

Groundwater Investigation Report

Site: Land Adjacent Centenary Road,
Southwater,
Horsham,
West Sussex,
RH13 9FU

Client: Miller Homes

Report reference: BH1532 Version: 0

Date: 08th April 2025

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Co-author: Dr Stephen Buss MA MSc FGS CGeol – Consulting Hydrogeologist



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1.0 Introduction

As part of a planning application for development at Centenary Road two boreholes are required to provide a duty standby regime for provision of the water supply to the estate. Nicholls Boreholes constructed and tested two abstraction boreholes between July and October 2024 in accordance with EA consent number S/2024/342 This consisted of drilling, combination pumping and monitoring of both boreholes.

Prior to the EA abstraction licence and planning approval being granted for the development, there is no requirement for any borehole water usage.

This report describes the site investigation, on-site works and includes the results of water quality testing and the initial design.

2.0 Site Investigation

Whilst the drilling of a borehole for the purposes of providing a drinking water supply does not fall directly into the specific work referenced in BS 5930:2015, there are some relevant, generalised sections which are applicable. These relevant processes are followed and are documented within this report.

Prior to commencement of any construction, site investigation was carried out in order to satisfy the Primary Objectives of BS5930:2015 Clause 4 and subsequent Sections 2 and 3 of the same standard. The basis for investigation was to identify a suitable aquifer which has a satisfactory water quality and can provide long-term sustainability. The basis for investigation also intended to prove no hydrogeological connection to the Hardham Basin.

2.1 Desktop Study

The desktop research carried out by WSP in September 2023 concluded the review of various sources of which the findings are summarised in the below table of information.

Investigation	Findings
Expected Geology – Taken from the BGS online portal and local BGS logs	Weald Clay Formation
Stability of the Geology	The strata is expected to be stable, subject to made up ground and soil deposits above the strata.
Expected Yield and Rest Water Levels	Yield is expected to be 75 to 85 m ³ /d at upto 100 m BGL
Aquifer Risks	Being from the Weald Clay there is a risk that water may be brackish.
Locality to SPZ	Confirmation that the site is not within an existing SPZ - the nearest SPZ being 9km South West of the site.
Risks to Water Quality	The area is not contained within a Nitrate Vulnerable Zone.
SNWRZ (Sussex North Water Resource Zone)	The target aquifer is stratigraphically and hydrogeologically separated from the Hardham Basin (Lower Greensand). The Hardham Basin abstractions are 14 km south west from the site.

References; BGS GeoIndex Onshore // Dr Stephen Buss MA MSc FGS CGeol

In addition to this, a desktop survey was carried out to identify water features in the locality of the boreholes. This survey highlighted an existing borehole at Pollards Farm 280m away. It also notes several shallow ponds and stream. This information was submitted to the EA as part of the pre-application.

2.2 History of the site

The land has no previous history of development and has been in agricultural use until 2020 when it was planted with a cash crop of Poplar trees which are being actively managed and harvested. The history of the site identifies a low risk for mining, quarrying, landfilling and ground contamination.

2.3 Topographical Review

The site is in the catchment of the River Adur, south of Southwater. This location is not in the Hardham Basin (Folkestone Beds) or the Chichester and Worthing Chalk, nor in the catchment of the River Rother.

The immediate environs of the borehole are agricultural use land to the South, the A24 trunk road bounds the Eastern edge and a housing development to the Northern boundary. The ground around the borehole is relatively flat and level.

2.4 Source Protection

Development of a water supply borehole leads to the creation of a default 50 m radius source protection zone (SPZ). **Appendix A** shows the 50 m radius over Google Earth imagery.

This image shows that the area is mostly grassland and forestry to the South, the housing development to the North is served by mains drainage and there the A24 to the East is served by surface water storm drains.

Activities that are prohibited within a SPZ are potentially very polluting such as land fill, construction of filling stations or chemical works etc. none of which are found within 1 Km of the site. Normal domestic/ agricultural activities are not prohibited within a SPZ 1.

Full details of the activities that are and are not permitted are contained within the Environment Agency's groundwater protection position statements.

The intended site is not within a Nitrate Vulnerable Zone (NVZ)

2.5 Conclusion on Desktop investigation

The investigatory work carried out prior to the construction of the water wells identified the general area, with the specific 2 primary locations being selected using the services of an independent water diviner. The site was deemed suitable and identified a minimal risk of contaminated land, mining, landfilling and quarrying.

The EA provided a consent to drill, no. S/2022/342 in accordance with the Water Resource Act 1991 Section 197. This consent to drill took into consideration the factors documented in the investigatory works and notably dictated the design of the borehole.

A pre-construction borehole design schematic was drawn up by Nicholls to represent the findings of the investigations.

The water sampling parameters were designed based on the usage being a public supply. Guidance was taken from the DWI Regulation on Private Water Supplies 2016 No. 618 which sets out the parameters (Group A and B) of sampling required for water intended for human consumption. After consultation with Environmental Health and Stephen Buss, further sampling suites above Group A and B were deemed unnecessary. The expected quality of the water was deemed to be suitable for filtration, which could ultimately enable its usage as a private supply.

2.6 On Site Investigation

The onsite investigation confirmed the locations of the boreholes, the suitability and above ground safety of drilling.

The locations highlighted in the water features survey were observed and the environs of the borehole were confirmed as per the desktop study. Additionally, the area owned by the Estate and the surrounding areas of public rights of way were visually inspected to confirm that no additional water features or evidence of potential contamination were present.

3.0 Borehole Construction

Risk assessments were carried out following the investigation work and in accordance with BS5930:2015 Clause 5, to provide a safe system of works for the construction phase.

All Nicholls Boreholes lead drillers have a minimum of 10 years' experience in the field of drilling, are NVQ Level 2 Land Drilling accredited, which is a nationally recognised qualification promoted and run by the British Drilling Association, as well as being SMSTS qualified and first aid trained. Nicholls is also a member of the Water Reg UK advisory body.

