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## Sandleford Park, Newbury

### APP/36: Lee Witts' rebuttal to Jon Bowden's Proof of Evidence

21<sup>st</sup> April 2021

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## 1 Mr Jon Bowden: Proof of Evidence

- 1.1 This technical note reviews the evidence provided by Mr Bowden to support his objection of the Land at Sandleford Park Application.
- 1.2 The proof expands on the reasons for refusal which was provided by the council in decision notice 20/01238/OUTMAJ.
- 1.1 Mr Bowden's commentary is noted in *italics* with my response noted in blue.

### Summary

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- 1.2 The summary states that the reasons for refusal are based of Mr Bowden's opinions and appears to not at all be supported with evidence.

### Reasons for Refusal

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- 1.3 Mr Bowden has repeated his reason for refusal. I have provided a point by point response to this within Chapter 6 of APP/16.

#### Procedural Matters

- 1.4 The proof states that part i) of the original refusal has been withdrawn (New Warren Farm).
- 1.5 Within Appendix 1, Mr Bowden has included Brookbanks Drainage Strategy which includes and illustrates New Warren's Farm boundary and drainage strategy.
- 1.6 However, Mr Bowden incorrectly stated in the Appendix contents page that it contains drawing 10309-DR-01 G. Instead he actually included 10309-DR-01 F.

### Impact on Ground Water Level

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- 1.7 *It is my opinion that, particularly where the proposed conveyance channels are close to the areas of Copse (Dirty Ground, Slockett's and Highwood), the impact resulting from creating a channel of unspecified profile and depth upon the hydrology of the immediate areas is unknown. Excavating new deep channels through the ground will in time provide easier pathways for groundwater (GW) to take, allowing groundwater to seep into the channels more readily. This will lead to an artificial lowering of the natural GW level locally that will be to the detriment of the surrounding areas, including the afore-named copses which comprise Ancient Woodlands.*
- 1.8 Mr Bowden appears to base his concerns on the groundwater levels across the site on his opinion and not on any factual information or evidence.

- 1.9 Mr Bowden states that a deep conveyance channel will have a negative impact on the groundwater hydrology but does not specify what depth is considered 'deep'. The SuDS currently proposed across the development has been designed to be no deeper than 1.5m.
- 1.10 All SuDS features will be designed to ensure that no stored rainfall will infiltrate into the groundwater or that any groundwater can seep into the SuDS. This will be secured via a condition.
- 1.11 Mr West undertook some analysis of the watershed analysis for the 7 ancient woodlands across the site. A watershed area of 94.92ha drains through the woodlands into the existing watercourses or infiltrates to replenish groundwater.
- 1.12 In accordance with Wallingford's greenfield runoff estimation tool (online) the standard percentage runoff the site is 47%, meaning that 53% of the sites surface water currently infiltrates into the ground.
- 1.13 Based off the 94.92ha contribution to the site groundwater, 50.31ha of that is expected to provide surface water to the ground. Once the new development has been built only 9.53ha will become impermeable creating a 18.9% reduction of surface water to groundwater.
- 1.14 However, this only represents a reduction in water from rainfall infiltrating, it does not account from other sources.
- 1.15 Mr West's analysis is included within APP/17 Appendix A.
- 1.16 *In the Infiltration Testing Report Trial Pit Logs provided for the Appellant by Geo Environmental Group, and as reproduced at Appendix C of the Environmental Statement Vol.3 Appendix K1 "FRA and Drainage Strategy" (the FRA) (CD1.9 pages 76–94), the ground investigation carried out in September 2014 shows no ground water present during testing. This conflicts with the WBC groundwater map shown at Appendix.2 of this Proof which shows GW levels to be close to the surface over parts of the site. This information was derived from a groundwater study carried out for the Council by JBA Consulting in 2014. These areas match reasonably closely with the area of the Environment Agency's Simplified Groundwater Vulnerability Zones Map, High Vulnerability Zone, as reproduced in figure 2d of the FRA (CD1.9, p7) and the geological head deposits or superficial deposits shown at figure 2c of the FRA (CD1.9, p6).*
- 1.17 Mr Bowden's response mentions that the JBA groundwater mapping was derived from a groundwater study (in 2014), but provides no further details of the study that was undertaken. The validity of this study is therefore questionable, and it is of pertinent note that the study was not included within his Appendix.
- 1.18 The mapping which is provided within Mr Bowden's Appendix 2 illustrates that groundwater levels are at least 5m below the ground surface where the residential parcels in DPN1 have been designed.
- 1.19 Further south within the site, the map shows a strip of groundwater levels that are between 0.025m and 0.5m below the ground surface (between the 100mAOD and 115mAOD contours). In terms of the development proposals, this strip has been retained as open space with just 1 proposed SuDS basin being located within this supposedly high groundwater area.
- 1.20 The JBA mapping then suggests that the remainder of the site to the south lies within a 'no risk' area of groundwater levels (between the 100mAOD and 80mAOD contours). It is within this area where the remaining 4 SuDS basins have been proposed. I therefore assume that Mr Bowden is in agreement that their locations are sound (in accordance with the JBA mapping).
- 1.21 I consider the JBA mapping to be illogical and inconsistent with how groundwater would behave within this site, taking account of topography, geology and the intrusive site investigation. To visually demonstrate these inconsistencies, a series of drawings have been produced in order to compare the ground water levels indicated by JBA's map in relation to the topography of the site. The drawings have been provided within the Appendix of this note, being:  
  
**Appendix A** – Review of Ground Water Mapping against Site Topography  
**Appendix B** – Review of Ground Water Mapping against Original Drainage Strategy  
**Appendix C** – Review of Ground Water Mapping against Alternative Drainage Strategy 1  
**Appendix D** – Review of Ground Water Mapping against Alternative Drainage Strategy 2
- 1.22 Firstly, groundwater does not slope parallel to the topography of the surface. Groundwater can only drop abruptly in the presence of a geological fault. However, there is no evidence that there is such a fault that occurs within the site boundary. Because of this there will not be such an immediate and dramatic change in groundwater levels due to a change in geology. The levels will rise or fall gradually across the site.

- 1.23 It is crucial to note that the mapping produced by JBA has no intrusive site tests to support its suggestions. Furthermore, Mr Bowden has provided no further evidence on what information was used to derive this mapping.
- 1.24 The JBA mapping also does not correspond correctly with 'real-world' borehole data retrieved close to the site via the British Geological Survey website. Historical boreholes taken only some 160m east of the site, shows groundwater was struck at 30m below ground level. This borehole sits within the same topographical level and geological formation as the site that JBA suggest has groundwater at just 5m below the ground. This record (including a small number of other historical ground reports in the local area of south Newbury) are provided in **Appendix E**.
- 1.25 The JBA mapping only follows the superficial and bedrock geology of the site and does not take into consideration the sites topography or existing ordinary watercourses in any way. The BGS geology map has been included as **Appendix E**.
- 1.26 *Whilst acknowledging that information obtained directly from a site will be more representative than modelled information in many cases, September is typically when GW levels are at their lowest. Groundwater monitoring should have been carried out during the winter months December – March to provide reliable enough data to prove that GW levels are well below the ground surface. So whilst there may be no risk to the proposed development from flooding originating from groundwater, as confirmed in FRA figure 3b 'Flooding Mechanisms' (CD1.9, p12), I still consider that groundwater levels may be high over parts of the site at certain times of the year leading to the concern regarding localised reduction in GW levels to the detriment of the Ancient Woodlands, as outlined in 3.1 above.*
- 1.27 Groundwater levels across the site were collected in September 2014 by Geo Environmental Group during soakaway testing.
- 1.28 The results of these intrusive site investigation works overrule any indicative mapping that has been produced, where intrusive testing was not used.
- 1.29 Further ground investigation works will be completed at the detailed designed stage via a planning condition. During these tests further groundwater monitoring can be completed within the locations of the SuDS.
- 1.30 APP/16 and APP/17 have also expanded on the precautions that can be taken to protect groundwater levels, including lining the SuDS.

## Impact of Surface Water Runoff on Ancient Woodland

- 1.31 *Drainage Strategy Plan, drawing number 10309-DR-02 included at Appx A of the FRA (CD1.9, p34) shows surface water flow arrows heading directly towards Slockett's Copse and Dirty Ground Copse. This is likely to reflect the existing situation given the ground contours shown on the underlying base map. Currently any such flow would be the 'natural state' on site and therefore has no adverse effect on the ancient woodland areas. If the same flow patterns is to be maintained post-development, from that time onwards flow indicated by those arrows will be formed of run-off from the new impermeable surfaces which will be accelerated across these areas since there will no longer be any slowing effect from existing vegetation. This will give rise to an unacceptable impact by surface water runoff on ancient woodland.*
- 1.32 Mr Bowden's concerns raised about the flow was initially addressed on 10309-DR-03 A (within the Wheatcroft consultation) where the drawing key was expanded to explain that the flow arrows only illustrated the existing conditions. Mr Bowden has failed to recognise this in his proof.
- 1.33 *Insufficient detail has been submitted such that it has not been possible to assess the effect of this situation. Therefore I consider that the proposal has not addressed satisfactorily the issue of surface water run-off onto the areas of Ancient Woodland, namely Slockett's Copse and Dirty Ground Copse. This is likely to result in ecological damage to those woodlands and their irreplaceable habitats.*
- 1.34 Mr Bowden does not make reference to any gardens, the new sewer network or SuDS in place that will intercept or slow the flow of surface water from the developed areas. This lack of acknowledgement undermines the professional judgement suggested.
- 1.35 Mr Bowden only suggests that there may be an adverse effect on root zones if conveyance channels are placed within root protection areas (RPA). In APP/16 evidence shows that no SuDS will be placed within RPAs.

