APPENDIX 1 : NICHOLLS AL100 REPORT

Borehole Water Neutrality Report
Design & Maintenance Supporting Detail
Limekiln Farm, Copsale

13th February 2023

Contents

1 INTRODUCTION

This report has been produced by Nicholls. The purpose of the document is to provide preliminary evidence in conjunction with an application for an Environment Agency Water Abstraction Licence for the land at Limekiln Farm, Copsale . This report in conjunction with the issue of a licence by the Environment Agency will prove beyond 'reasonable doubt' that the proposed borehole solution will meet Water Neutrality requirements.

It is proposed that Water Neutrality will be achieved via a private borehole. A detailed Prognosis report for a borehole at Limekiln Farm, Copsale was produced in January 2023 and will be subsequently submitted to Horsham District Council. This report seeks to demonstrate the design process and shows the likely end design that this site will need. This is based on knowledge of existing borehole extractions that exist within 5km of the site.

A decision has been taken to apply for an Environment Agency Water Abstraction Licence as part of the development for Water Neutrality. This will deliver all aspects of the regulatory regime and prove 'beyond all reasonable doubt' that the development site is water neutral.

The site will also be afforded the protected rights abstractor status from the Environment Agency licence regime, ensuring its sustainability and longevity.

2 ACHIEVING NEUTRALITY VIA A PRIVATE BOREHOLE

The borehole is designed to serve the use in an equine stable and a potable alternative without using mains water and thus being "neutral" has been investigated at a high level with local geologists and in detail with Nicholls Boreholes.

BOREHOLE INDEPENDENCE FROM THE 'AT RISK SUSSEX GROUNDWATER AQUIFERS'

"Due to the distance from the intended site it is considered very unlikely that a radius of influence due to well drawdown could extend to the St Leonards Forest, St Leonards Park Ponds and the Hardham designated sites. Further to this, the Hardham designated sites are underlain by a separate geological formation than that of the intended site and therefore the protected area draws groundwater from separate aquifer units than those targeted by the proposed borehole which are hydraulically disconnected." Ref: WSP Borehole Prognosis Report - LIME KILN FARM, BROADWATER LANE, COPSALE, RH13 6QW, January 2023, Report Reference: 62241301/ 001 / R340 version A (attached)

3 Borehole Prognosis Report

Nicholls requested a prognosis report from a panel of expert geologists which concluded that water availability should be adequate. This was followed by a Water Diviner to pinpoint a drilling location. However, until a borehole is drilled this can never be guaranteed. The report also concluded that the water quality, with the aid of treatment processes is likely to be suitable for the intended use (potable). Nicholls recommend water quality sampling is undertaken to ensure that the water quality is suitable for the intended use.

However, the exact treatment design will not be known until water quality sampling is undertaken.

Prognosis Report Attached

4 Borehole Design Approach

The first element of any borehole design requires an understanding of the local geology and the potential for a sustainable supply of water. This has been achieved by commissioning a prognosis report alongside Nicholls local knowledge and indicative information from existing boreholes that were drilled and continued to be supported by Nicholls for ongoing servicing and testing.

Design Considerations

Consideration has been given to the physical construction of the boreholes to best suit the geology and the expected water quality. The boreholes will be UVPC lined with 125mm screen and casing. This casing will be surrounded by a washed and graded shingle, gravel pack that forms a pre filter to hold the anulus open and stable. The top section of the boreholes will be sealed to a depth of 40m below ground level using a borehole grade bentonite which will form an impervious seal, so protecting the source from unconfined ground water in the upper geology.

The well head will be raised above the surrounding ground level to protect against surface run off or accidental spillage. Access to the well head will be protected and secured by a lockable and insulated cover.

Water Treatment

Water treatment will be designed around the expected quality (using data from local boreholes) and may be subject to some changes when the specific water chemistry from the site is known via sampling. The filtration will be, wherever possible, specified to utilise inert media, with the need to introduce secondary products to a minimum. The entire system will be stress tested and commissioned before going into service with group A & B testing used to prove efficacy.

Service and Maintenance

The service and maintenance of a water treatment plant is critical to the safety of the consumer, to that end, Nicholls will ensure that there is an appropriate testing

regime, based on the risk assessment carried out once drilling has taken place. Once the risk assessment is completed the correct service and maintenance plan will be implemented.

Nicholls will provide the necessary Water Safety Plan, Emergency Plan and would fill the role of specialist contractor, providing technical support and reactive call outs, as well as planned maintenance.

Licence Compliance

Nicholls will undertake the Environment Agency Licence Compliance regulatory activities on behalf of the client.

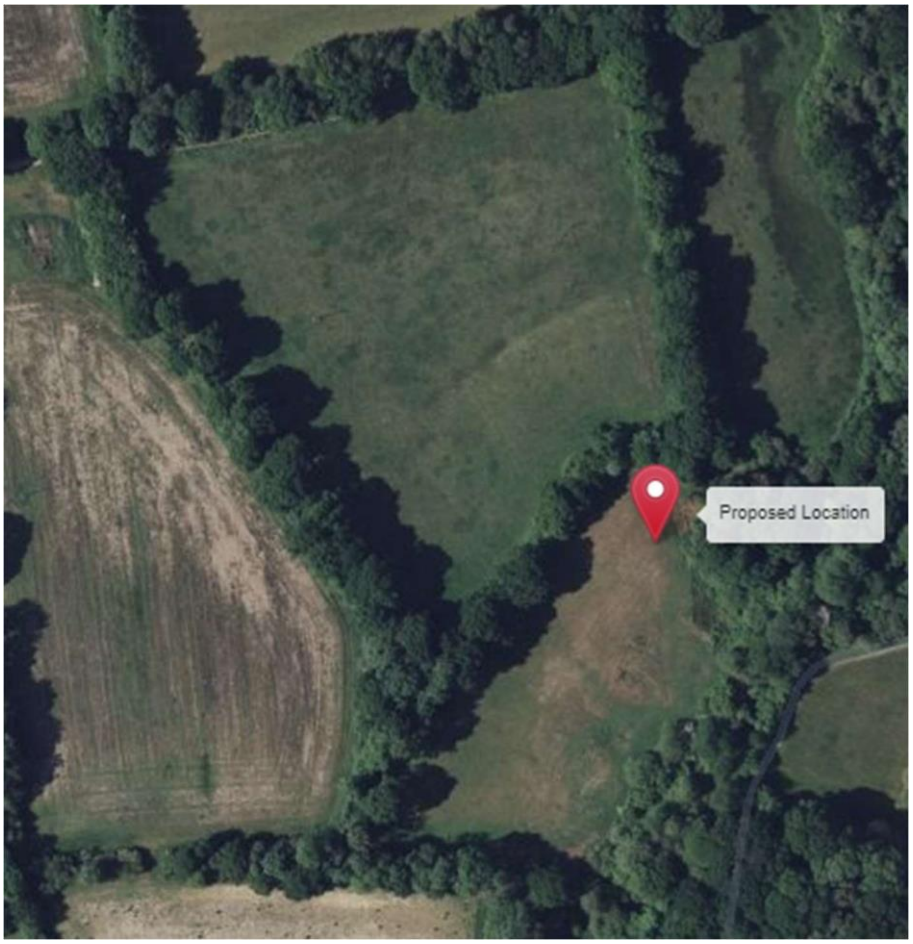
Treatment and Plant Room

The system will be housed in the designated machine room within the barn, laid out internally to ensure clear access is available to service and maintain all parts. Sample points will be included to ensure quality monitoring and testing can be achieved efficiently. Consideration will be given with the layout to store consumables and spare parts of the system so ensuring it can be efficiently maintained.

Visual warnings will be included in the design to alert the consumer to a system breakdown, this is particularly relevant to the Ultraviolet treatment, which ensures any bacteria in the water is neutralised. The borehole panel will have visual alarms. A borehole pump failure alarm would also be mounted on the outside of the plant room.

5 Borehole Proposed Location

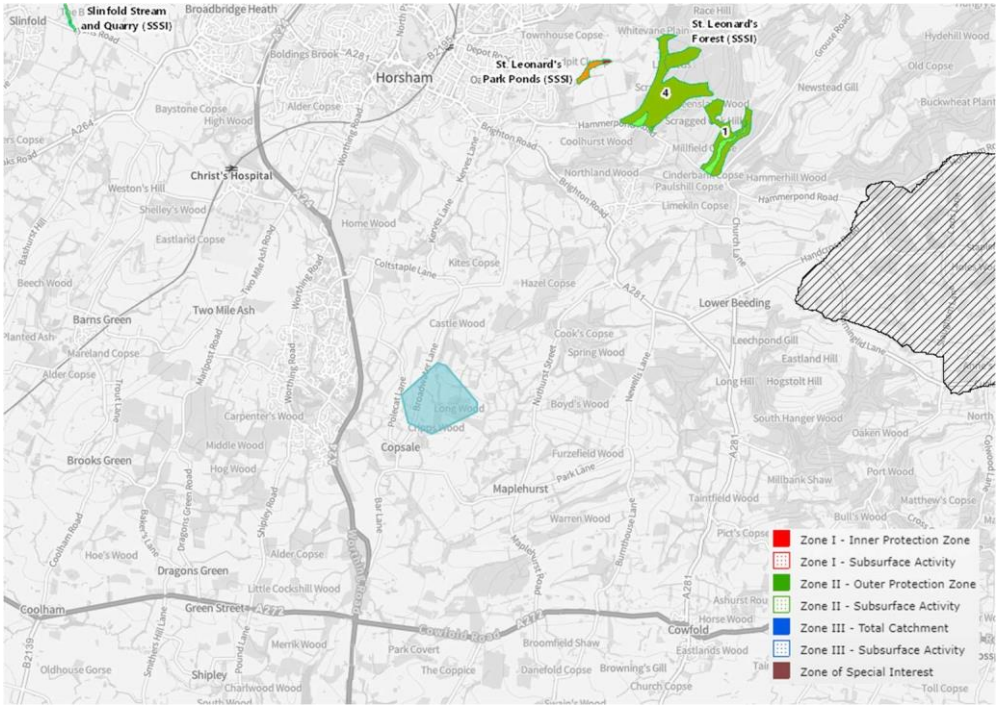
The exact location of the borehole is to be confirmed, however, it is proposed to be situated in the location shown below, with easy access for the treatment room for maintenance and testing.