3.1 Methodology

A rotary drilling methodology, with a re-circulating mud flush, was selected given the expected geology. The boreholes were drilled based on the design of the schematic shown in **Appendix B**. The boreholes were drilled using the best practices set out in the British Drilling Association manual for Rotary Drilling.

During the drilling process, the arisings were captured by the lead driller every 10m or change in formation type (recognised by changes in drilling torque, weight on bit and confirmed by visual changes in arisings). This is in accordance with BS5930:201 and EA consent no S/2024/342.

3.2 Borehole Construction

The two abstraction boreholes were constructed using rotary flush technique. These were constructed in accordance with the approved well design.

Borehole 1 Drilling –Appendix C

Location:	TQ 16161 24942
Ground level:	48.3 m AOD
Drilling date:	29-07-2024 to 30-07-2024
Construction details:	<p>The borehole was drilled using a recirculating mud flush to drill to 100mbgl at a diameter of 241mm.</p> <p>The borehole was then lined with 125mm UPVC slotted liner from 12mbgl to 99.5mbgl with a 0.5m solid sump and 125mm UPVC solid liner from 12mbgl to the surface. The annulus between the liner and borehole was filled with shingle to 7mbgl before the well was then airlifted to allow the shingle to settle. Additional shingle was installed to account for settlement and then mikolit pellet grout was installed from 7mbgl to the surface. Following the construction of the well, it was then air lifted again to remove any remaining drill fluids.</p>

Due to the drilling methodology, water strikes were challenging to identify but have been recorded at 6m, 36m and 60m below ground level. The geology encountered comprised mudstone with siltstone bands to 100 m depth. Detail can be found within appendix C

Borehole 2 Drilling –Appendix C.1

Location:	TQ 16171 24945
Ground Level:	48.3m AOD
Drilling date:	15-07-2024 to 19-07-2024
Construction details:	<p>The borehole was drilled using a recirculating mud flush to drill to 100mbgl at a diameter of 241mm.</p> <p>The borehole was then lined with 125mm UPVC slotted liner from 12mbgl to 97mbgl with a 0.5m solid sump and 125mm UPVC solid liner from 12mbgl to the surface. The annulus between the liner and borehole was filled with shingle to 7mbgl before the well was then airlifted to allow the shingle to settle. Additional shingle was installed to account for settlement and then mikolit pellet grout was installed from 7mbgl to the surface. Following the construction of the well, it was then air lifted again to remove any remaining drill fluids.</p>

Due to the drilling methodology, water strikes were challenging to identify but have been recorded at 6m, 40m and 60m below ground level. The geology encountered comprised mudstone with siltstone bands to 100 m depth. Detail can be found within appendix C

3.3 Geology

The boreholes' logs have been written and are attached with this report under **appendix C**. These have been completed using the arisings and analysis carried out by the lead driller and in house geologist.

4.0 Proof/ Test Pumping

Development pumping was carried out over multiple attendances to fully establish the potential yield for the well and ensure that this yield was achievable and sustainable.

Borehole 1 Proof Test Pumping – 25.07.2024 (Appendix D)

The well was initially dipped to measure the rest water level (8.40mbgl). Prior to installation in the well, the borehole pumping equipment was sanitised. The borehole pump was then installed to a depth of 60mbgl. The development pumping was carried out for a 4 hour period at a maximum flow rate of 45 litres per minute where a static water level was observed at 15.25mbgl.

Borehole 2 Proof Test Pumping – 29.08.2024 (Appendix D.1)

The well was initially dipped to measure the rest water level (8.92mbgl). Prior to installation in the well, the borehole pumping equipment was sanitised. The borehole pump was then installed to a depth of 60mbgl. The development pumping was carried out for a one hour period at a maximum flow rate of 45 litres per minute where a static water level was observed at 13.53mbgl.

4.1 Environment Agency proof Test Pumping

48Hr Constant rate – 55m³/day – 10.09.24 – 19.09.24

BH1 and 2 were tested independently, each on test for 48hrs. while one is on test the second borehole was monitored to identify any impact.

The boreholes were shown to be capable of maintaining these abstraction volumes. On completion of the testing the data was reviewed and submitted to Dr Stephen Buss for the generation of a HIA report which was subsequently submitted to the EA. The HIA report contains a more detailed review of the data and conclusions. The EA will review the HIA report as part of the full licence application.

5.0 Raw Borehole Water Quality Testing

5.1 Sampling

The samples were collected by a Nicholls engineer certified under the DWI certification of persons scheme for sampling private water supplies in accordance with ISO 5667-11. The volume of all boreholes was calculated approximately to be 1m³, this allows us to ensure the wells are pumped for an appropriate amount of time to ensure a representative sample. During the sampling the engineer ensured that samples were not contaminated and oversaw the transportation of the samples in a temperature-controlled container for storage within a temperature-controlled refrigerator at Nicholls office until the collection. The collection of the group A & B samples was done by a South East Water courier, who transferred to a temperature controlled vehicle and transported to South East Waters laboratory within 24 hours of sampling. Water samples were analysed by South East Water Scientific Services, which is a UKAS accredited lab.

Group A & B water samples were collected from each well at pump depth after a period of at least 1 hour of continuous running at a flow rate of 45lpm to ensure a representative sample of water from the aquifer. The analysis report is shown in **Appendix E**.

5.2 Water sample analysis

The analysis of all samples concluded that ammonium, odour, coliforms, conductivity, turbidity, sodium, iron and manganese were above the thresholds in the Private Water Supplies (England) Regulations 2016.

Hardness was analysed as 980.5mg CaCO₃/L and 1355.8mg CaCO₃/L, while there is no UK drinking limit for hardness, It is safe for consumption but will cause significant scale over time. A high level also restricts the use of certain filtration methods that would otherwise be used.

