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ELIVIA HOMES EASTERN

FURNER'S LANE DEVELOPMENT

TIMBERLEY FARM PUMPING TEST REPORT

MAY 2025

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TIMBERLEY FARM PUMPING TEST REPORT

MAY 2025

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APPENDICES

DRAWINGS	TITLE	SCALE
ST20845-001	Area of Interest	1:200,000

1 INTRODUCTION

1.1 Background

1.1.1 Wardell Armstrong LLP ('WA') was commissioned by Elivia Homes Eastern ('the Client') to undertake a pumping test at Timberley Farm, Bury, West Sussex in support of water neutrality mitigation for a proposed housing development at Furners Lane, Henfield, West Sussex.

1.1.2 Elivia Homes Eastern is proposing two development sites within the Sussex North Water Supply Zone, which are proposing to demonstrate water neutrality through the use of the borehole at Timberley Farm. Water within the Sussex North Water Resource Zone, which is managed by Southern Water, is provided from four sources: groundwater (35%), rivers (51%), reservoirs (8%) and transfers (6%)[1]. Mains water supplied by Southern Water principally comes from its abstraction site in Hardham (Hardham Public Water Supply, or 'PWS'), in Horsham District, which abstracts groundwater from the Lower Greensand Aquifer. Natural England states the Hardham PWS is having a detrimental effect on Sites of Special Scientific Interest, which form part of the Arun Valley Special Protection Area (SPA), the Arun Valley Special Area of Conservation (SAC) and the Arun Valley Ramsar site.

1.1.3 Natural England has therefore advised Horsham District Council and Chichester District Council through position statements[2] that any new housing developments that would require water supply from the Sussex North Water Resource Zone must demonstrate *water neutrality* through submission of a Water Neutrality Statement, detailing the existing and proposed water supply demands and how water neutrality will be achieved.

1.1.4 The definition of water neutrality used by Natural England is that of Therivel et al.[3], which states: *"For every new development, total water use in the region after the development must be equal to or less than the total water use in the region before the new development."* The "region" referred to by Natural England in this definition is the Sussex North Water Resource Zone.

[1] Southern Water (2024), Draft Water Resources Management Plan 2024 [Online]. Accessed April 2025. Available at: https://www.southernwater.co.uk/media/5vhj1tuv/02-wrmp24-technical-report.pdf

[2] Horsham District Council (2023). *Water neutrality: Position statement and response* [Online]. Accessed April 2025. Available at: https://www.horsham.gov.uk/planning/water-neutrality-in-horsham-district/position-statement

[3] Therivel, R., Drury, C. and Hepburn, I. (2006). *Achieving Water Neutrality in the South East Region*. Discussion Paper. Oct. 2006.

1.1.5 Water neutrality can be achieved through a combination of water efficiency measures (which would reduce the water supply demand to a minimum) and off-setting (which would neutralise any remaining excess in water supply demand). Water supply offsetting is required using a private water supply abstraction located outside the Hardham Supply Zone.

1.1.6 A hydrogeological assessment was undertaken in 2023 by WA[4] of the potential effect (if any) of using water credits for the proposed development's mains water demand generated by transferring the water supply of Timberley Farm from the mains (supplied from Southern Water's Hardham Public Water Supply abstraction) onto a private groundwater abstraction located outside the Hardham supply zone.

1.1.7 The Hydrogeological Conceptual Site Model (HCSM) report[4] analysed and illustrated the potential effect of the small abstraction volume (≤20 m^3/d) proposed at Timberley Farm and its predicted localised extent upon groundwater levels in the vicinity of the farm. Critically, abstractions of such limited volume per day would only have a very localised effect on groundwater levels (restricted to within 50 m of the abstraction borehole) and consequently impacts would be unlikely to propagate as far as the nearest habitat site, Amberley Wild Brooks Nature Reserve, with its southern Lower Greensand boundary located approximately 600 metres to the north of the farm.

1.1.8 Natural England have reviewed the HCSM report and have deferred the determination of potential effects upon the habitat sites to Horsham council. Horsham council has requested additional data (pumping test data and water quality testing results) to make its determination in relation to the potential to provide water neutrality offsetting mitigation and also with respect to compliance with the Private Water Supplies (England) Regulations 2016 regarding the supply of water intended for human consumption including in the production of food for human consumption.

1.1.9 This report presents the findings of the analysis of the pumping test data ,and update to the assessment presented in [4] using the findings of the pumping test, and the screening of the water quality testing data against the Drinking Water Quality standards published in Schedule 1 of the Private Water Supplies (England) Regulations 2016[5].