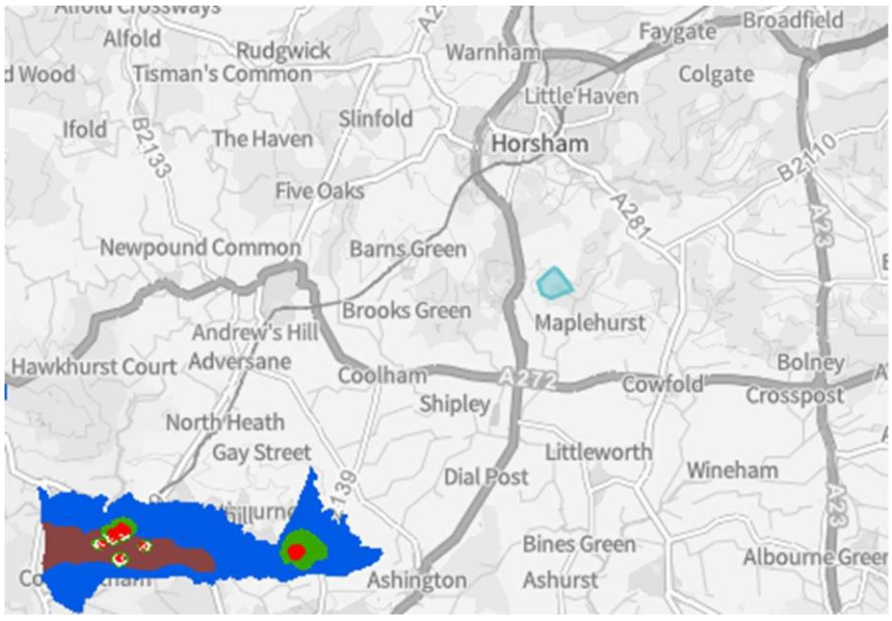
Grid Ref: TQ 18833 25860

6 Source Protection Zones

Upon issue of the Environment Agency Water Abstraction Licence the Limekiln Farm site will be become a "protected rights abstractor" and therefore will enjoy all the protections available from the Environment Agency regarding its abstraction under the regulated licence regime. This includes protection from other potential abstractors and discharges. Limekiln Farm site will also become a Source Protection Zone.



Closest SSSI site – 5km



Closest SPZ site – 12.27km

7 SERVICE AND MAINTENANCE SCHEDULE

An exact service and maintenance schedule that is specifically tailored to this borehole will be commissioned as part of the ongoing contract. The below is a reasonable expected schedule for a site such as this and will need to be updated to a formal Method Statement, post drilling and borehole commissioning.

In addition to the below regular maintenance routine Nicholls would be available for reactive maintenance and emergency attendance if required.

Working drawings, plant & equipment manuals, service details and contact numbers would be available within the plant room as part of the Water Safety Plan.

Sacrificial medias, essential equipment spares and a spare borehole pump would be stored within the plant room.

Booster set to be 'duty assist' so giving redundancy in the event of a breakdown. 6 monthly

- Electrical Testing on borehole pump, booster set and shunt pump
- Visual check on particulate filter (replace if necessary)
- Visual check on Ultraviolet & Media filters
- Visual check on compressors and contact tank
- Visual check on storage tank
- Dip sacrificial medias and top up as necessary (PH correction)
- Interim water test (targeted to ensure filter efficacy)
- EHO testing (suite to be as EHO instruction, minimum Group A) Annual

- Electrical testing on borehole pump, booster set and shunt pump
- Replace particulate filter
- Replace all ultraviolet lamps, quartz tubes and seal kits
- Clean contact tank and main storage tank
- Replace seal stack and pistons on filter heads
- Replace seal kits on the compressors
- Dip sacrificial medias and top up as necessary (PH Correction)
- Interim water test (target to ensure filter efficacy)
- EHO testing (suite to be as EHO instruction, minimum Group A) Bi-Annual

- If required, chemical flush of the borehole, down the hole screens, borehole pump and connecting pipework (to clean expected deposits).

5 Yearly

- Replace filter medias.

8 Long Term Accountability and Responsibility

During construction, accountability and responsibility for the borehole and water quality will sit with Nicholls. However, once construction is completed it will be the responsibility of the owner of Limekiln Farm for access and service and to instruct Nicholls to carry out the maintenance regime, repairs, testing and servicing for the borehole in perpetuity under a maintenance contract.

APPENDIX 2 : NICHOLLS PROGNOSIS REPORT

BOREHOLE PROGNOSIS REPOR

LIME KILN FARM, BROADWATER LANE, COPSALE, RH13 6QW

BOREHOLE FEASIBILITY ASSESSMENT

JANUARY 2023

NICHOLLS
LICENSING & CONSULTING

KINGS ORCHARD, 1 QUEEN STREET, BRISTOL BS2 0HQ

TEL: 0117 930 6200

DOCUMENT CONTROL SHEET

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A	FINAL	Eleanor O'Neill 20/12/2022	George Bateman 23/12/2022	Thomas Eckhardt 06/01/2023

Distribution

ORGANISATION	CONTACT	FORMAT	COPIES
Nicholls Boreholes	Tracie Anderson	PDF (e)	1

LIMITATIONS

This report is presented to Nicholls Boreholes with respect to the Borehole Feasibility Assessment for Lime Kiln Farm, Broadwater Lane, Copsale, RH13 6QW and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this Report.

Notwithstanding anything to the contrary contained in the report, WSP UK (WSP) is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Nicholls Boreholes, and WSP shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This report has been prepared by WSP. No individual is personally liable in connection with the preparation of this report. By receiving this report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

WSP has used reasonable skill, care and diligence in the design and interpretation of the ground investigation, however, the inherent variability of ground conditions allows only definition of the actual conditions at the location and depths of exploratory holes and samples/tests therefrom, while at intermediate locations conditions can only be inferred.

New information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

SUMMARY

A borehole prognosis has been completed, for a site located at Lime Kiln Farm, Broadwater Lane, Copsale, RH13 6QW. The prognosis has concluded that:

- Local borehole records indicate the water quality at the intended site may be elevated in Iron and Manganese and therefore is likely to be unsuitable for potable uses without treatment. However, the water quality may be suitable for irrigation.
- If the client would like to proceed then a borehole, drilled into the Upper Tunbridge Wells Sand Formation, to a depth of approximately 40 mbgl should be sufficient to provide a water supply of up to 25 m^3/d.
- The available data suggests a rest water level might be observed at a depth of 34 to 26 mAOD or 2 to 10 mbgl.

PROJECT RISKS

WSP expect the strata to be stable and the strata to be confined where overlain by the Weald Clay Formation. Artesian conditions were recorded at one borehole (TQ12SE20) located 1.6 km south of the intended site; therefore, there is a chance that artesian conditions may be encountered at the intended site. No regional groundwater abstractions are in place which may affect overall water pressures in the aquifer.

The Tunbridge Wells Sand Formation is a multi-layered aquifer of sandstones and limestones separated by clays; where low permeability clays are present above productive strata (sandstones and limestones) there will likely be some protection against the downward migration of pollutants. The driller should be aware that the success of a borehole in this formation will be dependent on intercepting productive layers of sufficient thickness. Though no siltation issues have been recorded on locally referenced logs, there is a potential risk of fines ingress into the well due to the sandy composition of the aquifer. The ingress of fines into the well can be largely managed with a suitable sand filter pack.

Water analysis results from two local boreholes (TQ22NW3 and TQ12NE113) indicate elevated iron and manganese levels (indicating water quality and risk of clogging issues), therefore the borehole design will need to consider minimising contact between the groundwater and the air in the well, if elevated levels of iron and manganese are found (to be confirmed from sampling).

Due to the distance from the intended site it is considered very unlikely that a radius of influence due to well drawdown could extend to the St Leonards Forest, St Leonards Park Ponds and the Hardham designated sites. Further to this, the Hardham designated sites are underlain by a separate geological formation than that of the intended site and therefore the protected area draws groundwater from separate aquifer units than those targeted by the proposed borehole which are hydraulically disconnected.

Prior to drilling the following potential risks should be addressed:

- Underground services and tunnels, overhead cables;
- Avoid potential contaminant sources;
- Access and other (ecology) constraints.

GENERAL CONSIDERATIONS

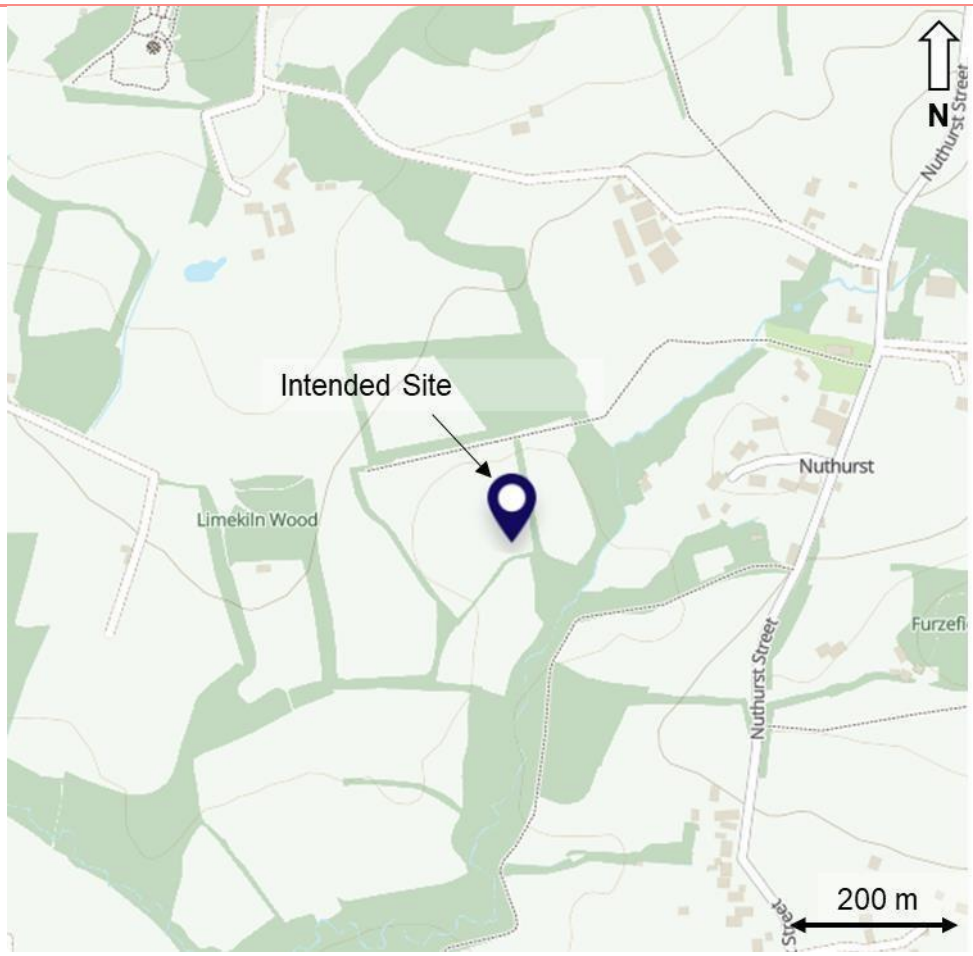
The following should be considered for all borehole installations:

- If the water is to be used as a potable resource, there may be a requirement for some basic form of treatment which will need to be addressed prior to consumption. The local Environmental Health Department will be able to advise further on appropriate sampling regimes;
- It is recommended that the borehole is located as close to the intended supply as possible;
- Where possible boreholes should always be sited away from any potential source of contamination such as septic tanks (e.g. a minimum of 50 m away, in accordance with Environment Agency guidelines).
- A licence is required for abstraction rates >20 m^3/d;
- As per Section 198 of the *Water Resources Act 1991,* all abstraction boreholes drilled greater than 15mbgl must report operations and drillers' logs to the British Geological Survey.

