphery will be maintained.
- 6.3.3 The site is not considered suitable for a soakaway due to the poor infiltration nature of the ground.

6.4 Foul Water Drainage

- 6.4.1 Foul water from the office/welfare facilities shall be captured on site and periodically removed to a suitable facility by a registered carrier.

7.0 SUMMARY OF POTENTIAL SOURCE AND IMPACT OF FLOODING

- 7.0.1 Flood risk from sources has been assessed. Flood risk was reviewed against flooding by:
- Flooding from fluvial sources;
 - Flooding from surface water and overland flow;
 - Flooding from groundwater;
 - Flooding from other sources;
 - Impact of the development on others.
- 7.0.2 The flood information shows that the Proposed Development lies wholly within Flood Zone 1. This Zone has a low probability of flood risk. The area is deemed to have an annual probability of less than 0.1% of river or sea flooding.
- 7.0.3 Flooding from surface water is indicated as being a risk within the eastern half of the site and in its southwestern corner. The proposed development should take account of surface water flooding to adjacent land so that there is no increase in offsite flood risk.
- 7.0.4 Flooding from groundwater is not considered to be a risk that requires significant mitigation.

- 7.0.5 There is no existing positive drainage infrastructure on the site which could pose a flood risk to the development.
- 7.0.6 The proposed drainage strategy outlined in Section 6 should provide adequate mitigation against the potential increased rates and volumes of surface water runoff.

8 PLANNING CONTEXT

8.0 Applicable Planning Policy

- 8.0.1 NPPF section 10 deals specifically with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA Flood Map. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

8.1 NPPF Flood Zones and Land Use Vulnerability

- 8.1.1 Within Planning Policy Guidance, each flood zone has a list of appropriate land uses dependent on vulnerability to flooding. The flood zones are described in Table 1, flood risk vulnerability classification in Table 2, and flood risk vulnerability and flood zone compatibility in Table 3. The Flood Zones refer to the probability of river and sea flooding, ignoring the presence of flood defences.

8.2 Sequential and Exception Test

- 8.2.1 The Sequential Test is required to assess flood risk of a development. Planning Policy Guidance recommends that the test be applied at all stages of the planning process to direct new development to areas with the lowest probability of flooding (i.e. Flood Zone 1).
- 8.2.2 The Proposed Development is located wholly in Flood Zone 1 (Low Probability). According to Table 1 of NPPF Planning Policy Guidance, all uses of land are appropriate in this area. According to Table 2 of Planning Policy Guidance, the Proposed Development falls in the 'Less Vulnerable' classification. Such developments are appropriate in Flood Zone 1 as shown in Table 3 of Planning Policy Guidance. The Sequential Test is therefore not applicable for this Proposal.

9 CONCLUSIONS, SUMMARY AND RECOMMENDATION AND MITIGATION

9.0 Conclusions

The proposed development is classified as 'Less Vulnerable' according to NPPF (Table 2: Flood risk vulnerability classification). The following table summarise the conclusions of this FRA.

1.	Development description and location
1a	What type of development is proposed and where will it be located? <ul style="list-style-type: none"> The extraction of clay minerals and the restoration with inert material
1b	What is its vulnerability classification?

	<ul style="list-style-type: none"> • Less vulnerable
1c	<p>Is the proposed development consistent with the Local Development Documents?</p> <ul style="list-style-type: none"> • Not mentioned
1d	<p>Provide evidence that the Sequential Test or Exception Test has been applied in the selection of this site for this type of development?</p> <ul style="list-style-type: none"> • See section 8.2, above.
2.	Definition of the flood hazard
2a	<p>What sources of flooding could affect the site?</p> <ul style="list-style-type: none"> • Surface water could affect parts of the development site.
2b	<p>Describe how flooding would occur?</p> <ul style="list-style-type: none"> • Precipitation ponds in depressions in the ground.
2c	<p>What are the existing surface water drainage arrangements for the site?</p> <ul style="list-style-type: none"> • There are a series of ephemeral and poorly maintained watercourses to the periphery of the development site.
3.	Probability
3a	<p>Which flood zone is the site within?</p> <ul style="list-style-type: none"> • The application site is within Flood Zone 1.
3b	<p>If there is a Strategic Flood Risk Assessment covering this site, what does it show?</p> <ul style="list-style-type: none"> • The SFRA shows little variance to current EA flood information.
3c	<p>What is the probability of the site flooding taking account of the contents of the SFRA and of any further site-specific assessment?</p> <ul style="list-style-type: none"> • The Proposed Development location has an annual probability of flooding of less than 1 in 1,000.
3d	<p>What are the existing rates and volumes of runoff generated by the site?</p> <ul style="list-style-type: none"> • The 1 in 1 year greenfield runoff rate for the site is estimated to be 35 l/s.
4.	Climate Change
4a	<p>How is flood risk at the site likely to be affected by climate change?</p> <ul style="list-style-type: none"> • The flood risk of the application site is not predicted to change as a result of climate change.
5.	Detailed development proposals
5a	<p>Provide details of the development layout.</p> <ul style="list-style-type: none"> • It is currently only possible to show the planning redline boundary of the development site.
5b	<p>Demonstrate, where appropriate, how land uses most sensitive to flood damage have been placed within the site that are at least risk of flooding.</p> <ul style="list-style-type: none"> • Not Applicable
6.	Flood risk management measures
6a	<p>How will the site be protected from flooding, including the potential impacts of climate change, over the development's lifetime?</p> <ul style="list-style-type: none"> • Not Applicable
7.	Offsite impacts
7a	<p>How will it be ensured that the proposed development and the measures to protect the site from flooding will not increase flood risk elsewhere?</p> <ul style="list-style-type: none"> • Controlled management of surface water within the development site and discharge offsite at a consented rate.
7b	<p>How will runoff from the completed development be prevented from causing an impact elsewhere?</p> <ul style="list-style-type: none"> • Runoff from the proposed development will be managed surface water management features that will control flow rates, volumes and water quality leaving the site.
8.	Residual risks
8a	<p>What flood related risks will remain after the implementation of measures to protect the site from flooding?</p>