## Detention Basins

- 1.36 *Drawing 10309-DR-02 included at Appx A of the FRA (CD1.9, p34) shows proposed detention basins A, B and C within the country park with the surface area in square metres being numerically similar to the volume in cubic metres. Assuming for example the basins have a depth of 1 metre, this would mean the basins could have nearly vertical sides. This would be unacceptable - basin side slopes should be constructed with a 1 in 3 maximum side slope in accordance with para 22.2 of the SuDS Manual C753 (CD17.24, p475).*
- 1.37 *In paragraph 3.6 of the Appellant's "Response To Comments For Consultees" (September 2020) (CD6.2, p7) submitted under the 'Wheatcroft' consultation, it is confirmed that the basins will have 1 in 3 side slopes. Additionally, the 'Wheatcroft' consultation revised Drainage Strategy Plan drawing 10309-DR-02 A included in the revised FRA at Appx A (CD6.2, p65) also confirms 1 in 3 side slopes and basin depths of 1.5m. If the 'Wheatcroft' consultation is accepted, this issue is therefore no longer of material concern.*
- 1.38 *Mr Bowden states that the basins appear to be designed with vertical sides. Within the Wheatcroft consultation, additional information was provided on 10309-DR-03 A within the 'blue SuDS boxes' outlining the design of each basin. Mr Bowden has failed to acknowledge this.*
- 1.39 *Mr Bowden states that if the Wheatcroft Consultation is accepted, this issue is therefore no longer of material concern.*
- 1.40 *The Wheatcroft comments have been addressed and expanded on in the Wheatcroft Consultation section.*
- 1.41 *In respect of the basin(s) at location B there appears to be limited room to accommodate the basin(s), proposed footpath and existing stream whilst maintaining an 8 metre buffer zone to the side of the stream as set out in the Appellant's proposed Ecology Condition 8 (CD1.12, p14), or to maintain the 15m buffer required around the ancient woodland in accordance with National England Standing Advice for ancient woodland (CD8.31) without consequential detrimental impact on existing streams. In accordance with the Ciria SuDS Manual C753 SuDS should "enhance biodiversity" and "[contribute to] effective protection of the natural environment" .... and .... "the preservation and support of habitats and biodiversity" respectively) (CD17.24, pages 19 & 26).*
- 1.42 *In respect of 5.3, the provision of acceptable and adequate basins is unlikely to be achievable in respect of existing watercourses, the proposed pedestrian infrastructure and the ancient woodland. Thus the refused appeal proposals are unacceptable.*
- 1.43 *Firstly, all storm water drainage for the site will be subject to a detailed design process including intrusive site investigation (infiltration testing), hydraulic modelling and CAD-based engineering drawings. This process will robustly confirm the optimal solution for drainage which will be carried forward to construction.*
- 1.44 *In accordance with GOV.uk guidance and the Woodland Trust Planning Manual for Ancient Woodland and Veteran Trees (2019), SuDS can be placed within a buffer as long as it avoids the root protection zones and does not impact the hydrology of the woodland.*
- 1.45 *Conveyance swales placed within the buffer zones can be lined to remove any risk of infiltration which will allow untreated surface water to find its way into the water table.*
- 1.46 *In areas where there is a steeper gradient fall instead of digging a channel, a bund channel can be designed. Therefore, the sides of the conveyance channels can be built up.*
- 1.47 *To ensure that surface water remains flowing through the woodlands the basin to the north of Slockett's Copse can discharge treated surface water through the woodlands via gabions at the outfall. The positive characteristics of gabions is that they disperse the flow instead of discharging a single "stream" of water. This would widen the area covered by these flows.*
- 1.48 *The location of the basins outfall will also be designed as to provide the most benefit for sustaining the flow of water throughout the site.*
- 1.49 *By discharging additional surface water away from the watercourse the size of the basin can also be decreased, providing a larger usable open space.*
- 1.50 *The proposed basins that lie south of Slockett's Copse and High Wood can be designed shallower and wider to become more integrated into the usable green space and provide an additional buffer to groundwater.*
- 1.51 *Once constructed all SuDS will become natural features within the environment.*
- 1.52 *At Reserved Matters stage, alternative drainage proposals could be considered which look to remove the need for conveyance swales through the buffer zones of the Ancient Woodlands.*



## Drainage Strategy and Design

- 1.53 *Drawing 10309-DR-02 included at Appx A of the FRA (CD1.9, p34) is incomplete, omitting a significant element of green infrastructure of the proposed country park and the River Enborne, hence it is not possible to assess what is proposed in this area.*
- 1.54 *The 'Wheatcroft' Consultation revised Drainage Strategy Plan drawing 10309-DR-02 A included in the revised FRA at Appx A (CD6.2, p65) includes all of the country park area. If the 'Wheatcroft' Consultation is accepted, this issue is therefore no longer of material concern.*
- 1.55 *Drawing 10309-DR-02 included at Appx A of the FRA (CD1.9, p34) also appears to indicate surface water flowing almost in line with ground contours in several places particularly towards the northern part of the site, rather than angled to them as would be expected. The same situation is retained on the revised Drainage Strategy Plan drawing 10309-DR-02 A included in the revised FRA at Appx A (CD6.2, p65). In both iterations of the plan, the information indicated in this respect is clearly in error and is therefore unacceptable as water will flow at an angle to any contour lines in the downhill direction*
- 1.56 *Mr Bowden states that if the Wheatcroft Consultation is accepted, this issue is therefore no longer of material concern.*
- 1.57 *The Wheatcroft comments have been addressed and explained on in the next point.*

## "Wheatcroft" Consultation

- 1.58 *Following the request to review the Appellants' later submission of a revised FRA under a 'Wheatcroft' Consultation (the "Wheatcroft FRA") (CD6.2), the following evidence deals with changes made in that new document.*
- 1.59 *In general terms the Wheatcroft FRA does not satisfactorily deal with the comments raised in my Consultation Response of 14/9/2020 (CD2.2). Rather, it does raise a number of new concerns such that the WBC Objection remains.*
- 1.60 *There are a number of minor errors and omissions in the Wheatcroft FRA (CD6.2) which mean that this document could not be accepted. They are:*
  - 1) fig 3-1 (p30) – the redline boundary does not line up with the base mapping;  
*The red line boundary slipped once the document was converted to PDF. This can easily be amended within the document as this was a digital processing error.*
  - 2) fig 3-5 (p34) does not show the redline boundary;  
*Figure 3-5 does not show the red line boundary (nor has it ever) as the image was included to illustrate the catchment boundary area. As the map does not show field boundaries an indicative red line boundary can be provided but it will not be an accurate location.*
  - 3) Para 4.15 (p37) states "Local Policy will be taken not consideration..." : It is assumed that "not" should read "into";  
*This was a grammatical error that can be corrected. Human error was at fault.*
  - 4) fig 5-1 (p39) : the redline boundary does not line up with the base mapping;  
*The red line boundary slipped once the document was converted to PDF. This can easily be amended within the document as this was a digital processing error.*
  - 5) Para 5.16 (p41) may be an incomplete sentence as it is not capitalised.  
*This was a missed capital letter on the word Flood. Human error was at fault.*
- 1.61 *Paragraph 2.16 from the original FRA (CD1.9, p8), which states "In terms of Groundwater Vulnerability the underlying geology is shown on DEFRA's MAGIC maps to form a Minor Aquifer with soils of a High leaching potential across the northern two thirds of the site", has been omitted from the Wheatcroft FRA (CD6.2). As I have set out in 3.1 – 3.3 above, I believe groundwater is an issue on parts of the site and the para 2.16 of the*

*original FRA gives some credence to that view. The Wheatcroft FRA (CD6.2) fails to address this and is therefore unacceptable.*

- 1.62 The initial Magic Maps Groundwater Vulnerability map was removed from the FRA, but it was replaced with an updated and more accurate map. This map can be seen within in Figure 3-3 of FRA 10309 FRA04 Rv2. With the new mapping the EA also released more vulnerability categories and with that new definitions.
  
