

Poors Allotment Charity
c/o 1 Snelsmore Farm Cottages
Snelsmore
NEWBURY
RG14 3BU

West Berkshire Council as Lead Local Flood Authority
Council Offices,
Market Street
Newbury
RG14 5LD

6th March 2022

Attention: Mr. Jon Bowden

Dear Mr. Bowden,

We are currently faced with two issues at the Parish Field in Enborne . There is a long running issue with drainage of water from the Parish Field onto the Spring Gardens Estate. The other issue centres on the objections of some Spring Gardens residents to Calleva's proposals to build a solar farm in the Parish Field. The two issues have become conflated.

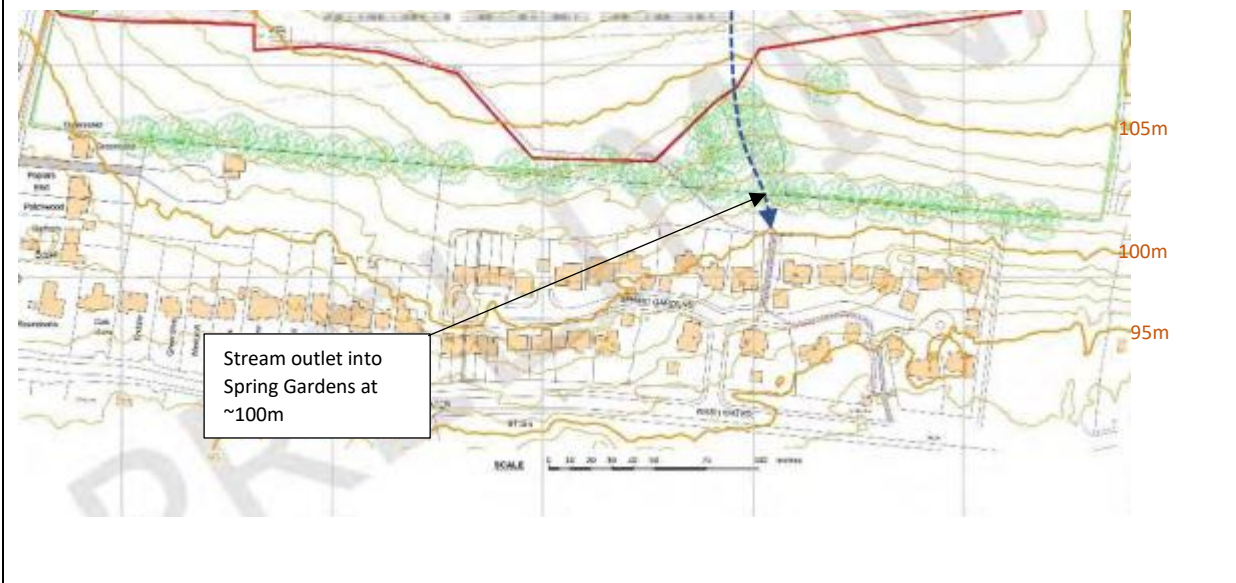
The solar farm proposals which have been submitted to the West Berkshire planning department have measures that may alleviate the long term water drainage issue and we are confident that the planners will give the measures appropriate consideration. However, we need to , if we can, solve the long running water drainage issue at Spring Gardens. Having visited a Government website and as we are not considering "a main river" we understand it is appropriate to inform the Lead Local Flood Authority (LLFA) of the problem and the conclusions of our own study. The LLFA is we believe in this instance West Berkshire Council (WBC).

1. Lie of the Land

The topography of the boundary between the Parish Field is illustrated in Figures 1 and 2. The field and Spring Gardens have a distinct slope to the south. There is a distinct undulation in the southerly dip of the parish field which forms a subtle valley, Point C on Figure 2. Let's call it the "Spring Gardens Undulation" (SGU). This is best described as a bourne as it does not have a permanent water course. Nevertheless, it directs any surface water within this part of the field towards the south and towards Spring Gardens. It has been thus, for hundreds of years. This topography probably dates back to the last ice age or soon after.

The bourne has an intermittent trickle at times of high precipitation or when springs are discharging into the SGU. The SGU is patchily boggy to the extent that in the winter it can be described as a quagmire both to the north and south of the bund that marks the boundary of the field. The boggy extent of the undulation can be seen in Figure 3 where the vegetation changes to the dark green spiky grass common where the ground is waterlogged. These boggy patches often mark the location of springs where water is percolating through the substrate to emerge at the surface, albeit in very diffuse fashion over quite large areas.

Figure 1 Contour map showing the topography of the southern part of the Parish Field and Spring Gardens. Taken from a map supplied by Lidar-Logic, September 2021, now part of planning application 22/00101.



The Parish Field is surrounded almost entirely on all sides by either an ancient bund or a drainage ditch. Sometimes the bund and or boundary ditch is just within the Parish Field and sometimes it lies just outside. It may be that these were dug to act as a property boundary marker. In places, where it is obviously a drainage ditch it complements the natural drainage i.e. in the southwest corner, to the west at the northeast corner and within the SGU. A western boundary ditch borders Andover Drove and allows water to flow south towards the River Enborne.

At the SGU a bund along the southern boundary of the Parish Field for a short distance serves to attenuate and concentrate the direct water flow from the SGU and its diverse springs and boggy patches into a single southerly outflow.

The height profile of the southern field boundary is shown in Figure 2 and can also be inferred from the contour map in Figure 1. The height profile was produced by the trustees by walking the southern field boundary with a hand-held GPS. Both the map and the profile show clearly that the land rises both west from and east from the SGU (point C). By more than 2m to the west and by almost 1m to the east.