	<ul style="list-style-type: none"> • The flood risk to the application site will remain unchanged
8b	<p>How, and by whom, will these risks be managed over the lifetime of the development?</p> <ul style="list-style-type: none"> • Risks will be managed by the routine inspection and maintenance by the site operator.

9.1 Summary

9.1.1 The proposed development is summarised as:

- The Proposed Development falls wholly within Flood Zone 1 of the EA's indicative flood outline;
- There are parts of the existing site that are at risk of surface water flooding, however these do not significantly affect the development proposals;
- The Proposed Development is a 'less vulnerable' classification and does not require a Sequential Test;
- Other flood risks considered included: existing drainage, groundwater, overland flow, surface runoff. These are not considered to pose a significant flood risk to the proposed development;
- The Proposed Development remains low risk against future flooding when taking account of climate change.

9.2 Recommendation and Mitigation

9.2.1 It is recommended that the Proposed Development is constructed at the location noted subject to these recommendations.

9.2.2 Mitigation against an increase in surface water runoff from the development site can be achieved by effective management control, such as the implementation of sustainable drainage methods, and restricting the runoff to no more than the current Greenfield rate.

9.2.3 Effective surface water management should be assessed, developed, and implemented for the proposed development. Initial and quarrying operation, with due recognition made of flood reduction work being assessed and undertaken in Loxwood.

10 REFERENCES

- 1 National Planning Policy Framework Communities and Local Government (2012/18);
- 2 Flood Risk and Coastal Change - Ministry of Housing, Communities & Local Government (Mar 2014);
- 3 Strategic Flood Risk Assessment (SFRA) of Chichester District Council – Capita Symonds (July 2008);
- 4 Chichester District Council Level 1 Strategic Flood Risk Assessment – JBA Consulting (Dec 2018);
- 5 Strategic Flood Risk Assessment of West Sussex – Capita Symonds (Jan 2010);
- 6 West Sussex Preliminary Flood Risk Assessment – WSCC (May 2011);

- 7 Loxwood Parish Council Flood Forum – Website Access (Sep 2010);
- 8 Environment Agency on-line flood risk mapping;
- 9 Urban Drainage 2nd Ed, - Butler & Davies (Spon 2004);
- 10 Greenfield Runoff Rate Estimation Tool – HR Wallingford/uksuds.com

APPENDICES

APPENDIX 1

Correspondence with the Environment Agency, West Sussex County Council, and Chichester District Council

Steven Barber-Bailey

From: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Sent: 10 August 2020 14:09
To: Steven Barber-Bailey
Subject: 200810 SSD179187 Product 3 Request - Land near Loxwood, West Sussex RH14
Attachments: SSD179187 letter.pdf; Surface water map.pdf

Dear Steve,

Thank you for your email of 10/7/2020.

Please be advised that we do not have any detailed modelling for the site as it is within Flood Zone 1, please see the attached letter which provides further information. I have also attached a surface water map for your information.

This information is supplied subject to the notice which can be viewed via the following link:
<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Please get in touch if you have any further queries or contact us within two months if you would like us to review the information we have sent.