SITE DESCRIPTION

Location	L me Kiln Farm, Broadwater Lane, Copsale, RH13 6QW
Grid Reference	T 18815 25922
Easting / Northing	5 8815, 125922
Latitude / Longitude	5 .020405 , -0.30737560
Approx. Elevation	3 mAOD (extracted from 1:10000 OS map)

FIGURE 1:
Location of the Site (marked by arrow)



(map derived from https://explore.o smaps.com/location, accessed December 2022)

PURPOSE OF ABSTRACTION

The Client has stated that the purpose of the abstraction is for it to be used primarily for irrigation and potable supply. The Client has confirmed that a yield of 20 to 25 m^3/d is required.

SUPERFICIAL DEPOSITS – based on the British Geological Survey (BGS) England and Wales Map Sheet 302 (solid and drift) and local borehole records

Superficial Deposits	Lithological Description	Expected Thickness (m)
None present	N/A	N/A

BEDROCK GEOLOGY – based on the BGS England and Wales Map Sheet 302 (solid and drift) and local borehole records			
Group	**Formation**	**Lithological Description**	**Expected Thickness (m)**
Wealden Group	Weald Clay	Dark grey thinly bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone, shelly limestones, and clay ironstones.	0 to 10
	Upper Tunbridge Wells Sand Formation	Predominantly fine- to medium-grained sandstone, siltstone and silty sand rhythms with finely bedded mudstones and thin limestones.	55 to 105
	Grinstead Clay Formation	The Grinstead Clay Member separates the Upper and Lower divisions of the Tunbridge Wells Sand formation	13 to 25
	Lower Tunbridge Wells Sand Formation	The Lower Tunbridge Wells Sand Formation (LTWS) can be divided into two parts: a lower unit of interbedded silts and fine sandstones, overlain by a massive clean white sandstone (Ardingly Sandstone Member approx. 10 – 20 m).	18 to 31
	Wadhurst Clay Formation	Comprises soft, dark grey thinly bedded mudstones ("shales") and mudstones with subordinate beds of pale grey siltstone, fine-grained sandstone, shelly limestone, clay ironstone and rare pebble beds.	18 to 80
Table notes: The intended site is mapped on BGS Map Sheet 302 as being on or near a boundary of the Weald Clay Formation and Upper Tunbridge Wells Sand Formation, therefore the Weald Clay may not present at the intended site. Where the Grinstead Clay and Lower Tunbridge Wells Sand Formation have not been intercepted fully in local historical BGS boreholes, the generalised vertical section provided on BGS Map Sheet 302 is referenced.			

There are three mapped faults within 1.5 km of the intended site, these include:

- The Nuthurst Fault located 0.32 km northwest with a roughly southwest to northeast orientation.
- A section of the Nuthurst fault is located 0.66 km southwest in a roughly northwest to southeast orientation.
- The Maplehurst Faiult is located 1.35 km southeast with a rough southwest to northeast orientation.

HYDROGEOLOGY AND AQUIFER DESIGNATION

Formation	Description
Weald Clay Formation	Mostly *Unproductive Strata* (mudstone) with some *Secondary A Aquifer* Designations (i.e., Horsham Stone Member). The Weald Clay Formation is essentially an impermeable, confining clay formation, although it contains some sandstones and silty areas which may yield some small local supplies (Jones et al., 2000).
Tunbridge Wells Sand Formation (including the Upper and Lower Tunbridge Wells Sand Formations)	*Secondary A Aquifer*. The Upper Tunbridge Wells Sand Formation is lithologically similar to the lower part of the Lower Tunbridge Wells Formation, Values of transmissivity for the Tunbridge Wells Sand Formation range from 6.1 m^2/d - 39.5 m^2/d, with a geometric mean of 19.0 m^2/d and an interquartile range of 13.8 m^2/d to 35.4 m^2/d. Yields from the Tunbridge Wells Sand Formation are generally less than 400 m^3/d, and often less than 100 m^3/d, although significantly higher yields have been obtained on occasion (Jones et al, 2000). It has been suggested that larger yields are generally obtained from the Lower Tunbridge Wells Sand Formation, especially the Ardingly Sandstone, rather than the Upper Tunbridge Wells Sand Formation (Jones et al., 2000). Lithology and degree of cementation have been found to show considerable variation; therefore, predictions of aquifer properties are difficult. Groundwater flow within the Tunbridge Wells Sand Formation is both intergranular and through joints, well yields tend to be variable (Jones et al, 2000).
Grinstead Clay Formation	*Unproductive Strata*. Low permeability strata, generally acts as an aquiclude (Jones et al, 2000).
Wadhurst Clay Formation	*Unproductive Strata.* Low permeability strata, generally acts as an aquiclude (Jones et al, 2000).

NEARBY SURFACE WATER FEATURES

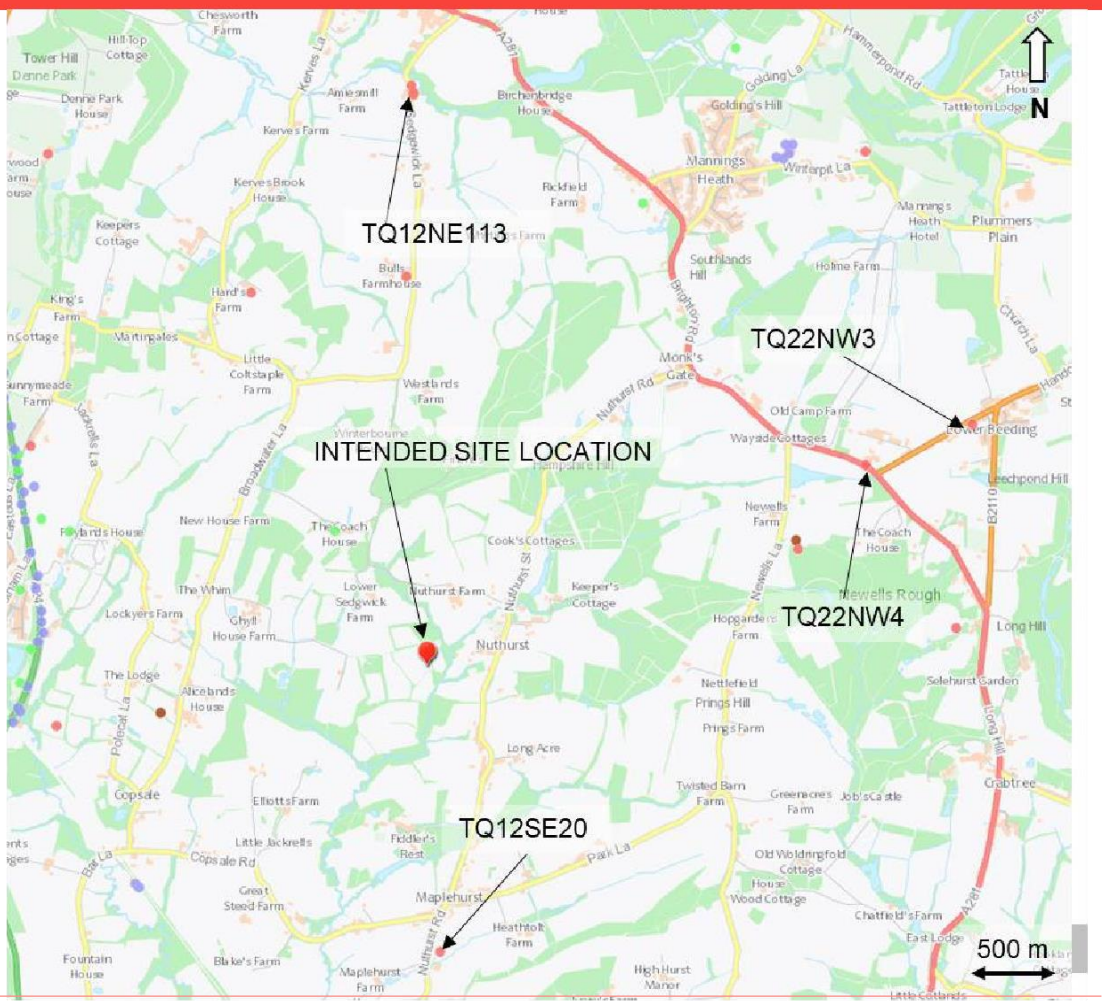
Type	Location
Unnamed Stream	Approx. 110 m east of intended site
Tributary	Approx. 110 m northeast of intended site
Tributary	Approx. 120 m southeast of intended site
Pond	Approx. 140 m southwest of intended site