Figure 2. Height profile of the southern boundary of the Parish Field and DEFRA Magic Map of Property Boundaries. GPS height and location data recorded by John Leeson 30 Jan -1st Feb 2022

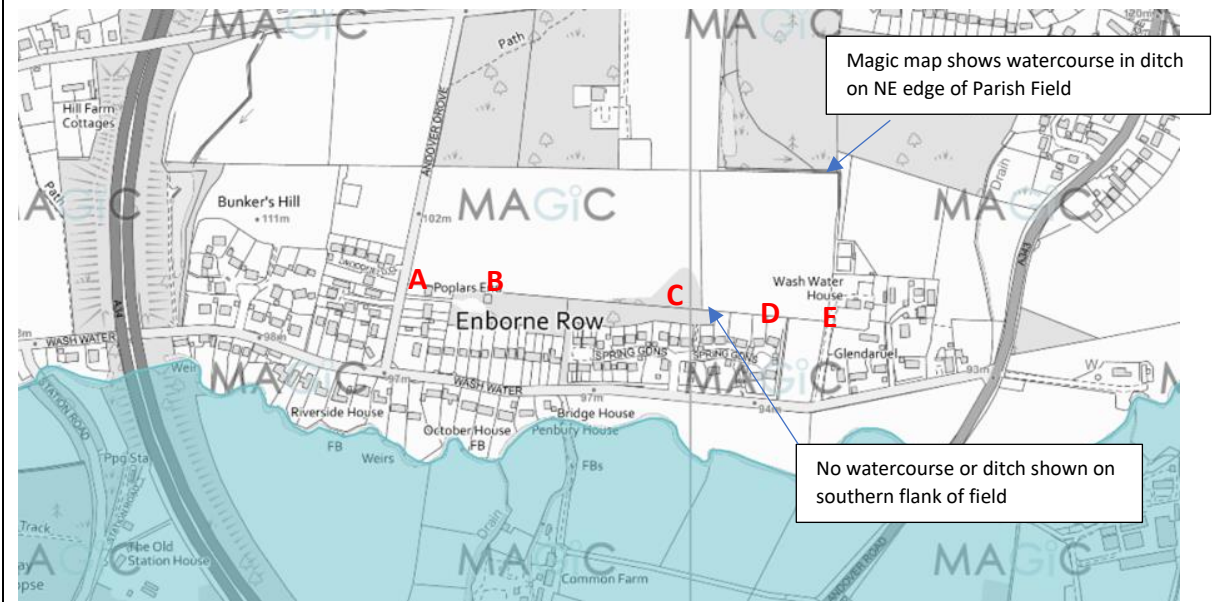
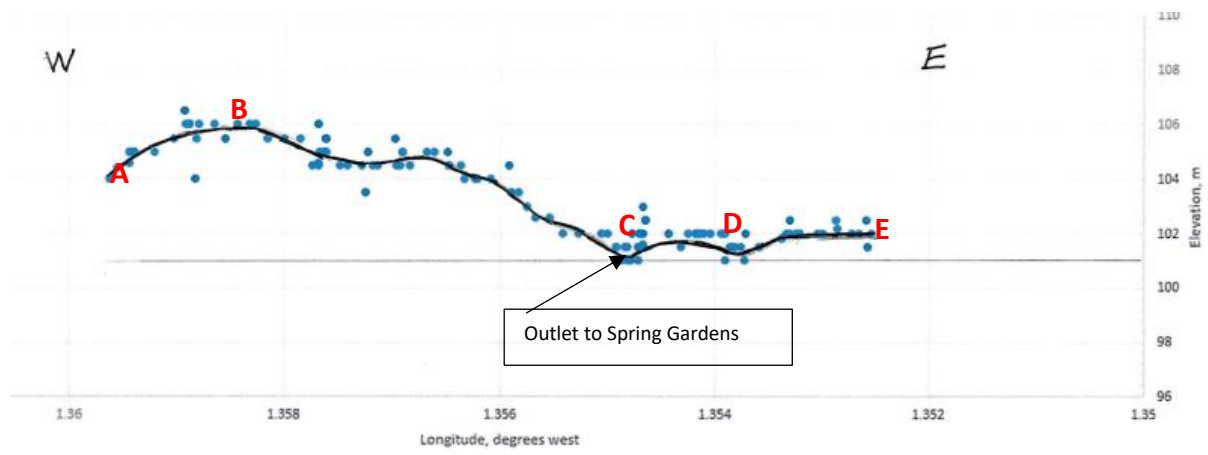
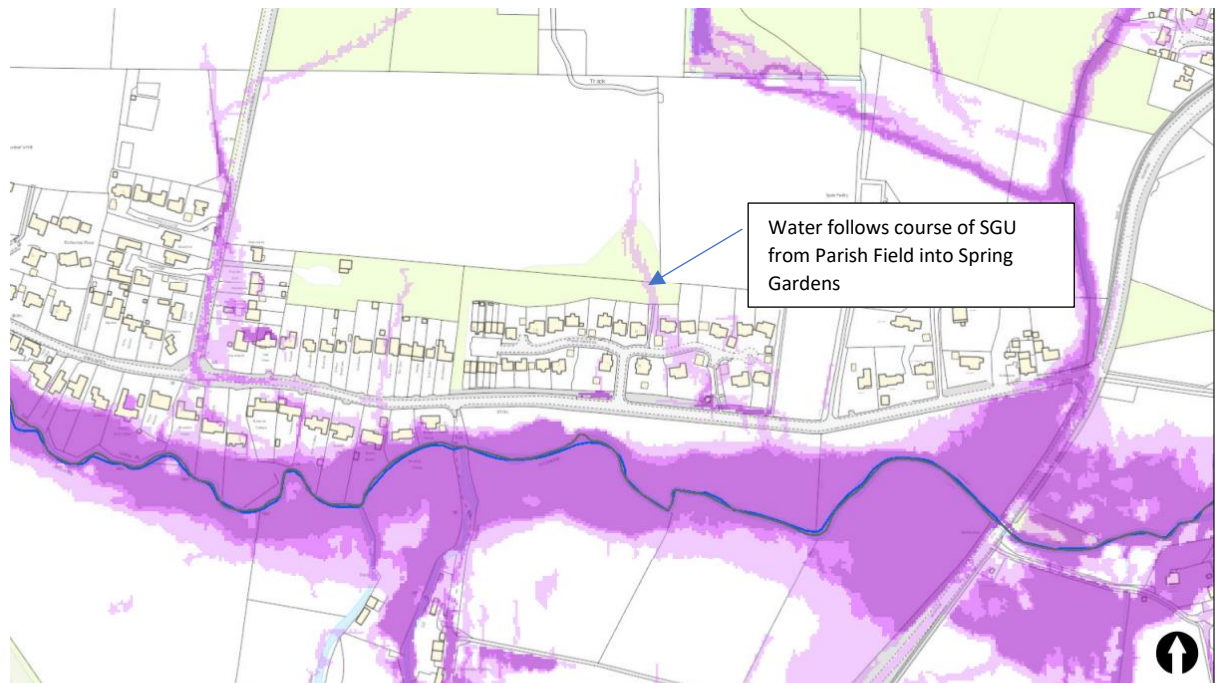


Figure 3. Spring Gardens Undulation from the north. The undulation is characterised by dark green spiky grass and a goat willow copse associated with waterlogged ground.