Kind regards,

Customers & Engagement Team

Environment Agency | Solent and South Downs Area | Guildbourne House | Chatsworth Road | Worthing | West Sussex | BN11 1LD
email: ssdenquiries@environment-agency.gov.uk

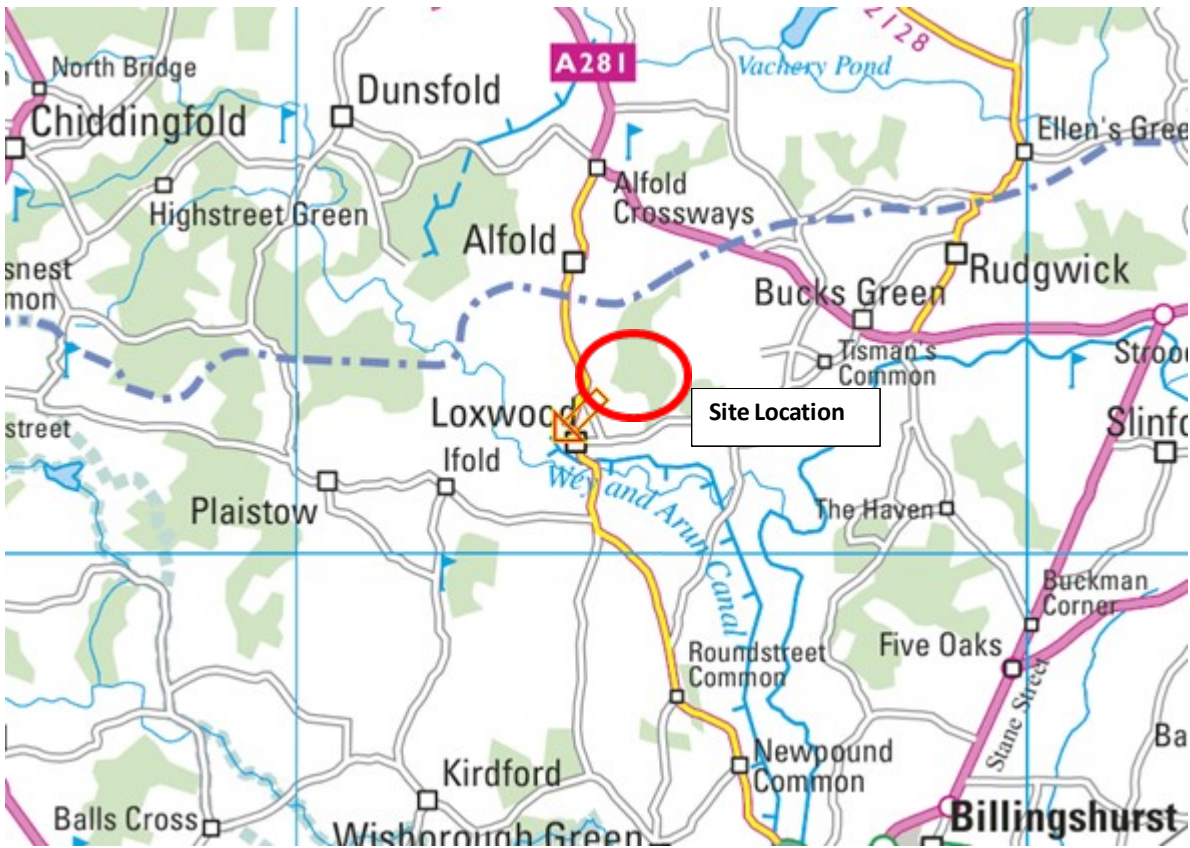
From: Steven Barber-Bailey [<mailto:StevenBarber-Bailey@caulmert.com>]
Sent: 10 July 2020 15:27
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 200715/NW02 Product 3 Flood Risk Assessment Request - Land near Loxwood, West Sussex RH14

Good afternoon,

I would like to request a **Product 3 information request for a basic flood risk assessment** of a development site located close to the B2133 road near Loxwood in West Sussex, close to RH14 0RW. The site is currently a woodland, and measures 7.5ha in plan (NGR: 505095, 132795). An Ordnance Survey extract is provided below, and a site layout record drawing is attached, for location purposes.

The proposed development is for the extraction of clay, which is to be followed by ground restoration.

I have been asked to capture information that would comprise a site-specific flood risk assessment and drainage strategy for the site. The site is bounded on all sides by woodland and open grassland, and is in Flood Zone 1. I would like to use the Product 3 information to inform content of a flood risk assessment that would accompany a planning application.



I understand that there is no charge for providing the information.

Do please let me know if you require any additional information I could provide so that you can form a comprehensive response.

With thanks and kind regards,

Steve



Steven Barber-Bailey

Mobile: 07827 918 056
Direct: 01745 777 158
Phone: 01745 530890
Extension: 1010

StevenBarber-Bailey@caulmert.com
www.caulmert.com

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Our reference: SSD179187

SENT BY EMAIL ONLY: StevenBarber-Bailey@caulmert.com

10/8/2020

Dear Steve,

Thank you for your request of 10/7/2020 to use Environment Agency Product 3 data.

Response to your request

The Environment Agency's records indicate that the above site is located in Flood Zone 1 (land assessed as having less than 0.1% (1 in 1,000) chance of flooding in any given year from **rivers or the sea**). Therefore, the likelihood of flooding from rivers and sea in this area is estimated as 'very low'.