- 1.63 Under the heading "Site Investigation Works", the Wheatcroft FRA sets out the testing parameters and results obtained during the site investigation (CD6.2, p50). This information was not provided in the original FRA main body of text (CD1.9), only in the Infiltration Testing Report at Appendix C.  
*A new paragraph appears at 6.44 of the Wheatcroft FRA (CD6.2, p50) where it is stated that infiltration testing was carried out in November 2014, thus putting the investigation closer to the period when GW levels would be starting to rise. This potentially gives the wrong impression since although the report was dated Nov.2014 the testing was actually carried out in September (CD1.9, p53 / CD6.2, p87), as raised in 3.3 above. The Appellant's statement relating to testing is the basis for a further statement in para 6.48 (CD6.2, p50) that "Any works completed on site supersedes indicative mapping produced by the council". Again as covered in 3.3 above, the investigation work is not sufficiently reliable in my view due to the date carried out and the statement in para 6.48 does not hold.*
  
- 1.64 The date of the report was included instead of the dates of testing.
  
- 1.65 Table 6-8 in para 6.69 of the Wheatcroft FRA (CD6.2, p54) contains an extract of Table 26.2 "Pollution Hazard Indices" from the SuDS Manual (CD17.24, p596); an equivalent was originally included at para 4.64 of the FRA (CD1.9, p26). The new version at Table 6-8 omits 2 lines from the original table, those for "Commercial yard..." and "Sites with heavy pollution...". As the refused Application contains delivery areas and non-residential parking the omission of these categories from the Wheatcroft FRA is unacceptable since these 2 situations would give rise to some of the highest pollution levels on the development.
  
- 1.66 As only residential development has been proposed commercial yard and site with heavy pollution was removed. Delivery areas and non-residential parking do not come under the commercial yard or heavy pollution areas, which is why they were removed. Their re inclusion would act purely as additional information.
  
- 1.67 Table 6-9 "SuDS Mitigation Indices for discharges to surface waters" at para 6.71 of the Wheatcroft FRA (CD6.2, p55), which is also an extract from the SuDS Manual at Table 26.3 (CD17.24, p597), omits SuDS mitigation indices for: "filter strip", "bio-retention system", "pond" and "wetland" from the "Type of SuDS Component" categories, whereas these categories were previously included in Table 4m at para 4.66, the equivalent table from the original FRA (CD1.9, p26), therefore implying these features are no longer to be used despite a contradictory statement that they are being proposed for use in the development in table 6-1 at para 6.14 of the Wheatcroft FRA (CD6.2, pp44/45). The omission of these features from Table 6-9 of the Wheatcroft FRA is unacceptable.
  
- 1.68 As these have not been illustrated and designed within the drainage strategy they were removed from the table but can be included back into the FRA as requested by the LLFA. Their re inclusion would act purely as a "toolbox" of other measures that could be introduced as part of the detailed design process.
  
- 1.69 Table 4n "SuDS Mitigation Indices for discharges to groundwater" from the original FRA (CD1.9, p27) has been omitted from the equivalent paragraph at 6.71 of the Wheatcroft FRA (CD6.2, p55) even though the text of the paragraph preceding the table refers to "...discharges to surface waters and groundwater respectively...". It is stated in both FRAs (CD1.9, pages 15 & 54 / CD6.2, pages 42 & 93) that limited infiltration is possible over parts of the site which is a reasonable assumption given the site conditions, thus it is my view that unless any SuDS which could potentially allow infiltration are lined with an impermeable liner to specifically prevent infiltration the table is relevant. The omission from the Wheatcroft FRA is unacceptable and demonstrates a failure to address the Council's concerns.
  
- 1.70 This table was removed as it is for discharging surface water into the ground. As infiltration features have not been proposed from the development it was removed. It's re inclusion would act purely as a "toolbox" of other measures that could be introduced as part of the detailed design process.

- 1.71** *In the Wheatcroft FRA Appendix A, when comparing the area of Basin A between drawing 10309DR-02 rev.A and the input in the MicroDrainage ("MD") calcs at Appendix B (CD6.2, p72), the 2 figures do not match (5,920 m<sup>2</sup> on the drawing against 5,650m<sup>2</sup> in the MD input) hence the figures are unacceptable.*
- 1.72** *The micro drainage calculations provide the minimum area required in order to store surface water from the catchment. The area illustrated on the plan is 5,920m<sup>2</sup>, there is no reason why you cannot provide a basin that is larger than minimally required. By providing a larger basin you are allowing an additional safety factor, as the peak water level will be lower and the freeboard within the basin is increased.*
- 1.73** *The matters set out in 7.2 – 7.10 above may be capable of resolution. However, at the time of writing this proof of evidence, the concerns are real and outstanding.*
- 1.74** *Noted.*

## Appendix 4: Valley Crossing Study

- 1.75** *In relation to Appendix 4: Valley Crossing Study of the Appellant's S78 Appeal Statement of Case (CD6.3), of the three potential options for the crossing set out in para 2.9, the 3rd option shown on VD17562-SK023 & VD17562-STR-SK-003 for the proposed vehicular/ pedestrian straight alignment bridge is least damaging to the hydrology of the area, and probably to the habitat/biodiversity as well.*
- 1.76** *The overall width of the twin deck structure at 16m will create a dark area underneath so the watercourse below the structure will not be able to support much in the way of biodiversity once built, with localised detriment resulting from its construction.*
- 1.77** *Construction of any of the options will cause major damage to the immediate habitat/bio- diversity and hydrology as inevitably the 'construction corridor' will be significant and the necessary construction depth for any temporary road-ways will be deep.*
- 1.78** *Mr Bowden's comments relate to the impact of habitat and biodiversity once the crossing has been constructed.*
- 1.79** *Mr West's rebuttal within APP/13 will expand on the impact that will be caused by the crossing.*
- 1.80** *Mr Bowden has stated that:*
- "Construction of any of the options will cause major damage to the immediate habitat/biodiversity and hydrology as inevitably the 'construction corridor' will be significant and the necessary construction depth for any temporary road-ways will be deep."*
- 1.81** *This is an ecology based point and is addressed within paragraph 4.2.10 in Mr West's document APP/13.*
- 1.82** *In this respect the Appeal proposals as refused are unacceptable and harmful and contrary to policies CS3, CS14, CS16, CS17 and CS18 of the West Berkshire CS DPD (CD8.5); the design principles contained in the WBC SuDS SPD (Dec 2018), particularly in 'Our Vision' and paras 2.1 & 2.2.2 (CD8.16, p5, p7 and p9 respectively); the NPPF Section 15 (paras 170, 174 and 175) (CD8.1, pages 51-52); the National Design Guide "Planning practice guidance for beautiful, enduring and successful places" (MHCLG, October 2019) sections N1-N3 (Nature) (CD8.4, pages 31-32); and the Ciria SuDS Manual C753 (paras 1.1 and 1.4 in particular, where SuDS should "enhance biodiversity" and "[contribute to] effective protection of the natural environment" .... and .... "the preservation and support of habitats and biodiversity" respectively) (CD17.24, pages 19 & 26)..*
- 1.83** *The Valley Crossing will be designed and constructed in accordance to national and local policies via a condition.*

## Appellants Response to Comments for Consultees

- 1.84** *In relation to the LRM Planning Response To Comments For Consultees Section 3 : LLFA, I acknowledge in response to paragraph 3.4 "Pollution Control (Occupied Phase)" (CD6.2, p7) that "there is no evidence to suggest that there are existing sensitivities that detrimentally impact the hydrology of the site including the water courses contained within"; that is to say I accept the existing site currently functions in a natural and*