LOCAL BOREHOLE RECORDS DRILLED WITHIN ca 5000m (BGS GeoIndex) (Appendix A)				
Well NGR:	TQ 21860 27260	TQ 21330 27050	TQ 18890 24320	TQ 18740 29130
Easting/Northing	521880,127280	521280,127050	518890,124320	518740,129130
Distance from Site	Approx. 3.3 km northeast of intended site	Approx. 2.7 km northeast of intended site	Approx. 1.6 km south of intended site	Approx. 3.2 km north of intended site
Location	**TQ22NW3 Sandygate Lane, Lower Beeding**	**TQ22NW4 Cisswood Cottage, Lower Beeding**	**TQ12SE20 Maplehurst**	**TQ12NE113 White's Bridge, Magpie Lane**
Completion Date	1933	1929	1913	1926
Completion Depth	39.01 m	60.96 m	42.21 m	79.86 m
Site Elevation	99.67 mAOD	96. 01 mAOD	36.58 mAOD	47.85 m
Aquifer	Upper Tunbridge Wells Sand Formation	Upper Tunbridge Wells Sand Formation	Upper Tunbridge Wells Sand Formation	Upper Tunbridge Wells Sand Formation
Rest Water Level (RWL)	69.80 mAOD (29.87 mbgl) Water struck between 64.92 and 65.84 mAOD and 97.23 and 97.84 mAOD	23.93 mAOD (37.03 mbgl) Water strikes at 9.6, 15.24, 23.16, 35.05, 36.58 and 55.48 mbgl	33.52 mAOD in 1913 and 1940 (3.06 mbgl) Water strikes between 3.96 and 4.88 mAOD	41.91 mAOD in 1926 (5.94 mbgl)
Pumping Test/ Groundwater Yield	28.37 m^3/d (260 g.p.h recorded on log for test in May 1933) 32.73 m^3/d (300 g.p.h maximum recorded on log in June 1947)	Not recorded on log	27.28 m^3/d (250 g.p.h recorded on log in 1940) 32.73 m^3/d (300 g.p.h recorded on log in 1947)	2,214.86 m^3/d (20,300 gph continuously for 7 days; drawdown to 13.72 m)
Notes	Log states "Fe and Mn render this water inferior for drinking and domestic use".	N/A	Artesian conditions were recorded in 1913	N/A

LOCAL BOREHOLE RECORDS DRILLED WITHIN ca 5000m (BGS GeoIndex) (Appendix A)

Figure 2: Location of nearby boreholes

	Confidential
	0-10m
	10-30m
	30+m



WATER QUALITY

The intended site is not within a Nitrate Vulnerable Zone (NVZ) as specified by the Environment Agency (2017). The intended site is in an area designated as a 'an unproductive' zone; this zone is attributed to the Weald Clay Formation as inferred from geological Map Sheet 302. The Upper Tunbridge Wells Sand Formation to the east is designated as a "high groundwater vulnerability" aquifer.

Groundwater quality was sampled from the Upper Tunbridge Wells Sand Formation at historic borehole TQ22NW3 located 3.3 km northeast of the intended site. Results found 32, 0.93 and 1.11 mg/l of Chlorine, Iron and Manganese respectively. The borehole log states "Fe and Mn render this water inferior for drinking and domestic use"; these results exceed UK drinking water standards for iron (0.2 mg/l) and manganese (0.5 mg/l). Additionally, groundwater from the Upper Tunbridge Wells Sand Formation was sampled at TQ12NE113 located 3.2 km north of the intended site. The results concur with those recorded at TQ22NW3 and recorded elevated concentrations of Iron (1.0 mg/l) and Manganese (0.4 mg/l) respectively. The above water quality results were conducted between 1933 and 1935; therefore, the results may not be representative of current conditions

The unconsolidated sands and silt of the Upper Tunbridge Wells Sand Formation may contribute to fines ingress into the well, however, this can be largely mitigated by installing a suitable sand and gravel pack (Jones et al., 2000).

Where groundwater is to be used for potable supply, the regulations maintained by the Local Health Authority (The Private Water Supplies (England) (Amendment) Regulations 2018) will need to be met to ensure that no risk to public health is caused by the supply i.e. the water will have to be sampled and tested to ensure that it is fit for human consumption. The Nicholls Licensing and Consultancy Team will be able to advise further on appropriate sampling regimes if the abstracted groundwater is to be used for potable supply.

SOURCE PROTECTION ZONE

The intended site (Lime Kiln Farm, Broadwater Lane, Copsale, RH13 6QW) is not located within a Groundwater Source Protection Zone (SPZ) and there are none present within a 10 km radius of the intended site.

CONCLUSIONS AND RECOMMENDATIONS

Based on the local borehole records, the British Geological Survey Geological Map (Map Sheet 302) and literature review, WSP would recommend drilling into the Upper Tunbridge Wells Sand Formation as a primary target for irrigation; however, the water quality of the Upper Tunbridge Wells Sand Formation may not be sufficient for potable supply without treatment to reduce Iron and Manganese. Two local boreholes (TQ22NW3 and TQ12NE113) within 3.5 km of the intended site recorded elevated Iron and Manganese which exceeded UK drinking water standards.

If the client would like to proceed then a rest water level (RWL) is expected at approximately 2 to 10 mbgl (34 to 26 mAOD) for the Upper Tunbridge Wells Sand Formation.

Local borehole logs indicated that a borehole which targets these strata in this location should be capable of providing a yield of up to 25 m^3/d. The table below provides a feasibility design for the proposed borehole targeting the Upper Tunbridge Wells Sand Formation, based upon the findings and recommendations in this report.

Drilling should be carried out by a competent driller, who understands the nature of the work and can provide the client with a cost for drilling that includes an assessment of any associated risks that may be encountered (e.g. infrastructure, services etc.).

Borehole Construction – Feasibility Design*	
Target Formation Strata & Slotted Screen Section Depths	Upper Tunbridge Wells Sand Formation 10 mbgl – 40 mbgl (26 mAOD to -4 mAOD)
Borehole Completion Details	In an ideal scenario the borehole construction should include plain casing and grout to the approximately 10 mbgl or to the base of the Weald Clay Formation (if present). Below this depth there would be slotted screen casing with a suitable sand filter pack through to a depth of approximately 40 mbgl. Particular care should be taken in the well design to avoid/minimize contact of the water with air causing oxidation/clogging due to the elevated Iron and Manganese concentrations. Borehole headworks should be completed in such a way that any future risk of contamination of the borehole is minimised as far as practicable. A schematic illustrating these construction details is presented in Appendix B.
* The client should be aware that the feasibility borehole design is not a substitute for a formal borehole design, which should be proposed prior to commencement of the drilling, and finalised during the construction of the borehole. WSP are happy to assist in offering the client a formal borehole design if required.	

HYDRAULIC CONNECTIVITY AND POTENTIAL IMPACT ON PROTECTED AREAS		
Protected Area	**Designation**	**Distance from intended site**
St Leonards Forest	Site of Specific Scientific Interest (SSSI)	4.3 km north
St Leonards Park Ponds	Site of Specific Scientific Interest (SSSI)	4.5 km north
Hardham	Several designated sites in the local area of Hardham; including but not limited to Pulborough Brooks and Waltham Brooks which are designated as a Special Protected Area (SPA), Site of Specific Scientific Interest (SSSI) and Special Conservation Area (SCA).	14.9 km southwest

The proposed borehole will target the Upper Tunbridge Wells Sand Formation. The formation dips southwest beneath the Weald Clay Formation which indicates groundwater may flow in a similar direction; however local groundwater flow directions may be more complex.

There are two SSSI located within 5 km of the intended site; St Leonards Park Ponds and St Leonards Forest. St Leonard's Park Ponds is designated due to the presence of the nationally scarce plant "Yellow Century" and an outstanding dragonfly assemblage (Natural England, 2022). Groundwater does not form a pivotal part of the designation.

St Leonards Forest designated due to supporting an important deciduous woodland community. According to the Environment Agency (2020), St Leonards Forest features a GWDTE and several springs are shown on ordnance survey maps within the designated boundary. Geological maps indicate both of the designated sites are underlain by the Upper Tunbridge Wells Sand Formation.

The area of Hardham features several SSSI and is recorded as a Ground Water Dependent Terrestrial Ecosystem by the EA (2020). Geological maps indicate the designated site is underlain by the Folkestone Formation, Gault Formation and superficial deposits of alluvium, river terrace and head which is a separate to the target formation of the intended borehole (Tunbridge Wells Sand Formation).

Due to the distance from the intended site it is considered very unlikely that a radius of influence due to well drawdown could extend to the St Leonards Forest, St Leonards Park Ponds and the Hardham, this is expected to be confirmed by a formal pumping test so as to meet the conditions of the abstraction licence application. Further to this, the Hardham designated sites are underlain by a separate geological formation than that of the intended site and therefore the protected area draws groundwater from separate aquifer units than those targeted by the proposed borehole which are hydraulically disconnected.

LICENCE

The drilling and pump testing of a borehole for quantities <20 m^3/d do not require a licence. A licence is required for abstraction rates >20 m^3/d and a '*Groundwater Investigation Consent*' needs to be obtained from the Environment Agency before drilling and test pumping of such a borehole.

WSP understand that up to 25 m^3/d is required from this borehole (Lime Kiln Farm, Broadwater Lane, Copsale, RH13 6QW), therefore an abstraction licence would be required, which would need to be submitted to and approved by the Environment Agency. Correspondingly, a preceding application to the EA for consent to drill & test will be required.

IMPORTANT

This prognosis is based on a limited range of available data, including the published historic geological map supplied by the British Geological Survey[1]. Whilst this map is generally reliable, it provides only indicative geological information based on available borehole information and field mapping.

In the preparation of this report, WSP has used professional experience and skills to provide the best estimates of thickness of the various formations, and the likely success of obtaining a satisfactory yield from the intended borehole site. It is emphasised that the yield and groundwater quality cannot be guaranteed.

The decision to proceed with the borehole rests with those parties that are responsible for the procurement and installation of the intended borehole. This report has been designed to provide those parties with readily available hydrogeologically based facts, and associated interpretations intended to inform any such

[1] https://largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001794, accessed December 2022

decision. WSP will not be held responsible for either the decision to proceed or for any subsequent issues arising from any such decision to proceed.

