Technical Memorandum: Review of HIA for Development of Land at Eastfield, Submitted by Banks Group Ltd for Planning Application 2025/60/92776/E.

To: Louise Bearcroft, Kirklees Planning Department
From: Chartered Hydrogeologist on behalf of Shepley Spring Ltd
Date: November 6th, 2025
Subject: Review of hydrogeological impact assessment for proposed residential development

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1 Executive Summary

Shepley Spring Ltd objects to planning application **2025/60/92776/E** for land at Eastfield and requests refusal, or suspension of determination until a full, site-specific quantitative Hydrogeological Impact Assessment (Q-HIA) is provided.

The submitted Hydrogeological Impact Assessment (HIA) report is a preliminary desk-study that does not meet the requirements of Kirklees Local Plan policies LP34 and LP52 or the Environment Agency's groundwater protection position (notably N7 and N8). The site lies partly within a Source Protection Zone 1 (SPZ1) for licensed drinking-water abstractions serving Shepley Spring; a simple Tier 1 desk study assessment is inadequate for that sensitivity.

The HIA lacks essential site-specific data (baseline groundwater monitoring, aquifer properties, test pumping, operating details of abstraction boreholes) and omits the quantitative numerical groundwater flow and contaminant transport modelling (Tier 3 / DQRA) the EA expects for SPZ1 developments adjacent to commercial abstractions.

The proposed development creates credible source–pathway–receptor linkages to a legally protected, commercially critical groundwater supply abstracted under licence. The aquifer is vulnerable (thin soil cover, fractured Coal Measures), so contaminants and pathogens have limited natural attenuation within the 50-day SPZ1 travel time and within the wider SPZ2 travel time area. Contamination risk is effectively irreversible and could terminate Shepley Spring's operations and cause severe economic consequences.

Granting outline permission on the basis of the current submission would be premature and contrary to the precautionary principle embedded in national policy (NPPF), the EA approach to groundwater protection, and local plan policies requiring no deterioration of groundwater quality. Approving without resolving these critical constraints would be inappropriate for development within the SPZ.

Requested actions and conditions:

- Refuse the application as submitted, or suspend determination until the applicant provides a full, independent, peer-reviewed Q-HIA (including site investigation, baseline monitoring, test pumping, capture-zone delineation and numerical contaminant transport modelling) approved by the Environment Agency.

- If the LPA considers any reduced scheme, require as a minimum that the historic SPZ1 area be designated a permanent, undevelopable exclusion zone prohibiting buildings, deep foundations and any infiltration-based drainage, and that EA sign-off of a detailed DQRA and CEMP be secured before any approval. The existing SPZ1 model uncertainties should also be reviewed with respect to current pumping operations and fracture-flow mechanisms. The precautionary principle must be conservatively applied at all stages.
- Require developer funding for baseline and ongoing sentinel groundwater monitoring, independent review, enforceable action levels and a bond-backed liability for contamination and business interruption.

The current HIA does not demonstrate that the development can avoid unacceptable risk to a statutory protected drinking-water supply. The principle of development cannot be established until the groundwater, and associated business, risks to Shepley Spring's abstraction are demonstrably eliminated through rigorous, quantitative assessment and EA sign-off.

2 Position of Shepley Spring

2.1 Introduction

Shepley Spring Ltd is a producer of both bottled Spring Water and recognised Natural Mineral Water with a nationwide distribution to most major UK supermarkets. Under the Natural Mineral Water, Spring Water and Bottled Drinking Water (England) Regulations 2007, there is a statutory requirement that the water source is protected from all risk of pollution and strict conditions are established for the operator (especially so for recognised Natural Mineral Waters such as their Ice Valley brand).

Under the Food Safety Act 1990 and EU Regulation 178/2002 (retained in UK law), water used as an ingredient in food production is subject to food safety requirements. Shepley Spring operates under Food Standards Agency oversight as a food business operator (FBO). Any contamination of the water source creates not only a commercial risk but potential liability under food safety legislation if contaminated product reaches consumers.

Pristine groundwater is abstracted under licence from a vulnerable aquifer resource via boreholes located adjacent to the proposed development site. Protection of the source is regulated primarily through the establishment of a source protection zone (SPZ) by the EA. Under EA Position Statement N8, there is a strong presumption against development within SPZ1, with the EA normally objecting in principle to such proposals unless exceptional circumstances are demonstrated and unacceptable risks can be proven to be eliminated. The current SPZ1 area must be considered only as a starting point for risk assessment. There is inherent uncertainty in the SPZ process that may not offer adequate protection to Shepley Spring's source water from residential development, especially considering its status under the Bottled Drinking Water regulations.

