

PLANNING REF: 243124

PROPERTY ADDRESS: RG10

SUBMITTED BY: Richard H Thomas

DATE SUBMITTED: 06/01/2025

COMMENTS:

PLANNING APPLICATION NUMBER 243124

Site Address: Land At Bridge Farm Bridge Farm Lane Twyford

Description: Application for the approval of reserved matters pursuant to outline planning consent 212720 for the erection of 200 dwellings with associated infrastructure, open space, biodiversity enhancements, landscaping and green infrastructure (Appearance, Landscaping, Layout and Scale to be considered).

In respect of Flood Risk and Drainage, I object to the discharge of Planning Conditions 25, 26 and 29. The details provided in Stuart Michael Associates Technical Note Ref 7236.TN02 Rev04 dated 9th December 2024 (SMA) and its Appendices are incomplete and/or inadequate.

I am a chartered geologist with a Masters in hydrogeology and over 50 years professional experience. From 2008 until 2024 I headed our company's services to the Planning Unit at Surrey County Council providing technical advice on flood risk and drainage, groundwater, geology and geotechnics, land stability, minerals and waste on all the planning applications before them. Also, a similar role for Somerset CC 2007 to 2018.

The comments I offer below are for the sake of ensuring a safe and sustainable development for the purchasers of property at the site. Besides making sure finished floor levels are set high enough for fluvial flooding, it is also essential that properties, gardens, infrastructure and public open space are not affected by a high groundwater table, manifesting itself as surface water but equally importantly not leading to waterlogging, boggy gardens, loss of planting etc.

Condition 25 (SMA Pages 1 and 2)

"Finished floor levels shall be set no lower than 35.83 metres above Ordnance Datum (AOD)".

This may well be the case in respect of Fluvial Flooding however this does not consider high groundwater levels and / or groundwater flooding. Please refer to my comments below.

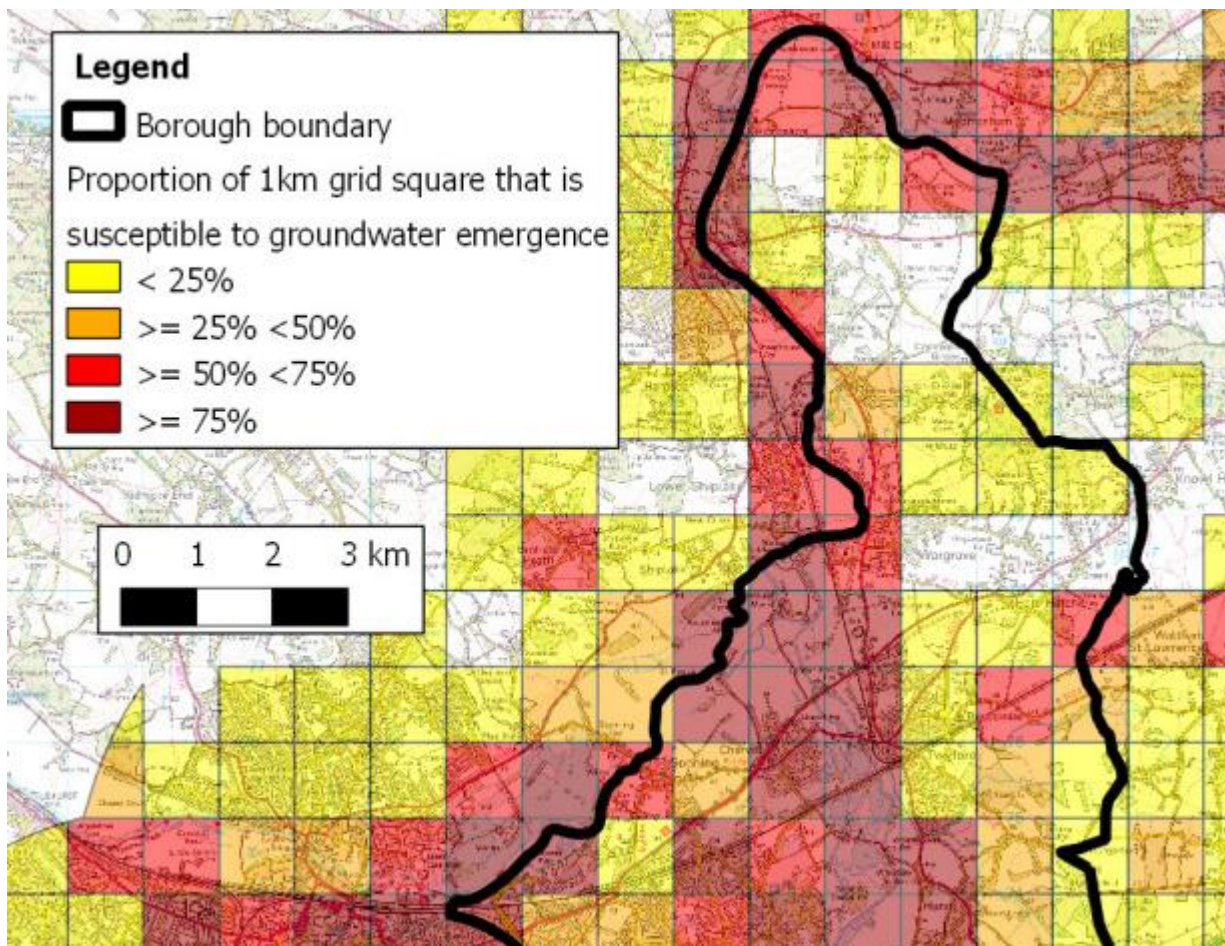
Condition 26 (SMA Pages 2 to 5)