REFERENCES

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ACRONYMS

BGS	British Geological Survey
EA	Environment Agency
g.p.h.	Gallons per hour
NGR	National Grid Reference
mAOD	Meters above ordnance datum
mbgl	Meters below ground level
m^3/d	Cubic meters per day
mg/l	Milligrams per litre

GLOSSARY	
Secondary A Aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Unproductive Strata	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
Source Protection Zone (SPZ)	Source Protection Zones (SPZs) for groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk
Nitrate Vulnerable Zone (NVZ)	Existing NVZ are the zones which apply from 1st January 2013 – 31st December 2016 and relate to surface and ground waters, and also eutrophic waters. With relation to groundwater – water held underground in the soil or in pores and crevices in rock that has or could have if action is not taken, a nitrate concentration of >50mg/L
Groundwater Vulnerability	Assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one-kilometre square grid.
Special Area of Conservation (SAC)	Designates a conservation area which protects one or more special habitats and/or species – terrestrial or marine – listed in the Habitats Directive.
Special Protected Area (SPA)	Special Protection Areas are selected to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, or certain regularly occurring migratory species.
Site of Special Scientific Interest (SSSI)	A formal conservation designation, usually, used to describe an area which is of particular interest to science due to the rare species of fauna or flora it contains - or even important geological or physiological features that may lie in its boundaries.
Groundwater Dependent Terrestrial Ecosystems (GWDTE)	Groundwater Dependent Terrestrial Ecosystems are wetlands which critically depend on groundwater flows or chemistries. They are safeguarded by the Water Framework Directive (WFD) and are sensitive to hydrological and ecological changes caused by developments.

APPENDIX 3 : DRILLING REPORT

Borehole record form

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for: Lime Kiln Farm

Location: Lime Kiln Farm Broadwater lane Copsale Horsham RH13 6QW

NGR (ten digits): TQ 18836 25827 Please attach site plan

Ground level (if known): 33 metres Above Ordnance Datum

Drilling company: SussexBoreholes

Date drilling commenced: 09/10/2023 (DD/MM/YYYY) Completed: 16/10/2023 (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) _____ metres (m). Please tick if this is above □ or below □ ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter 225 mm from 0 to 45 m/depth

mm from _____ to _____ m/depth _____

mm from _____ to _____ m/depth _____

mm from _____ to _____ m/depth _____

Casing material upvc diameter 125 mm from 0 to 45 m/depth

and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material plain diameter 125 mm from 0 to 27 m/depth

Casing material slotted diameter 125 mm from 27 to 45 m/depth

Casing material _____ diameter _____ mm from _____ to _____ m/depth

Grouting details gravel pack, bentonite pellets at 16-8 meters and cement groute to surface

Water struck at 1. 5 m (depth below datum - mbd) 2. 9 m (mbd)

3. 12 m (mbd) 4. _____ m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum _____ m. Please tick if this is above □ or below □ ground level.
(if different from borehole datum)

Pump suction depth _____ mbd

Water level (start of test) +2 mbd

Water level (end of test) _____ mbd

Type of test (for example, bailer, step, constant rate)
OverFlowed @900 lires an hour

Pumping rate _____ m^3/hour ☑ or litres/second □. Please tick as appropriate. for _____ days, _____ hours, _____ mins

Recovery to _____ mbd in _____ days, _____ hours, _____ mins (from end of pumping)

Date(s) of measurements Pump started _____ (DD/MM/YYYY)

Pump stopped _____ (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box □

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	Sandy yellow clay with sandstone	5	5
	Grey Clay with hard bands and layers of sandstone	7	12
	Grey sand with layers of sandstone and clay	33	45
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this form

How long did it take you to fill in this form?

For Official use only

Date received (DD/MM/YYYY)	File	Consent	BGS reference number
Accession	Wellmaster number	SOBI	NG
LIC	Purpos		EA reference number
Copy	Entered by		

F The Data Protection Act 1998

The Environment Agency will process the information you provide so that we can:

- deal with your application;
- make sure you keep to the conditions of any consent; and
- process renewals.

The Environment Agency will pass the information provided on this form to the British Geological Survey, in accordance with Section 198 of the Water Resources Act 1991, which states that any person drilling a well or borehole more than fifty feet below the surface, shall notify the British Geological Survey of this and provide them with the information as requested on this form.

We may also process or release the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- prevent anyone from breaking environmental law, investigate cases where environmental law may have been broken, and take any action that is needed;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

The British Geological Survey will use the information you provide to assist in its geological mapping programme and other research activities.

The British Geological Survey will process, or release, the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

- We will also publish the information on our website; and
- provide the technical details of the borehole (for example, the depth, geology and water levels) to others. This will not include information about ownership of the borehole.

APPENDIX 4 : INVICTA REPORT

Invicta W'afer *Treatment*

[redacted]

Lime Kiln Farm
Broadwater Lane
Copsale
By email:
28/11/23

Dear Stephanie,

Re: Private Water Supply at Lime Kim Farm Copsale Site — Raw Borehole Water Analyses (to date and **inferences); Proposed Design and Compliancœ with PWS** Regs 2016 Amended 2018

Further to the request that a raw borehole sample was taken by an accredited UKAS PWS Sampler, I can confirm that this was performed on 10/11/23 by Stefan Massingham. The artesian borehole was allowed to flow for some 2 hours prior to sampling. It has been frequently flushed and allowed to develop during drilling prior to sampling. Visually, the water was turbid and grey in colour.

The samples were taken in accordance with DWI requirements (based on Group A & B Schedules PWS Regs 2016), with the correct bottles supplied by the UKAS Accredited lab, SE Water Scientific Services (SEWSS). and then duly transported to the lab thereafter, at the required transit temperatures (between 2°C and 8ºC).

Given the timescales, SEWSS can only supply an interim certificate, however it covers almost all determinands.

Signed acceptance of IWT Order by SEWSS

Invicta Water Treatment
89 Castle Drive
Horley
Surrey RH6 9DD
T. 01293 781077
Mobile. 07970 154529
Email. sales@invictawatertreatment.co.uk www.invictawatertreatment.co.uk

Determinands to Date	**Sample Number 4638890 (sampled 10/11/23) Interim Certificate 1173327-1 Interim dated 28/11/23**
Alkalinity, mg/l	470.0
Ammonium (Ammonia and Ammonium ions), mg/l	0.298
Chloride, mg/l	78.45
Nitrate, mg/l	<0.9
Nitrite, mg/l	0.005
Nitrite/nitrate, mg/l	0.002
Sulphate, mg/l	12.8
Total Hardness, mg/l	<10.0
Odour – Qualitative	Burnt matches/cabbage
Odour – Quantitative	2
Colony Count 3 days at 22°C, cfu/ml	>300
E coli, mpn/100 ml	0
Total Coliforms, mpn/100 ml	3
Pseudomonas aeruginosa, cfu/100 ml	Competing growth, indicative count 0
Clostridium perfringens (including spore), cfu/100 ml	0
Colour, mg/l Pt/Co	<2
Conductivity, uS/cm	809
Hydrogen ion, pH	8.6
Turbidity, NTU	32.800
Bromate, ug/l	<0.8
Antimony, ug/l	<0.2
Arsenic, ug/l	1.2
Selenium, ug/l	<0.8
Boron, mg/l	0.600
Calcium, mg/l	<1.1
Magnesium, mg/l	<0.5
Sodium, mg/l	231.1
Fluoride, mg/l	3.126
Benzo(a)pyrene, ug/l	<0.003
Benzo(1,12)perylene, ug/l	<0.003
Benzo(11,12)fluoranthene, ug/l	<0.003
Benzo(3,4)fluoranthene, ug/l	0.004
Indeno(1,2,3-cd)pyrene, ug/l	<0.003
PAH Total, ug/l	**0.004**
1,1,1 Trichloroethane, ug/l	<0.60
1,2-Dichloroethane, ug/l	<0.12
Benzene, ug/l	<0.02

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Dibromochloromethane, ug/l	<0.50
Dichlorobromomethane, ug/l	<0.43
Tetrachloroethene	<0.15
Tetrachloroethen/Trichloroethene- SUM, ug/l	**0.00**
Tetrachloromethane, ug/l	<0.11
Total Trihalomethane, ug/l	**0.00**
Tribromomethane, ug/l	<0.60
Trichloroethene, ug/l	<0.10
Trichloromethane, ug/l	<0.50
Aluminium, ug/l	2,931.3
Copper, mg/l	<0.009
Iron, ug/l	1,481.1
Iron (free), ug/l	41.3
Lead, mg/l	<0.9
Manganese, ug/l	9.6
Nickel, ug/l	1.6
Cadmium, ug/l	<0.12
Chromium, ug/l	3.5
First Draw Copper, mg/l	<0.009
First Draw Lead, mg/l	<0.9
First Draw Nickel, mg/l	1.1
Calc Pesticides – Total Substances	To follow
Aldrin, ug/l	<0.007
Dichlobenil, ug/l	<0.006
Gamma-HCH (Lindane), ug/l	<0.005
Heptachlor, ug/l	<0.008
Heptachlor Epoxide, ug/l	<0.005
Propyzamide, ug/l	<0.005
Tri-allate, ug/l	<0.005
2,4,5-T, ug/l	<0.007
2,4-D, ug/l	<0.007
Bentazone, ug/l	<0.007
Bromoxynil, ug/l	<0.007
Dicamba, ug/l	<0.020
Dichlorprop, ug/l	<0.003
Fluroxypyr, ug/l	<0.008
MCPA, ug/l	<0.008
MCPB, ug/l	<0.008
Mecoprop(MCPP), ug/l	<0.005
Triclopyr, ug/l	<0.015
Atrazine, ug/l	<0.002
Carbendazim, ug/l	<0.001
Carbetamide, ug/l	<0.002

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Chlorotoluron, ug/l	<0.003
Diuron, ug/l	<0.004
Epoxiconazole, ug/l	<0.003
Flutriafol, ug/l	<0.003
Isoproturon, ug/l	<0.003
Linuron, ug/l	<0.003
Oxadixyl, ug/l	<0.003
Pendimethalin, ug/l	<0.007
Prometryn, ug/l	<0.002
Simazine, ug/l	<0.003
Terbutryn, ug/l	<0.002
Trietazine, ug/l	<0.004
% transmission	68.5
UV Abs (10 mm) @ 254 nm unfiltered	0.164 abs_unit
Bicarbonate Alkalinity, mg/l	459.47
Total Phosphate, ug/l	460
Total Organic Carbon, mg/l	0.6
Silica, mg/l	6.70
Suspended Solids, mg/l	24.6
Aluminium (free), mg/l	116.0

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Treatment Prognosis
Based on the failures to date, the water treatment system will need to remove excess:

- iron (1,481.1 ug/l, maximum 200.0 ug/l)
- aluminium (2931.3 ug/l, maximum 200.0 ug/l)
- sodium (231.1 mg/l, maximum 200.0 mg/l
- fluoride (3.126 mg/l, maximum 1.5 mg/l)
- Bacteria (see above)

The recommended treatment will be extensive particle filtration followed by either antiscalant dosing or softening prior to an RO unit (see emailed attachment for full RO design calculations) with remineralisation thereafter of the permeate. The treatment train will be similar to that for the Brook Hill Development, recently accepted by HDC and reported on by HDC consultant Dr. G. Pearce. If we find that the raw water can be treated directly by RO with just antiscalant dosing, we may propose that. This would be similar to the scheme at Wellcross, also looked at by Dr. G. Pearce for HDC. Once we have the full analysis then a final design can be submitted, however given the information to date the main treatment will still be RO, remineralisation and subsequent disinfection by UV light.