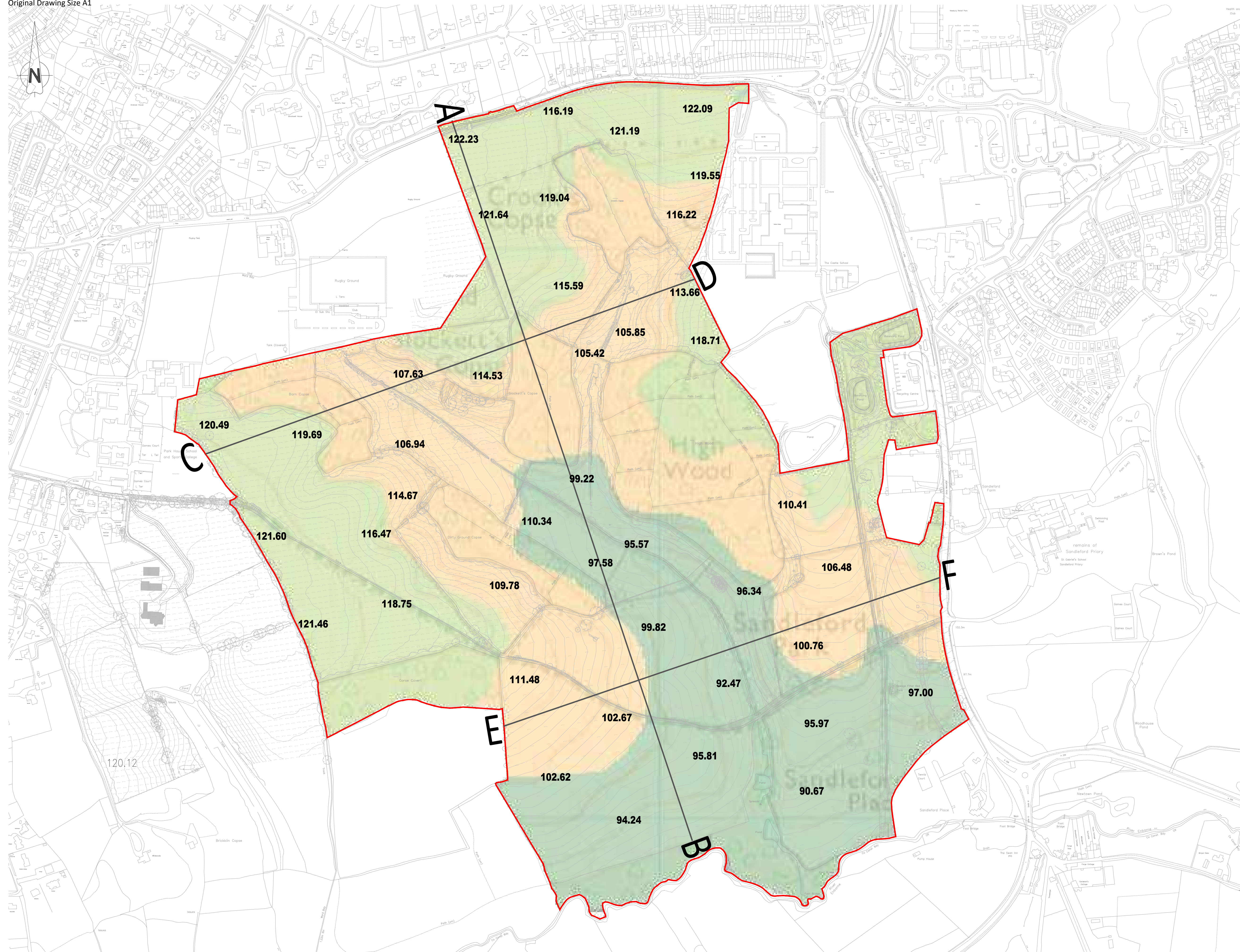
*balanced way. However, the implementation of the proposals will be to the detriment of the hydrology of the site, particularly around the Copse and Valley Crossing areas.*

- 1.85** A hydrology appraisal of the proposed valley crossing was completed and a summary of which was placed within 10309 FRA04 Rv2 as Chapter 7.
- 1.86** As mentioned in 1.83 the proposed crossing will be designed to ensure that the peak flows of the watercourse will fall comfortably below the possible threshold of what volume of water can pass under the crossing.
- 1.87** *For that reason, despite the statement later in para 3.4 referring to the ES Vol.1 Chapters 6 and 11 (CD1.7) that the Appellants "...provided an assessment on the sensitivity of the watercourses and springs within their wider studies and concluded that in parts either a negligible or minor beneficial effect would occur at the Occupied Phase", it is difficult to see how the completed development will have a minor or even a negligible benefit for the site in respect of, in particular, the pollution control aspect of its hydrology when compared to the existing situation. The application site is an un-developed 'green' site, currently subject to little human disturbance and which generates minimal pollution other than from natural processes. So despite the 'best efforts' of any SuDS measures that could ever be built the construction of those SuDS measures in the first place, coupled with a substantial increase in human usage once the development is occupied will inevitably result in a level of disturbance and degradation of the water environment that, by comparison, will be much greater. Future failure of any part of the SuDS management train is likely to lead to pollution occurrences for the duration of such a failure, which clearly is not a current risk in the site's undeveloped form.*
- 1.88** *The statement given in para 3.4 of the LRM Planning Response is not accurate when considering the development on site.*
- 1.89** In regards to the ES Chapters 6 and 11 Mr Bowden makes a general observation on the impact of human activity on the disturbance and degradation of the water environment. However, absolutely no direct reference is made to the appeal site. Mr Bowden appears to intentionally omit his knowledge that the introduction of a treatment train has the positive benefit of cleaning and controlling water flow to the better of its immediate and downstream environments.
- 1.90** Finally, it is worth making note that within Application 18-00764/OUTMAJ, the Lead Local Flood Authority (Mr Charlie Cooper) formally approved the drainage proposals. These proposals included ES Chapters 6 and 11 which remained identical to the 20/01238/OUTMAJ submission. It is difficult to understand where this sudden objection to the environmental impact assessment has been drawn from.
- 1.91** *In respect of para 3.6 "Basins" (CD6.2, p7), it is acknowledged that C753 SuDS Manual accepts a side slope of 1 in 3 as an acceptable design and is dealt with in 5.2 above.*
- 1.92** This point has been addressed in "Basins" above.
- 1.93** *In relation to para 3.8 "Combined Drainage Strategy" (CD6.2, p7), the Council is no longer questioning the issue of the interrelationship of surface water runoff between the application site and the remainder of the Sandleford Strategic Site Allocation, as set out in 3.1 above.*
- 1.94** This objection has been removed.

## Appendix A –Review of Ground Water Mapping against Site Topography (10309-SK-05)

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**NOTES:**

1. Do not scale from this drawing.
2. All dimensions are in metres unless otherwise stated.
3. Brookbanks Consulting Ltd has prepared this drawing for the sole use of the client. The drawing may not be relied upon by any other party without the express agreement of the client and Brookbanks Consulting Ltd. Where any data supplied by the client or from other sources has been used, it has been assumed that the information is correct. No responsibility can be accepted by Brookbanks Consulting Ltd for inaccuracies in the data supplied by any other party. The drawing has been produced based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.
4. No part of this drawing may be copied or duplicated without the express permission of Brookbanks Consulting Ltd.

KEY:

-  Site Boundary  
**106.94** Spot Levels

JBA Groundwater Mapping

- |   |  |
|---|--|
|  | Ground water levels are at least 5m below the ground surface             |
|  | Ground water levels are between 0.025m and 0.5m below the ground surface |
|  | No Risk  |

UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR COMMENCE SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT HIS OWN RISK.



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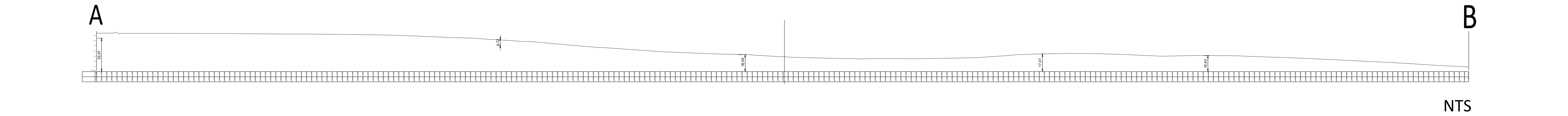
Bloor Homes Ltd &  
Sandleford Park Partnership

Land at Sandford Park  
Newbury

Review of JBA Ground Water  
Mapping against Site Topography  
Page 1 of 4

Status	Status Date	
Information		APR 2021
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-05	-





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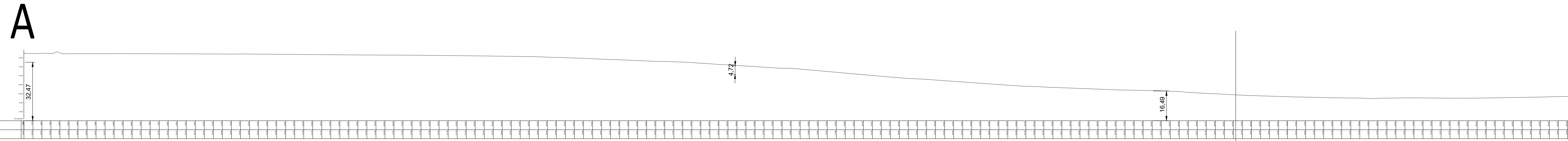
**KEY:**

Existing Ground Level

Highest groundwater Level as indicated by JBA Mapping (Marked as either 5m or 0.025)

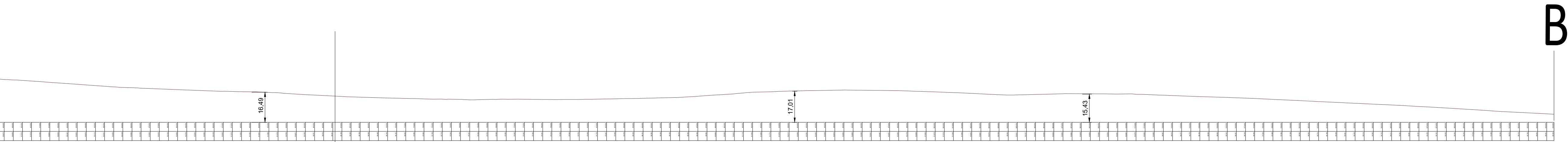
(NOTE: No water level shown where no level was provided by JBA. Areas of no water level were marked as no risk by JBA.)