[4] Wardell Armstrong, 2023. Water Neutrality: Hydrogeological Conceptual Site Model Report, Ref. ST20485-0001 v.2.0 Final.
[5] DEFRA (2016), The Private Water Supplies (England) Regulations 2016 [Online]. Accessed April 2025. Available at: https://www.legislation.gov.uk/uksi/2016/618/contents

1.2 Sussex North Water Resource Zone

1.2.1 Water companies in England and Wales, including Southern Water, prepare and maintain a Water Resources Management Plan (WRMP). A WRMP sets out how a water company intends to achieve a sustainable water resource for its customers and the environment over at least 25 years. It is prepared at least every five years and reviewed annually[6].

1.2.2 A WRMP is based on assessments undertaken on water resource zones. A water resource zone, such as the Sussex North Water Resource Zone, is defined as *"an area within which the sources of water and distribution of water to meet demand is largely self-contained (apart from any agreed bulk transfers)"*.

1.2.3 The Sussex North Water Resource Zone covers all of Horsham District and approximately half of Chichester District (as well as parts of neighbouring Arun District and Crawley District). This coverage includes the locations of the proposed housing developments, Southern Water's site (Hardham, in Horsham District), the abstraction well at Timberley Farm (Chichester District), the Lower Greensand Arun & Western Streams water body and SSSIs in the Arun Valley, including those designated as SPA, SAC and Ramsar Sites. The area of the Sussex North Water Resource Zone is shown on drawing ST20845-001.

1.2.4 The Lower Greensand Arun & Western Streams water body refers to the area where the Lower Greensand Group outcrops. Southern Water's PWS is within the delineation of the water body while the abstraction well at Timberley Farm is outside it. However, the Timberley Farm abstraction well also takes water from the Lower Greensand Group (specifically the Folkestone Formation), albeit outside the delineation of the water body. At Timberley Farm, the Lower Greensand Group is covered by the Gault Formation rather than outcropping at the surface. The area of the Lower Greensand Arun and Western Streams Water Body is shown on drawing ST20845-001.

1.3 Abstraction Well at Timberley Farm

1.3.1 The abstraction well was drilled and installed in September 2022 and is located within the main farmyard area of Timberley Farm, at National Grid Reference (NGR) TQ 02061 14232. Photographs showing the location of the abstraction well, the water

[6] UK Government, 14 April 2023. *Water resources planning guideline* [Online]. Accessed April 2025. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline

tank and providing detailed views of the abstraction headworks are provided in Appendix 1.

1.3.2 The record of the geological log of the abstraction well held by the BGS[7] (BGS ID 21360821 BGS; Reference: TQ01SW46) states at the time of writing that the abstraction well at Timberley Farm is screened in the Upper Greensand Formation. However, it is understood based on correspondence[8] between the Client and Nicholls Boreholes & Ground Source, who were responsible for the geological log of the abstraction well, that the record held by the BGS is erroneous: the abstraction well at Timberley Farm is in fact screened in the Folkestone Formation of the Lower Greensand Group and therefore in the Lower Greensand Aquifer.

1.3.3 The WR38 Borehole Record Form provided to the Client by Nicholls Boreholes & Ground Source, which includes the correct version of the geological log and the construction log, is presented in Appendix 2. The abstraction well is screened from 50 to 74 m below ground level (mbgl), within the Folkestone Formation, which was encountered during drilling from 29 mbgl to the end of the borehole at 77 mbgl. The pump intake is above the screen level and is set up to route abstracted groundwater to a 25,000 litre capacity storage tank at surface. Although the Nicholls Boreholes & Ground Source Pump & Filtration Installation Record presented in Appendix 3 indicates that the storage tank has a 20,000 litre capacity, observations made at Timberley Farm during the pumping test confirmed that storage tank has a 25,000 litre capacity.

1.3.4 The pump system and tank were installed in June 2023. The pump is controlled by a float switch in the tank. The pump is turned on when the level of water in the tank drops below the level set by the float switch and turns off when water reaches the float switch near the top of the tank.

[7] British Geological Survey (2020),. *GeoIndex (onshore)* [Online]. Accessed April 2025. Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

[8] Email correspondence between Emma Challenger (Head of Strategic Land, Elivia Homes) and Simon Parsons (Senior Project Manager, Nicholls Boreholes & Ground Source), 20 November 2023.

2 WORK COMPLETED

2.1 Borehole Upgrades

2.1.1 Prior to the pumping test, the Client contracted Nicholls Boreholes & Ground Source to install a dip tube in the abstraction well to allow measures of groundwater level to be taken whilst the well was being pumped. A WA hydrogeologist was in attendance during these works which took place on 2 April 2025. To install the dip tube, the pump was switched off and temporarily removed from the abstraction. While the pump was temporarily removed from the abstraction, the depth to groundwater was recorded at 12.96 mbgl and the depth to the base of the abstraction well was measured to be as 77 mbgl. Following installation of the dip tube, the pump was re-installed at a depth of 38.60 mbgl. The base of the dip tube was recorded at 38.50 mbgl.