Due to the SPZ extending across the development site, and the associated risks to water and the business, the principle of redeveloping agricultural land for housing in the zone is fundamentally unsound. Shepley Spring therefore formally objects to the submitted outline planning

application. The development is incompatible with the protection of a licensed drinking water source located within SPZ1 and is also likely to be incompatible with SPZ2 requirements.

2.2 Key Grounds for Objection

2.2.1 Submission of an Outline Planning Application and Regulatory Conflict

The applicant has submitted an outline planning application, seeking to establish the principle of development with detailed matters reserved. However, for a site with fundamental environmental constraints, the principle cannot be established without resolving those constraints. Case law establishes that environmental assessment cannot be deferred beyond the point where the principle of development is established. Where uncertainty exists about whether a development can be made acceptable, permission in principle should not be granted.

The purpose of outline planning is not to approve developments with unresolved fundamental constraints, hoping they can be resolved later. It is to establish that the site is suitable in principle, with only detailed design matters to be resolved.

The risk to a statutorily protected groundwater resource that supports a significant local employer is unquestionably an unresolved constraint. Deferring the detailed assessment to a later stage is inappropriate because it would mean the Local Planning Authority (LPA) would be granting permission in principle without fully understanding the potential for unacceptable harm.

A decision cannot be made without a full detailed HIA and should be refused at this stage. The submitted HIA is not fit for purpose as a decision-making document for planning determination. It is a desk-study only, lacking site-specific data, quantitative modelling, and robust risk assessment. The deficiencies expose Shepley Spring to significant and unacceptable business risk.

The principle of development in and next to an SPZ1 abstraction is critical. The economic impact on an existing lawful business is a material planning consideration given that the consequence of contamination could be existential to Shepley Spring.

The EA should be consulted on this matter, and their objection should be determinative. We request that, if an application is re-submitted, the LPA mandates the developer prepare a quantitative technical document approved by the Environment Agency (EA) before any consideration of the application proceeds.

Under the national planning framework NPPF[1] (2024), planning decisions must prevent unacceptable water pollution and ensure development is appropriate to the location. National

[1] National Planning Policy Framework (Department for Levelling Up, Housing and Communities, most recently revised December 2024). Ch 2 and Ch15.

guidance (Environment Agency) makes a presumption against most forms of new development within an SPZ1[2] that disturb an aquifer.

The LPA should immediately classify that part of the site within SPZ1 as undevelopable. The EA's Approach to Groundwater Protection (GP3) guidance is clear that development in SPZ1 is high risk. The guidance states that for high-risk activities, a quantitative risk assessment is required. The submitted desk-study HIA does not meet this requirement.

Given the sensitivity of the receptor and the potential for irreversible harm to the groundwater resource, the precautionary principle should be applied. This means that where there is a threat of serious or irreversible damage, a lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. In this case, the 'cost-effective measure' is the undertaking of a comprehensive (Tier 3) HIA before the principle of development is established.

A desk-top qualitative (Tier 1) HIA, full of assumptions and uncertainty, simply does not provide the LPA or the EA with the information they need to make an informed decision. It is not possible to determine whether the proposed development is acceptable on risk grounds, or what mitigation measures might be required, and should therefore be refused.

Additionally, under Article 7.3 of the Water Framework Directive[3], Drinking Water Protected Areas must be given necessary protection 'with the aim of avoiding deterioration in their quality.' Groundwater bodies in England are designated as Drinking Water Protected Areas. This creates an obligation to prevent deterioration and show no unacceptable risk.

2.2.2 Local Plan Policy[4]

Kirklees Local Plan policies on water quality and pollution prevention are well established. Under Local Plan Policy LP52, protection and improvement of environmental quality requires that development proposals do not harm the quality of surface or groundwater resources and must demonstrate that adequate safeguards are in place. It requires that development within Source Protection Zones need to show that risks to water quality are avoided or fully mitigated.

The policy is the cornerstone for protecting surface water and groundwater resources from development proposals in Kirklees. Developments must ensure Source Protection Zones are protected from contamination in line with national guidance.