395m	230m	300m
Silchester Gravel Member - Sand and Gravel	No Superficial	
London Clay Formation – Sand		London Clay Formation – Clay, Silt and
Groundwater levels are at least 5m below the ground surface	Groundwater levels are between 0.025m and 0.5m below the ground surface	No Risk (no levels provided by JBA)



1:1250

230m	300m	155m	260m
No Superficial		No Superficial	
	London Clay Formation – Clay, Silt and Sand	London Clay Formation – Sand	London Clay Formation – Clay, Silt and Sand
Groundwater levels are between 0.025m and 0.5m below the ground surface	No Risk (no levels provided by JBA)	Groundwater levels are between 0.025m and 0.5m below the ground surface	No Risk (no levels provided by JBA)



1:1250

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**BROOKBANKS**

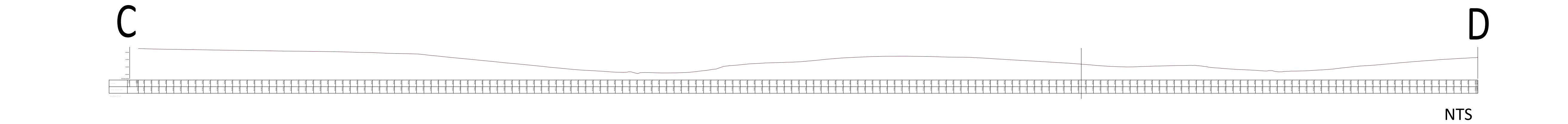
6150 Knights Court, Solihull Parkway, Birmingham, B37 7WY  
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W brookbanks.com

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Sandleford Park Partnership

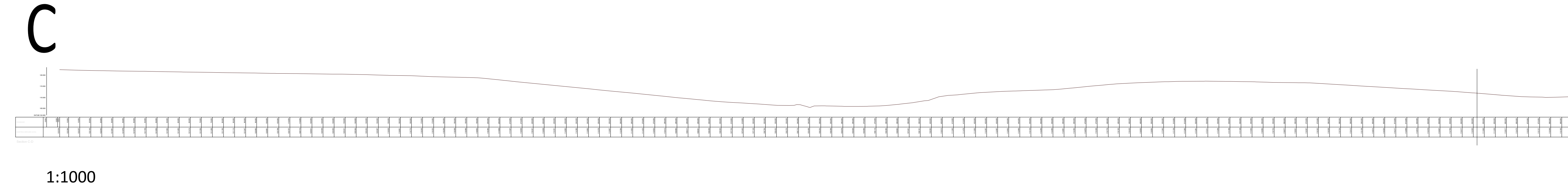
Land at Sandleford Park  
Newbury

Review of JBA Ground Water  
Mapping against Site Topography  
Page 2 of 4

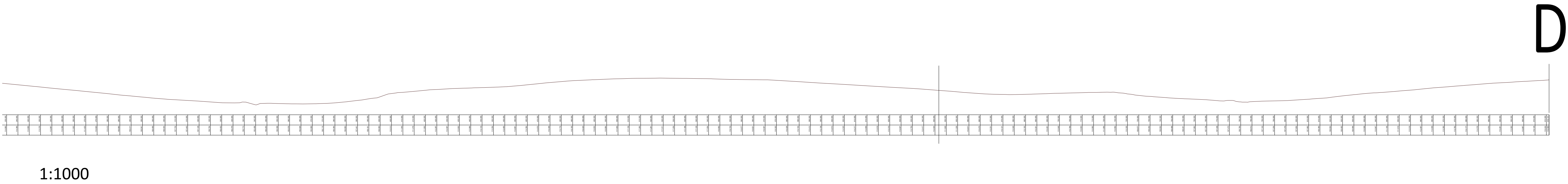
Status		Status Date
Information		APR 2021
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-05	-



208m	260m	133m	
Silchester Gravel Member - Sand and Gravel	No Superficial	Silchester Gravel Member - Sand and Gravel	
London Clay Formation – Sand			London Clay Fo
Groundwater levels are at least 5m below the ground surface	Groundwater levels are between 0.025m and 0.5m below the ground surface	Groundwater levels are at least 5m below the ground surface	



260m	133m	310m	
No Superficial	Silchester Gravel Member - Sand and Gravel	No Superficial	
London Clay Formation – Sand			
Groundwater levels are between 0.025m and 0.5m below the ground surface	Groundwater levels are at least 5m below the ground surface	Groundwater levels are between 0.025m and 0.5m below the ground surface	



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  - Highest groundwater Level as indicated by JBA Mapping (Marked as either 5m or 0.025)
- (NOTE: No water level shown where no level was provided by JBA. Areas of no water level were marked as no risk by JBA.)

First Issue KM LW LW 15.04.21



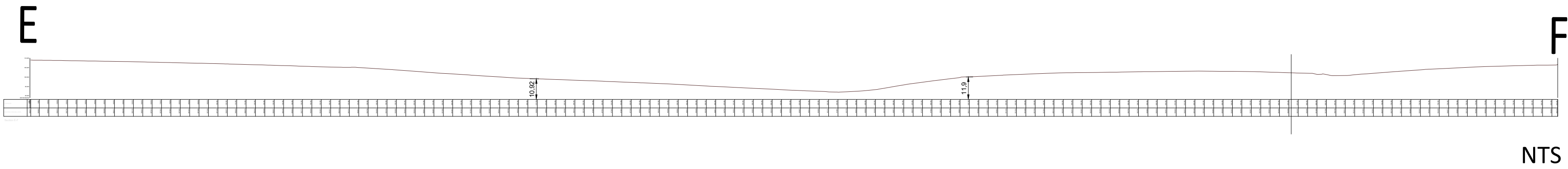
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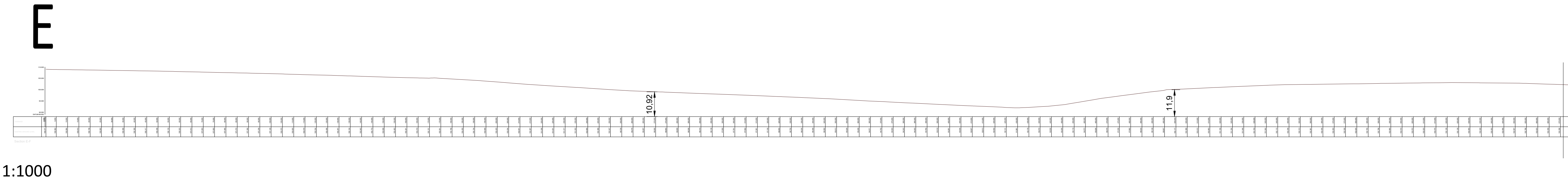
Land at Sandleford Park Newbury

Review of JBA Ground Water Mapping against Site Topography  
Page 3 of 4

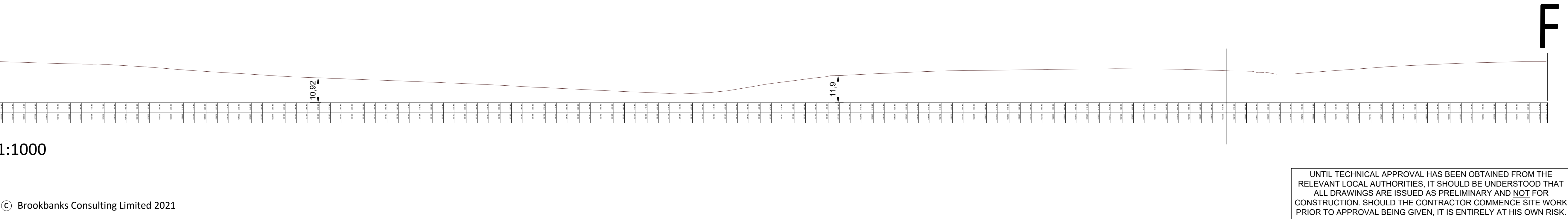
Status		Status Date
Information		APR 2021
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-05	-



265m	237m	287m
No Superficial		
London Clay Formation – Sand	London Clay Formation – Clay, Silt and Sand	London Clay Format
Groundwater levels are between 0.025m and 0.5m below the ground surface	No Risk (no levels provided by JBA)	Groundwater levels are betw and 0.5m below the ground



m	237m	287m	
No Superficial			
ormation – Sand	London Clay Formation – Clay, Silt and Sand	London Clay Formation – Sand	
are between 0.025m ground surface	No Risk (no levels provided by JBA)	Groundwater levels are between 0.025m and 0.5m below the ground surface	



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KEY:

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  - Highest groundwater Level as indicated by JBA Mapping (Marked as either 5m or 0.025)
- (NOTE: No water level shown where no level was provided by JBA. Areas of no water level were marked as no risk by JBA.)