2.1.2 The 25,000 l tank was full at the start of the works and needed to be drained so that the pumping test could be undertaken. It is understood that the tank was filled after the pump was installed in June 2023, this is because the pump is controlled by a float switch located at the top of the tank which deactivates the pump once water reaches the level of the float. The water-meter was observed on the first day of the works to have a reading of 21.4 m^3 which confirms our understanding that the tank was filled to the float level once following installation of the pump and that water from the abstraction has not been used. With the permission of the landowner, the tank was drained to a nearby manhole that leads to a soakaway. Once the tank was drained a water sampling tap was fitted to the rising main and the pump was switched on for approximately one minute to confirmed that it was functioning correctly.

2.1.3 A TD-Diver groundwater level logger was installed in the abstraction well at a depth of 37.7 mbgl recording pressure at fifteen-minute intervals. A TD-Diver barometric pressure logger was installed at ground level recording pressure at the same frequency.

2.1.4 No other groundwater wells were identified in the vicinity of the abstraction well at Timberley Farm. Therefore, the pumping tests were completed without monitoring groundwater levels at a monitoring well. A well (BGS reference: TQ01SW10) recorded as being located approximately 480 m west of the abstraction could not be found on the ground and the landowner indicated that this well no longer exists.

2.2 Constant Rate Test

2.2.1 A constant rate pumping test was completed on 3 April 2025. It is understood that, other than the one-minute test of the pump on the previous day, the pump had not been in use since June 2023. Prior to the commencement of the test, the TD-Diver groundwater level logger was removed from the abstraction and reprogrammed (along with the barometric pressure logger) to record pressure levels at five-second intervals.

2.2.2 The constant rate pumping test commenced at 11:44:30am (hh:mm:ss). Test duration was seven hours at a consistent pumping rate of 69.12 m^3/day. The test was closely supervised by a WA hydrogeologist who undertook manual water level measurements within the abstraction well, recorded flow rates and volumes and took water quality measurements.

2.2.3 Manual water level monitoring was undertaken at the following intervals, where t = time:

- t < 10 minutes: 1-minute intervals;
- 10 minutes < t < 20 minutes: 2-minute intervals;
- 20 minutes < t < 60 minutes: 5-minute intervals;
- 60 minutes < t < 100 minutes: 10-minute intervals;
- 100 minutes < t < 300 minutes: 20-minute intervals;
- 300 minutes < t < 400 minutes: 50-minute intervals;
- Final manual measurement taken at 420 minutes (7 hours).

2.2.4 Flow meter readings were recorded and flow rates were calculated throughout the test. A total of 27 flow meter readings were recorded across the seven-hour test. All flow meter readings throughout the test indicated a constant flow rate of approximately 0.8 l/s (equivalent to 69.12 m^3/d). A total of 20.16 m^3 of water was abstracted during the test.

2.2.5 Water quality parameters including temperature, pH and electrical conductivity were recorded using a multi-parameter probe at a frequency of every 15 minutes for the first 150 minutes of the test and every 30 minutes thereafter. Two water samples were taken for analysis at a UKAS accredited laboratory 60 minutes and 420 minutes from the start of the test.

2.2.6 Comparison against long-term records of groundwater elevation data acquired from the EA Hydrology Data Explorer at the groundwater monitoring installation Greatham

Bridge 1[9] located approximately 2.3 km north east of Timberley Farm suggests that groundwater levels at the time of the pumping test were typical of average conditions in the aquifer.

2.3 Recovery Test

2.3.1 The recovery test commenced as soon as the pump was switched off at 18:46:00 on 3 April 2025. Manual water level measurements were recorded by the WA hydrogeologist for ten minutes after switching off the pump. The TD Diver groundwater level and barometric pressure loggers were left to record data overnight. A further manual measurement of groundwater level was taken at 10:00am on 4 April 2025, over 15 hours following the end of the pumping test. At this point, the water level was within 0.01 m of the pre-test water level at this time. This marked the end of the recovery phase. The TD Diver groundwater level and barometric pressure loggers were retrieved, and pressure data were downloaded.