The proposed development, with a high proportion of the site in SPZ1 and within a few metres of licensed drinking water boreholes that Shepley Spring's business relies on, cannot credibly demonstrate compliance with LP34 and LP52 given the uncertainty of the hydrogeology and the impossibility of guaranteeing attenuation of pollutants within the 50-day travel time. This conflict means the LPA should refuse the application.

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[2] Environment Agency. *The Environment Agency's Approach to Groundwater Protection*. Ref: LIT 7660. Updated 2 October 2023.

[3] Transposed into UK law via the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

[4] Kirklees Council, *Kirklees Local Plan – Strategy and Policies*, adopted 27 February 2019

If the LPA is minded to approve a reduced scheme (excluding the SPZ1 area) after submission of a full, detailed, quantitative HIA, the approval should be conditional upon the successful completion and EA sign-off of a detailed, independent risk assessment and CEMP (Construction Environmental Management Plan).

The HIA report notes (page 7) that 'previous applications within the Shepley Spring SPZ have not been subject to objections,' implying this somehow justifies the current proposal. This is precisely the 'slicing' effect that planning policy seeks to prevent. Each incremental development is presented as individually manageable but cumulatively exceeds the protection capacity of the resource. If this development is approved, future applicants could cite it as precedent, leading to cumulative degradation of the SPZ that no single development assessment captures. The LPA is requested to consider not just this application in isolation, but the strategic implications for groundwater protection across the entire SPZ catchment.

2.2.3 Hydrogeological Risk

The HIA submitted with the application has been critically reviewed to the extent possible within the reduced Consultation period. The results are presented in the assessment matrix appended to this memorandum. Key groundwater risk themes for the proposal are:

- The aquifer is extremely vulnerable to contamination from development (and other land uses) due to it being unconfined, with thin soil cover and extensive fracture networks.
- The flow regime has not been investigated and assessed using standard quantitative techniques and so desk-study assumptions are used in the submitted HIA to develop real-world conclusions and recommendations.
- SPZ1 is delineated based on a 50-day travel time from any point within the zone to the abstraction borehole, as per EA methodology (EA 2019, updated 2024). This timeframe provides minimal natural attenuation capacity for many contaminants, particularly pathogens, which can remain viable for this duration.
- Hydraulic gradients generated within the pumping bore's capture zones have not been assessed. Shepley Spring has not been engaged for technical input to the HIA. In any case they only retain hydrogeology information specific to the operation of their business – not for contaminant fate and transport modelling or infiltration and recharge modelling.

2.2.4 Economic and Public Health Impact

The bottled water regulations that Shepley Spring operates within, severely restricts permitted water treatments, much more so than for public water supply providers, and requires long term chemical stability. Any form of contamination, or even a change in chemical signature, renders supply non-compliant.

If water quality was compromised it would trigger an immediate cessation of bottling operations and a stock recall. Even if only temporary, an event like this can cost the business millions of pounds. The risk to the business is significant – loss of sales, cost of down-time, loss of market share to competitors, damage to the brand.

Unlike surface water pollution, which can often be remediated through source control and natural flushing, groundwater contamination in fractured rock aquifers is effectively permanent. Once contaminants enter the fracture network beneath the site they cannot be physically accessed for removal and natural attenuation timescales are often measured in decades.

The source-pathway-receptor linkage cannot be broken without abandoning the borehole receptor. This irreversibility means the precautionary principle must be applied with maximum rigor. Once contamination occurs, Shepley Spring's business could be finished at this location, with no realistic prospect of restorative remediation or compensation.

With the bottling of raw groundwater for public consumption there is a risk to consumer health if a contaminant enters the water. While Shepley Spring continuously monitors water quality, this is primarily for pathogens potentially introduced outside the aquifer. Harmful compounds such as pesticides and hydrocarbons are less frequently analysed for. Treatment and dilution through blending is not permitted under the Spring Water regulations.

Monitoring detects harm after it has occurred; it does not prevent harm. For Shepley Spring, detection of potential development contamination means the damage is already done. The water is already compromised, and the business is already at risk. Downgradient monitoring provides evidence for litigation but does not protect the business or the consumer.

True mitigation requires prevention of contamination through measures that eliminate pathways. For a site in SPZ1 with fractured rock, and thin soil cover, the only reliable prevention is avoidance.