A marginal level of bacteria was present, above the regulatory limits. Whilst all our equipment is sanitised prior to each installation, we cannot guarantee low levels of bacteria influencing the results. Regardless of the origin of the bacteria, the final filtration system will need to include filtration to combat potential bacteria which we will detail in the concept design.

6.0 Concept design

The design below is based on the usage of both boreholes as duty standby. The filtration system will be suitable to treat 55m³ per day for the full developments daily requirements. The design in **Appendix F** is intended as the concept design only and has been prepared prior to any detailed technical design and specification.

Using the design in **Appendix F** you can follow the flow of water through the system with the text below.

- Stage One** Turbidity filter – to remove particulate (turbidity), including some FeIII iron
- Stage Two** Iron filter – To remove the remaining iron.
- Stage Three** Chemical dosing - The water will then be treated with a chemical mix to ensure remaining iron, manganese and hardness is kept in solution prior to RO.
- Stage Four** Reverse osmosis – To ensure all the other levels are kept below the UK drinking limits
- Stage Five** UV filter - in order to de-nature bacteria including cryptosporidium
- Stage Six** Storage tank – A chlorine dosing unit will cycle water through a separate line monitoring chlorine concentration in the water. This dosing unit will maintain a set chlorine level to denature the bacteria in the tank and ensure free chlorine levels are kept to the required volume at all outlets.
- Stage seven** Multistage booster set – sized accordingly to supply the correct flow and pressure to the network

Stage eight Sediment filter – to remove any remaining particulate within the water, to bring the level below the UK drinking water limit. The water is then distributed through the network.

Overarching – throughout the system telemetry links to all the filtration and treatment stages. The telemetry system will input a level of automatic control on the system. Additionally, the telemetry will be monitored remotely, allowing easy diagnostics and system amendments as well as warnings which could help pre-empt potential maintenance requirements.

Emergency Backup – the water storage tank will have a CAT 5 complaint turret which will provide an emergency backup supply, should there be a system outage or failure within the filtration. This will be from an existing mains water supply.

7.0 Regulatory Compliance

7.1 Sampling and Testing Regime

In accordance with the Private Water Supplies (England) Regulations 2016 Regulation 9, under which the development falls, monitoring of the parameters will be as listed in Part 1 of schedule 1, analysed twice per year, and monitoring of parameters in part 2 of schedule 1, analysed twice per year. Sampling over the requirements of Part 1 and 2 of Schedule 1 will additionally be carried out as outlined in the local authority risk assessment at the specified intervals. The contaminants that have already been analysed in excess of the standards (as laid out in Schedule C.1) are included within Part 1 of schedule and as such will be sampled twice per year.

In the case of a failure to any of the parameters the development will be supplied with mains water through the compliant emergency mains water backup built into the filtration system. This will ensure that the development will maintain a wholesome supply. Once the mains supply has been implemented, the development will engage with a competent organisation to carry out a full investigation into the cause of the failure and rectify the cause. The outcome of the investigation will ultimately dictate the additional required monitoring and potential maintenance that will be implemented on the area of the system deemed to have failed. Full details of the investigation procedure will be provided within the Water Safety Plan.

7.2 Maintenance and Servicing

Servicing will be required at by yearly intervals throughout the year to ensure the system is maintained to continue to deliver a wholesome supply at all times. In addition to the maintenance, regular visual inspections will be carried out by the appointed persons in accordance with the stipulations from the local authority and water safety plan by the appointed persons. Servicing arrangements will also include any additional requirements as identified as by the local authority.

Full details of the servicing are to be provided within the Water Safety Plan.

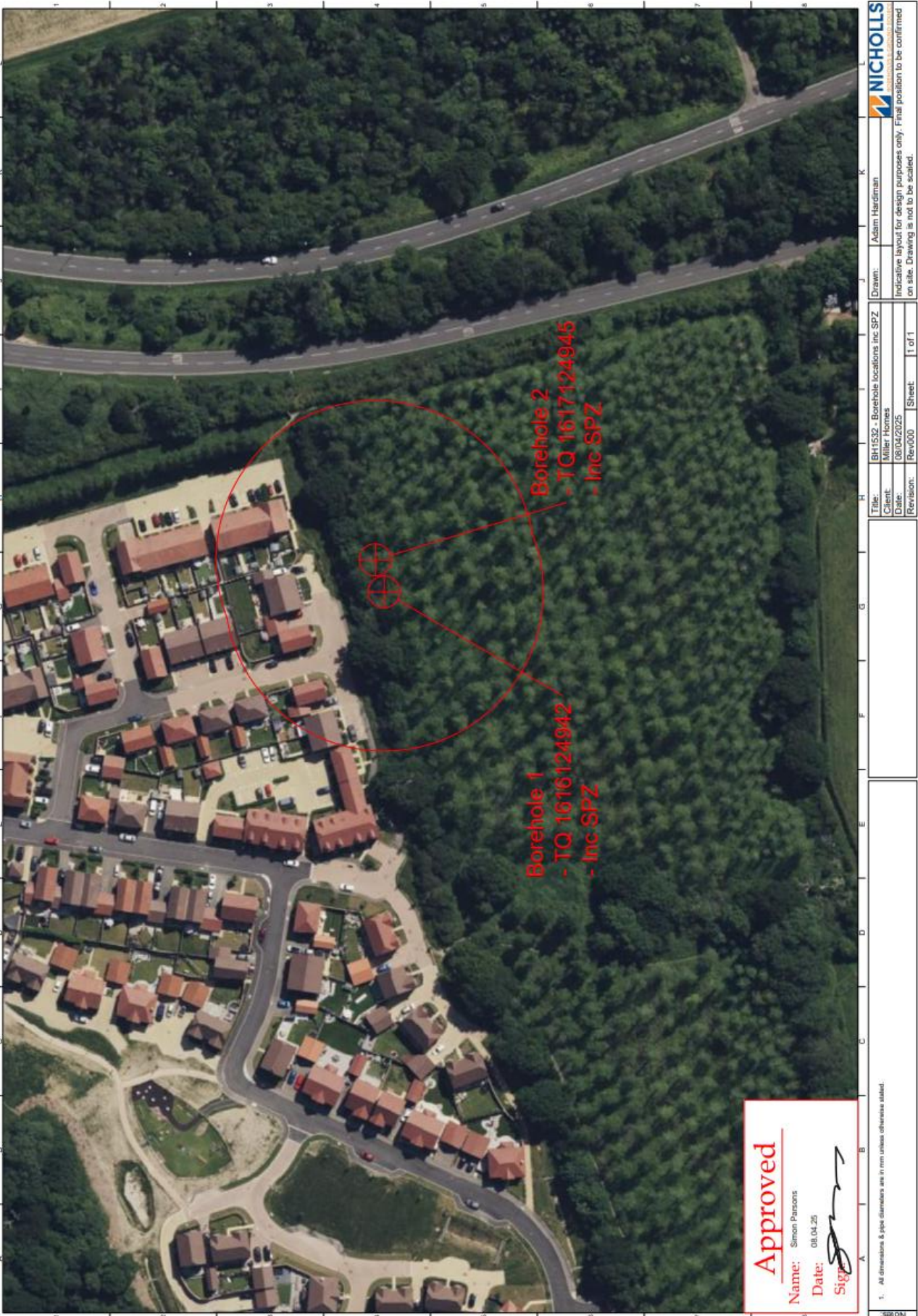
In the event of equipment failure, a stock of replacement parts will be kept within the plant room to ensure that the supply can be re-initiated as soon as possible. In the event that the supply from the boreholes is interrupted, the mains backup will be implemented to ensure a wholesome supply to the development. Full details of the equipment failure procedure will be provided within the Water Safety Plan.