Proximity to Flood Zones 2 or 3

The above site is approximately 1287 metres away from Flood Zone 3. We are therefore unable to provide data from our detailed fluvial or tidal models which is relevant to your site.

More information on Flood Zones can be found on the GOV.UK website:

<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-1-flood-zones/>

Surface water flooding

Our mapping indicates that this site **is** at risk of surface water flooding.

For information on flooding from all other sources, such as surface water, please contact the Lead Local Flood Authority, which in this case is West Sussex County Council. A link to their information available online is shown below:

<https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/local-flood-risk-management-strategy/>

Please note that the above is a link to an external website which the Environment Agency does not control or maintain. Therefore, the link may not be the most up-to-date at the date of this letter. If the link does not work, and you are unable to find the information about surface water flooding on the relevant website, please contact the authority named above directly.

Where you can find further information

- Detailed long-term flood information and maps can be found on the GOV.UK website:
<https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
- Flood maps for planning can be found on the GOV.UK website:
<https://flood-map-for-planning.service.gov.uk/>
- Please be aware that in February 2016 the Environment Agency updated its guidance on climate change allowances. The standard allowance of adding 20% to peak flows – as per previous guidance in the National Planning Policy Framework, may not be applicable for the purposes of informing development proposals. It is possible that our current modelling has under estimated flood risk when taking climate change into consideration. This does not however have an effect on Flood Zones 2 or 3. For further information please visit:
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
- Further details about the Environment Agency information supplied can be found on the GOV.UK website:
<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>
- If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency information for Flood Risk Assessments:
<https://www.gov.uk/planning-applications-assessing-flood-risk>
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

If you have any queries or would like to discuss the content of this letter further please call us on 03708 506 506, or reply to the email sent to you with this letter attached.

Please get in touch if you have any further queries or contact us within two (2) months if you would like us to review the information we have sent.

For information on what you can expect from us and our full service commitment to you, please click on this link:

<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment--2/environment-agency-customer-service-commitment>

Yours sincerely,

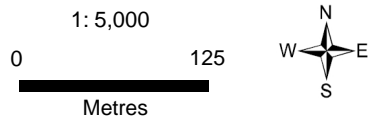
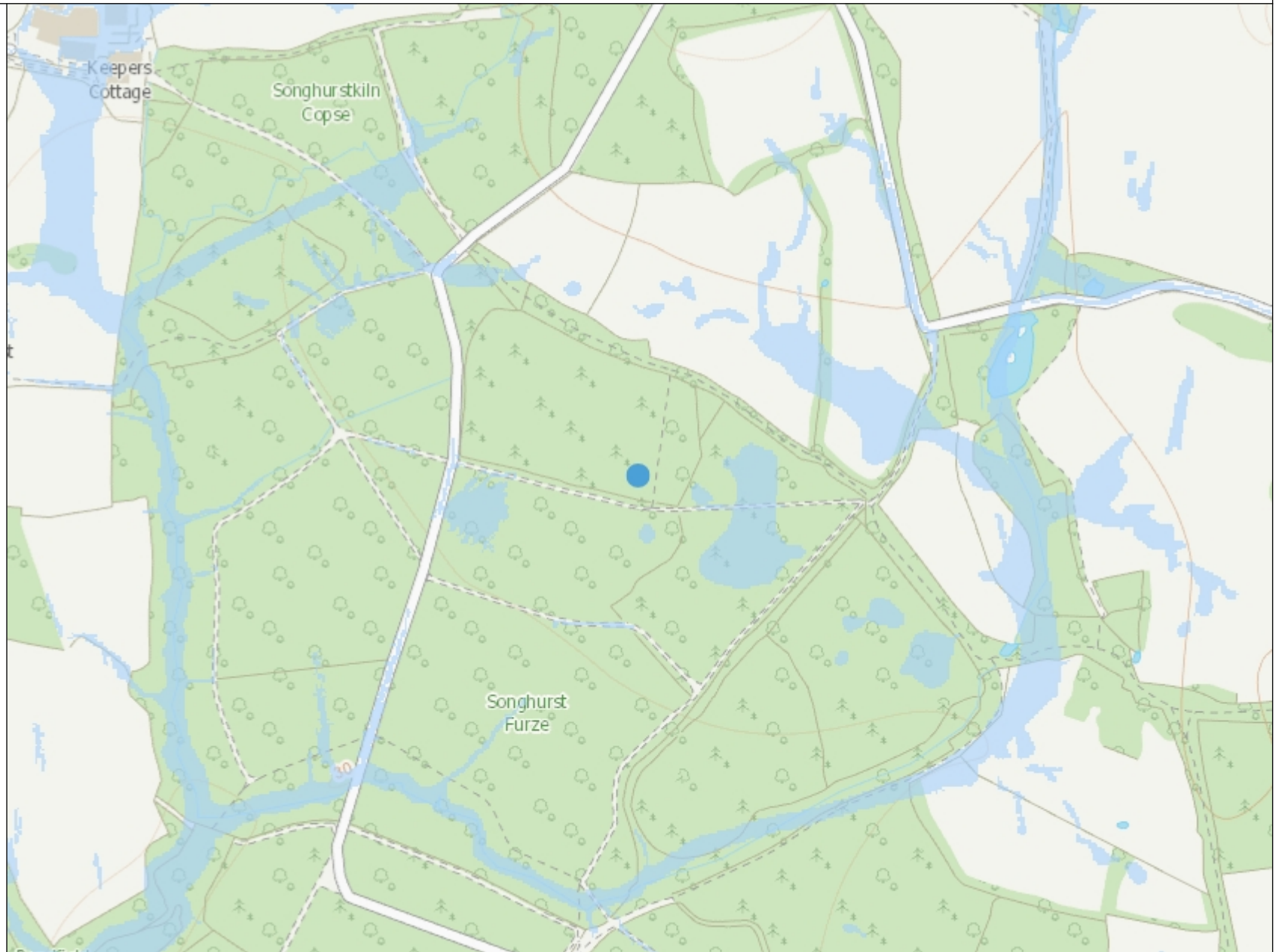
Customers & Engagement Team