As the UK's largest independent water bottler, Shepley Spring is a longstanding contributor to the local economy, employing hundreds of people directly and indirectly. Contracts with major retailers, suppliers and distributors are in place and significant capital investment over the years has built an historic local family business into a modern company. It contributes significant business rates and has invested heavily in infrastructure. All this is placed in jeopardy if planning permission for the proposed development is granted.

2.3 Requirements

2.3.1 Comprehensive Hydrogeological Impact Assessment (HIA)

If this project, or a variant of it, is allowed to proceed in the future, to satisfy the LPA and the EA at the outline application stage, the HIA needs to move beyond simple desk studies. The HIA can use the historic SPZ1 delineation data to draw a non-negotiable "Exclusion Zone" on the site plan where no buildings, deep foundations, or drainage will be permitted. This needs to be a quantitative decision based on the location of Shepley Spring's boreholes and calculated travel times. It is probable that after detailed HIA modelling, incorporating Shepley Spring's current pumping regime, the existing SPZ areas may need to be revised outwards to cover more of the site.

The hydrogeological assessment should employ a dual-porosity or discrete fracture network model appropriate for fractured Pennine Coal Measures aquifers. The submitted preliminary

HIA explicitly acknowledges that 'Groundwater storage and movement occur predominantly within and through fractures in the sandstones'. Use of a simple porous media model would:

- Overestimate contaminant travel times
- Underestimate contamination risks from rapid fracture flow
- Produce unreliable particle tracking for capture zone delineation

A suitable numerical model would inform a detailed quantitative risk assessment (DQRA) with site-specific risk criteria.

The original SPZ1 should be revisited and updated based on newly acquired data. The uncertainty inherent in all groundwater studies must be acknowledged. The groundwater capture zone delineation retains uncertainty and thus a precautionary approach is needed from the regulators. This approach requires conservatism be applied to all models, conceptual or numerical.

A technical reviewer should be assigned and needs to be a suitably qualified and independent hydrogeologist, appointed by the LPA.

2.3.2 Safeguards

In theory, a minimum 12-month period of groundwater monitoring would need to be undertaken, with suitably constructed sentinel boreholes installed downgradient of the development. During any construction works there would need to be real-time monitoring. And then an ongoing period of post-construction monitoring for as long as risks to the SPZ remain. Action levels would need to be clearly defined with enforceable response protocols.

However, as mentioned above, monitoring can only detect harm once it has occurred and the aquifer has been compromised. Therefore, most importantly, the developer would need to take on the risk by agreeing to a bond-backed liability for contamination and subsequent business interruption or closure.

3 Conclusions and Recommendations

The proposed outline development, as currently submitted, is unacceptable due to the significant risk it poses to a critically important water resource with a designated Source Protection Zone 1 (SPZ1) and supplying a Spring Water and Natural Mineral Water bottling operation. The application, when considered in light of existential business risks to a neighbouring stakeholder, fails to satisfy the basic requirements for environmental protection under both local and national planning policy.

Based on our review of the submitted ‘preliminary’ HIA and the non-negotiable constraint imposed by the SPZ1, we conclude the following:

- The proposal demonstrates a clear breach of Kirklees Local Plan Policy (Conserving and enhancing the water environment) by failing to demonstrate "no deterioration of... groundwater" and failing to protect the SPZ from contamination.

- The use of a desk-study HIA for a site containing an SPZ1 is inadequate and fails to satisfy the requirement for a robust assessment, directly contravening Environment Agency (EA) guidance and the principles of the NPPF.
- A decision regarding the principal of development cannot be correctly made based on the submission.

We formally request the Local Planning Authority (LPA) refuse the application on the grounds that the unmitigated environmental and economic risks associated with the SPZ1 breach Local Plan Policy LP52 and the overarching requirements of the NPPF.

Should the LPA be minded to proceed, we strongly request the application determination be suspended until the applicant provides a full, site-specific, quantitative Hydrogeological Impact Assessment (HIA), independently verified and approved by the Environment Agency.

Any future approval should be subject to a strict condition that the entire SPZ1 boundary area is designated as a permanent, undevelopable exclusion zone, prohibiting all building, excavation, and the routing of any foul or infiltration-based surface water drainage (SuDS). The LPA is also requested to obtain the EA's SPZ derivation.

In summary, the principle of development cannot be established until the risk to the vulnerable water resource, and thus Shepley Spring's business, is demonstrably eliminated. The current application fails to meet this essential safeguard and should not be permitted.