• Results of intrusive ground investigation demonstrating seasonal high groundwater levels for the site and infiltration rates in accordance with BRE365

The tiny amount of groundwater level monitoring undertaken is completely inadequate for the purpose of assessing seasonal high groundwater levels. A robust assessment is needed not only for infiltration drainage (now abandoned by the Developer), but also to ensure the development is not affected by high groundwater levels and / or groundwater flooding.

Readings on only three dates in Spring 23 and then Spring 24 are insufficient. Environment Agency (EA) usually require at least 12 months and for some sensitive sites 24 or 36 months.

Your own mapping shows the site lies in a 1km grid square where over 75% of the area is susceptible to groundwater emergence.



The site is situated very close to an area just north of the A4 that is known to suffer from groundwater flooding.

The site is situated within the Zone 2 groundwater source protection zone for the three public water supply wells at Sheeplands WTW about 1100 m from the north end of the development site.

Very large volumes of groundwater pumping by Thames Water (150 to 250 M gallons per year) have a profound influence on groundwater levels over a very wide area including the site.

The Appellant's groundwater level data cannot be relied upon unless the effect of groundwater abstraction pumping at Sheeplands is fully understood and factored in.

There is no guarantee that TW will always be pumping so worst-case highest groundwater levels must be determined assuming TW stop pumping at a time when levels are at their highest, or stop pumping permanently.

Data from British Geological Survey Memoir (Wartime pamphlet. Geological Survey of Great Britain, 15).