**Environment Agency, Guildbourne House, Chatsworth Road, Worthing, West Sussex,
BN11 1LD**

Risk of Flooding from Surface Water- Created 10/8/2020

Legend

- Statutory Main Rivers
- Flood Extent 1 in 1000



Steven Barber-Bailey

From: Kevin Macknay <kevin.macknay@westsussex.gov.uk> on behalf of Flood Risk Management <FloodRiskManagement@westsussex.gov.uk>
Sent: 13 August 2020 15:21
To: Steven Barber-Bailey
Subject: RE: Flood Risk Assessment - Information Request - Land near Loxwood, West Sussex RH14
Attachments: Groundwater flood risk_JBA mapping.pdf; Surface water flood map_1in30 and 1in100 storm events.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Red Category

Steven,

Please see our response to your recent enquiry below:

Flood Zones

- Please confirm the Flood Zones for this area.
The area is shown to be in Flood Zone 1 based on current EA flood mapping.
- Please confirm surface water, reservoir flooding, sewer flooding. Please provide plans and depth data from your GIS UFMSW for 30yr, 100yr & 1000yr as applicable (OS Datum).
The site is shown to be generally at low risk of surface water flooding. However, current surface water flood mapping does show some areas within your 'red line boundary' to be at risk during a 1 in 30 and 1 in 100 storm event. See attached plan.
 - Within your design please consider existing overland flow routes, both within and outside the boundary of your site.
 - A wholesale site level rise via the spreading of excavated material must be avoided. Any excavated material kept on site should be located in areas designed and designated for that purpose.
- Please confirm mapping and records for any surface water assets owned or maintained.
We do not have any existing surface water assets within the area of interest.
- Please confirm if there are any future drainage improvements proposed for this area.
We are aware that Loxwood has historically flooded and that the parish council are currently covering out a study to see if any local improvements can be made to reduce to risk of flooding.
- Please confirm details of existing or planned flood alleviation and defences in this area.
See above.
- Please confirm if you are aware of any historic flooding within the confines of the site.
None that has been reported to WSCC as LLFA.
- Please confirm if you are aware of any historic flooding in close vicinity and/or on the public highway.
None that has been reported to WSCC as LLFA.

Groundwater

- Please confirm details of any groundwater flooding issues in the area, including flood levels, flood extents and any available anecdotal information.

The site is shown to be at low risk of groundwater flooding. Based on the current JBA Groundwater Flood Risk Maps ground water is shown to be at least 5m below the ground surface.

Assets

- Please confirm mapping and records for any surface water assets owned or maintained.
WSSC have no surface water assets within the area of interest.
- Please confirm if there are any historic culverted watercourses within or in close vicinity to the site.
Please provide map records where available.
We are not aware of any historic culverted watercourses within or in close vicinity to the site. However, the area is criss crossed with ordinary watercourses. Any would in, near or over any ordinary watercourse will require 'Ordinary Watercourse Consent' from Chichester District Council.
- Please can you provide any map records denoting the highway drainage network. Is this a piped system or soakaways?
WSSC have no surface water assets within the area of interest.

Policy/Future

- Please confirm the most recent Strategic Flood Risk Assessment (SFRA).
WSSC – January 2010
- Please confirm if there are any future drainage improvements proposed for this area.
None that we are aware of.
- Please confirm if any drainage studies and/or SWMP have/are being assess for this area.
None that we are aware of.

Regards,

Kevin

Kevin Macknay

Flood Risk Management – Team Leader
Highways, Transport and Planning
Place Services
West Sussex County Council

 CALL  IM  EMAIL

Location: Western Area Office, Drayton Lane, Nr. Chichester, West Sussex. PO20 2AJ.