Figure 4 Environment Agency Flood Risk Map, obtained from WBC



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- DISTRICT BOUNDARY
- ENVIRONMENT AGENCY RIVERS
- ≡ RISK OF FLOODING FROM SURFACE WATER - 3.3pc
- ≡ RISK OF FLOODING FROM SURFACE WATER - 1pc

≡ RISK OF FLOODING FROM SURFACE WATER - 0.1pc

1:2,500
 0 0.03 0.06 0.12 mi
 0 0.05 0.1 0.2 km

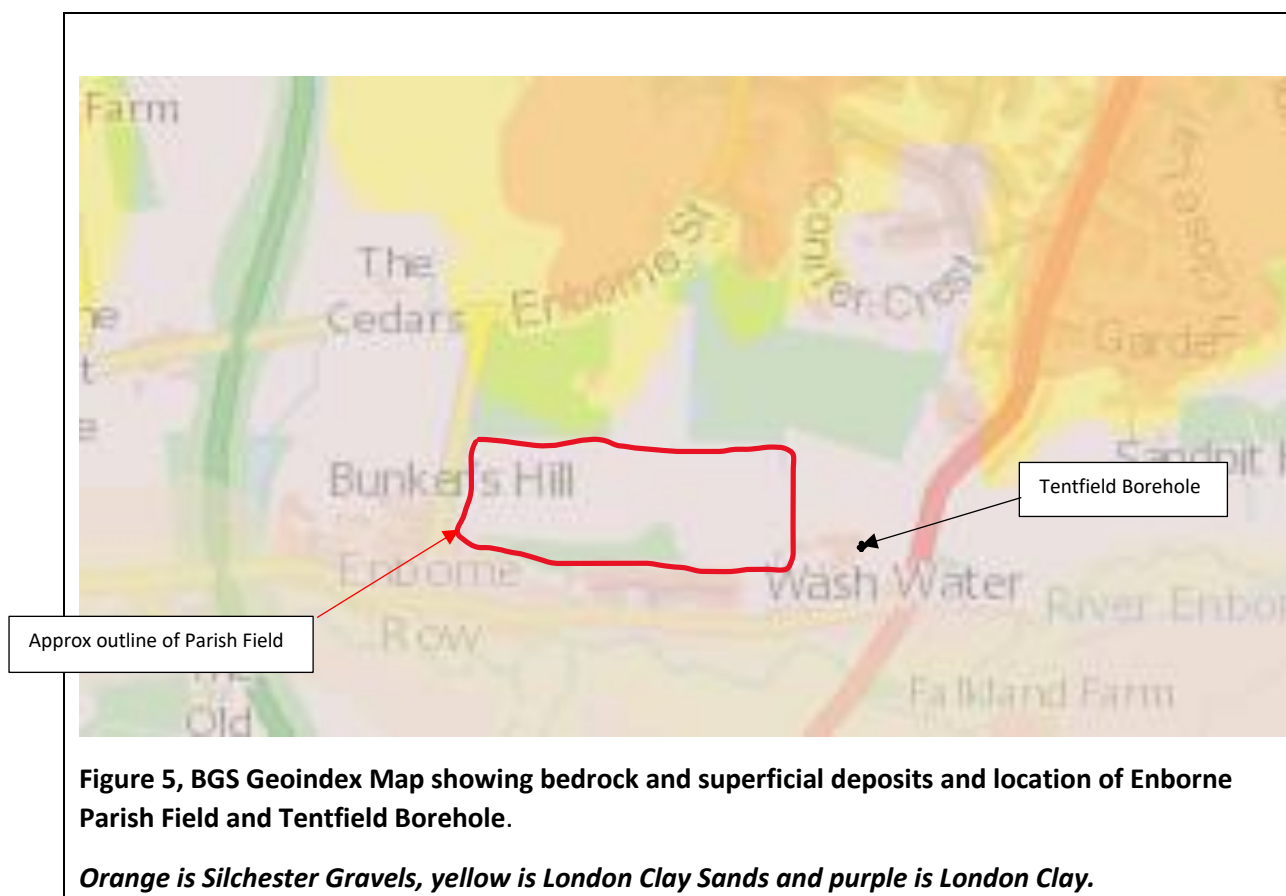
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Figure 4 is a flood risk map for the area of the Parish Field and Spring Gardens. It shows area at risk of flooding in purple. The SGU is clearly delineated as at risk of surface water flooding and the flow direction that the flood water would follow into and through Spring Gardens is clearly marked. It is worth noting that in addition to water flowing from the Parish Field supplementary flows may join from springs discharging within the Spring Gardens Estate. **The highlighted area is entirely consistent with the flow direction followed by the trickle of water coming from the Parish Field into Spring Garden during periods of high discharge.**

2. Geology

The BGS geologic map shows the Parish Field and Spring Gardens are underlain by London Clay Formation (shaded purple), see Figure 5. To the north the clay is overlain by London Clay Sand, (shaded yellow). This in turn is overlain by the Silchester Beds (shaded orange), a late-stage superficial gravel.



If we look at the log for the Tentfield Borehole, Figure 6, we can see that the London Clay formation consists of layers of Blue Clay, Sandy Clay, Large pebbles and Mottled Clay.