Yours faithfully,

THE GEOLOGICAL SOCIETY
CGeol
CHARTERED GEOLOGIST
Fellow No. 1005378

Comment #	Reference Section #	HIA Deficiency	Shepley Spring Comment	Shepley Spring Recommendation
1	Executive Summary	Initial hydrogeological impact assessment	The HIA is a preliminary document and not suitable for the LPA and EA to make a decision with. The principle of development cannot be granted in this case with unresolved environmental constraints	A detailed HIA, with associated investigation and assessment work needs to be undertaken prior to outline planning permission being granted. The scope of the HIA should be established by the EA with input from Shepley Spring and should be a Tier 3 assessment.
2	Executive Summary	The HIA to be used to assess hydrogeological impacts.	Impacts have only been assessed in a qualitative way using desk-study data. Given receptor sensitivity, the assessment needs to be much more rigorous.	A detailed quantitative risk assessment is required for this project, to inform a decision by the LPA.
3	Executive Summary	No site specific information made available by Shepley Spring	No request for technical data has been made to Shepley Spring. "The HIA is a high-level assessment based on numerous assumptions."	A detailed scope of work should be prepared by Banks for a revised HIA. This should be approved by the EA and Shepley Spring approached for comment. Shepley Spring are willing to share some technical information but much of what is required will need to be obtained by Banks through their own investigations.
4	Executive Summary	Assessment risk conclusions are not robust, and based on assumptions	The reason for the wide range of risk is presented as being "due to the current unknowns" and can be refined when they are in "receipt of further information about the Shepley Spring water resource source receptor". There is no mention of how this further information will be obtained.	The statement implies that Banks' technical team are not expecting to actively investigate and assess the impacts through their own studies and that remaining uncertainty will be resolved by Shepley Spring sharing data. The reality is that significant detailed assessment work by Banks is needed before any decision regarding planning is made.
5	1.1	Insufficient information provided	The HIA recognises the sensitivity of borehole receptors and requirement for no credible technical objections. But does not present data to resolve objections	As above, a more detailed HIA is required.
6	1.1	References previous applications	This is irrelevant and seeks to introduce the 'salami-slicing' approach to development.	The focus should be on the current proposal but with consideration of the wider impact to the aquifer from other developments. Banks are encourage to broaden the assessment to include these if they wish.
7	1.1	No robust risk assessment	The HIA acknowledges that a "robust risk assessment" is required, but doesn't provide one.	The robust risk assessment is critical for a decision to be made regarding outline planning.
8	1.2	Scope is too small	A preliminary desk study is not appropriate as a HIA for development in a SPZ1 area.	As above, a more detailed HIA is required.
9	1.5	No ground investigation works	The HIA should discuss the investigation works undertaken by Banks	Agree a detailed scope of work with the EA and with Shepley Spring input
10	1.5	Reliance on Shepley Spring studies	The HIA incorrectly states that "Shepley Spring has conducted their own internal HIA study for this proposal" and that the results were not made available. No such study has been undertaken and no request for technical data has been made.	Shepley Spring are keen to review and agree to future detailed HIA findings and will primarily work with the EA in this regard. They are able to share some operational information regarding the borehole receptors. However, the onus is on Banks to perform their own HIA suitable for the project and not rely on Shepley Spring to do it for them.
11	1.5	Reliance on Shepley Spring website	The HIA should not use marketing material to inform it.	Shepley Spring operates three sites in Yorkshire, two of them both draw from the Carboniferous Coal Measures using multiple bores. The target formations need to be confirmed and Shepley Spring can assist if needed. The precautionary principal should be enforced where there isn't certainty.
12	1.5	Assumption there will be no change in the hydrochemical regime	This is a critical uncertainty that must be resolved.	Any change would likely impact Shepley Spring who operate under strict regulations related to Spring Water and Natural Mineral Water bottling. A change in hydrochemistry could jeopardise the business.
13	1.5	Impacts to water levels and flow regime have not been quantified	An assessment is critical to the operation of the borehole receptors.	Quantitative modelling is required, with pre and post development monitoring.
14	1.5	No site visit undertaken	The HIA states all data obtained via desk study	The HIA is not fit for purpose to inform the LPA in making a decision and planning should be refused.
15	1.5	The conceptual model will be updated after future intrusive investigations.	A full investigation is required prior to the principle of planning being considered.	The HIA is not fit for purpose to inform the LPA in making a decision and planning should be refused.
16	1.5	The HIA can be updated with information from the EA and Shepley Spring	Updates are likely to be marginal based on this data and wont resolve the uncertainty. No request for data has been made to Shepley Spring.	A fully scoped detailed HIA plan, including data requirements, should be prepared for EA review and comment from Shepley Spring at this outline stage.
17	1.5	SPZ uncertainty	The SPZ is a critical factor and needs thorough investigation. SPZ2, as well as SPZ1, needs assessment.	The SPZ should only be considered a starting point. It's initial development is based on historic data and will likely need refinement. A suitable numerical model is required for this
18	1.6	Insufficient consultation	Shepley Spring were not approached to inform the HIA scope and process, nor to share their own risk assessment work. No evidence of a request is cited in the HIA.	Shepley Spring did not "decline" to be engaged on technical matters. Also, any of their own assessment work would not have been done to inform impacts from a housing development. Banks need to commission their own project-specific studies.