Contact: **Internal:** 26429 | **External:** +44 (0)330 222 6429 | **Mobile:** +44 (0)7540 641819

E-mail: kevin.macknay@westsussex.gov.uk

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From: Steven Barber-Bailey [mailto:StevenBarber-Bailey@caulmert.com]

Sent: 30 July 2020 10:30

To: Flood Risk Management

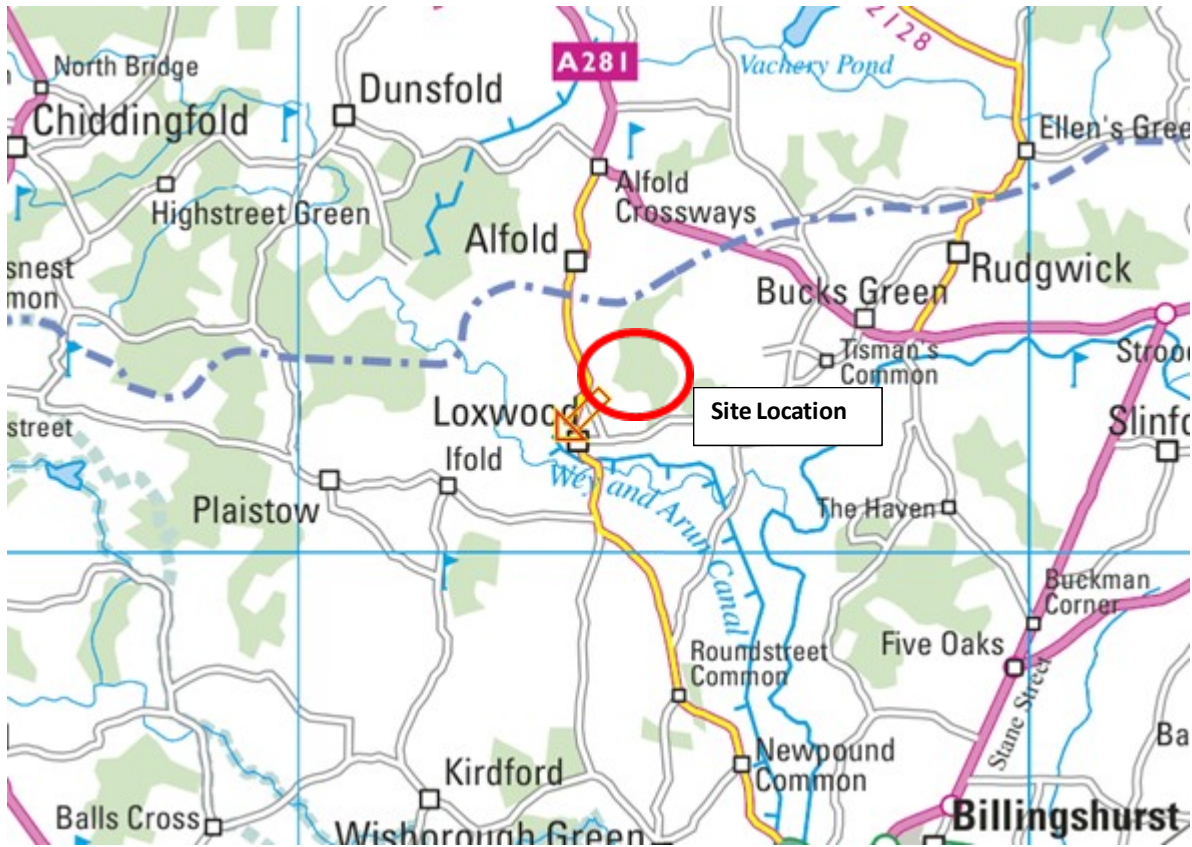
Subject: Flood Risk Assessment - Information Request - Land near Loxwood, West Sussex RH14

Good morning,

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I would like to include any site-specific information that should form part of the FRA. I would therefore request sight of any relevant site-specific information that you might hold and that should be part of this FRA. I have been made aware of a series of flooding incidents within Loxwood and of the various modelling work that seeks to mitigate certain area so of flood.

I have been asked to capture information that would comprise a site-specific flood risk assessment and drainage strategy for the site. The site is bounded on all sides by woodland and open grassland, and is in Flood Zone 1. I shall make reference to published information from Chichester District Council and from the West Sussex County Council to inform content of a flood risk assessment that would accompany a planning application.



Do please let me know if you require any additional information I could provide so that you can form a comprehensive response.

I look forward to hearing from you.