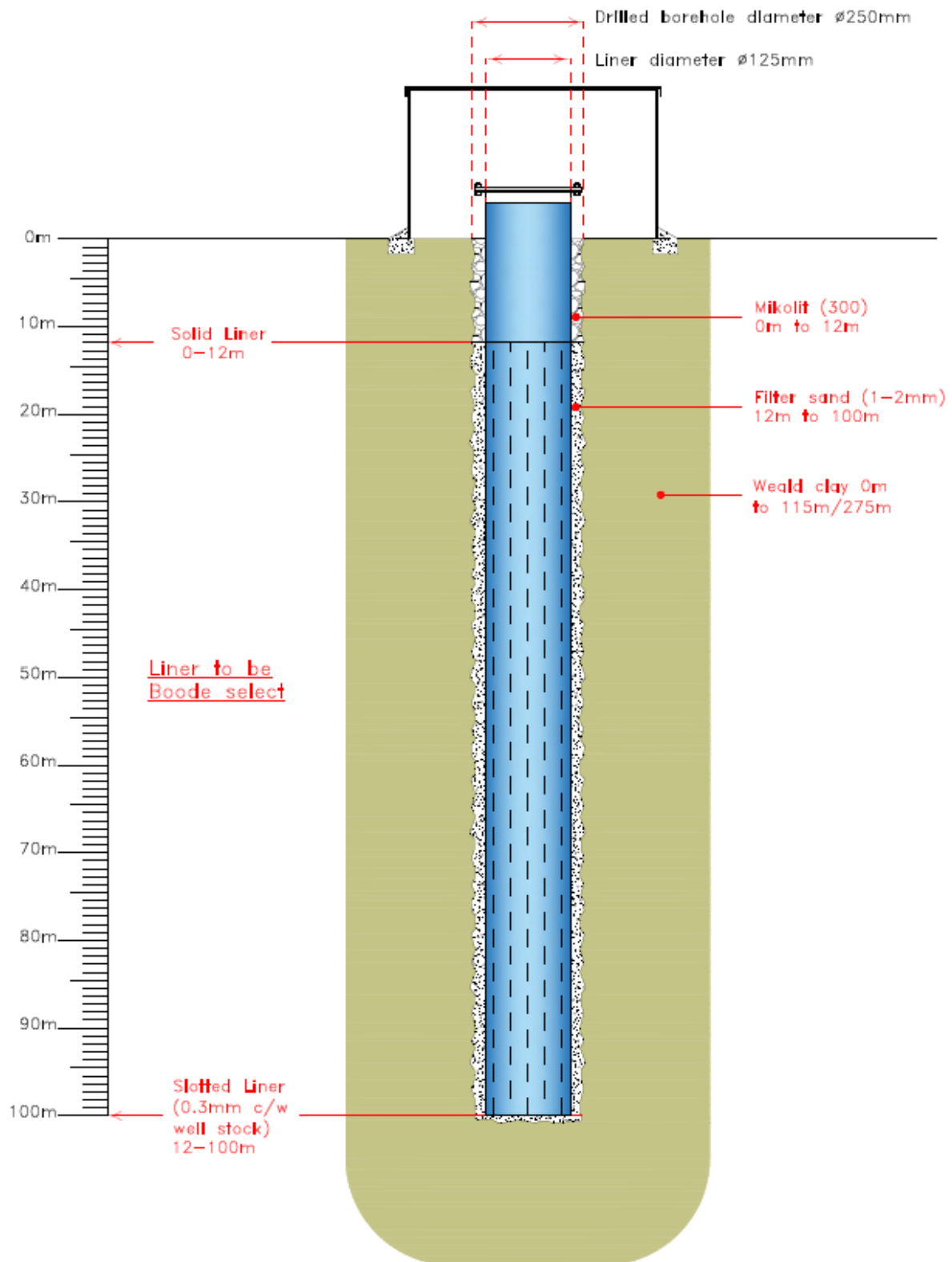
7.3 Record Keeping

Servicing and sampling records will be completed after each service and a hard copy of these will be kept in the plant room within the Water Safety Plan, with a digital copy being provided to the relevant parties and retained by the service provider. Full details of the required record keeping will be provided in the Water Safety Plan.