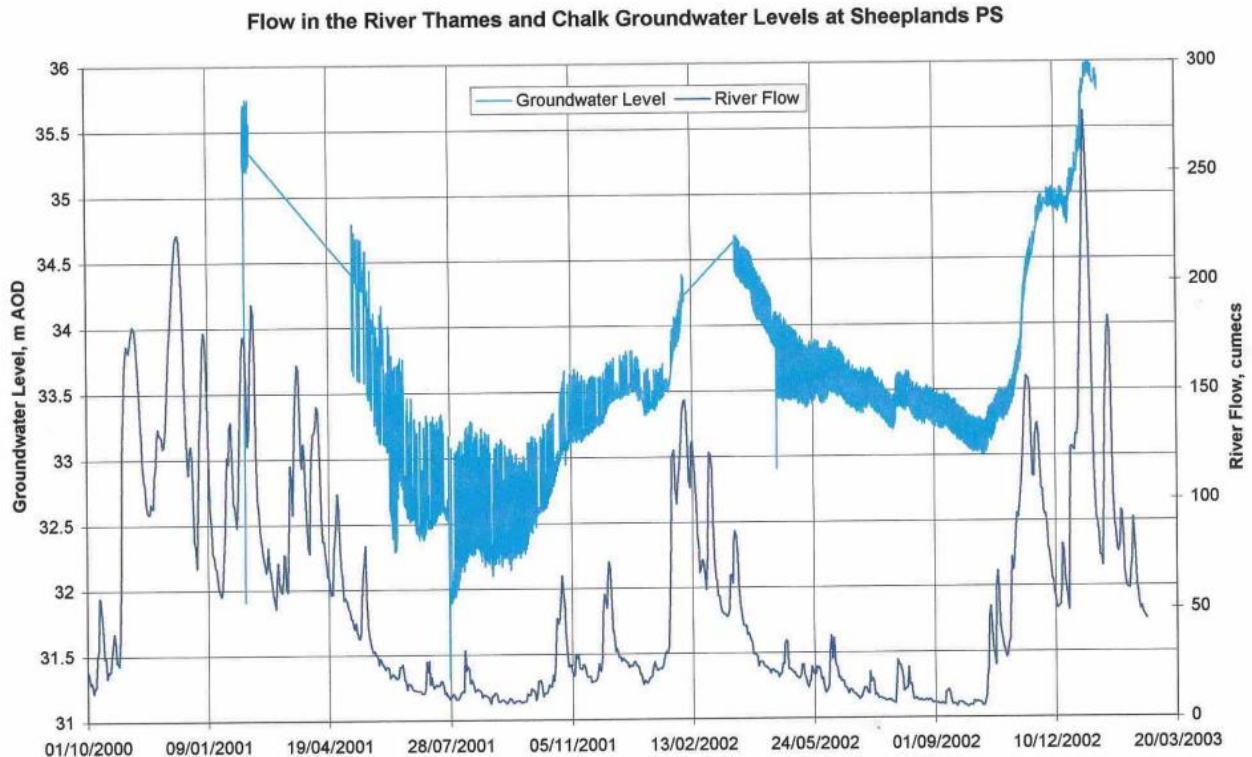
160. (268/244). Wargrave: Wokingham R.D.C., Wargrave and Twyford Waterworks, Sheeplands Pumping Station. Public Supply.
 (a) Surface +118. Shaft 7; bore 168. Lining tubes: 43 x 12 in. from 4 to 47. R.W.L. +117 $\frac{1}{2}$ (winter); +108 $\frac{1}{2}$ (summer). Suction +90. (Allsebrook, 1929).
 R.W.L. +117 $\frac{1}{2}$. P.W.L. +107 $\frac{3}{4}$ (Feb.). Yield 33,500 g.p.h. (1930).
 Hardness: P. 5, T. 26. Anal. (1933). Recovery immediate. Yield 16,000 g.p.h. 5 $\frac{1}{2}$ h.p.d. (1935).
 (b) Surface +118. Shaft 25 x 6; rest 2 bores. Lining tubes: No. 1 bore, 55 x 18 in. from 22 to 77; No. 2 bore, 57 x 18 in. from 22 to 79. Water struck at +99. R.W.L. +112. P.W.L. +95 $\frac{1}{2}$. Yield 65,000 g.p.h. (test). (LeGrand, 1941).

1929 Winter Rest Water Level is 35.75m AOD, only just below the minimum finished floor level specified in Condition 25.

The site is up gradient from Sheeplands so groundwater levels will naturally be higher at the development site than at Sheeplands.

Data below is from Thames Water as part of a study I undertook for Wargrave residents in 2003

TW's hydrogeologists made a very strong case that that the flooding was caused by groundwater flooding. I agreed.



FEB 2001 NB 35.75 m AOD >>>> than 35.46 mAOD. TW still pumping BH 3 @ c 1600m³/day

DEC 2002/JAN 2003 36.0 m AOD TW still pumping BH 3 to supply @ c 800 m³/day.