With thanks and kind regards,

Steve



Steven Barber-Bailey

StevenBarber-Bailey@caulmert.com
www.caulmert.com

Mobile: 07827 918 056

Direct: 01745 777 158

Phone: 01745 530890

Extension: 1010

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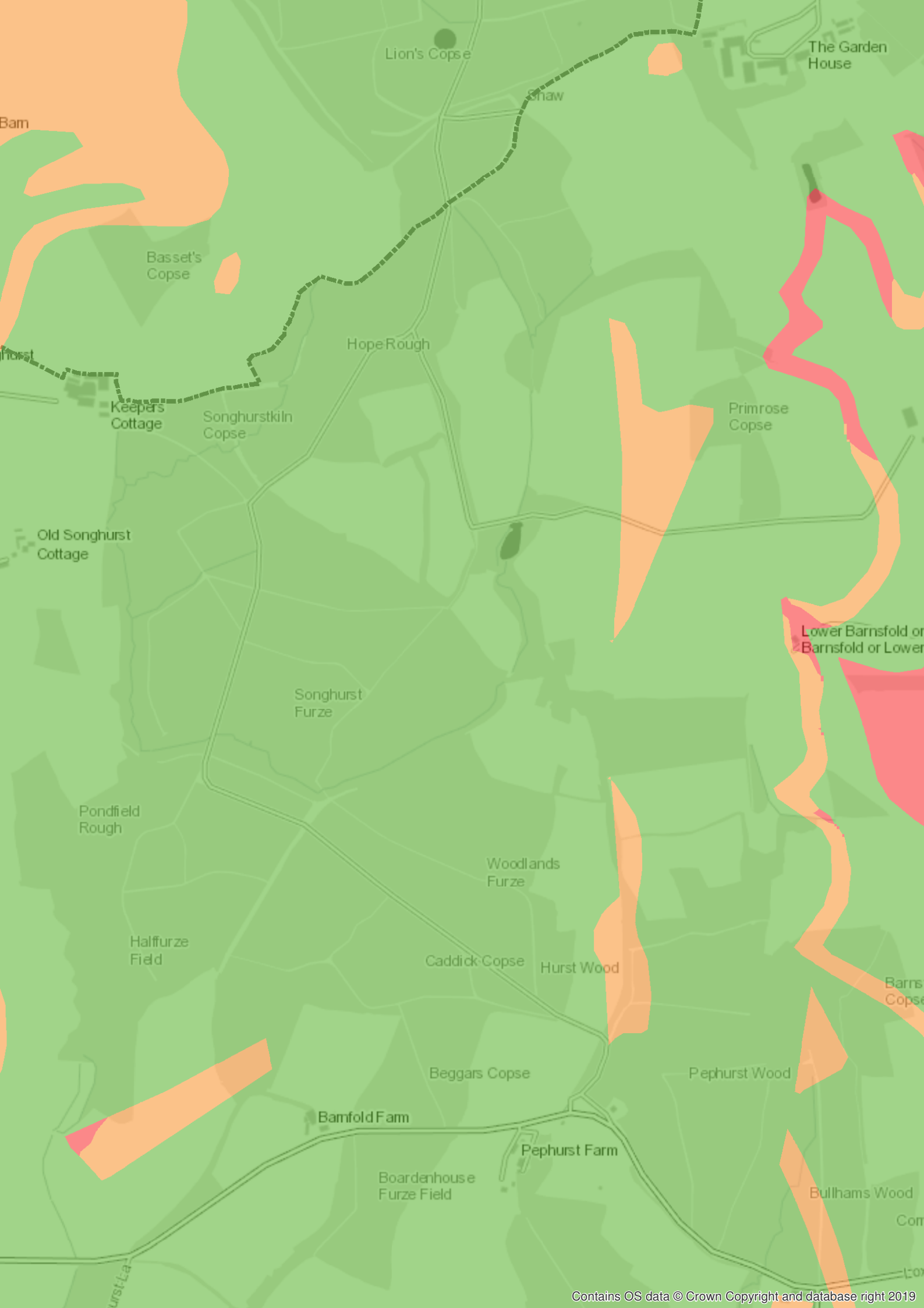
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Lion's Copse

The Garden House

Shaw

Bam

Basset's Copse

Hope Rough

Primrose Copse

Keepers Cottage

Songhurstkin Copse

Old Songhurst Cottage

Songhurst Furze

Lower Barnsfold or Barnsfold or Lower

Pondfield Rough

Woodlands Furze

Halfurze Field

Caddick Copse

Hurst Wood

Barns Copse

Beggars Copse

Pephurst Wood

Bamfold Farm

Pephurst Farm

Boardenhouse Furze Field

Bullhams Wood

Hurst La

Steven Barber-Bailey

From: Dominic Henly <dhenly@chichester.gov.uk>
Sent: 24 August 2020 16:51
To: Steven Barber-Bailey; Land Drainage
Subject: RE: Flood Risk Assessment - Information Request - Land near Loxwood, West Sussex RH14

Categories: Red Category

Hi Steven

Apologies it's taken longer than I would have liked to come back to you,

Because of the rural nature of the sites in question we have limited knowledge/information, and have had no reports of flooding. I have attached a copy of a map with the 1 in 100 yr. surface water flood layer turned on which clearly shows some pathways through the land, which presumably are watercourses, and will need to be retained.