- First Issue KM LW LW 15.04.21



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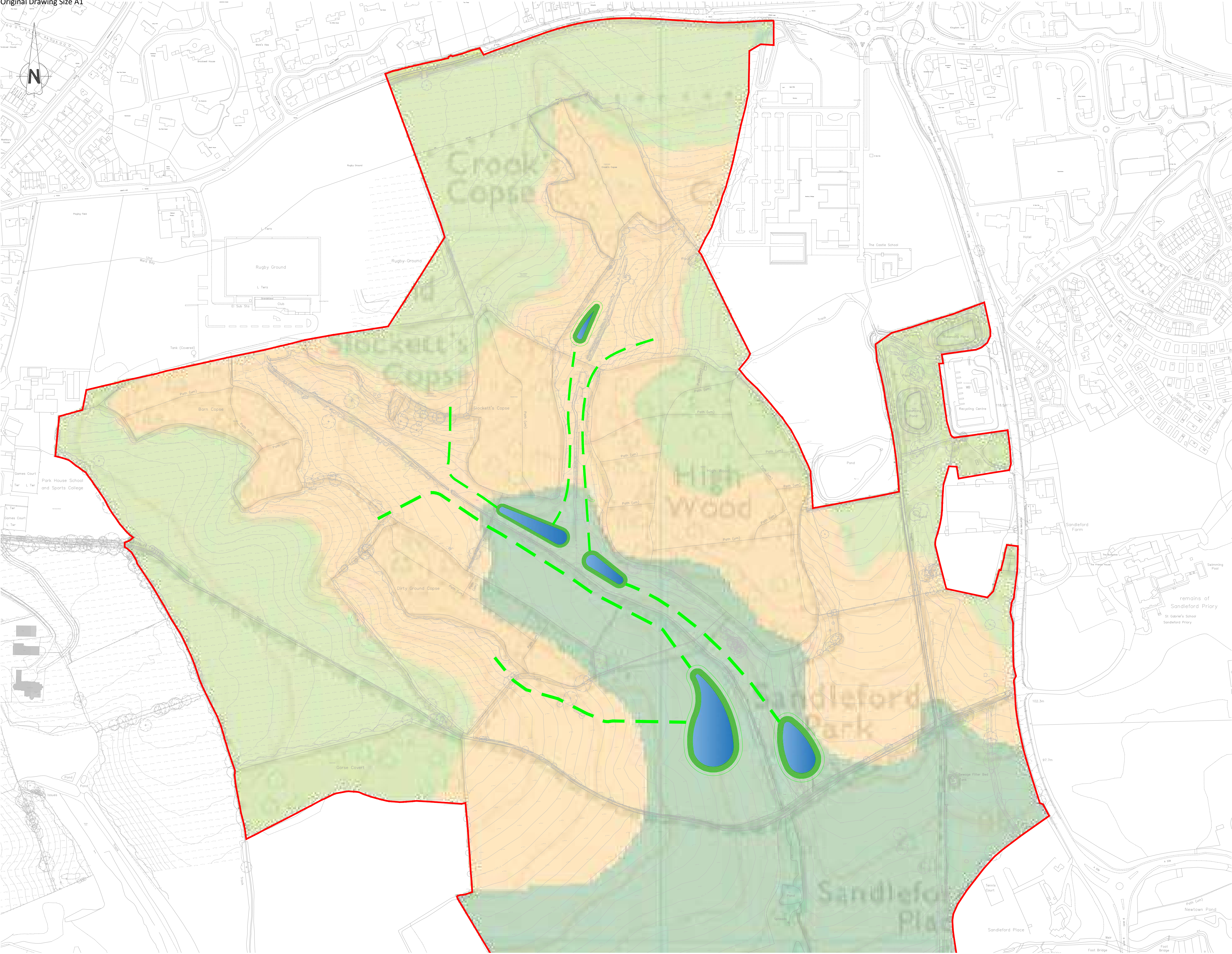
Land at Sandleford Park  
Newbury

Review of JBA Ground Water Mapping against Site Topography		Page 4 of 4
Status	Status Date	
Information	APR 2021	
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-05	-

## Appendix B –Review of Ground Water Mapping against Original Drainage Strategy (10309-SK-06)

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  4. No part of this drawing may be copied or duplicated without the express permission of Brookbanks Consulting Ltd.

- KEY:**
- Site Boundary
  - Illustrative SuDS Location
  - - - Proposed Conveyance Channel

- JBA Groundwater Mapping**
- Ground water levels are at least 5m below the ground surface
  - Ground water levels are between 0.025m and 0.5m below the ground surface
  - No Risk

Drainage Strategy was issued and 10309-DR-03 A. Plan can be seen within APP/17 Appendix B. The plan is also appended to the FRA which is included within APP/17 Appendix D.

- First Issue KM LW LW 15.04.21

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Newbury

Review of JBA Ground Water  
Mapping against Drainage  
Strategy

Status		Status Date
Information		APR 2021
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-06	-

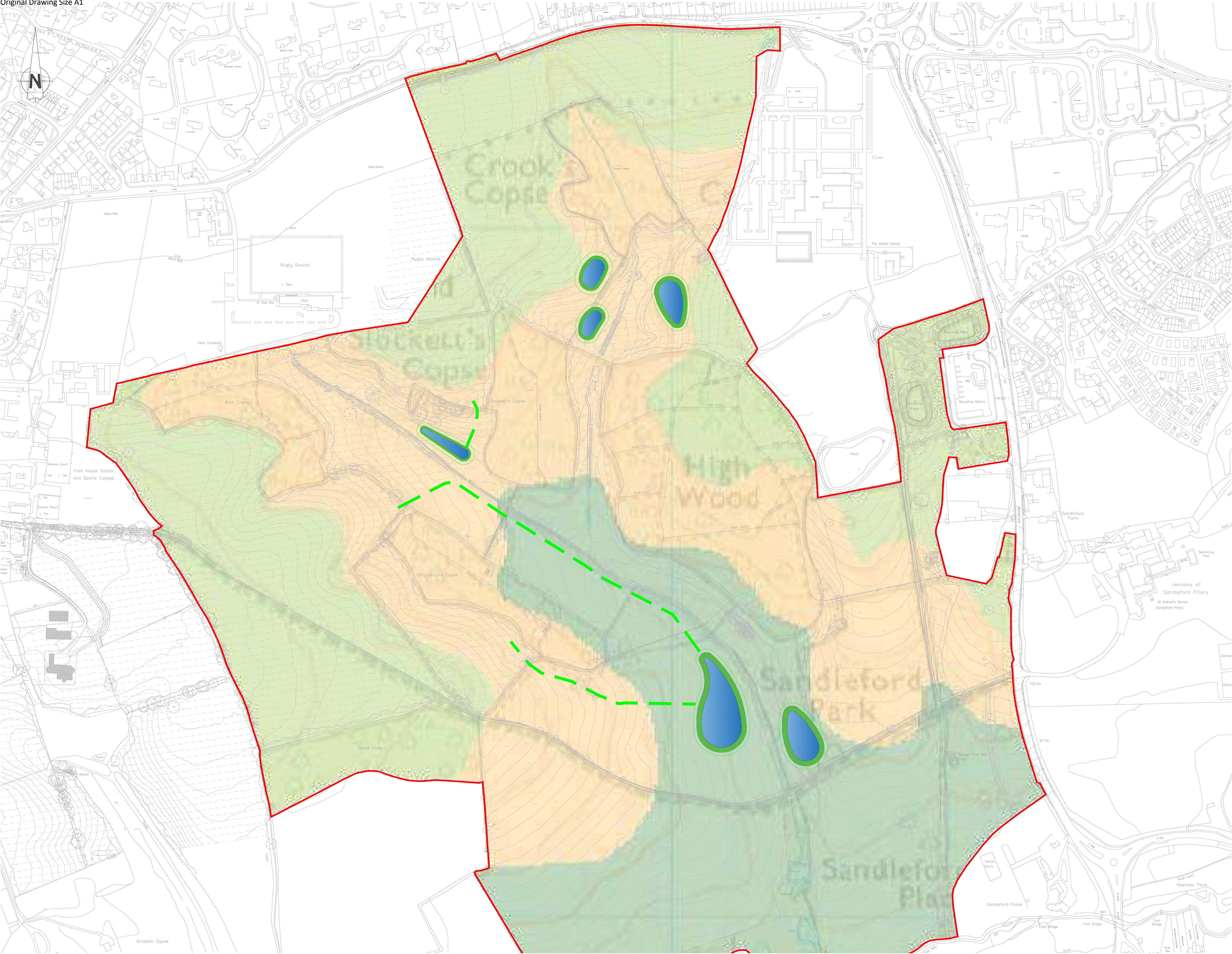
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## Appendix C – Review of Ground Water Mapping against Alternative Drainage Strategy 1 (10309-SK-07)

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4. No part of this drawing may be copied or duplicated without the express permission of Brookbanks Consulting Ltd.

KEY:

- Site Boundary
- Illustrative SuDS Location
- - - Proposed Conveyance Channel

JBA Groundwater Mapping

- Ground water levels are at least 5m below the ground surface
- Ground water levels are between 0.025m and 0.5m below the ground surface
- No Risk

Drainage Strategy was issued as 10309-DR-04 A within APP/17 Appendix E.