TW also pumping BH 1 down the waste main to the Sewage Works during this period. No data.

So what are the groundwater levels that should be adopted for development layout and infrastructure design at this site?

Levels should be set to keep ground floors above highest possible groundwater flood levels while maintaining safe and dry access, gardens / shared open spaces that are not waterlogged for months on end killing off planting and preventing their use as a household amenity, and ensuring drainage infrastructure is not affected.

The public rely on the planning process to ensure their homes, gardens and the infrastructure serving them do not flood.

Based on the Sheeplands data the minimum level of 35.83m AOD stipulated in Condition 25 is almost certainly too low because groundwater levels higher than 35.83m AOD have been recorded a short distance

downstream of the site while Thames Water are still pumping. Upstream seasonally high levels will be slightly higher. And what about the effects of Climate Change?

Thames Water cannot be relied on to keep pumping during peak winter groundwater highs. They would not give that commitment in 2003 and will not now.

Sheeplands groundwater is high in Nitrates, costly to treat or blend, and so there is no guarantee the wells will always be in use.

What then the impact on groundwater levels in the future?

Groundwater Flood Risk and Groundwater levels have not been adequately considered by the Developer.

A detailed and long term programme of groundwater level monitoring, data from Thames Water, and predictive modelling will be required to assess seasonally high groundwater levels, and set minimum levels for ground floors and gardens etc. The outcome could very well be that substantial changes to development layout, number of dwellings, and drainage strategy and layout are necessary.

IMPLICATIONS

The developer accepts that ALL components of the SW drainage system will need to be lined however the effect of a high groundwater table on the lining system has not been taken into account.

Uplift pressures from high groundwater on base of lining systems must be factored into design of all lined below ground components of the drainage system; the basin, the swales, bioretention features and the offline storage crates. They must be designed to resist floatation, rupture and sufficient surcharge weight applied.

c 0.5m thickness of stone or clay is required to resist 1m upward groundwater pressure. This results in a loss of attenuation volume.

Therefore, attenuation basins, swales, ditches etc are likely to be relocated, shallower and much larger in area than those shown indicatively in the outline drainage strategy.

There will be knock on effects on masterplan layout, number of units, landscape /visual, ecology, amenity, sustainability etc. once the drainage scheme is properly designed.

- ***A drainage strategy plan for the proposed development, including pipe details with invert levels.***

3.6. The proposed drainage consists of a series of swales, bioretention, off line below ground storage crates and a basin. Swales and bioretention are proposed adjacent to roads throughout the development and provide treatment and conveyance of surface water towards the basin. The basin discharges surface water runoff to the watercourse located adjacent to the western boundary. The proposed SuDS Management Train provides sufficient treatment prior to discharge to the watercourse. A drawing showing the drainage strategy is included in Appendix F.

It is clear from the Appendix F Drawing provided as part of the submission that the claim in the paragraph above that ***“Swales and bioretention are proposed adjacent to roads throughout the development”*** is far from accurate or objective. I have not measured it but there is probably more road **without** adjacent swales and bioretention alongside than with.

Also, no evidence or designs whatsoever have been provided to support the statement that ***“The proposed SuDS Management Train provides sufficient treatment”*** See below also.

The LPA /LLFA should NOT accept paragraph 3.6 at face value.

- ***A maintenance arrangement for the SuDS features throughout the lifetime of the development, indicating who will be responsible for the maintenance.***

3.7. The proposed maintenance and management for all SuDS in public areas, including the bioretention, swales and basin, will be with a private management company. A plan showing who maintenance

responsibilities lie with is included within Appendix G. Maintenance schedules are also included within Appendix G, detailing maintenance activities of all SuDS features.

This confirms the developer will not seek adoption of the drainage infrastructure, and presumably the same will have to apply to the roads because the roads and drainage are intrinsically linked infrastructure. The owners of the new homes will be at the mercy of the “private management company”, who will no doubt seek to profit from the enterprise.

This is a scandal called Fleecehold in the media.