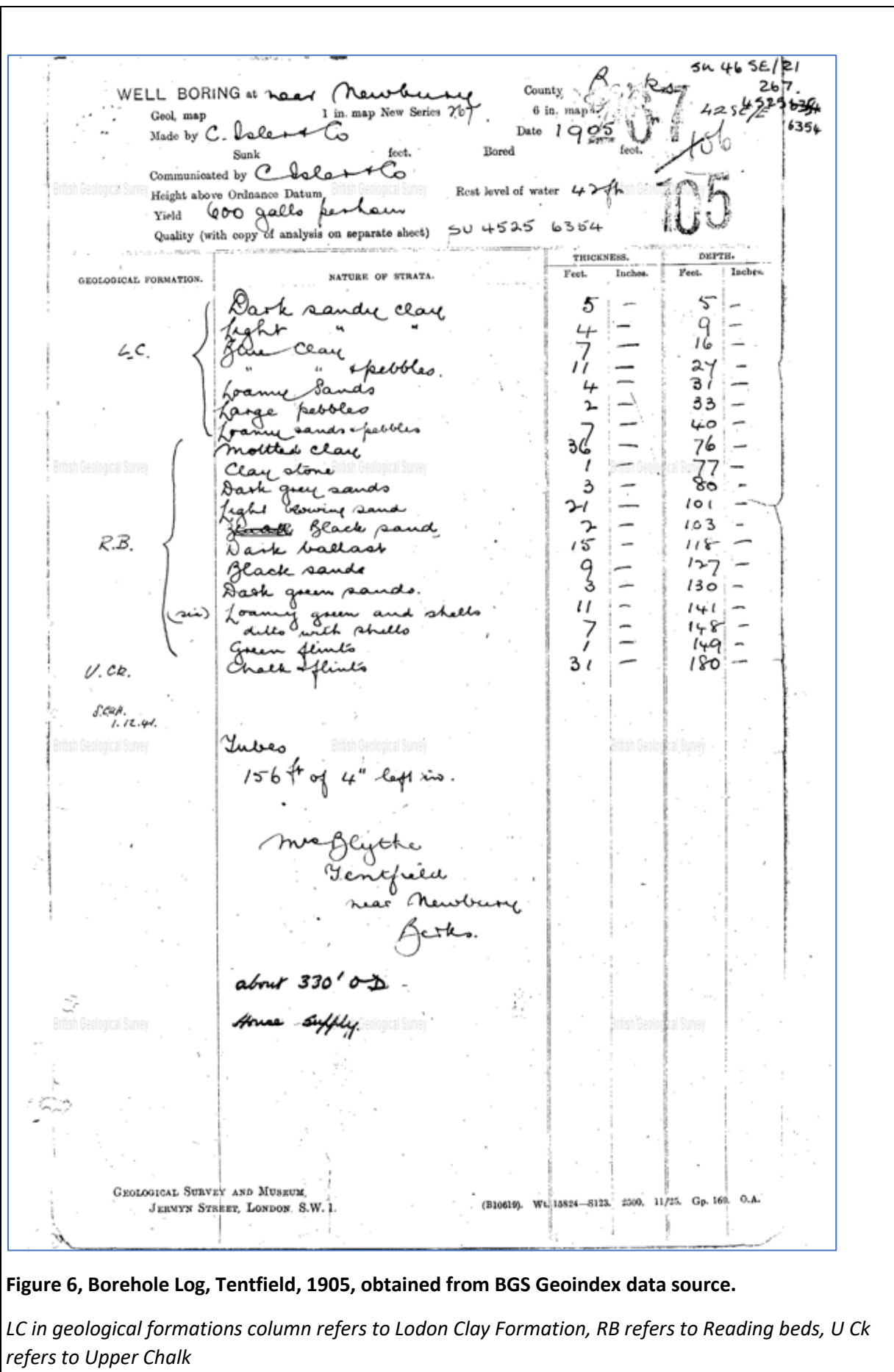


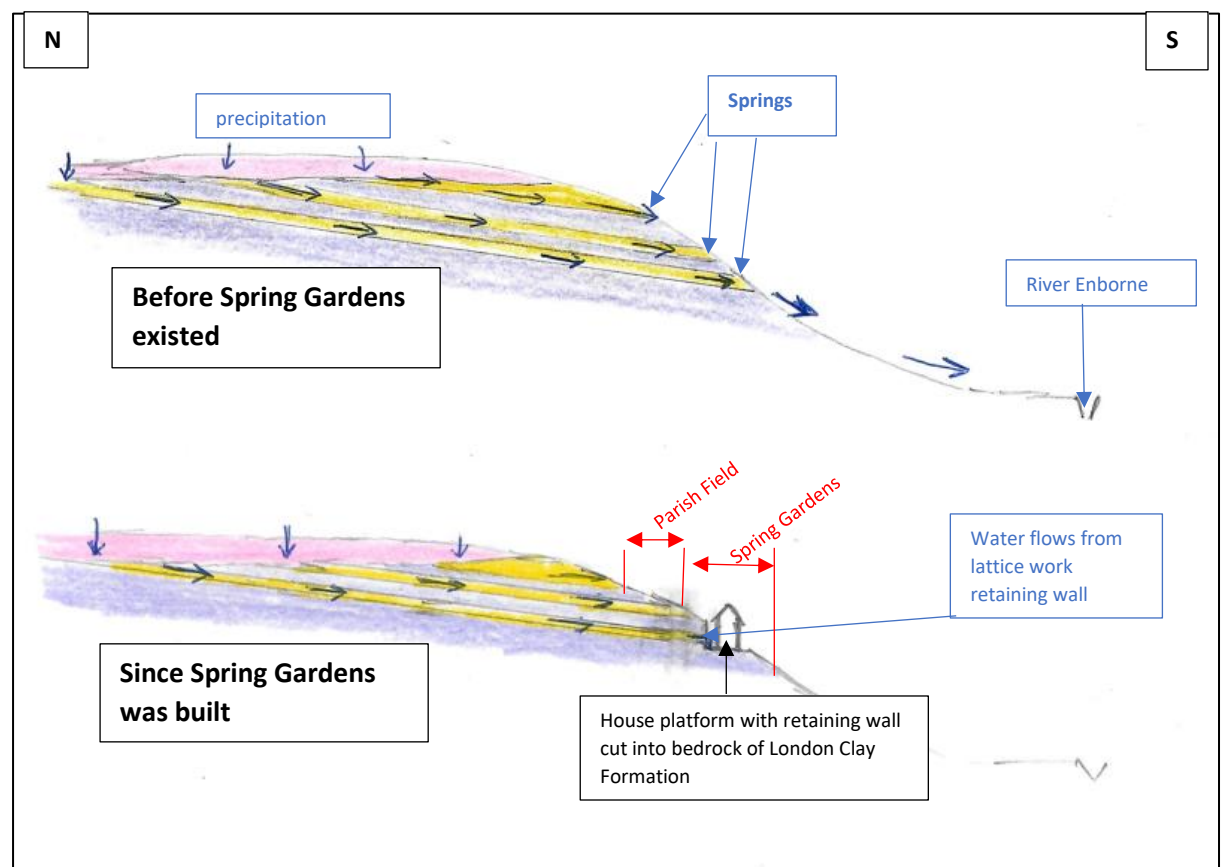
Figure 6, Borehole Log, Tentfield, 1905, obtained from BGS Geindex data source.