[9] Environment Agency (2025), Hydrology Data Explorer [Online]. Accessed April 2025. Available at: https://environment.data.gov.uk/hydrology/station/4b32e6d3-a6da-46b3-bdd2-13673a4a6e1f_244150003

3 PUMPING TEST RESULTS AND ANALYSIS

3.1 Constant Rate Test

3.1.1 Water level before the pump was turned on was measured to be 13.01 mbgl.

3.1.2 Following the commencement of the constant rate test at 0.8 l/s (69.12 m^3/day), drawdown of 0.21 m from the rest water level was observed within 10 seconds. This steadily increased to 0.26 m (13.27 mbgl) after 45 minutes, where it remained until 280 minutes, following which it steadily decreased to 0.23 m at 300 minutes. Drawdown remained at 0.23 m until the completion of the test at 420 minutes (7 hours). After the pump was switched off, recovery to resting groundwater level was observed within 10 seconds. A time series of groundwater levels before, during and after the pumping test is presented in Appendix 4.

3.1.3 Based on the borehole log of the abstraction well, the pumped water level is approximately 11.4 m above the top of the screened section of the abstraction and approximately 9.6 m above the base of the Gault Clay.

3.2 Aquifer Properties

3.2.1 The results of the constant rate test were analysed to estimate transmissivity (T) in the aquifer. T values were estimated using the Logan Equation[10] and using the analytical pumping test analysis software AQTESOLVE. The Theis (1935)/Hantush (1961) and Cooper-Jacob (1946) solutions for confined aquifers were used. Due to the rapid drawdown at the start of pumping and rapid recovery following pump switch off, the Theis (1935)/Hantush (1961) displacement / time graph curves have been positioned to capture the responses during drawdown and recovery. All variables that are required to input into the AQTESOLVE model are known other than the saturated thickness off the aquifer. Therefore, for each solution, the model has been run using a minimum saturated zone thickness (screened section of the abstraction) and a maximum saturated zone thickness (based on data on the hydrogeological map of the region[11]). It should be noted that the saturated zone thickness does not affect the results of the Cooper-Jacob (1946) solution. The range of T values are presented below in Table 1. The AQTESOLVE displacement / time graphs are presented in Appendix 5.

[10] Logan, J (1964) Estimating transmissibility from routine production tests of water wells. Ground Water 2:35-37.

[11] Institute of Geological Sciences and Southern Water Authority, 1978. Hydrogeological Map of the South Downs and Adjacent Parts of the Weald. NERC, 1978.

3.2.2 The Theis solutions give a less-good fit to the observed data than the Cooper-Jacob relationship and therefore the T values calculated from the Theis model fit are not considered to be representative. The similarity between the Logan equation estimate and the Cooper-Jacob estimate tends to indicate that the Cooper-Jacob estimate is more representative of conditions in the aquifer around the abstraction well.

Table 1: Estimated Range of Transmissivity

Value (m^2/day)	Comment
33	Theis (1935)/Hantush (1961) solution for confined aquifers assuming a saturated zone thickness of 26m.
102	Theis (1935)/Hantush (1961) solution for confined aquifers assuming a saturated zone thickness of 160m.
388	Cooper-Jacob (1946) solution for confined aquifers
324	Logan Equation ((1.22 × 69.12)/0.26))

3.2.3 Storage coefficients could not be estimated from the test data because no observation well data were available. Storage coefficients for the confined Lower Greensand are likely to be in the range 0.001 to 0.0001 [12].

3.3 Water Quality

Field Measurements Results

3.3.1 Field parameters were recorded during the constant rate test using a multi-parameter probe at a frequency of every 15 minutes for the first 150 minutes of the test and every 30 minutes thereafter. The following parameters were measured:

- Temperature;
- pH;
- Oxidation Redox Potential;
- Dissolved Oxygen (% Saturation);
- Dissolved Oxygen (mg/l);

[12] Allen, D.J., Brewerton, L.J., Coleby, L.M., MacDonald, A.M., Wagstaff, S.J. and Williams, A.T., 1997. *The physical properties of major aquifers in England and Wales.* British Geological Survey (BGS) Technical Report WD/97/34. 312pp. Environment Agency R&D Publication 8.

- Electrical Conductivity;
- Total Dissolved Solids;

3.3.2 The results of the field measurements are presented below in Table 2. Time series of temperature, pH and electrical conductivity are presented in Appendix 6.