Some of the issues that can arise if this development is provided with inappropriately designed, or badly constructed SuDS are described below.

Since their widespread adoption in new developments 20 to 30 years ago, and even with huge commuted sums on offer, Local Authorities, Lead Local Flood Authorities and Highway Authorities etc. have become increasingly reluctant to adopt SuDS and associated infrastructure such as highways, public open space and landscaped areas containing SuDS components.

Developers have overcome this by transferring ownership and maintenance responsibility to a private limited management company, with an obligation placed on all homeowners etc. within the development via their title deeds to pay their own share of maintenance costs. Schemes now known as “fleecehold”. [New Build Estate Management Fees: How Much Do They Cost In 2024?](#)

Many LAs have not adopted SuDS because inter alia: a) technical standards for SuDS are non-statutory and LAs lack certainty that the systems have been designed and constructed to adoptable standards and b) many components of SuDS schemes are below ground, out of sight, and not easily inspected or maintained, and c) despite being well designed and maintained some SuDS components have a limited lifespan (perhaps 20 to 30 years) much shorter than the development they serve.

The long-awaited introduction of SuDS Approval Bodies in England has still not happened.

Below ground components include conventional soakaways, borehole soakaways, infiltration trenches, bioretention systems, dry swales, permeable pavements, cellular attenuation storage systems (think layers or stacks of interconnected milk crates) under driveways, gardens, open spaces, and roads. All these tend to silt up and decline in performance with the passage of time. Their condition cannot be easily or cheaply monitored, and often the first indication residents have of a problem is flooding under climatic conditions where flooding did not occur previously when the development was new. Maintenance and rehabilitation of these below ground systems is expensive, and homeowners can be presented with large unexpected bills when the need for this arises.

Under most private management company schemes set up by developers, homeowners will already be paying their share under an annual fee for routine inspection and maintenance such as gully emptying, grass cutting, desilting of attenuation ponds and swales and general landscape maintenance etc.

Other components of SuDS that have a limited lifespan are the water quality treatment train components. Runoff from roads, hardstandings and driveways contains pollutants such as hydrocarbons and metals and Environment Agency does not generally allow direct discharge of such water to groundwater or surface water without it undergoing treatment to improve its quality.

Treatment systems can include bioretention areas and filter trenches with gravel infill providing filtration and attenuation/ absorption of contaminants, gravel filled cellular systems (think underground milk crates filled with gravel), and in surface water systems reed beds provide a similar function. All have a finite lifespan after which their capacity to remove and retain silt and chemical contaminants is exhausted. Again, many key components of these systems are below ground and not easily and cheaply replaced or regenerated.

Members of the public buying homes on this development will be in complete ignorance of the potential issues as described herein relating to the storm water drainage at the site. They will be at the mercy of the

Management Company set up and probably owned at arms-length by the developer with no tribunal or dispute resolution mechanism.

The developer will be tempted to provide a cheap and cheerful drainage system and pay scant regard for workmanship because the home owners will be obligated to pick up the cost of shortcomings later on.

I urge the LPA (and its consultees LLFA and EA) to not grant discharge of Planning Conditions 25, 26 and 29 until they are completely satisfied that the drainage systems are designed and constructed to a sufficiently high standard and verified as such, so that the owners of properties on this estate are NOT at risk from excessive maintenance costs in the years to come. The LPA is all that stands between homeowners and the likelihood of drainage failures and excessive costs later on down the line.

“No development shall take place until full details of the drainage system for the site have been submitted to and approved in writing by the LPA”.

Full details means precisely that, and the details submitted are far from “full”. The Applicant is being deliberately obscure to avoid LPA, LLFA and EA scrutiny. It is highly questionable whether the scheme proposed is as “sustainable” within the SuDS hierarchy as it should be.

Attenuation is lower down the SuDS hierarchy than infiltration which was the option selected for the outline application. With infiltration abandoned the development is not as “sustainable” as the development consented under the outline application. The Developer is “chipping away” at the undertakings made in order to obtain consent.