The filtration equipment is modular in nature and so upgrades are quite straight forward.

The treated water will meet the PWS Regs requirements. The system will supply some 7,000 litres per day as calculated for Water Neutrality.

Ongoing Maintenance & Sampling
The water treatment system will require maintenance. We will provide a bespoke O&M manual for your system along with the manufacturer's documentation. We will issue a line drawing of the water treatment process and provide hands-on training during the commissioning phase. Critical spares will be left on site and these are: spare UV lamp, quartz sleeve and sediment filters.

Sampling the raw borehole as well as the treated water is important to understand how the ground water is changing over time and how it reacts to weather events. We will only test pertinent process determinands and those required under the Schedules (see PWS Regs). If the council requires regulatory samples, we assume we will be instructed accordingly.

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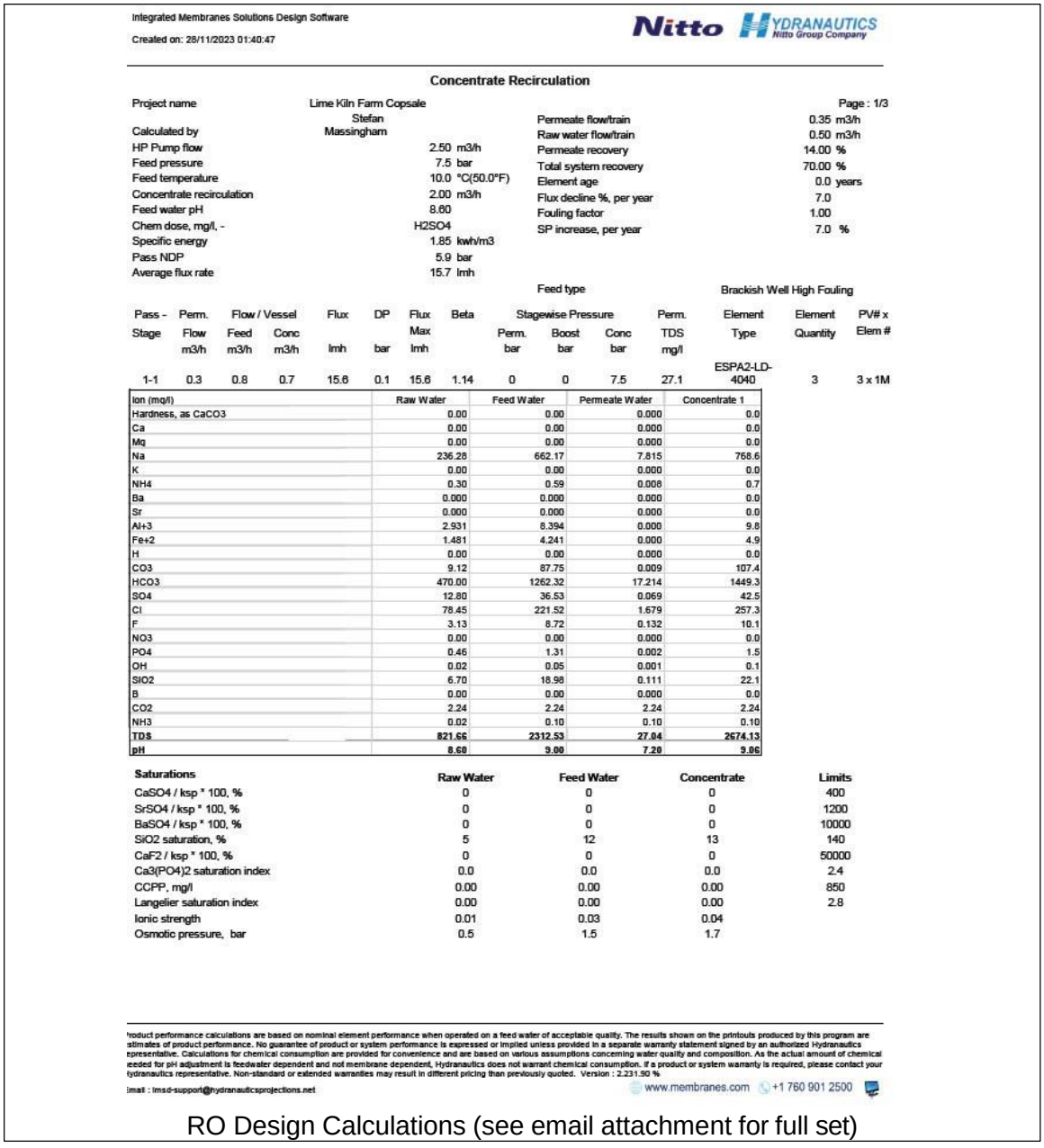

Integrated Membranes Solutions Design Software

Created on: 28/11/2023 01:40:47

Nitto HYDRANAUTICS Nitto Group Company

Concentrate Recirculation

Page : 1/3

Project name	Lime Kiln Farm Copsale	Permeate flow/train	0.35 m3/h
Calculated by	Stefan Massingham	Raw water flow/train	0.50 m3/h
HP Pump flow	2.50 m3/h	Permeate recovery	14.00 %
Feed pressure	7.5 bar	Total system recovery	70.00 %
Feed temperature	10.0 °C(50.0°F)	Element age	0.0 years
Concentrate recirculation	2.00 m3/h	Flux decline %, per year	7.0
Feed water pH	8.60	Fouling factor	1.00
Chem dose, mg/l, -	H2SO4	SP increase, per year	7.0 %
Specific energy	1.85 kwh/m3		
Pass NDP	5.9 bar		
Average flux rate	15.7 lmh		

Feed type: Brackish Well High Fouling

Pass - Stage	Perm. Flow m3/h	Flow / Vessel Feed m3/h	Flow / Vessel Conc m3/h	Flux lmh	DP bar	Flux Max lmh	Beta	Stagewise Pressure Perm. bar	Stagewise Pressure Boost bar	Stagewise Pressure Conc bar	Perm. TDS mg/l	Element Type	Element Quantity	PV# x Elem #
1-1	0.3	0.8	0.7	15.6	0.1	15.6	1.14	0	0	7.5	27.1	ESPA2-LD-4040	3	3 x 1M

Ion (mg/l)	Raw Water	Feed Water	Permeate Water	Concentrate 1
Hardness, as CaCO3	0.00	0.00	0.000	0.0
Ca	0.00	0.00	0.000	0.0
Mg	0.00	0.00	0.000	0.0
Na	236.28	662.17	7.815	768.6
K	0.00	0.00	0.000	0.0
NH4	0.30	0.59	0.008	0.7
Ba	0.000	0.000	0.000	0.0
Sr	0.000	0.000	0.000	0.0
Al+3	2.931	8.394	0.000	9.8
Fe+2	1.481	4.241	0.000	4.9
H	0.00	0.00	0.000	0.0
CO3	9.12	87.75	0.009	107.4
HCO3	470.00	1262.32	17.214	1449.3
SO4	12.80	36.53	0.069	42.5
Cl	78.45	221.52	1.679	257.3
F	3.13	8.72	0.132	10.1
NO3	0.00	0.00	0.000	0.0
PO4	0.46	1.31	0.002	1.5
OH	0.02	0.05	0.001	0.1
SiO2	6.70	18.98	0.111	22.1
B	0.00	0.00	0.000	0.0
CO2	2.24	2.24	2.24	2.24
NH3	0.02	0.10	0.10	0.10
TDS	821.66	2312.53	27.04	2674.13
pH	8.60	9.00	7.20	9.06

Saturations	Raw Water	Feed Water	Concentrate	Limits
CaSO4 / ksp * 100, %	0	0	0	400
SrSO4 / ksp * 100, %	0	0	0	1200
BaSO4 / ksp * 100, %	0	0	0	10000
SiO2 saturation, %	5	12	13	140
CaF2 / ksp * 100, %	0	0	0	50000
Ca3(PO4)2 saturation index	0.0	0.0	0.0	2.4
CCPP, mg/l	0.00	0.00	0.00	850
Langelier saturation index	0.00	0.00	0.00	2.8
Ionic strength	0.01	0.03	0.04	
Osmotic pressure, bar	0.5	1.5	1.7	

Product performance calculations are based on nominal element performance when operated on a feed water of acceptable quality. The results shown on the printouts produced by this program are estimates of product performance. No guarantee of product or system performance is expressed or implied unless provided in a separate warranty statement signed by an authorized Hydranautics representative. Calculations for chemical consumption are provided for convenience and are based on various assumptions concerning water quality and composition. As the actual amount of chemical needed for pH adjustment is feedwater dependent and not membrane dependent, Hydranautics does not warrant chemical consumption. If a product or system warranty is required, please contact your Hydranautics representative. Non-standard or extended warranties may result in different pricing than previously quoted. Version : 2.231.90 %

Email : lmsd-support@hydranauticsprojections.net www.membranes.com +1 760 901 2500

RO Design Calculations (see email attachment for full set)

Compliance

With reference to the PWS Regs 2016 and amended 2018, this supply will be classified as Reg 9. We have allowed for a DWI risk assessment on the completed system by David Clapham (RIAMS independent consultant) along with the required sampling by a UKAS accredited sampler. We understand, under PWS Regs section 6 & 7, the duties of the council. We look for the council to provide clarity on this.