LC in geological formations column refers to Lodon Clay Formation, RB refers to Reading beds, U Ck refers to Upper Chalk

We would expect the clay layers to be impermeable, the sandy layers and particularly the pebble layers should be permeable and a potential channel for groundwater flow provided they can be charged somewhere up dip/up slope. Figure 7 is a cross-section showing the geological situation at the Parish Field and Spring Gardens. The overlying Silchester Gravels are permeable and allow precipitation to percolate down onto the underlying London Clay Formation. The water is able to enter permeable sand and pebble layers in the London Clay formation to emerge in the Parish Field or Spring Gardens. Where the water percolating down through the Silchester gravel encounters clay the water flows across the impermeable upper surface of the clay, following the topography of the clay surface. At the Parish Field and Spring Gardens the SGU concentrates the surface water and any spring water into a small intermittent trickle that passes from the Parish Field into Spring Gardens.

A written discussion between the BGS and Lidar Logic is reported in a Lidar Logic report of September 2021. Rachel Cartwright of the BGS also noted that “Spring Gardens” may have been named because of the presence of springs locally and the BGS have provided further detail as follows: “We have one spring mapped upgradient of the site, at 445050, 164011 (this doesn’t mean that no others are present). This spring is at the head of a stream which flows close to the boundary of your site. To the east of the site there are multiple springs arising from the London Clay, suggesting that the same could happen at this site”.

Figure 7, Schematic Cross Section, N to S across the Parish Field and Spring Gardens. Not to scale and with vertical exaggeration.



Before the Spring Gardens estate was built the trickle of water was further supplemented by more spring water that emerges within the field (now Spring Gardens) as illustrated in Figure 7, upper

diagram. This resulted in a very boggy field. The farmer who used to rent the Spring Gardens field from Mrs Rooke, a former owner, for grazing cattle attests that the field was always extremely boggy, to the extent that a tractor could become stuck. The lower cross section in Figure 7 shows the likely current situation and may explain why water flows from retaining walls behind the houses on the north side of Spring Gardens road

3. Before the development of the Spring Gardens Estate

Figure 8 is a satellite download from 1999, before the estate was built. The resolution is not great and it was obviously taken in the summer. The shadows from the trees indicate the satellite image was taken near midday, as the trees cast a shadow to the north. The boundary bund along the edge of the Parish Field is clear to see at two places where there are no trees. Given that there is no shadow associated with a ditch wall or significant mound I conclude the earthwork is not deep enough to have been a drainage ditch that allowed water to flow from west to east.

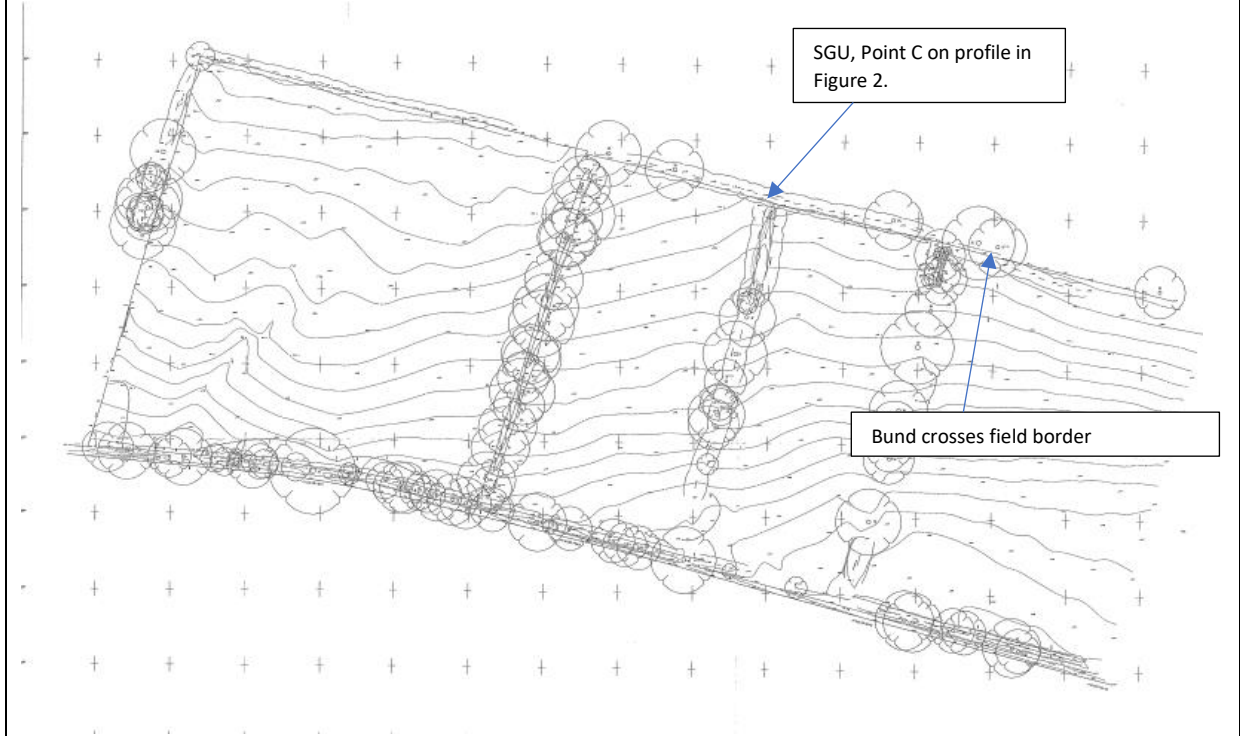
Superimposed on the satellite image are the boundaries of Spring Garden’s properties 22 to 28. This satellite image with the superimposed plot boundaries was kindly supplied by WBC.