19	2.1	Assessment of seriousness of consequences to receptors	The HIA recognises that the EA may object and that the precautionary principle should be adopted. But feasible "serious or irreversible" consequences are not discussed.	The HIA should present the potential existential business risk to Shepley Spring from impacts to their groundwater supply.
20	2.2	Omission of key regulations	Key relevant regulations are: The Natural Mineral Water, Spring Water and Bottled Drinking Water (England) Regulations 2007, as amended.	The strict regulations that Shepley Spring operates under should be explicitly considered and referenced in any HIA. They are material to the sensitivity of the borehole receptors.
21	2.4	Key EA guidance is presented but is not satisfied by the submitted HIA	The HIA does not meet the requirements of the guidance that is presented within it.	The HIA is not fit for purpose to inform the LPA in making a decision and planning should be refused on this basis. The SPZ is "an initial screening tool" and more detailed assessment is essential.
22	2.7	Incomplete discussion of safeguard zones and SPZs	The EA is resource-limited to the extent that they will sometimes request an SPZ is delineated by the groundwater user themselves. Safeguard zones do not necessarily account for the lack of treatment allowed for Spring Water definition.	The HIA should review the SPZ as part of a detailed assessment of risk. The HIA, as a whole, needs to account for potential impacts to Shepley Spring's ongoing operation as a business.
23	3.1	Relevance of historic planning applications	It is not known if the LPA approached the EA regarding the referenced application, to discharge their statutory duties. Shepley Spring were not made aware of it.	Past planning decisions are not considered relevant to this application. Past LPA decisions have no bearing on the need for Bank Group to fully account for impacts from their proposed development.
24	3.2	Data sources cited are insufficient for preparing a robust HIA	A desk study HIA does not meet the requirements needed to assess potential impacts to Shepley Spring as a water user.	A more detailed, quantitative HIA is required before any planning decision is made.
25	3.7	Generalised geological interpretation	As a desk study the HIA relies on lithological interpretations made by third party non-specialists such as drilling crews. BGS descriptions are regional generalisations.	A more detailed, quantitative HIA is required before any planning decision is made.
26	3.7	Poor recognition of structural controls on groundwater flow and resulting increase in uncertainty	HIA states that "faulting within the study area is complex" but does not discuss the implications.	A more detailed, quantitative HIA is required before any planning decision is made.
27	Figure 3.3	Only a regional geological sequence is presented	The regional sequence interpreted by the British Geological Survey provides limited data for a site-specific HIA.	A more detailed, quantitative HIA is required before any planning decision is made.
28	3.8	Hydrogeology of fractured rock insufficiently assessed	The HIA recognises the importance of fracture flow in the aquifer. However, this section of the report does not resolve the high importance of fracture flow on the overall risk posed by the development.	A more detailed, quantitative HIA is required before any planning decision is made. Conclusions made in the existing HIA are based on regional studies only.
29	3.9	Recharge poorly assessed	HIA mentions poor aquifer properties and declining yields.	The aquifer has sustainably supplied Shepley Spring's licensed abstraction needs for decades. This is an important consideration. Tests using an infiltrometer are required to properly assess localised recharge.
30	3.9	No citations	Descriptions of formation properties are given without any references.	Reference data sources and acknowledge deficiencies of a desk study.
31	3.9	Aquifer properties are not site specific	Huge range in hydraulic conductivity given that is incompatible with assessing receptor sensitivity	Site-specific testing is needed to calculate hydraulic conductivity and reduce down the presented range, which spans five orders of magnitude.
32	3.9	No site groundwater levels given	Only a general discussion on regional piezometry is presented, using level data decades old. The HIA states the data presented "may not be a reliable indicator" of conditions.	A period of groundwater monitoring is required to develop a conceptual understanding of the local regime. This needs to account for the influence of phased pumping by Shepley Spring.
33	Figure 3.4	Figure not clear	The figure is unclear and cannot be reviewed	Provide a clear figure
34	3.9	No discussion of groundwater quality importance to Shepley Spring	No local groundwater quality data was collected. Baseline monitoring is essential as is recognition of regulations around Natural Mineral Waters	A more detailed, quantitative HIA is required before any planning decision is made.
35	3.10	Black Shale formation described as a confining layer	This has not been established by Banks through investigative work and is an assumption.	A more detailed, quantitative HIA is required before any planning decision is made.
36	4.1	The outline plan is given to set the principle of development	A decision on the principle of development cannot be made at this stage given the vulnerability of groundwater users within a SPZ1	A more detailed, quantitative HIA is required before any planning decision is made.
37	4.2	Not all impact sources captured	Disturbance of the aquifer from excavation and altered recharge is not discussed	Impacts to raw water mineral signature are an impact to Shepley Spring and should be assessed. Excavations "up to 5 meters" are mentioned and need further discussion as a risk.