Appendix A



Appendix B



Appendix C BH1

WR38: Borehole record form

Borehole record form



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Environment
Agency

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

A Site details

Borehole drilled for Miller Homes Ltd
 Location Centenary Road, Southwater, Horsham, RH13 9FU
 NGR (ten digits) TQ 1818124942 Please attach site plan
 Ground level (if known) 48 metres Above Ordnance Datum
 Drilling company Nicholls Boreholes
 Date drilling commenced 29/07/2024 (DD/MM/YYYY) Completed 30/07/2024 (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 241 mm from 0 to 100 m/depth
 mm from to m/depth
 mm from to m/depth
 mm from to m/depth

Casing material Solid uPVC diameter 125 mm from 0 to 12 m/depth
 and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material Slotted uPVC w/ cap diameter 125 mm from 12 to 99.5 m/depth
 Casing material diameter mm from to m/depth
 Casing material diameter mm from to m/depth

Grouting details 192 x 25kg bags of washed shingle; 18 x 25kg bags of Mikolit

Water struck at 1. 6 m (depth below datum – mbd) 2. 36 m (mbd)
 3. 60 m (mbd) 4. m (mbd)

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

Test pumping datum 1.3 m. Please tick if this is above ☒ or below ☐ ground level.
 (if different from borehole datum)

Pump suction depth 60 mbd

Water level (start of test) 8.40 mbd

Water level (end of test) 13.77 mbd

Type of test (for example, bailer, step, constant rate)

Constant Rate

Pumping rate 41.7 m³/hour ☐ or litres/second ☒. Please tick as appropriate.

for 2 days, 0 hours, 0 mins

Recovery to 9.02 mbd in 0 days, 4 hours, 0 mins
 (from end of pumping)

Date(s) of measurements Pump started 07/09/2024 (DD/MM/YYYY)

Pump stopped 12/09/2024 (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
	<p>TOP SOIL - CLAYEY SILTY LOAM</p> <p>Grey CLAY, SILTSTONE and MUDSTONE [Weald Clay Formation] comprising depth samples:</p> <p>light brown soft sticky wet CLAY w/ firm, brittle dark brown angular SILTSTONE @3m</p> <p>grading into brown mottled grey firm moist CLAY with occasional black organic specs and light grey irregular interbedded SILTY MUDSTONE @ c. 3-20m</p> <p>soft grey CLAY with occasional firm grey SILTSTONE @ 30m</p> <p>dry dark grey SHALE with firm light grey porous SILTSTONE matrix @ 40m</p> <p>grey dry firm v fine SILTY MUDSTONE with rare light brown mottled very fine grained SAND, subangular moderately sorted @ c. 50 - 70m</p> <p>grey SILTY MUDSTONE with CLAY turbidity and inclusions of grey SILTSTONE @ c. 80 - 90m</p> <p>light grey SILTY CLAY with lenses of SILTS and brown mottled ferrous staining @ 100m</p>	<p>0.7</p> <p>39.3</p> <p>60</p>	<p>0.7</p> <p>40</p> <p>100</p>
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this formHow long did it take you to fill in this form? **For Official use only**

Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Accession number	Wellmaster number	SOBI number	NGR
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
LIC NO	Purpose		EA reference number
<input type="text"/>	<input type="text"/>		<input type="text"/>
Copy number	Entered by		
<input type="text"/>	<input type="text"/>		

Appendix C.1 BH2

WR38: Borehole record form

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 Miller Homes Ltd
 Location Centenary Road, Southwater, Horsham, RH13 9FU
 NGR (ten digits) TQ 1617124945 Please attach site plan
 Ground level (if known) 46 metres Above Ordnance Datum
 Drilling company Nicholls Boreholes
 Date drilling commenced 15/07/2024 (DD/MM/YYYY) Completed 19/07/2024 (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 241 mm from 0 to 100 m/depth
 mm from to m/depth
 mm from to m/depth
 mm from to m/depth

Casing material Solid uPVC diameter 125 mm from 0 to 12 m/depth
 and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material Slotted uPVC w/ cap diameter 125 mm from 12 to 97 m/depth

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Grouting details 190 x 25kg bags of washed shingle; 22 x 25kg bags of Mikolit

Water struck at 1. 6 m (depth below datum – mbd) 2. 40 m (mbd)
 3. 60 m (mbd) 4. m (mbd)

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

Test pumping datum 1.2 m. Please tick if this is above ☒ or below ☐ ground level.
 (if different from borehole datum)

Pump suction depth 60 mbd

Water level (start of test) 8.28 mbd

Water level (end of test) 12.78 mbd

Type of test (for example, bailer, step, constant rate)

Constant Rate

Pumping rate 40.9 m³/hour ☐ or litres/second ☒. Please tick as appropriate.
 for 2 days, 0 hours, 0 mins

Recovery to 9.35 mbd in 0 days, 4 hours, 0 mins
 (from end of pumping)

Date(s) of measurements Pump started 17/09/2024 (DD/MM/YYYY)

Pump stopped 19/09/2024 (DD/MM/YYYY)

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

E Completing this form

For Official use only

Date received (DD/MM/YYYY)