First Issue KM LW LW 15.04.21



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Land at Sandleford Park Newbury

Review of JBA Ground Water Mapping against Alternative Drainage Strategy 1

Status		Status Date
Information		APR 2021
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-07	-

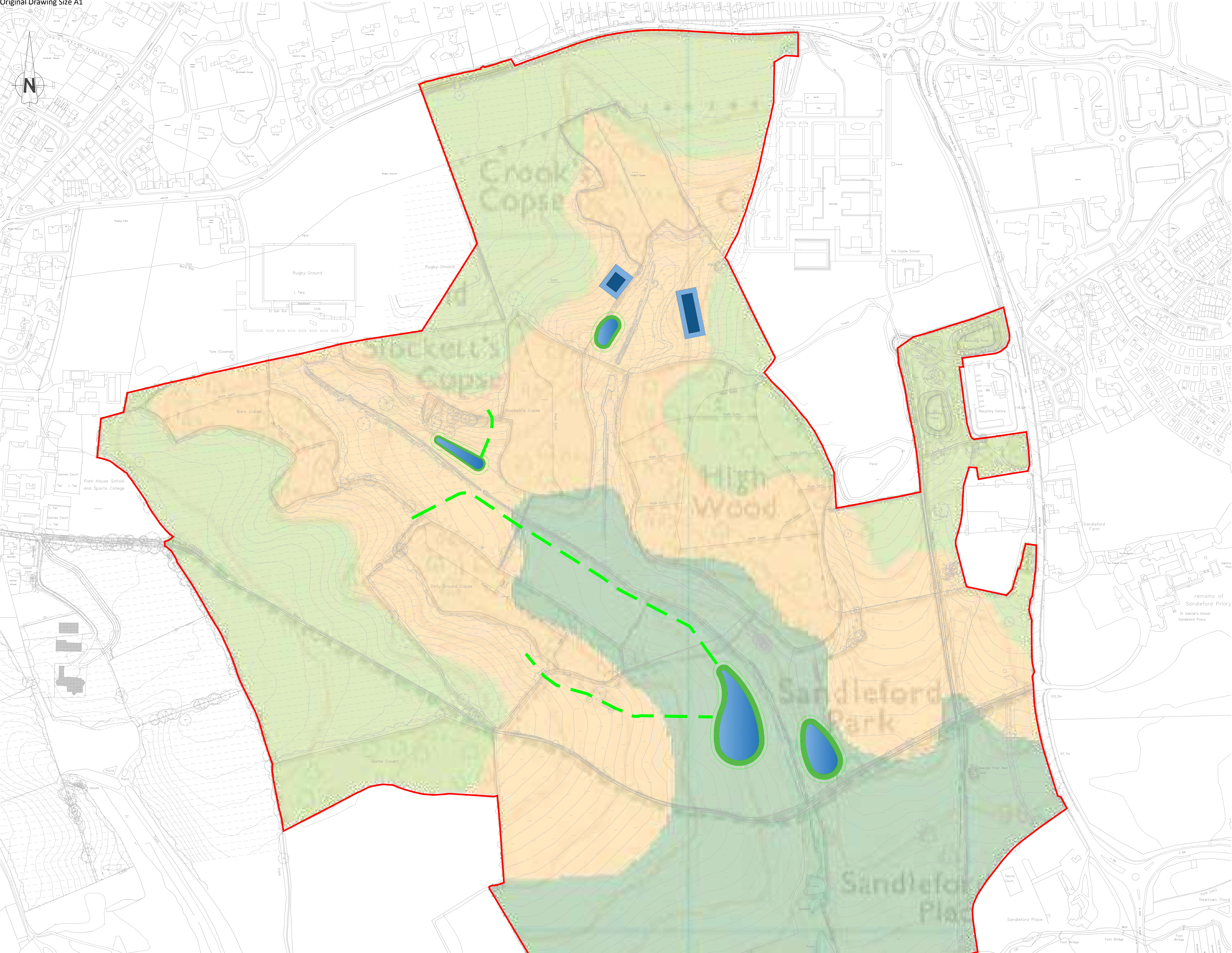
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## Appendix D – Review of Ground Water Mapping against Alternative Drainage Strategy 2 (10309-SK-08)

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  4. No part of this drawing may be copied or duplicated without the express permission of Brookbanks Consulting Ltd.

- KEY:**
- Site Boundary
  - Illustrative SuDS Location
  - Proposed Conveyance Channel
  - Underground Surface Water storage

- JBA Groundwater Mapping**
- Ground water levels are at least 5m below the ground surface
  - Ground water levels are between 0.025m and 0.5m below the ground surface
  - No Risk

Drainage Strategy was issued as 10309-DR-04 A within APP/17 Appendix E.

- First Issue KM LW LW 15.04.21

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Review of JBA Ground Water Mapping against Alternative Drainage Strategy 2

Status		Status Date
Information		APR 2021
Drawn	Checked	Date
KM	LW	15.04.21
Scale	Number	Rev
NTS	10309-SK-08	-

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## | Appendix E – BGS Geology Map and Borehole Records

# BGS Geology Mapping


## Key:

### Superficial Deposits

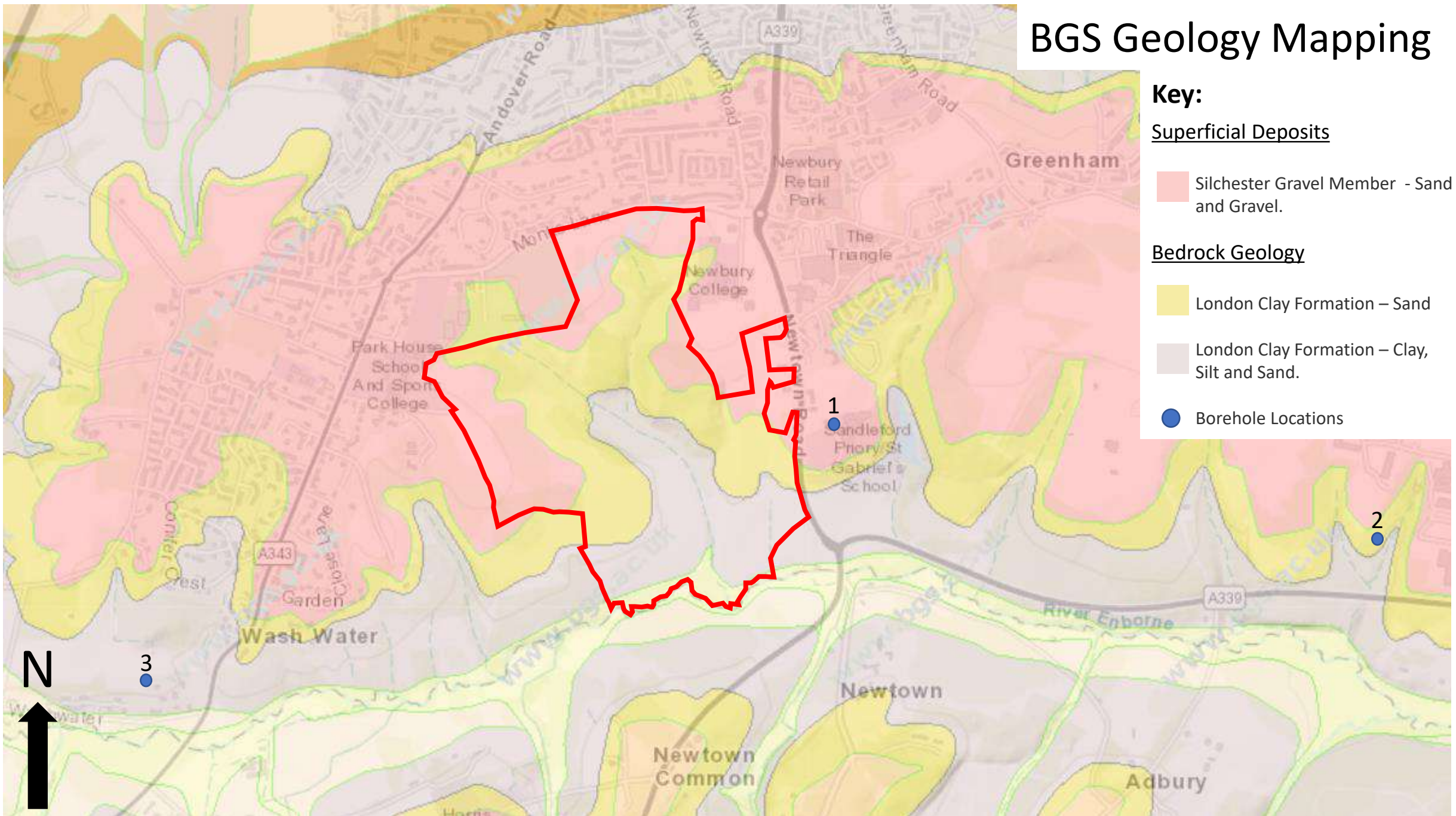
 Silchester Gravel Member - Sand and Gravel.

### Bedrock Geology

 London Clay Formation – Sand

 London Clay Formation – Clay, Silt and Sand.

 Borehole Locations





**NGRC  
BOREHOLE RECORDS  
ADJUSTMENT FORM**

**QUARTER SHEET** SU 46 SE

**BH REGISTRATION NUMBER** 121 - 143

**RECORDS ENTERED AND HELD BY WALLINGFORD**

**BH REGISTRATION NUMBER(S)**

C 385' O.D.

267

83

Su46/55A+B

b) 4765 6449

**Sandleford Priory.**

Mrs. MYERS.

Bored and communicated by Messrs. C. ISLER & Co. to Mr. WHITAKER.  
Tubed 215 feet with 5-inch tube, 8 feet above surface.