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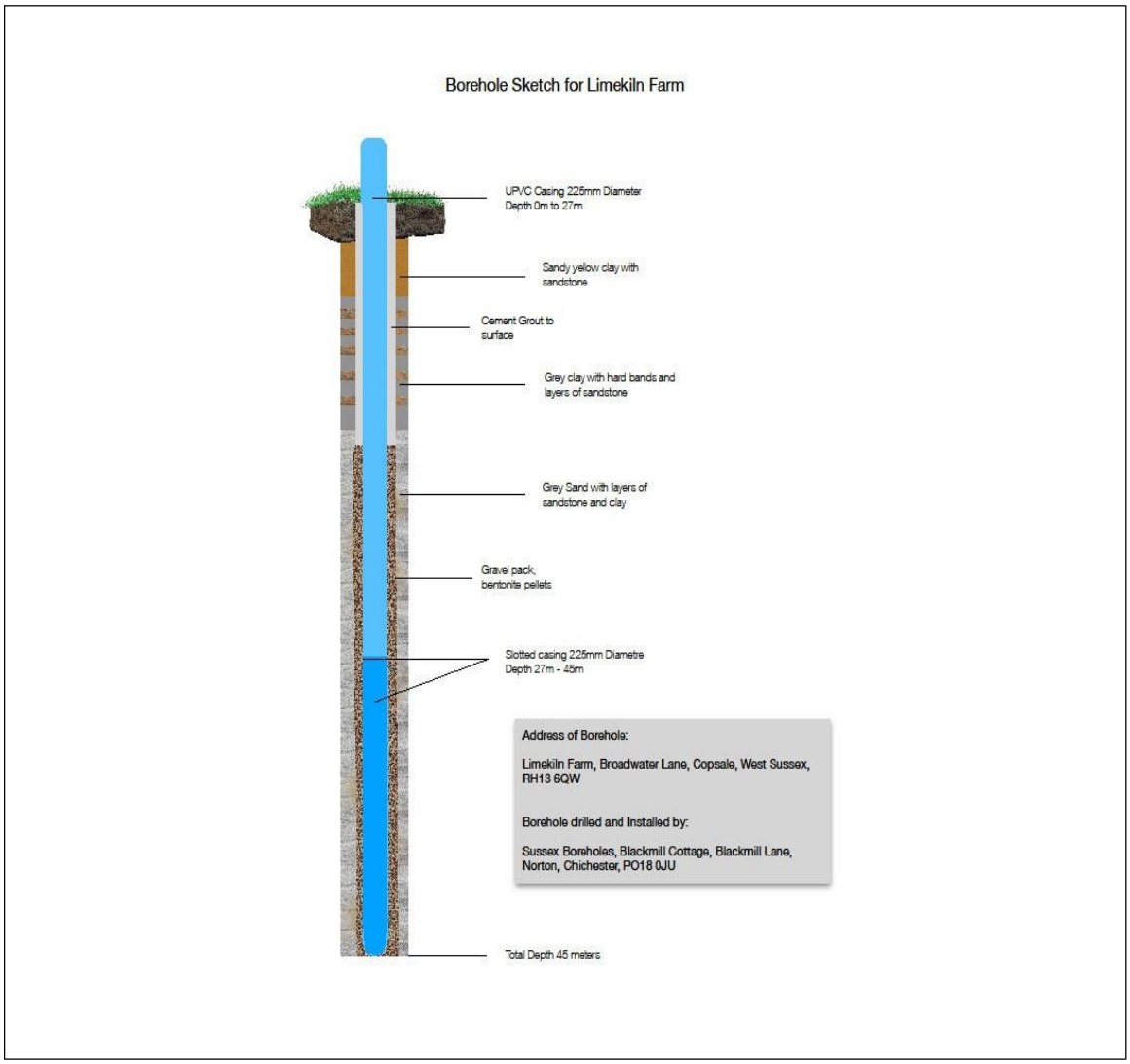
Borehole Design As Drilled On Site



The borehole has been drilled into the sandstone. The borehole is artesian and the upper producing strata have been isolated so water emanates from the lower sands rather than the upper clays. The borehole has been finished above ground. There are no known sewage systems or ground contamination sources nearby.

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Surrey RH6 9DD
T. 01293 781077
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Borehole record form

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for: Lime Kiln Farm

Location: Lime Kiln Farm Broadwater lane Copsale Horsham RH13 6QW

NGR (ten digits): TQ 18836 25827 Please attach site plan

Ground level (if known): 33 metres Above Ordnance Datum

Drilling company: SussexBoreholes

Date drilling commenced: 09/10/2023 (DD/MM/YYYY) Completed: 16/10/2023 (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) _____ metres (m). Please tick if this is above ☐ or below ☐ ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter: 225 mm from 0 to 45 m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth

Casing material: upvc diameter: 125 mm from 0 to 45 m/depth
and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.
Casing material: plain diameter: 125 mm from 0 to 27 m/depth
Casing material: slotted diameter: 125 mm from 27 to 45 m/depth
Casing material: _____ diameter: _____ mm from _____ to _____ m/depth

Grouting details: gravel pack, bentonite pellets at 16-8 meters and cement groute to surface

Water struck at 1. 5 m (depth below datum – mbd) 2. 9 m (mbd)
3. 12 m (mbd) 4. _____ m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum _____ m. Please tick if this is above ☐ or below ☐ ground level.
(if different from borehole datum)

Pump suction depth _____ mbd

Water level (start of test) +2 mbd

Water level (end of test) _____ mbd

Type of test (for example, bailer, step, constant rate)
OverFlowed @900 lires an hour

Pumping rate _____ m³/hour ☑ or litres/second ☐. Please tick as appropriate.
for _____ days, _____ hours, _____ mins

Recovery to _____ mbd in _____ days, _____ hours, _____ mins
(from end of pumping)

Date(s) of measurements Pump started _____ (DD/MM/YYYY)
Pump stopped _____ (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box ☐

Page 1 of 3 – see email attachments for full document

Summary
We trust that there is enough information herein for HDC. Please keep us informed of your progress. HDC can contact me directly if they wish.

Please feel free to call on 07970 154529 if you need any parts of the report clarifying. Regards

Stefan Massingham BSc (Hons Chem.) MSc (Cran) MWMSoc **Director - Invicta Water Treatment Limited Qualified UKAS Private Water Supply Sampler**

Recent Projects with Photos - Click Here

APPENDIX 5 : SILVERLINE SPECIFICATION

To:You

Fri 9/27/2024 8:09 AM

ATT14591.pdf
1 MB

From: martin@silverlineuk.co.uk <martin@silverlineuk.co.uk>
Sent: 27 September 2024 16:05
To: 'MICHAEL BISSETTPOWELL' <bissettpowell@btinternet.com>
Cc: 'Stephanie Newell' <newell.steph75@gmail.com>
Subject: RE: WATER FILTRATION: LIMEKILN FARM, COPSALE

Hi Michael and Stephanie

The water quality im sure will improve with more pumping but to treat the water as it is which will tick the boxes for planning you will need to install the following equipment:

Taking into account a turbidity level of 32, aluminium of 2931, iron of 1418, manganese of 9.6. pH of 8.6, sodium of 231, flouride of 3.1, a daily use of 1 m3 per day and a peak flow rate of 20 lpm you will need to install the following equipment:

1 X 200 liter pressure vessel £886.00
This is to reduce the starts and stops on the borehole pump

1 X pressure switch £48.00

1 X 10” x 54” turbidity filter £1285.00
https://silverlineuk.co.uk/shop/turbidity-filter-pstf-ev/

this unit it to remove the particles from the water

once fitted this unit will need little or no maintaince

1 X 10” x 54”1.4EO iron and manganese filter £1670.00
https://silverlineuk.co.uk/shop/10-quot-x54-quot-psim-1054-1-4eo/

This unit once fitted will need little or no maintaince apart from topping up the potassium every 6 months the cost of the media recharge is £38.50

1 X SFMC01 commercial water softener with separate brine tank £1541.67

https://silverlineuk.co.uk/shop/commercial-water-softener-sfcm01/

This unit once fitted will need little or no maintaince apart fromm topping up with salt as required

1 X compact 150 reverse osmosis unit £2781.00
https://silverlineuk.co.uk/shop/reverse-osmosis-compact-150/

this unit will need the prefilter replacing every year at a cost of £12.00 and the membrane every 3-5 years depending on how much water you use the cost of the replacement membrane is £229.00

from here the water will go into a 1 m3 water storage tank £sourced locally

coming out from the tank

1 X 0.55 kw variable speed booster pump £1630.00
This is a fully variable speed pump it will speed up and slow down to maintain the preset pressure regardless of the flow rate required.
I have attached the data sheet on the pump above

1 X UV-DS30 21 lpm UV steriliser £381.67
https://silverlineuk.co.uk/wp-content/uploads/2020/02/UV-DS30_WRAS.pdf

this unit has 1 lamp that will need replacing every year the cost of the replacement lamp is £22.46

1 X 10” x 54” pH correction unit £595.00
https://silverlineuk.co.uk/shop/standard-ph-correction-unit-with-no-backwash-head-psph/

this unit will need the media replacing every 2 years the cost of the replacement media is £120.00

After the above treatment the water will be upto drinking water standards.

Once you purchase the equipment we will set you up on our reminder system so we send you a reminder when replacments are due.

I would suggest testing the treated water every year to make sure it still meets drinking water standards.