File

Consent number

BGS reference number

Accession number

Wellmaster number

SOBI number

NGR

LIC NO

Purpose

EA reference number

Copy number

Entered by

Appendix D BH1



Operator Name	M.V	Project Number	BH1532 BH1			
Address	Centenary Road, Southwater, RH13 9FU					
BH Number per site drawing	BH1	Date	25.07.24			
Installation Method (please circle)	Terex One	Terex Two	Yellow Tow Behind Reeler	Narrow Black Reeler	Wide Black Reeler	By Hand
Left on site? (please circle)	Yes			No		
Pump Used	Franklin V52/10					
Motor Used	0.55kw					
Timer Fitted	Yes/No	Type	On for	Off for		
Well Depth (m) (From dip-meter reading)	97m					
Pump Depth (m) (from Team Up and/or PM)	60m					
Rest Water Level at Start (m) (From dip-meter reading)	8.40m					
Start stop watch before turning pump on						
Draw Down (please circle)	Static level achieved for at least 1h			To pump		
	Time ran for (min)	280 min		Time taken (min)		
	Depth (m)	15.25m		Depth (m)		
	Max flow rate (L/m)	45 LPM		Max flow rate (L/m)		
Pump Restricted	Yes/No	Pump restricted to (L/m)				
Draw Down Test Pumping Regime						
Time taken to draw down (min) PHONE OFFICE ONCE RESULTS ARE IN FOR THIS BEFORE PACKING UP	First run					
	10 min rest					
	10 min rest					
	20 min rest					
Recovery rate (m/min)						
Samples Taken (please circle)	Yes/No	Lab sample		Office sample		
Rest water level at end (m)	15.25m					
Total Quantity Pumped (L)	12905L					
Development flow rate (L/min)						
Timer fitted	Timer Type		On for (min)		Off for (min)	
Notes	Ready for sampling					

Appendix D.1 BH2

Operator Name	M.V	Project Number	BH1532 BH2			
Address	Centenary Road, Southwater, RH13 9FU					
BH Number per site drawing	BH2		Date		29.08.24	
Installation Method (please circle)	Terex One	Terex Two	Yellow Tow Behind Reeler	Narrow Black Reeler	Wide Black Reeler	Weasel
Left on site? (please circle)	Yes			No		
Pump Used	Franklin VS3/10					
Motor Used	0.75kw					
Timer Fitted	Yes/No	Type	On for		Off for	
Well Depth (m) (From dip-meter reading)	97m					
Pump Depth (m) (from Team Up and/or PM)	60m					
Rest Water Level at Start (m) (From dip-meter reading)	8.92m					
Start stop watch before turning pump on						
Draw Down (please circle)	Static level achieved for at least 1h			To pump		
	Time ran for (min)	82 min		Time taken (min)		
	Depth (m)	13.53m		Depth (m)		
	Max flow rate (L/m)	45 LPM		Max flow rate (L/m)		
Pump Restricted	Yes/No	Pump restricted to (L/m)		45LPM		
Draw Down Test Pumping Regime						
Time taken to draw down (min)	First run					
PHONE OFFICE ONCE RESULTS ARE IN FOR THIS BEFORE PACKING UP	10 min rest					
	10 min rest					
	20 min rest					
Recovery rate (m/min)						
Samples Taken (please circle)	Yes/No	Lab sample		Office sample		
Rest water level at end (m)	9.14m					
Total Quantity Pumped (L)	2974L					
Development flow rate (L/min)						
Timer fitted	Timer Type		On for (min)		Off for (min)	
Notes	Ready for sampling					

Appendix E BH1

South East Water Scientific Services
3 Columbus Drive, Farnborough
Hampshire, GU14 0NZ
E-Mail: sales@southeastwater.co.uk
Website: www.sewservices.co.uk



ANALYTICAL REPORT

Page 1 of 3

NICHOLLS BOREHOLES

Brownings Barn

Glasshouse Lane

Kirdford

West Sussex

RH14 0LW

Collected From: BH1532 CENTENARY ROAD

Date Received: 12/09/2024

Certificate Number:

1306472-1 Final

Order Number:

BH1532

Date Reported:

15/10/2024

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4854626	Desc: BH1532 Collect From: BH1532 CENTENARY ROAD Order No: BH1532 Received Date: 12/09/2024 Tested Date: 12/09/2024 Sampling Date: 11/09/2024 13:00 Sample Type: GW : Ground Water Product: SS-DWREGS	255	Ammonium (Ammonia and Ammonium Ions)	3.647	mg/l	<0.500	F
		245	Nitrate	<0.9	mg/l	<50.0	
		225	Nitrite	<0.004	mg/l	<0.500	
		calc	Nitrite/Nitrate	0.000	mg/l	<1.000	*
		230	Odour - Qualitative	Rotten egg/Rotten vegetable			*
		230	Odour - Quantitative	2			F
		430	Colony Count 3 Days at 22°C	>300	cfu/ml		
		400	E coli	0	mpn/100ml	0	
		400	Total Coliforms	4	mpn/100ml	0	F
		660	Colour	<2	mg/l Pt/Co	<20	
		660	Conductivity	4850	uS/cm		F
		660	Hydrogen Ion (pH)	7.4	pH_unit	6.5 to 9.5	
		660	Turbidity	43.600	NTU	<4.000	F
		ext	Acrylamide	<0.003	µg / l	<0.100	
		ext	Epichlorohydrin	<0.1	µg / l	<0.10	*
		ext	Vinyl Chloride	<0.113	µg / l	<0.500	
		3401	Bromate	<0.8	µg / l	<10.0	
		390	Enterococci	0	cfu/100ml	0	
		5413	Total Cyanide	<4.1	µg / l	<50.0	
		765	Mercury	<0.04	µg / l	<1.00	
		745	Antimony	<0.2	µg / l	<5.0	
		745	Arsenic	<1.0	µg / l	<10.0	
		745	Selenium	<0.8	µg / l	<10.0	
		740	Boron	0.443	mg/l	<1.000	
		740	Calcium	183.2	mg/l		
		740	Magnesium	114.6	mg/l		
		740	Sodium	1054.0	mg/l	<200.0	F
		3371	Fluoride	0.506	mg/l	<1.500	
		3545	2,4,5-T	<0.007	µg / l	<0.100	
		3545	2,4-D	<0.007	µg / l	<0.100	