Water-level 100 feet from surface. Yield 100 gallons per hour.

		Thickness.	Depth.
		<i>Ft. in.</i>	<i>Ft. in.</i>
[Plateau]	Gravel - - - -	3 6	3 6
[Bagshot Beds]	Yellow sand - - - -	3 0	6 6
{	Sandy clay - - - -	20 0	32 6
	Yellow clay and pebbles - - - -	12 0	44 6
	Blue clay - - - -	14 6	59 0
	Blue clay and pebbles - - - -	5 6	64 6
	Blue clay - - - -	19 6	84 0
{	White clay stone - - - -	1 3	85 3
	Blue clay - - - -	34 0	120 0
	Gray chalk-flints - - - -	5 0	125 0
{	Mottled clay - - - -	17 6	142 6
	Blue clay - - - -	4 6	147 0
	Mottled clay - - - -	31 0	178 0
{	Gray sand - - - -	22 5	200 5
	Green sand - - - -	14 1	214 6
	Sandy clay, shells - - - -	2 6	217 0
{	Chalk with flints - - - -	6 0	223 0
	Chalk - - - -	38 0	261 0
	Chalk with flints - - - -	41 0	302 0

Berks. 43 N.W./W.

Sited on 6" by 9 1/4 in 1941

Drilled but plant retained

No certain details as to yield.

Note on back of F.J. Bennett's field slip Berks 43 NW (W):

(a) Su476 644 Well [by] E. Powers, Newbury.  
Sandleford Priory

Gv. 10

Blue Cl. 14

Pebbles 4

Iron Pan & sand 14

42

Published in  
'The Water Supply  
of Berkshire',

P. 105

2, WELL BORING at SANDLEFORD, Newbury  
 Geol. map 1 in. map New Series No 7  
 Made by C. Isler & Co  
 Sunk feet. Bored feet.  
 Communicated by C. Isler & Co  
 Height above Ordnance Datum  
 Yield 500 gph  
 Quality (with copy of analysis on separate sheet)

County 267  
 6 in. map 105  
 Date 83  
 Rest level of water 100.4 down  
S 446/558

GEOLOGICAL FORMATION.	NATURE OF STRATA.	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
	Gravel	3	6	3	6
	Yellow Sand	3	-	6	6
	— Sandy clay	26	-	32	6
	— Clay & pebbles	12	-	44	6
	Blue clay	14	6	59	-
	— pebbles.	5	6	64	6
	"	19	6	84	-
	White Clay Stone	1	3	85	3
	Blue Clay	34	9	120	-
	Grey chalk & flints	5	-	125	-
	Mottled clay	17	6	142	6
	Blue Clay	4	6	147	-
	Mottled clay	31	-	178	-
	Light grey sand	22	5	200	5
	Green Sand	14	1	214	6
	Sandy Clay & Shells	2	6	217	-
	Chalk & flints	6	-	223	-
	"	38	-	261	-
	"	41	-	302	-
<u>Tubes</u> 215 ft of 5" tubes, top 8 ft above surface.					
For Mrs Myers Sandford Priory Newbury					
3600 2272.5					



5446/55  
A+B

Sandleford Priory Newbury. YWT 46/55- 264/83 A  
Visited Filled in not in use

JMT 23.10.49.

Sandleford Priory Newbury YWT 46/55- 264/83 B  
Visited In cellar, not in use, equipment in situ.

JMT 23.10.49

267/83 b.

SU46/558

Plateau Gravel	to	3'6"
Bagshot Beds	to	44'6"
London Clay	to	125'
Reading Reds	to	217'
Upper Chalk	to	302'

RAE 30.4.81

T.W.A.  
Eastern.

N.860071

# GEORGE STOW CO. LTD.

Waterworks Engineers

READING ROAD - HENLEY-on-THAMES. OXON.

SU 46/143B

SU 46 SE 67

4960 6414

267

## RECORD OF WELL (SHAFT OR BOREHOLE)

DATE COMPLETED 3rd October 1986.

### All depths to be measured below Ground Level

Work carried out for P.S.A. R.A.F. Greenham Common.

Locality (Exact Site) Greenham Common R.A.F. No. 2 Borehole.

Level of Ground Surface above Sea Level (O.D.) 109 metres AOD m.

Depth of Shaft m. Diameter mm.

Depth of Bore 142 m. Diameter: At Top 300 mm. At Bottom 275 mm.

### Details of Permanent Lining Tubes

Diameter	Length Inserted		Plain	Slotted	Top At	m below	Ground Level
	mm.	m.					
300		80		Nil	1	XXXX	

Water Struck at depth of (in m.) 76m

Rest Level of Water below Ground Level 73 m.

Yield on 48 Hours test. Pumping approx 16\* litres per sec. Date 23 Sept, 86

Pump Water level 117 m. below Ground Level.

Time of Recovery Rapid

\* 10 tonnes of acid injected at 85 m below ground and then yield test  
48 hours step/constant rate 27 litres per sec from 93 metres below ground level.

Remarks

See back for Strata Record.

### DETAILS OF STRATA

[illegible]

RAF GREENHAM Common N°2

SU 46-143B

Owner <b>U.S.A.F.</b>		Licence No.		Nat. Grid Ref. <b>SU 4960 6414</b>	
Occupier		IGS Ref. No.		Status <b>KNOWN EXEMPT</b>	
Ground Level		m OD		ft. OD	
Level of Well Top		m OD		ft. OD	
Rest Water Level <b>74.3</b>		m bwt		ft. bwt	
(Date <b>11.11.86</b> )		m OD		ft. OD	
Construction				Summary of Geological Section	
				GRAVEL	
				BAGSHOT BEDS	
				LONDON CLAY	
				READING BEDS	
				U. CHALK	
Depth bwt	Dia.	Linings (below well top)		Thickness	Depth
		From	To	Dia.	Type
<b>140m</b>	<b>300mm</b>	<b>C.G.L.</b>	<b>78.7</b>	<b>300mm</b>	<b>PLAIN STEEL</b>
	<b>287mm</b>				
Abstraction Rates		Type of Pump			
gph		Chem./Bact. Anal.		YES	NO
gpd		Well Driller <b>STOW</b>		<b>9/1986</b>	

If insufficient space has been allowed, continue in 'Notes' overleaf.

GEOPHYSICAL LOGS (A-STOW)  
GAMMA, CALIPEN, TEMP, ΔTEMP.

## Site Plan

## Notes

## TEST PUMPING

BEFORE ACIDIZING 22/9/86 17 l/sec PWL, 118m. bwt  
After acidizing 27 l/sec PWL 96m bwt



WELL BORING at *near Newbury*

Geol. map

1 in. map New Series *767*

Made by

*C. Isler & Co*

Sunk

feet.

Bored

feet.

Communicated by

*C. Isler & Co*

Height above Ordnance Datum

Rest level of water

*42 ft*

Yield

*600 galls per hour*

Quality (with copy of analysis on separate sheet)

*SU 4525 6354*

*SU 46 SE/21*

*267.*

*42 SE 4525 6354*

*6354*

GEOLOGICAL FORMATION.

NATURE OF STRATA.

THICKNESS.

DEPTH.

Feet.

Inches.

Feet.

Inches.

*L.C.*

*Dark sandy clay*

*light " "*

*Blue clay*

*" " spebbles.*

*loamy sands*

*large pebbles*

*loamy sands + pebbles*

*mottled clay*

*Clay stone*

*Dark grey sands*

*light blowing sand*

*~~black~~ black sand*

*5*

*—*

*5*

*—*

*4*

*—*

*9*

*—*

*7*

*—*

*16*

*—*

*11*

*—*

*27*

*—*

*4*

*—*

*31*

*—*

*2*

*—*

*33*

*—*

*7*

*—*

*40*

*—*

*36*

*—*

*76*

*—*

*1*

*—*

*77*

*—*

*3*

*—*

*80*

*—*

*21*

*—*

*101*

*—*

*2*

*—*

*103*

*—*

*15*

*—*

*115*

*—*

*PR*



V. Ck.

S. C. H.  
1. 12. 41.

(in)

Dark ballast  
Black sands  
Dark green sands.  
Loamy green and shells  
ditto with shells  
Green flints  
Chalk flints

9	—	127	—
3	—	130	—
11	—	141	—
7	—	148	—
1	—	149	—
31	—	180	—

Tubes

156 ft of 4" left in.

Mr Glythe  
Gentfield  
near Newbury  
Berks.

about 330' O.D.

House Supply

GEOLOGICAL SURVEY AND MUSEUM,  
JERMYN STREET, LONDON. S.W. 1.

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British Geological Survey

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British Geological Survey  
267/105

British Geological Survey

SU 46/38

London Clay to 40'  
Reading Beds to 149'  
Upper Chalk to 180'

RAE 30.4.81

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Su 46/38

Yentfield in Newbury YW 264/105.  
Visited The original outhouses have been rebuilt  
as a dwelling and sold off from 'Yentfield'.  
In the shed the original bore is still in place  
with the pumping equipment above, not in use  
Jm G 24/10.49



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