38	4.3	Aquifer described as having poor aquifer properties	This doesn't fit with local abstractions nor the formation's status with Secondary A designation.	The aquifer properties are good enough to support local abstractions in the long term.
39	4.3	All pathway inferences are speculative	A detailed investigation is required.	A more detailed, quantitative HIA is required before any planning decision is made.
40	4.4	Receptors not fully recognised	Shepley Spring's abstraction described as "a valuable drinking water abstraction which requires protection". However, it is not just a drinking water source. It has Natural Mineral Water recognition.	The risk of, and significance of, pollution needs to consider the regulations for bottling Spring Water and Natural Mineral Water, and associated impacts to Shepley Spring.
41	4.4	Downgradient abstraction licenses scoped out of study	Inferred faulting and lack of SPZ given as reason not to consider downgradient bores in assessment	These should not be ruled out before more detailed HIA (with numerical modelling) is submitted.
42	4.5	The conceptual model is not sufficiently rigorous	The CSM is based on a desk study, with no suitable fieldwork or even a site visit by the HIA authors.	A more detailed, quantitative HIA is required before any planning decision is made.
43	4.5	The geology is not sufficiently understood	The wording is speculative and full of assumptions, as expected in a desk study	A more detailed, quantitative HIA is required before any planning decision is made.
44	4.5	Coal mining impacts are unknown	Mine entrances identified 50m from the site and not assessed. Only that "historic mining activity could be confirmed during GI works"	Coal mining could significantly affect the groundwater flow regime but has not been investigated.
45	4.5	Recharge is not understood at a local scale	the HIA needs a more detailed understanding of recharge to assess future impacts.	A more detailed, quantitative HIA is required before any planning decision is made.
46	4.5	Current groundwater levels are unknown	The HIA states "It is difficult to make any interpretations on groundwater levels due to the sparse and historical nature of the data". And that "there is much uncertainty and likely complexity regarding vertical variations in groundwater levels and associated hydraulic gradients with depth."	Time-series water level data is needed, as is an understanding of horizontal and vertical hydraulic gradients in the context of aquifer recharge, flow regime and the operation of Shepley Spring's bores.
47	4.5	There is poor understanding of groundwater flow.	No groundwater contour map has been drawn. No account of abstractions affecting flows has been assessed. Only that Shepley Spring's boreholes may "change the local hydrogeological flow regime"	A dynamic groundwater flow model needs to be developed and run for different pumping scenarios.
48	4.5	Limited discussion of groundwater quality vulnerability.	Lack of superficial cover and historic mining is mentioned as making the aquifer highly vulnerable. This should be emphasised more in terms of perpetual risks to water quality from a housing development.	A more detailed, quantitative HIA is required before any planning decision is made.
49	4.5	SPZ discussion uses earlier assumptions as facts	The Pennine Lower Coal Measures are described as offering protection to the aquifer but without supporting data.	A more detailed, quantitative HIA is required before any planning decision is made.
50	4.5	Uncertainty regarding source rock for Shepley Spring.	The aquifer versus aquitard properties of the formation bands has not been investigated. The jointing and fracturing has not been assessed. The supply bores are of different depths and supply different brands.	A more detailed, quantitative HIA is required before any planning decision is made. It is not right to suggest that "the depth of the source abstraction zone is to be confirmed during the determination period"
51	4.5	Mentions "suggestive correspondence with Shepley Spring regarding the capabilities of the Black Shale acting as a hydraulic barrier".	This is disputed.	Provide a reference regarding this correspondence.
52	4.5	Uses consent of other applications to suggest Shepley Spring not concerned.	Shepley Spring are extremely concerned about the proposed development, this should not be underestimated.	Each planning application must be determined on its own merits and demonstrate that the scheme's impacts are acceptable.
53	Figure 4-5	Illegible	The source pathway receptor conceptualisation cannot be read	Provide a clear version, and one that is sufficiently detailed and robust for LPA decision-making
54	5.1	Not quantitative	The approach is to indicate that a more robust HIA might be prepared at a future date	Risk linkages have not been assessed and need to be as they are critical to the impact assessment
55	5.1	States that Shepley Spring declined discussions regarding risk mitigation	This is disputed, no approach was made.	It is disingenuous to imply Shepley Spring would not engage. However, given the severity of potential impact to the business from the scheme, the preferred mitigation is avoidance of land development.