If you need any further details or would like to discuss anything please do not hesitate to contact us.
All prices are subject to carriage + vat at the standard rate. Quotation valid for 30 days then subject to confirmation. E & OE.
Kind regards,

Martin Goddard

Silverline UK Ltd
Telephone: 01805 804202
Email: martin@silverlineuk.co.uk

APPENDIX 6 : DRINKING WATER SAFETY PLAN

DRINKING WATER SAFETY PLAN

This drinking water safety plan (DWSP) is for the private water supply known as Limekiln Farm, Copsale, RH13 6QW

The document defines the private water supply from source to tap, identifies any hazards present and introduces mitigation measures to reduce the likelihood of harm to all users on the supply. The DWSP must be reviewed at least every 12 months

Date DWSP completed: 30th April 2025

Relevant contacts:

Relevant Party	Name	Address	Telephone	Email
Supply Owner	Mr & Mrs Newell	Limekiln Farm, Copsale, West Sussex, RH13 6QW	Steph: 07534003643 Pete: 07776414605	Limekilnfarm22@gmail.com
Source catchment Landowner	Mrs Newell	As above	07534003643	Limekilnfarm22@gmail.com
Water treatment plant suppliers	Silverline UK Ltd	Whitemoor, Winkleigh, Devon, EX18 8BN	03333 446 286	enquiries@silverlineuk.co.uk
Water treatment plant engineers	SGE (Seal) Ltd	Church Farm Church Street Seal Sevenoaks TN15 0AT	01732 761724	info@sgeseal.com
Regulating authority	Horsham District Council, Environmental health dept	Alberly House Springfield Road Horsham RH12 2GB	01403 215641	ehl@horsham.gov.uk

The Supply:

Source and Catchment	Answers	Additional comments
Type of Source (eg borehole, Spring, Well, land drain etc)	Borehole	Water table is Tunbridge wells Sand (Compliant with water neutrality)
Location of source including grid reference	Limekiln Farm, Copsale, RH13 6QW	Grid Reference: 18836 25827
Is Stock proof fencing present and in good structural (yes, No or N/A)	N/A	Borehole and water supply our housed in a plant room with pipes and tanks underground
Distance of stock proof fencing around the radius of catchment tank (in meters distance)	N/A	
Storage Tank(s)	**Answers**	**Additional comments**
Storage tank construction material(s) (eg concrete, brick, plastic etc)	Plastic	
Is the roof and lid of the storage tank(s) secure from any external contamination (Yes/No)	Yes	
Are Sediment strainers fitted on all outlets	No	Post treatment no sediment strainers/filters needed
Are all tank overflows protected from animal access by a mesh or storm flap (Yes/No)	Yes	
Cleaning frequency of storage tank (Yes, No, N/A & Frequency	N/A	No maintenance cleaning of tanks required – advice from Silverline UK Ltd

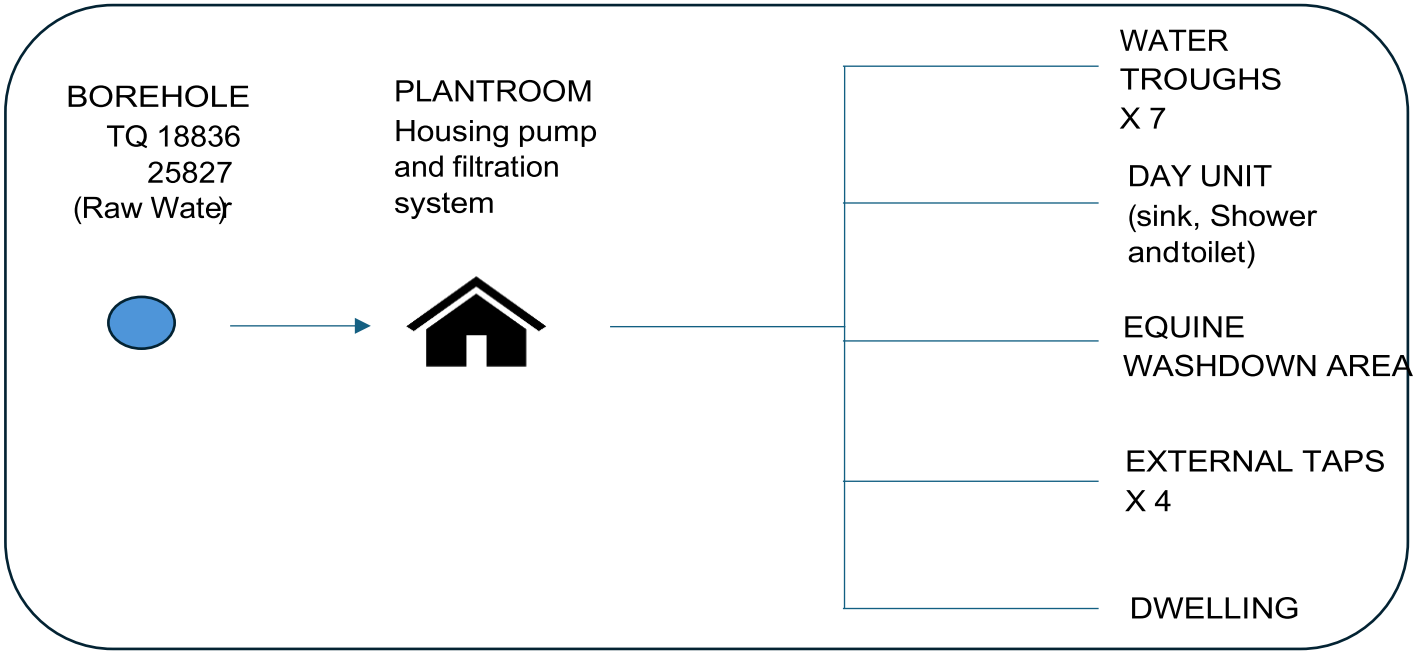
Treatment Systems(s)	Answers	Additional comments
Are treatment systems installed on all premises on the supply (Yes, No, Partial)	Yes	
Sediment Filter details	PSTF1054 – 10” x 54” Turbidity Filter	
Treatment System(s) make, model, power rating (w) and maximum flow rating	Silverline Uk – RO/COMPACT 150 – Reverse Osmosis Unit – Flow rate is 150L per hour – Power rating (w) .4KW 400w	
Treatment system serviced in accordance with manufacturing guidelines (Yes, No, N/A)	Yes	Guideline set out by Silverline and serviced by SGE Seal Ltd
Can water flow into the supply during power failure i.e. is a failsafe in place	Yes – the Ro is solenoid controlled no power no water can pass through system	
Are any additional treatment systems in place? (e.g. Activated Carbon, pH Filters, water softener, ion-exchange, etc)	PSIM1054/1.4CO – Iron & Manganese Filter SFMC01 – Commercial Water Softener UV-DS30 – 30W Ultraviolet Steriliser PSPH – 10” x 54” Remineralisation Unit	

How often is the water quality from the borehole tested	Annually from the date of the water being used from the treatment plant	SGE Seal Ltd test the water as part of our maintenance and the result will be filed and a copy sent to Environmental health at Horsham District Council
Other and Miscellaneous		
Details of pipe work material(s) used throughout the supply (e.g. alkathene, copper, ceramic, etc)	MDPE	
Is the septic tank over 50m away from the source catchment area (Yes/No)	Yes	
Is the septic tank regularly monitored to ensure correct operation (Yes/No)	Yes	

Is a Chemical and slurry spreading exclusion zone 50m around the source	Yes	
Is there any known lead piping to the supply	No	
Other and Miscellaneous continued		
Details of outbuildings or troughs (e.g. appropriate backflow protection to prevent contamination of the drinking water	7 Toughs 1 shower unit 1 toilet 1 kitchenette (day room)	
How will the reports and records be kept, for the Borehole, treatment plant etc	Hard copies will be filled and copies kept on an external hard drive.	

Supply Schematics:

Schematic diagram of supply (from source to tap including any intermediate storage vessels and distribution points such as troughs, agriculture etc)



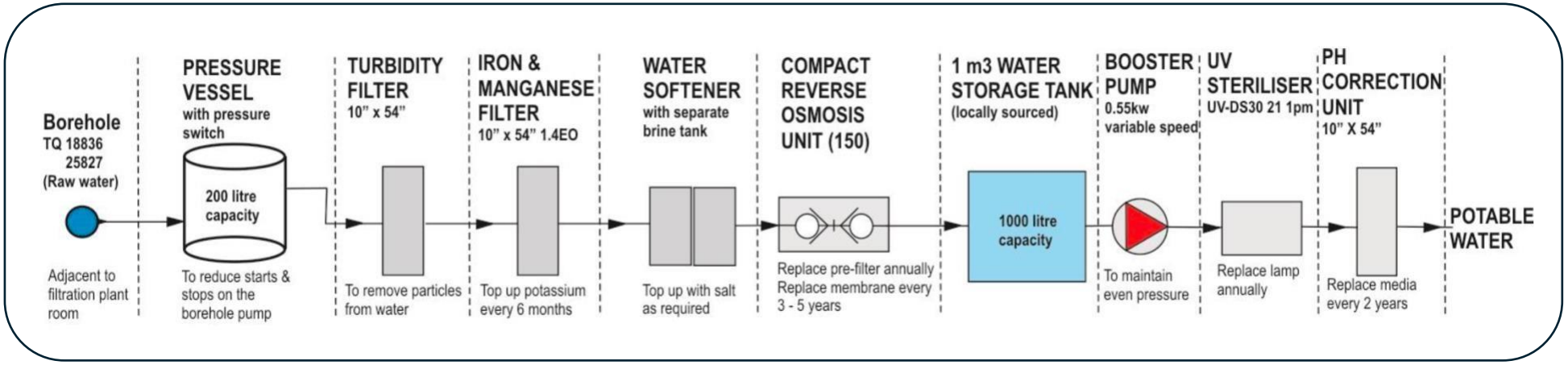
SCHEMATIC PLAN 1:

WATER DISTRIBUTION
DIAGRAM

SCHEMATIC PLAN 2:

SCHEMATIC DIAGRAM OF TREATMENT SYSTEM(S)

WATERFILTERATION SYSTEM



Properties served by the supply

Name Owner	Property address	Contact details
Mr & Mrs Newell	Limekiln Farm, Broadwater Lane, Copsale, West Sussex, RH13 6QW	M: 07534003643 E: limekilnfarm22@gmail.com

EMERGENCY ACTION PLAN

State what will happen in the event of an emergency (e.g. power failure, bacterial failure, drought etc)

In the event of an emergency the following procedure should be adopted:

1. Stop using any of the water supply
2. Contact SGE (Seal) Ltd for emergency advice and attendance on site on 01273 761724

Maintenance checks:

Item	Action	Frequency	Person responsible
Catchment tank	Clean tank and assess structural condition	N/A	
Storage tank	Clean tank and assess structural condition	If structurally sound annually	Owner
Backflow protection measures	Check any backflow protections are functioning correctly	Weekly	Owner
Sediment Pre filter(s)	Check sediment filter condition and replace accordingly	Annually	Owner
Treatment System Servicing	Service treatment system in line with manufacturer guidelines	Annually	SGE (Seal) LTD
Failsafe System	Check and test that failsafe systems are operating correctly	Weekly via visual and audible alarm	Owner
Filtration components	Visual check	Daily	Owner
Water toughs	Visual check	Daily	Owner
Water purifier	Top up salt in water purifier as required	Weekly	Owner
Potassium levels	Check Potassium levels and top up if required	6 monthly	Owner
UV Lamp	Replace the bulb in the UV Lamp	Annually	Owner
Steriliser UV	Replace steriliser UV Lamp	Annually	Owner
pH Levels	Replace pH correction media	2 yearly	Owner
RO pre-filter	Replace RO pre-filter	3 – 5 years	Owner