Certificate Number: 1306472-1 Final

Order Number: BH1532

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4854626	Continued from Page 1	3545	Bentazone	<0.007	µg / l	<0.100	
		3545	Bromoxynil	<0.007	µg / l	<0.100	
		3545	Dicamba	<0.020	µg / l	<0.100	
		3545	Dichlorprop	<0.003	µg / l	<0.100	
		3545	Fluroxypyr	<0.008	µg / l	<0.100	
		3545	MCPA	<0.008	µg / l	<0.100	
		3545	MCPB	<0.008	µg / l	<0.100	
		3545	Mecoprop (MCPP)	<0.005	µg / l	<0.100	
		3545	Triclopyr	<0.015	µg / l	<0.100	
		2587	Atrazine	<0.002	µg / l	<0.100	
		2587	Carbendazim	<0.001	µg / l	<0.100	
		2587	Carbetamide	<0.002	µg / l	<0.100	
		2587	Chloroburon	<0.003	µg / l	<0.100	
		2587	Diuron	<0.004	µg / l	<0.100	
		2587	Epoxiconazole	<0.003	µg / l	<0.100	
		2587	Flutriafol	<0.003	µg / l	<0.100	
		2587	Isoproturon	<0.003	µg / l	<0.100	
		2587	Linuron	<0.003	µg / l	<0.100	
		2587	Oxadixyl	<0.003	µg / l	<0.100	
		2587	Pendimethalin	<0.007	µg / l	<0.100	
		2587	Prometryn	<0.002	µg / l	<0.100	
		2587	Propazine	<0.002	µg / l	<0.100	
		2587	Simazine	<0.003	µg / l	<0.100	
		2587	Terbutryn	<0.002	µg / l	<0.100	
		2587	Trietazine	<0.004	µg / l	<0.100	
		480	Benzo (a) pyrene	<0.003	µg / l	<0.010	
		480	Benzo(1,12)perylene	<0.003	µg / l		
		480	Benzo(11,12)fluoranthene	<0.003	µg / l		
		480	Benzo(3,4)fluoranthene	<0.003	µg / l		
		480	Indeno(1,2,3-cd)pyrene	<0.003	µg / l		
		calc	PAH Total	0.000	ug/l	<0.100	*
		775	1,1,1 Trichloroethane	<0.60	µg / l		
		775	1,2-Dichloroethane	<0.12	µg / l	<3.00	
		775	Benzene	<0.02	µg / l	<1.00	
		775	Dibromochloromethane	<0.50	µg / l		
		775	Dichlorobromomethane	<0.43	µg / l		
		775	Tetrachloroethene	<0.15	µg / l	<10.00	
		calc	Tetrachloroethene/Trichloroethene- Sum	0.00	µg / l		*
		775	Tetrachloromethane	<0.11	µg / l	<3.00	
		calc	Total Trihalomethanes	0.00	µg / l	<100.00	*
		775	Tribromomethane	<0.60	µg / l		
		775	Trichloroethene	<0.10	µg / l	<10.00	
		775	Trichloromethane	<0.50	µg / l		
		730	Aluminium	<6.1	µg / l	<200.0	
		730	Iron	3241.7	µg / l	<200.0	F

Certificate Number: 1306472-1 Final

Order Number: BH1532

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4854626	Continued from Page 2	730	Manganese	180.4	µg / l	<50.0	F
		735	Cadmium	<0.12	µg / l	<5.00	
		735	Chromium	0.5	µg / l	<50.0	
		730	First Draw Copper	<0.009	mg/l	<2.000	
		730	First Draw Lead	<0.9	µg / l	<10.0	
		730	First Draw Nickel	<0.9	µg / l	<20.0	
		360	Clostridium perfringens	0	cfu/100ml	0	*
		calc	(Including spore				
			Pesticides - Total Substances	0.000	ug/l		
		5823	Aldrin	<0.007	µg / l	<0.030	
		5823	Dichlobenil	<0.004	µg / l	<0.100	
		5823	Dieldrin	<0.006	µg / l	<0.030	
		5823	Gamma-HCH (Lindane)	<0.010	µg / l	<0.100	
		5823	Heptachlor	<0.009	µg / l	<0.030	
		5823	Heptachlor Epoxide	<0.005	µg / l	<0.030	
		5823	Propyzamide	<0.005	µg / l	<0.100	
		5823	Tri-allate	<0.005	µg / l	<0.100	
		730	Iron (Free)	<7.3	µg / l		
		calc	Hardness (CaCO3)	980.5	mg CaCO3/l		
		295	Gross Alpha	0.04	Bq/l	<0.10	
		295	Gross Beta	<0.28	Bq/l	<1.00	

Appendix E BH2

South East Water Scientific Services
3 Columbus Drive, Farnborough
Hampshire, GU14 0NZ
E-Mail: sales@southeastwater.co.uk
Website: www.sewsscientificservices.co.uk



ANALYTICAL REPORT

Page 1 of 3

NICHOLLS BOREHOLES

Brownings Barn

Glasshouse Lane

Kirdford

West Sussex

RH14 0LW

Date Received: 19/09/2024

Certificate Number:

1310920-1 Final

Order Number:

BH1532 BH2

Date Reported:

30/10/2024

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4861291	Desc: RAW BOREHOLE WATER Order No: BH1532 BH2 Received Date: 19/09/2024 Tested Date: 19/09/2024 Sampling Date: 18/09/2024 10:55 Sample Type: GW : Ground Water Product: SS-DWREGS	255	Ammonium (Ammonia and Ammonium Ions)	4.266	mg/l	<0.500	F
		245	Nitrate	<0.9	mg/l	<50.0	
		225	Nitrite	<0.004	mg/l	<0.500	
		calc	Nitrite/Nitrate	0.000	mg/l	<1.000	*
		430	Colony Count 3 Days at 22°C	>300	cfu/ml		
		400	E coli	0	mpn/100ml	0	
		400	Total Coliforms	5	mpn/100ml	0	F
		660	Colour	<2	mg/l Pt/Co	<20	
		660	Conductivity	4460	uS/cm		F
		660	Hydrogen Ion (pH)	7.2	pH_unit	6.5 to 9.5	
		660	Turbidity	62.300	NTU	<4.000	F
		ext	Acrylamide	<0.012	µg / l	<0.100	
		ext	Epichlorohydrin	<0.1	µg / l	<0.10	*
		ext	Vinyl Chloride	<0.113	µg / l	<0.500	
		3401	Bromate	<0.8	µg / l	<10.0	
		390	Enterococci	0	cfu/100ml	0	
		5413	Total Cyanide	<4.1	µg / l	<50.0	
		745	Antimony	<0.2	µg / l	<5.0	
		745	Arsenic	<1.0	µg / l	<10.0	
		745	Selenium	<0.8	µg / l	<10.0	
		740	Boron	0.450	mg/l	<1.000	
		740	Calcium	286.7	mg/l		
		740	Magnesium	156.5	mg/l		
		740	Sodium	837.0	mg/l	<200.0	F
		3371	Fluoride	0.356	mg/l	<1.500	
		3545	2,4,5-T	<0.007	µg / l	<0.100	
		3545	2,4-D	<0.007	µg / l	<0.100	
		3545	Bentazone	<0.007	µg / l	<0.100	
		3545	Bromoxynil	<0.007	µg / l	<0.100	
		3545	Dicamba	<0.020	µg / l	<0.100	
		3545	Dichlorprop	<0.003	µg / l	<0.100	
		3545	Fluroxypyr	<0.008	µg / l	<0.100	

Certificate Number: 1310920-1 Final

Order Number: BH1532 BH2

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4861291	Continued from Page 1	3545	MCPA	<0.008	µg / l	<0.100	
		3545	MCPB	<0.008	µg / l	<0.100	
		3545	Mecoprop (MOPP)	<0.005	µg / l	<0.100	
		3545	Tridopyr	<0.015	µg / l	<0.100	
		2587	Atrazine	<0.002	µg / l	<0.100	
		2587	Carbendazim	<0.001	µg / l	<0.100	
		2587	Carbetamide	<0.002	µg / l	<0.100	
		2587	Chlortoluron	<0.003	µg / l	<0.100	
		2587	Diuron	<0.004	µg / l	<0.100	
		2587	Epoxiconazole	<0.003	µg / l	<0.100	
		2587	Flutriafol	<0.003	µg / l	<0.100	
		2587	Isoproturon	<0.003	µg / l	<0.100	
		2587	Linuron	<0.003	µg / l	<0.100	
		2587	Oxadixyl	<0.003	µg / l	<0.100	
		2587	Pendimethalin	<0.007	µg / l	<0.100	
		2587	Prometryn	<0.002	µg / l	<0.100	
		2587	Propazine	<0.002	µg / l	<0.100	
		2587	Simazine	0.008	µg / l	<0.100	
		2587	Terbutryn	<0.002	µg / l	<0.100	
		2587	Trietazine	<0.004	µg / l	<0.100	
		480	Benzo (a) pyrene	<0.003	µg / l	<0.010	
		480	Benzo(1,12)perylene	<0.003	µg / l		
		480	Benzo(11,12)fluoranthene	<0.003	µg / l		
		480	Benzo(3,4)fluoranthene	<0.003	µg / l		
		480	Indeno(1,2,3-cd)pyrene	<0.003	µg / l		
		calc	PAH Total	0.000	ug/l	<0.100	*
		775	1,1,1 Trichloroethane	<0.60	µg / l		
		775	1,2-Dichloroethane	<0.12	µg / l	<3.00	
		775	Benzene	<0.02	µg / l	<1.00	
		775	Dibromochloromethane	<0.50	µg / l		
		775	Dichlorobromomethane	<0.43	µg / l		
		775	Tetrachloroethene	<0.15	µg / l	<10.00	
		calc	Tetrachloroethene/Trichloroethene- Sum	0.00	µg / l		*
		775	Tetrachloromethane	<0.11	µg / l	<3.00	
		calc	Total Trihalomethanes	0.00	µg / l	<100.00	*
		775	Tribromomethane	<0.60	µg / l		
		775	Trichloroethene	<0.10	µg / l	<10.00	
		775	Trichloromethane	<0.50	µg / l		
		730	Aluminium	12.4	µg / l	<200.0	
		730	Iron	4835.2	µg / l	<200.0	F
		730	Manganese	176.0	µg / l	<50.0	F
		735	Cadmium	<0.12	µg / l	<5.00	
		735	Chromium	<0.5	µg / l	<50.0	
		730	First Draw Copper	<0.009	mg/l	<2.000	
		730	First Draw Lead	<0.9	µg / l	<10.0	

Certificate Number: 1310920-1 Final

Order Number: BH1532 BH2

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4861291	Continued from Page 2	730	First Draw Nickel	<0.9	µg / l	<20.0	
		360	Clostridium perfringens (Including spore	0	cfu/100ml	0	
		calc	Pesticides - Total Substances	0.008	ug/l		*
		5823	Aldrin	<0.007	µg / l	<0.030	
		5823	Dichlobenil	<0.004	µg / l	<0.100	
		5823	Dieldrin	<0.006	µg / l	<0.030	
		5823	Gamma-HCH (Lindane)	<0.010	µg / l	<0.100	
		5823	Heptachlor	<0.009	µg / l	<0.030	
		5823	Heptachlor Epoxide	<0.005	µg / l	<0.030	
		5823	Propyzamide	<0.005	µg / l	<0.100	
		5823	Tri-allylate	<0.005	µg / l	<0.100	
		730	Iron (Free)	<7.3	µg / l		
		calc	Hardness (CaCO3)	1355.8	mg CaCO3/l		*
		295	Gross Alpha	<0.02	Bq/l	<0.10	
		295	Gross Beta	<0.28	Bq/l	<1.00	
		230	Odour - Qualitative	None			*
		230	Odour - Quantitative	0			

Appendix F