Table 2: Water quality readings collected during the constant rate pumping test (3 April 2025)							
Time (minutes from test start)	**Temperature (°C)**	**pH**	**Oxidation Redox Potential (mV)**	**Dissolved Oxygen (% Saturation)**	**Dissolved Oxygen (mg/l)**	**Electrical Conductivity (µS/cm)**	**Total Dissolved Solids (mg/l)**
15	14.13	7.29	184.4	47.1	4.84	1072	696
30	14.3	7.27	173.8	37.5	3.83	1059	688
45	14.33	7.27	173.5	43.3	4.43	1075	698
60	14.2	7.28	167.7	50.1	5.14	1060	689
75	14.3	7.26	163.2	39.4	4.03	1054	685
90	14.15	7.26	169.6	40.7	4.17	1068	694
105	14.3	7.26	165.8	41.1	4.2	1070	695
120	14.13	7.26	161.3	37.9	3.9	1055	685
135	14.2	7.25	160.6	32.2	3.3	1079	701
150	14.2	7.26	160	38.5	3.94	1060	689
180	14.7	7.25	161.3	37.4	3.79	1069	694
210	14.4	7.26	162.8	42.2	4.3	1049	681
240	14.3	7.26	158.4	40.1	4.09	1068	694
270	14.2	7.27	160.9	48.7	4.98	1066	692
300	14.63	7.25	160.9	36.4	3.69	1070	695
330	14.2	7.26	157.8	39.8	4.07	1065	692
360	14.2	7.26	155.4	37.5	3.84	1052	683
390	14	7.28	154.2	41.1	4.24	1062	690
420	13.6	7.28	152.6	39.9	4.13	1063	690
Average	14.2	7.3	163.4	40.6	4.2	1064.0	691.1

3.3.3 As shown in Table 2 and Appendix 6, field parameters remained consistent throughout the constant rate test.

3.3.4 The two groundwater samples collected from the abstraction after 60 minutes and 420 minutes from the start of the test were analysed by ALS (a UKAS ISO 17025 accredited laboratory) for the following indicator parameters:

- Total Dissolved Solids;
- Ammoniacal Nitrogen;
- Fluoride;
- Arsenic;
- Manganese;
- Sodium;
- Magnesium;
- Potassium;
- Calcium;
- Iron;
- Nitrate;
- Sulphate;
- pH;
- Alkalinity.

3.3.5 Horsham Council confirmed to the Client that, with the intended use of the abstraction being for cattle watering and associated uses, a full assessment of the quality of the water against potable water quality standards was not required as part of the pumping test[13]. Therefore, only the limited suite of indicator parameter listed above were analysed.

3.3.6 The results of the laboratory analysis are presented below in Table 3. The laboratory certificate of the analysis is presented in Appendix 7.

Table 3 – Laboratory Analysis

Parameter	Unit	Result (60 minutes after test start)	Result (420 minutes after test start)
Total Dissolved Solids	mg/l	636	635
Ammoniacal Nitrogen as N	mg/l	0.667	0.674

[13] Email correspondence between Senior Planning Officer at Horsham Council and Senior Planner at ECE Planning, 31 January 2025.

Table 3 – Laboratory Analysis			
Parameter	**Unit**	**Result (60 minutes after test start)**	**Result (420 minutes after test start)**
Fluoride	mg/l	<0.5	<0.5
Arsenic (dissolved)	µg/l	3.05	3.11
Manganese (dissolved)	µg/l	11.1	11.1
Sodium	mg/l	143	143
Magnesium	mg/l	10.5	10.4
Potassium	mg/l	10.5	10.5
Calcium	mg/l	43.2	43.3
Iron (dissolved)	mg/l	0.939	0.948
Nitrite as NO_2	mg/l	<0.05	<0.05
Sulphate	mg/l	5.5	5.4
Chloride	mg/l	279	278
Nitrate as NO_3	mg/l	<0.3	<0.3
pH	pH units	7.47	7.53
Alkalinity (Total as $CaCO_3$)	mg/l	93.4	93.5

3.3.7 As shown in Table 3, the laboratory analysis displays consistency between 60 minutes and 420 minutes from the commencement of the test.

4 INTERPRETATION

4.1 Yield Assessment

4.1.1 The constant rate test was carried out at an abstraction rate 69.12 m^3/day resulting in maximum drawdown of 0.26 m. With a maximum proposed abstraction rate when the abstraction is in operation not exceeding 20 m^3/day, it can be safely concluded that the yield of the abstraction well is significantly higher than the required yield. The proposed abstraction rate of <20 m^3 / day will therefore be sustainable in the long term.

4.2 Drawdown Assessment

4.2.1 When the abstraction well at Timberley Farm is operated, there will be a lowering of the water level in the aquifer (the potentiometric surface) around the abstraction well called a *cone of depression*. The edge of the cone of depression, which represents the extent to which the water table or potentiometric surface is influenced, is called the *radius of influence.* The difference in elevation between the unpumped (rest) water level and the water level during pumping is called the *drawdown*.

4.2.2 This section uses an analytical hydrogeological equation to estimate the drawdown and the radius of influence from the hypothetical operation of the abstraction well at Timberley Farm. The calculations update those presented in WA's earlier reporting[4].