Management of runoff at source is a key component of SuDS and there is no mention of rainwater harvesting, green roofs, sub-base storage under driveways etc within individual plots. It looks like a minimum cost scheme to me.

Some examples of missing “details” are given below. It is not an exhaustive list. I would expect the LLFA to go through it in detail.

- Full details of the flow control device at the outfall from the attenuation basin are not provided.
- The 1 in 20 year fluvial flood level is about 34.9m AOD (SMA FRA 2022 Rev 4). The invert level of the outfall from the basin at the flow control device is 33.95m AOD. From this it is clear the basin cannot drain properly, and run-off water will back up in the basin even during modest flood events in the River Loddon. Adequate storage volume needs to be provided in the basin and other detention features above the 1 in 100 year +40% CC fluvial flood level, for the design rainfall events, and it is by no means clear to me from the calculations provided that this is the case. The LLFA need to check the calculations provided carefully. An allowance is required for siltation and loss of storage volume in the below ground and unseen elements of the detention system.
- Driveway and Road Runoff contains pollutants and such runoff should not be discharged to surface water without treatment. From Appendix F Drainage Strategy Drawing it shows drainage from some parts of the development is directed via bioretention areas or swales, however large parts of the site drain directly into the attenuation basin and no treatment train is shown in the basin. My experience is that Environment Agency (EA) will not accept this. I would have expected to see cellular treatment features below driveways and roads, a pre-treatment and a treatment train. It is all in the SuDS Manual. The Applicant has not provided adequate detail. Full design detail and justification is required.
- The offline attenuation crates proposed do not allow for any treatment (except sediment settlement) and this is a missed opportunity. One has to question how rapidly sediment will build up, how easy it will be to remove sediment from inside the crates and the costs of doing this to be borne by the homeowners.

- The Applicant has not provided any design details as to how impermeable membrane linings will be protected from the effects of upward high groundwater pressure. Calculations, cross sections and detailed engineering design of these features including how the lining will be held down against groundwater pressure need to be provided. How will the membrane be tied into the ground at its edges, sealed around pipework etc?
- I would expect to see long sections along the drainage runs and typical design detail drawings for the offline attenuation crates, berms, manholes, gullies, intakes, headwalls and outfalls etc. Also hydrocarbon interceptor details (none shown on drawing).
- The Applicant has not provided any details of the Construction Quality Assurance (CQA) procedures that will be put in place for the liner systems used. A CQA plan and a verification plan is required to address site preparation, membrane welding, sealing around edges and pipework, testing by certified operatives, surcharge installation etc and including a verification report for WBC building control that shows these essential components of the drainage scheme have been installed as designed.
- Whilst some treatment is possible via the bioretention areas and swales, no details are provided as to the assumed pollutant load in the runoff, the % clean-up than can be expected via these features, their life span before any treatment capacity is used up, long term renewal obligations, and so on. The Applicant has not demonstrated treatment /cleanup meets an acceptable standard for discharge into watercourse.
- There are permanent and temporary wet areas, but no information has been given as to the measures that will be put in place to protect members of the public in respect of water safety. It seems unlikely that any opportunity for recreational use of these areas has been taken up.

6.0 CONDITION 29 (SMA Page 5)

29. The layout of the development site and the drainage system should be designed so that natural low-lying areas and overland conveyance pathways are used to manage surface runoff, where appropriate, where they do not pose an unacceptable risk to the new developments or downstream areas/ elsewhere. Where run-off from off-site sources is drained together with the site run-off, the contributing catchment should be modelled as part of the drainage system to take full account of additional flows.

6.1. The basin is proposed at the low point of the site, with exceedance and overland flow routes being directed towards the low point, away from the development. Exceedance flow routes will only be used during exceedance flood events. See Appendix H for the exceedance flow routes.

Paragraph 6.1 above is the Applicant's only response to planning Condition 29. The Applicant has not addressed the final sentence of Condition 29 in respect of off site sources of runoff. Evidence is required that runoff from off site sources is included in the drainage design, or evidence is required that there are no off site areas draining via the site.

Therefore, based on the above I object to the discharge of Conditions 25, 26 and 29.