There has also been localised flooding in the Loxwood catchment affecting a number of houses, so surface water will need to be managed carefully to ensure no increase in flood risk.

<https://gis.chichester.gov.uk/>
 Mapping - Intranet | iShare GIS application

iShare GIS | Select & Measure | View | Search

Map Categories

- SFRA Flood zone 2 Fluvial
- SFRA Flood zone 2 Tidal
- SFRA_floodzone 3a Fluvial
- SFRA floodzone 3a Tidal
- SFRA floodzone 3b Tidal
- SFRA Flood zone 3b Fluvial
- Private Water Supplies
- Source protection zone
- Surface Water 30
- Surface Water 100
- Surface Water 1000

Estates 0/7

- Property Ownership
- Acquisitions and Disposals
- Transferred to Housing association
- Current Leases and Licences
- Expired Leases and Licences
- County Ownership
- County Disposals

Nature 0/1

Reset layers

Kind regards



Dominic Henly

Senior Engineer
Environment
Chichester District Council

Ext: 34689 | Tel: 01243534689 | dhenly@chichester.gov.uk | Fax: 01243 776766

<http://www.chichester.gov.uk>



From: Steven Barber-Bailey [<mailto:StevenBarber-Bailey@caulmert.com>]

Sent: 30 July 2020 10:25

To: Land Drainage

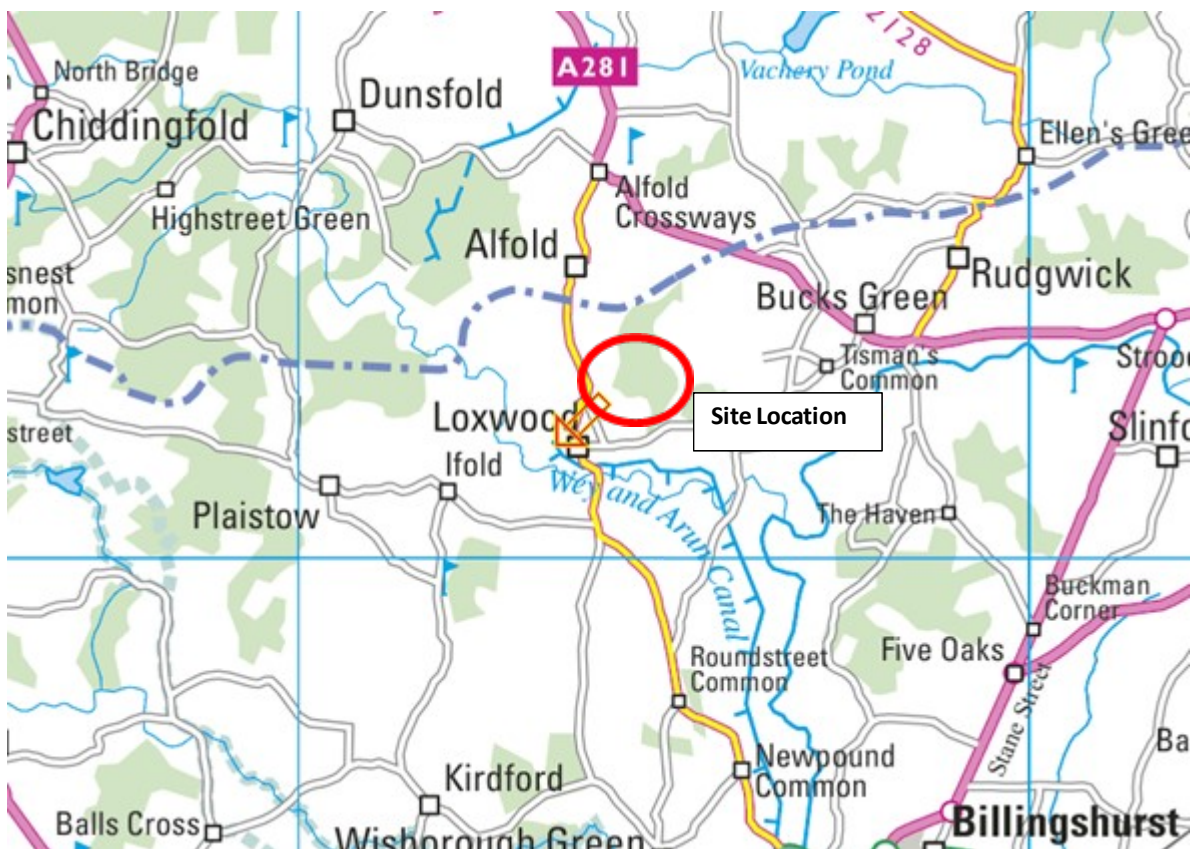
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Do please let me know if you require any additional information I could provide so that you can form a comprehensive response.

I look forward to hearing from you.

With thanks and kind regards,

Steve

Steven Barber-Bailey

StevenBarber-Bailey@caulmert.com

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Mobile: 07827 918 056

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