4.2.3 The analytical hydrogeological equation used is the Cooper-Jacob approximation for confined aquifers. The Environment Agency "Tier 1 Analytical Tools" spreadsheet (Version 1.6)[14] has been used, which is a Microsoft-Excel-based spreadsheet that provides numerous analytical hydrogeological equations in a convenient format.

4.2.4 The Cooper-Jacob approximation for confined aquifers is as follows:

$$s = \frac{Q}{4\pi T} \ln\left[2.2459 \frac{Tt}{r^2 S}\right]$$

- s = drawdown [m]
- Q = abstraction rate [m^3/day]
- T = transmissivity [m^2/day]
- t = time [days]
- r = radial distance from abstraction well [m]

[14] Environment Agency, 25 January 2006. *Tier 1 Analytical Tools* spreadsheet. Version 1.6. Previously available online (https://www.gov.uk/government/publications/tier-1-groundwater-anaytical-equation-tool) but withdrawn 13 August 2014.

- S = storage coefficient [dimensionless]

4.2.5 The equation was rearranged to estimate radius of influence. The estimates of radius of influence are presented in Table 4. The Environment Agency's approach in their Tier 1 Analytical Tools spreadsheet is to round estimates to one decimal place (e.g., a value of 0.004482… m is rounded to 0.0 m), reflecting the precision of the equation.

4.2.6 The radius of influence at which drawdown of the potentiometric surface is less than 0.1 m is estimated to vary between 0.1 m and 2.0 m for the representative aquifer properties determined in the pumping test and the proposed operating abstraction rate (Table 4). The nearest water-dependent SSSI within the Arun Valley is over 600 m away and therefore well outside this zone of influence.

4.2.7 Drawdown of the piezometric surface in a confined aquifer is not the same as drawdown at the water table at the surface. Drawdown at the water table would be expected to be orders of magnitude lower than the drawdown in the confined aquifer. This is due to two factors: firstly, the low permeability of the confining layer (the Gault Clay) that separates the aquifer (the Lower Greensand) and the water table, and secondly the higher storage coefficient of a water table aquifer compared with a confined aquifer.

4.3 It can therefore be concluded that abstraction from the well at Timberley Farm at a rate of up to 20 m^3/d would have no effect on water levels at SSSIs within the Arun Valley.

4.4 Water Quality Conceptualisation

4.4.1 The quality of the groundwater at Timberley Farm is distinct from other types of groundwater from the Lower Greensand aquifer (see Appendix 8). The composition of the groundwater at Timberley Farm is different from that typical of the Lower Greensand outcrop area. This difference in composition suggests that there is separation between the confined part of the aquifer at Timberley Farm and the outcrop around Southern Water's Hardham public water supply source. This tends to support the conclusions presented in WA's 2023 hydrogeological assessment that the aquifer supporting Timberley Farm is distinct from the Lower Greensand outcrop that supplies the Hardham public water supply.

Table 4: Calculation of the radius of influence of abstraction from the well at Timberley Farm						
Property	**Transmissivity**	**Storage coefficient**	**Abstraction rate**	**Time**	**Drawdown**	**Radius of influence**
Symbol	**T**	**S**	**Q**	**t**	**s**	**None**
Units	**m^2/day**	**Dimensionless**	**m^3/day**	**day**	**m**	**m**
	324	0.001	20	365	0.1	0.6
	324	0.0001	20	365	0.1	2.0
	388	0.001	20	365	0.1	0.1
	388	0.0001	20	365	0.1	0.3

5 SUMMARY AND CONCLUSIONS

5.1.1 A constant rate pumping test has been completed on the abstraction well at Timberley Farm, Bury, West Sussex (National Grid Reference TQ 02061 14232). This well is used to abstract groundwater from the Lower Greensand aquifer (Folkestone Formation) where it is confined (covered) by the lower permeability Gault Formation (clay). The Gault formation is 29 m thick and the Folkestone Formation at least 48 m thick. The total depth of the well is 77 m.

5.1.2 Around 20 m^3 of groundwater was abstracted from the well over a 7-hour period on 3 April 2025. The average pumping rate was 0.8 l/s, equivalent to around 69 m^3/d. The groundwater level in the well was 13.01 m below ground level before the start of the test. Groundwater levels in the well fell by 0.26 m during the test to 13.28 mbgl. Water levels recovered to pre-test rates within a few minutes of the pump being switched off.

5.1.3 It was not possible to estimate the maximum yield of the well from the testing that was completed. However, it is clear from the small amount of drawdown observed that the maximum yield is very much greater than the rate at which the well was tested. The well was tested at a higher rate than is proposed for long-term operation. Abstraction at a rate of up to 20 m^3/d would be sustainable in the long-term.