56	5.2	Dual porosity system poorly assessed	Rapid fracture pathways are recognised in the HIA as the primary source of water to the boreholes. But then matrix porosity is used as an argument for natural attenuation of dissolved contaminants.	The HIA is a speculative desk study and not fit for purpose.
57	5.3	Significant risks are identified but not sufficiently assessed	The risks identified in this section pose an existential risk to Shepley Spring's business.	Given the highly sensitive nature of the receptors, a more detailed, quantitative HIA is required before any planning decision is made.
58	5.4	Mitigation measures are stated to be "supported by the detailed hydrogeological conceptual model"	The conceptual model is a desk study using data from the internet.	The proposed measures rely on administrative or engineering controls. Many of which are given as the responsibility of builders and future homeowners (e.g. "environmental awareness training for site workers" and "The use of pesticides/ herbicides and fertilisers should be kept to a minimum or not allowed in order to avoid contamination of the aquifer"). Mitigation measures cannot be fully assessed until the risks are better understood. None of this section of the HIA gives comfort that Shepley Spring's business will not be put at significant risk.
59	5.4	It is not clear if drainage is or is not to be allowed to infiltrate into the aquifer	No changes to the existing groundwater chemistry should be allowed.	Physical and chemical disturbance of the local aquifer poses a significant risk to Shepley Spring's lawful abstraction and bottling of raw groundwater.
60	5.4	The establishment of site-specific trigger levels are mentioned as a mitigation measure	This measure needs considerable assessment to avoid being tokenistic. There is no detail regarding a groundwater monitoring and remediation scheme.	Monitoring identifies an impact after it has occurred. Any impact to Shepley Spring's water supply could be catastrophic.
61	5.5	The risk matrix is not comprehensive enough	The impact magnitude thresholds are generic and do not account for the local conditions, namely the risk to Shepley Spring.	No planning decision should be made until a revised risk matrix is completed after a Tier 3 detailed quantitative HIA including numerical modelling.
62	5.7	All risk results are qualitative and subjective and not sufficient for this scheme	A desk study risk assessment of this type is inappropriate given the significance of potential impacts.	A more detailed, quantitative HIA is required before any planning decision is made.
63	Table 5-7	Residual risks arbitrarily given	Many risks are discounted as negligible after mitigation, despite high sensitivity.	A detailed quantitative risk assessment is required for this project, to inform a decision by the LPA and allow Shepley Spring and the EA to comment fully.
64	6	Conclusions and recommendations section heavily emphasises the reliance on future assessment during the determination period	The purpose of outline planning is not to approve developments with unresolved fundamental constraints, hoping they can be resolved later. It is to establish that the site is suitable in principle, with only detailed design matters to be resolved	Where uncertainty exists about whether a development can be made acceptable, as with this scheme, permission in principle should not be granted. A desk study HIA is not appropriate for the potential consequences of groundwater impacts.