Figure 8, 1999 Satellite Image of the South East Corner of the Parish Field and the Adjacent Fields to the South (Now Spring Garden).



A contour map of the “Spring Garden Fields” prepared on behalf of the Friends of the Hospital and dated May 2001 can be found on the WBC planning portal, Figure 9. Interestingly it shows the boundary bund crossing into the Spring Gardens Fields.

Figure 9. Contour map of the fields that are now Spring Gardens before the development, downloaded from WBC planning portal.



4. During Development of Spring Gardens

Figure 10 shows the layout for Spring Gardens proposed in 2001. This screenshot was taken from the WBC planning portal, planning no. 01/01328, and shows the same boundary configuration as the contour map, Figure 9. Both diagrams show north to south features that are probably a ditch and flow channel emerging from the Parish Field at Point C and following the old hedgerow through the fields that are now Spring Gardens.

Figure 11 is a satellite image taken in 2003 during the construction phase of Spring Gardens. This can be interpreted to show the line of the drainage channel that was running down the old hedgerow. This drainage channel directs water towards "the access path", which was to allow access to a common access area running west to east behind the Spring Gardens properties. We have been told by a representative of WBC that the planners insisted on this access path and that it was regarded as an outflow route for any excess water. This seems likely as the access path largely follows the route of the old drainage channel and hedgerow and the Environment Agency Map area at flood risk, Figure 4..

Figure 10. Illustrative Layout of Spring Gardens, 2001 Document from West Berkshire Planning Portal, 01/01328

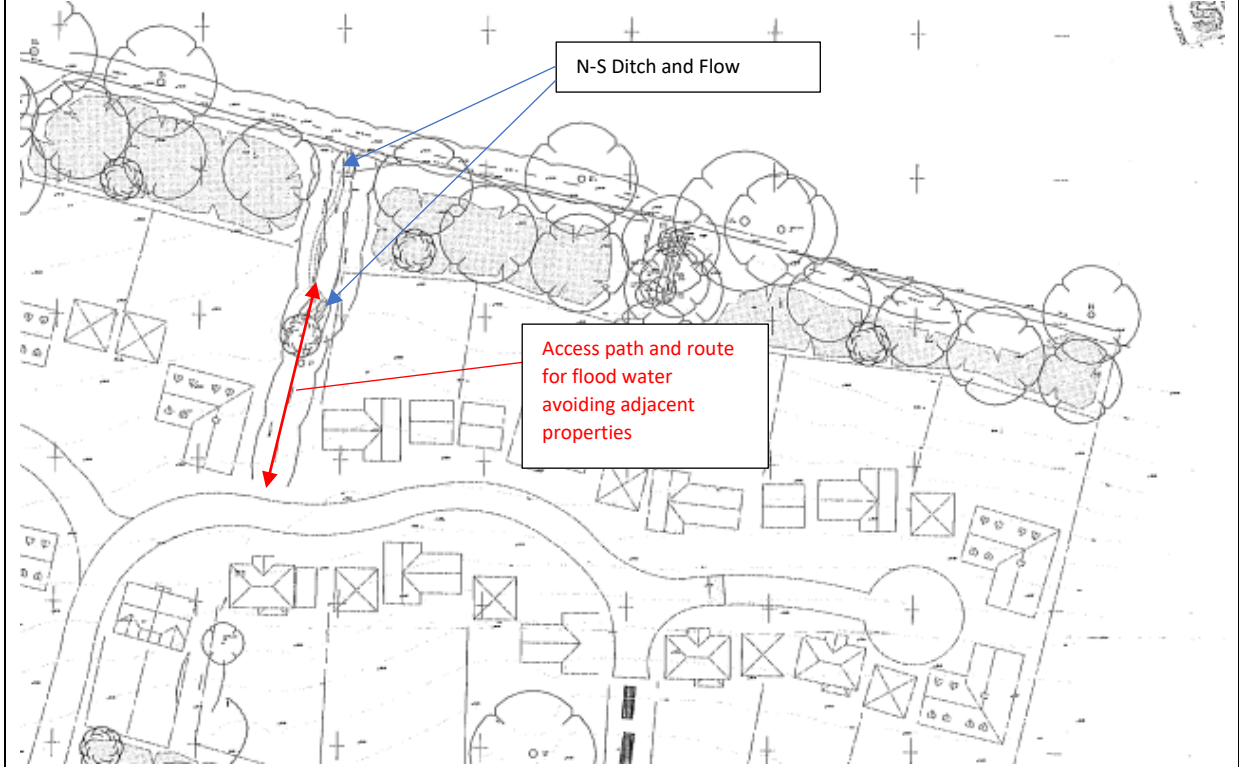


Figure 11. Satellite Image of Spring Gardens During Construction, Image B with added interpretation.