5.1.4 Interpretation of water level data from the abstraction well collected during the test indicates that the Lower Greensand has a transmissivity of between 324 and 388 m^2/d at this location. This is towards the higher end of the range of values reported in the literature. The Lower Greensand remained confined throughout the test (i.e. water levels remained above the top of the Lower Greensand) hence a storage coefficient of between 1×10^{-3} and 1×10^{-4} is indicated. Analysis using these properties shows that the radius of influence of this abstraction at a rate of 20 m^3/d would extend less than 2.0 m from the well for piezometric surface drawdown of less than 0.1 m. Drawdown at the water table would be even lower than this due to the low permeability of the confining Gault Formation and the higher hydrogeological storage coefficient of the water table aquifer. It is concluded that abstraction from the well at Timberley Farm will have no effect on water-dependent SSSI sites in the Arun Valley, the nearest of

which is more than 600 m away. This confirms the conclusions of Wardell Armstrong's earlier study[15].

5.1.5 The quality of water pumped from the borehole was measured throughout the pumping test. Parameters remained stable with a pH of 7.3, electrical conductivity of 1,064 µS/cm and dissolved oxygen concentration of 4.2 mg/l. Two samples were collected for laboratory analysis of indicator parameters during the test. The laboratory analysis showed the presence of fresh groundwater. Concentrations of ammoniacal nitrogen, dissolved iron and chloride slightly exceeded potable water quality standards for private water supplies. The water is proposed to be used for cattle watering so a full assessment against drinking water quality standards was not completed.

5.1.6 The chemistry of groundwater abstracted from the well at Timberley Farm is distinct from the typical chemical composition of groundwater from the Lower Greensand outcrop. This supports the conclusion from Wardell Armstrong's earlier study that the aquifer at Timberley Farm may be hydraulically separate from the outcrop area and therefore separate from the hydrogeological catchment supporting Southern Water's public water supply at Hardham.

[15] Wardell Armstrong, 2023. Water Neutrality: Hydrogeological Conceptual Site Model Report, Ref. ST20485-0001 v.2.0 Final

APPENDICES

APPENDIX 1

Photographs

Appendix 1 – Photographs

Timberley Farm, Bury – Borehole Location

Timberley Farm, Bury – Borehole Location

APPENDIX 2

WR38 Borehole Record Form

Borehole record form

NICHOLLS BOREHOLES & GROUND SOURCE

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 [redacted]

Location TIMBERLEY FARM, BURY, RH20 1NP

NGR (ten digits) TQ 02061 14232 Please attach site plan

Ground level (if known) _____ metres Above Ordnance Datum

Drilling company NICHOLLS BOREHOLES

Date drilling commenced 27-09-2022 (DD/MM/YYYY) Completed 27-09-2022 (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 200 mm from 0 to 77 m/depth

_____ mm from _____ to _____ m/depth

_____ mm from _____ to _____ m/depth

_____ mm from _____ to _____ m/depth

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

Casing material SOLID UPVC diameter 125 mm from 0 to 50 m/depth

Casing material SLOTTED UPVC diameter 125 mm from 50 to 74 m/depth

Casing material SOLID UPVC diameter 125 mm from 74 to 77 m/depth

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

Grouting details 5 BAGS WASHED SHINGLE, 8 BAGS OF MIKO-IT

Water struck at 1. N/A DRILLED m (depth below datum - mbd) 2. _____ m (mbd)

3. WITH MUD m (mbd) 4. _____ m (mbd)

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

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

Pump suction depth _____ mbd

Water level (start of test) _____ mbd

Water level (end of test) _____ mbd

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

_____

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
	TOP SOIL	1	1
	FINE YELLOW SAND, BECOMING GREYER AT BASE	4	5
	GAULT CLAY	43	48
	FOLKESTONE BEDS - GREY SAND WITH OCCASIONAL BANDS OF SOFT SANDSTONE	29	77
	(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 number	BGS reference number
Accession number	Wellmaster number	SOBI number	NGR
LIC NO	Purpose		EA reference number
Copy number	Entered by		

The British Geological Survey will use the information you

APPENDIX 3

Pump and Filtration Installation Record

Pump & Filtration Installation Record

Customer Name	James Bromhead		
Customer Address	Timberley Farm, Bury, RH20 1NP		
Order Number	BH1337	Install Completion Date	22/6/23
Pump & Wet-End	VS2/10 0.55kW	Borehole Depth	77 mbgl
Liner diameter	125mm	Pump Depth	40 mbgl
Pipe Diameter	32mm	Borehole Grid Ref	TQ 02061 14232
Flow rate			