Spring Gdns - 2003

West Berkshire



Spring Gdns - 2003

West Berkshire



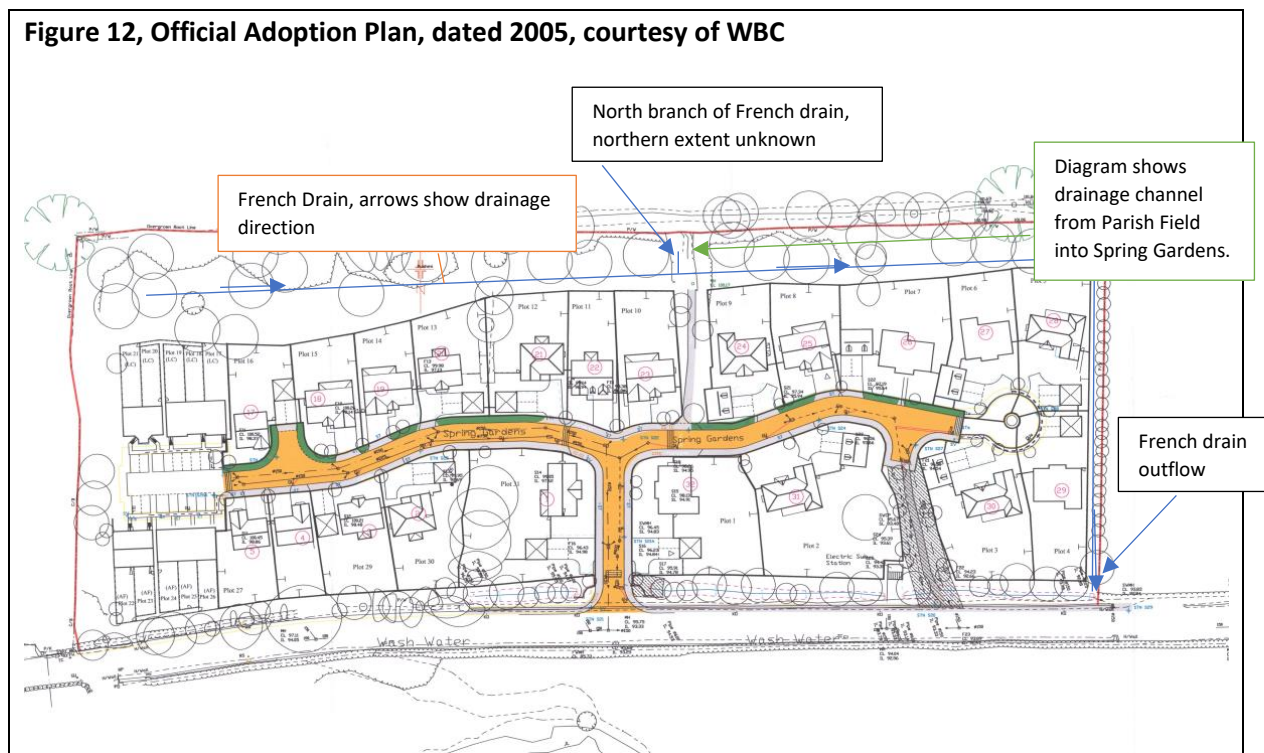
5. The Current Problem

When the Spring Gardens estate was built the developer cut platforms into the natural slope to create horizontal slabs onto which to build houses. This created a near vertical bank behind the houses of a meter or two in height. Older residents of Enborne Row attest that water was seen running out of this steep bank after it was cut. The likely source of this water is a sand or pebble layer in the London Clay charged from somewhere upslope, see Figure 7.

London Clay, especially if lubricated with water is notoriously unstable and the developer decided to build a retaining wall behind the houses. The retaining wall is not solid, but has a lattice structure, presumably so that there would not be a substantial build-up of water behind. There is therefore an outflow of ground water through the lattice retaining wall, particularly when groundwater levels are high.

To further mitigate the boggy ground problem at the top of the estate the developer installed a “French” drain. The approximate location of the french drain is shown in Figure 12. Figure 12 is the adoption plan submitted to WBC by the developer in 2005. This was kindly supplied by WBC. It shows an area for common access behind the properties, it also shows the access path and the existing channel for outflow from the Parish Field.

The french drain is designed to take water from the boggy parts of the common access along the north edge of the estate and to flow the water west to east behind the properties and down the east border of the development with a substantial drop to a ditch by Wash Water Road



The french drain reputedly has a short northern branch which extends from an inspection cover north towards the boundary of the Parish Field. We don't know how close this northern arm of the drain approaches to the field boundary

The estate was designed with a 2-4m wide common access area running along the north border to allow we presume, among other things access to/maintenance of the french drain.

Gravel infills lying over perforated pipes were, we believe, supposed to allow the surface water flowing over the impermeable clay surface, including water from the Parish Field, to percolate through the gravel into the drain and flow away thus mitigating flow towards the houses or down the access path. It is possible that over time these perforations have plugged so that water is not readily accessing the french drain.

The french drain will not have solved the problem with groundwater emerging at springs topographically lower than the French drain gravel infills.

6. Earthworks in the Parish Field and the Parish Field Boundary Ditch or Mound

You may ask what is the purpose of the boundary bund, particularly where it crosses the SGU? For a short distance, perhaps 2-3 meters, it currently acts as an attenuation pond which overtops through a small channel cut into the top of the south bank allowing the excess water to flow down the access path within Spring Gardens, as it always did.

Other earthworks are visible within the Parish Field within the SGU. There are a series of shallow contour parallel trenches within the copse of goat willow trees which presumably act to attenuate flow down the slope. Figure 13.

Figure 13, Contour Parallel Trenches in the Goat Willow Copse of the Spring Gardens Undulation



We do not know when these contour parallel trenches were dug or by whom. We do know that they are not visible or distinguishable in the satellite image from 1999, Figure 8, which also shows that there was no copse of goat willow in 1999.

It is clear that someone has been accessing the Parish Field and digging out the boundary mound/ditch, presumably to enhance its water attenuation capacity. This work has not been instigated by the Trustees. Figure 14 shows the outflow from the ditch in the summer 2021, located immediately west of a distinctive tree.

Figure 14, Ditch and OutFlow Channel in Summer 2021. Photo and annotation from the Lidar Logic Report dated September 2021.



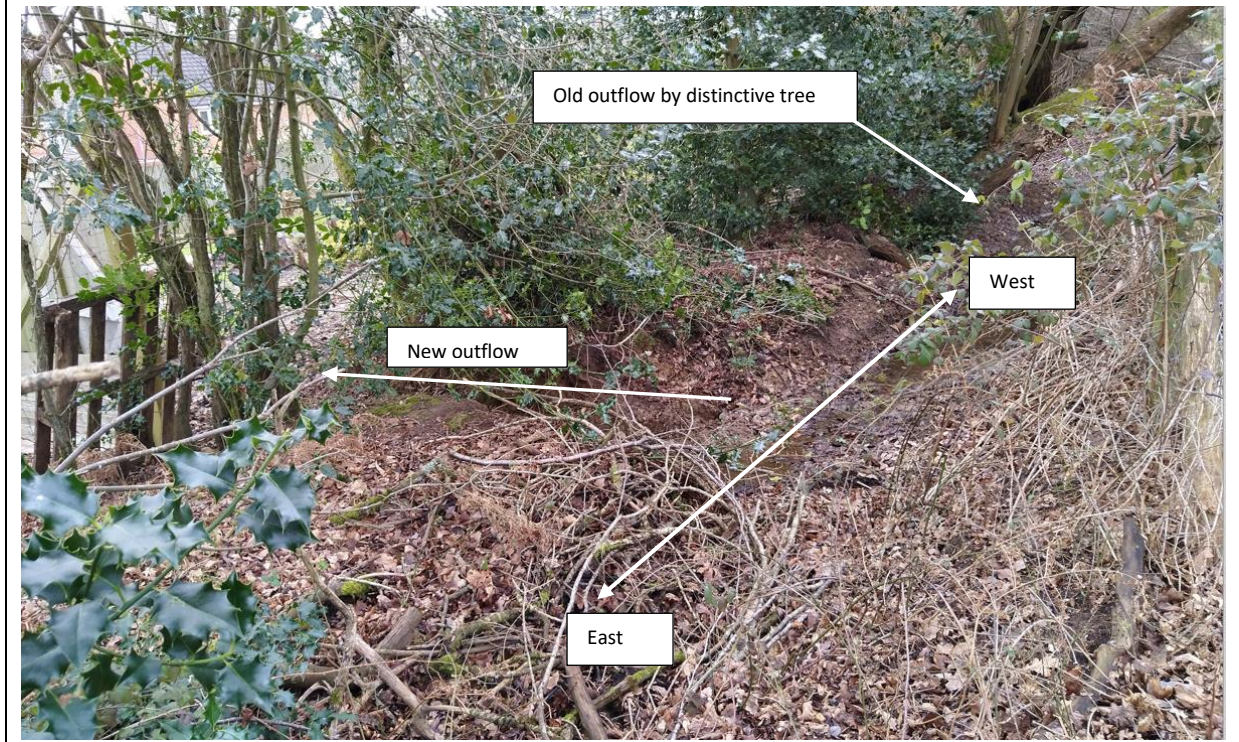
Some of the excavated spoil from the ditch has been used to block the old outflow, see Figure 15

Figure 15, Ditch February 2022. Outflow by Tree Blocked.



A new outflow has been dug a few meters to the east, Figure 16, transferring the outflow water to the east.

Figure 16, Latest Outflow Location, February 2022



There has for some time been a problem with water from the boggy area at the top of Spring gardens flowing down the access path and out onto the Spring Gardens hardtop road, see Figures 16 and 17., which are photographs taken in the summer of 2021 and during 2016, respectively. In the winter the water on the road freezes on frosty mornings creating a safety hazard.

Figure 17, View from Outflow Channel Looking South Down the Access Path. Photo from Lidar Logic, September 2021.



Figure 18, Water Flowing from Access Path and Across the Hardtop, 2016 from John Leeson



7. The Common Access Area

The common access area was we believe a planning requirement to allow access and maintenance of the french drain. It was originally owned by David Wilson Homes the developer of the estate and ran along the entire northern boundary of the Spring Gardens Estate. In the early years of the 2000's there were no resident owned properties abutting the Parish Field. We understand the common access area was sold to Homeground Management Company.

The gardens of properties 25-28 have since been extended to abut the Parish Field. This is we understand with the knowledge of Homeground Management Company but it is not clear to us who actually owns the land that originally formed the common access area behind properties 24-28.

8. Conclusions

There is currently a misconception concerning the southern boundary of the Parish Field and it's maintenance by the Charity. We should be clear the bund has not substantially changed in the 20 years or so since the Spring Gardens development was built. The SGU has long existed and the natural drainage route from the Parish Field has, likewise, long existed. Furthermore, the problem caused by the natural drainage route through Spring Gardens was obviously recognised by the developer.

It may not be possible to intercept the water within the deeper permeable layers of the London Clay Formation which may be emerging at the retaining walls within the gardens of Spring Gardens Properties

9. What should or could be done to solve or mitigate the excess water problem suffered by some Spring Gardens Properties?

a) Intercepting and Collecting the Water Flowing Down the SGU

The water in the SGU emerges from the ground at numerous points within the Parish Field and within the Spring Gardens Estate. It therefore make sense to collect this water and divert the flow in order to mitigate the situation in Spring Gardens. It further makes sense to intercept the water as far down the slope as possible. Some water could be intercepted within the Parish Field but any groundwater emerging lower down the slope below the interception point will continue to flow down the existing flow path. We conclude **lower is better** and as it would be good to stop water flowing down the access path and out onto the road an interception point within the common access area of Spring Gardens is optimum.

b) Diverting the water

Options for diverting the water include:

- Raising the Parish Field boundary bund within the SGU, thus increasing the storage in the attenuation pond and digging a ditch to flow water to the east. This solution would involve flowing water past the gardens of properties no. 24-28 before it discharges into the field to the east of Spring Gardens or onto the drive of Wash Water house. We cannot envisage either of these property owners agreeing to this. Furthermore this ditch may have to be deep enough to be unstable and dangerous.

- Using the existing french drain makes the most sense. The water could be intercepted at the optimum location and flowed away to the east and down to the ditch at Wash Water Road. This we presume is the solution the developers and planners had in mind. This solution would not involve imposing on any of the currently unaffected landowners to the east of the Spring Gardens. We therefore pose the following questions:
 - Is the french drain properly maintained and still working?
 - How close to the Parish Field does the northern branch approach and is it open to accept water and is it functioning correctly?
 - Is there still access from the gravel infill into the perforations in the french drain or are the perforations blocked?
 - Is any of the water percolating down through the gravel infill getting underneath the french drain and into the groundwater system below and therefore feeding out of the retaining walls?

Finally, we are here to help and will give consideration to any suggestions you may have.

Your sincerely

CH Garrett

Christopher H. Garrett

Enborne Parish Councillor and Trustee of the Poores Allotment Charity

BSc. Geology and Geography, University of Exeter, MSc. Oceanography, University of Southampton and, Fellow of the Geological Society of London.

Copies to:

A representative of the residents of the Spring Gardens estate

West Berkshire District Councillors for the Kintbury Ward

Homeground Management Limited

Firstport Property Management