Equipment Installed

Nicholls Express Multi Panel – single phase
Float
Brass meter

Tank size: 20,000L
Above ground/below ground: Above
Access for cleaning: good, very tall tank – approximately 6m

Service Intervals, Requirements

Site Notes				
Meter Reading – new so 0.0				
Pressure Vessel Pressure	Pressure Vessel Size			
Cable Insulation Value	Brown E >299	Black E >299	Grey E >299	Combined
Motor Winding Resistance	Brown-Black 15.2	Brown-Grey 20.4	Black-Grey 6.31	
Pump Controller Type – Nicholls Express Multi Panel – single phase				
Probe Depth High				
Probe Depth Low				
Capacitor Size – 20 uf				
Capacitor Reading				
PH Level				
Mains back up available Yes				

APPENDIX 4

Groundwater Levels

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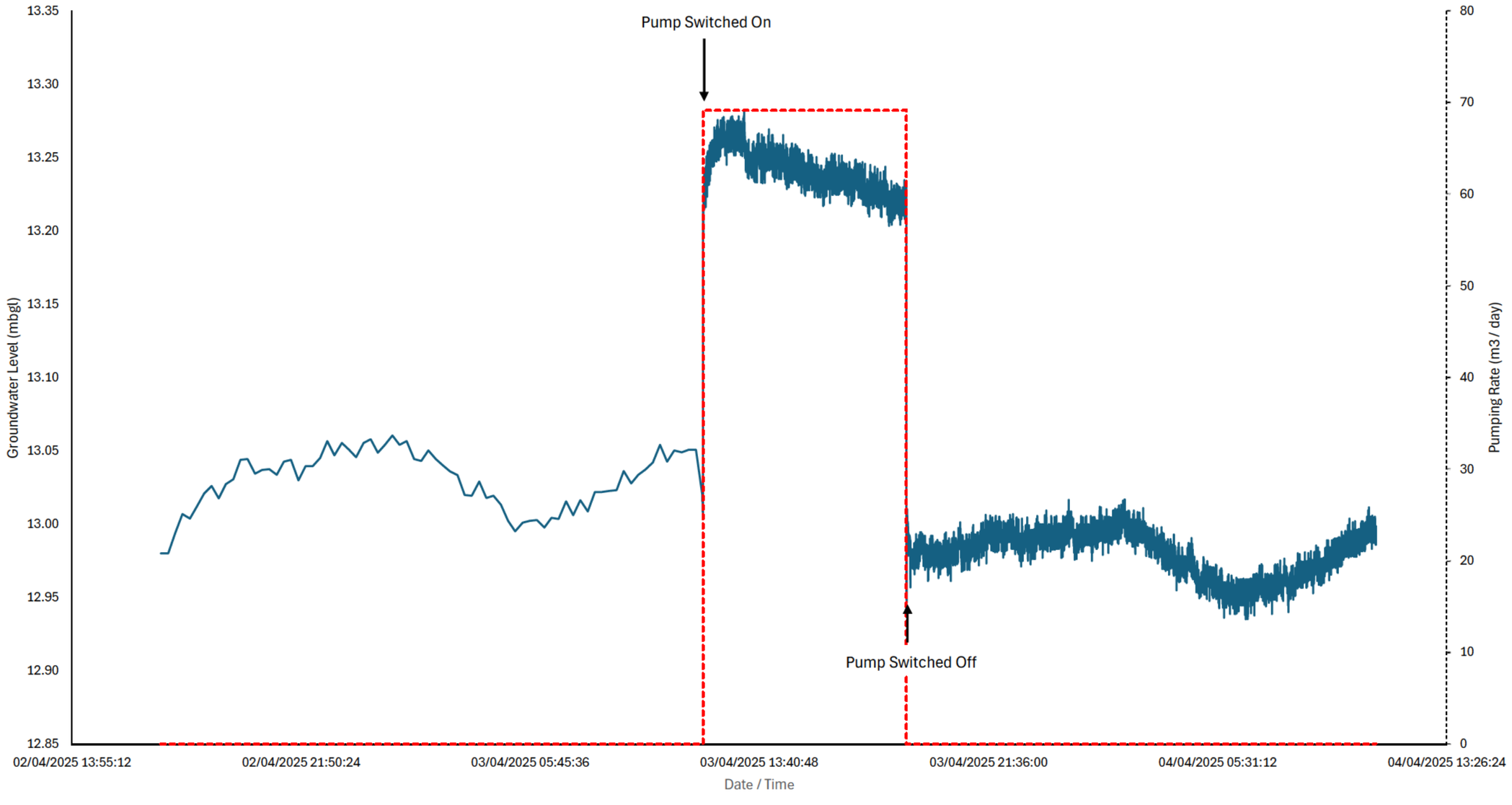
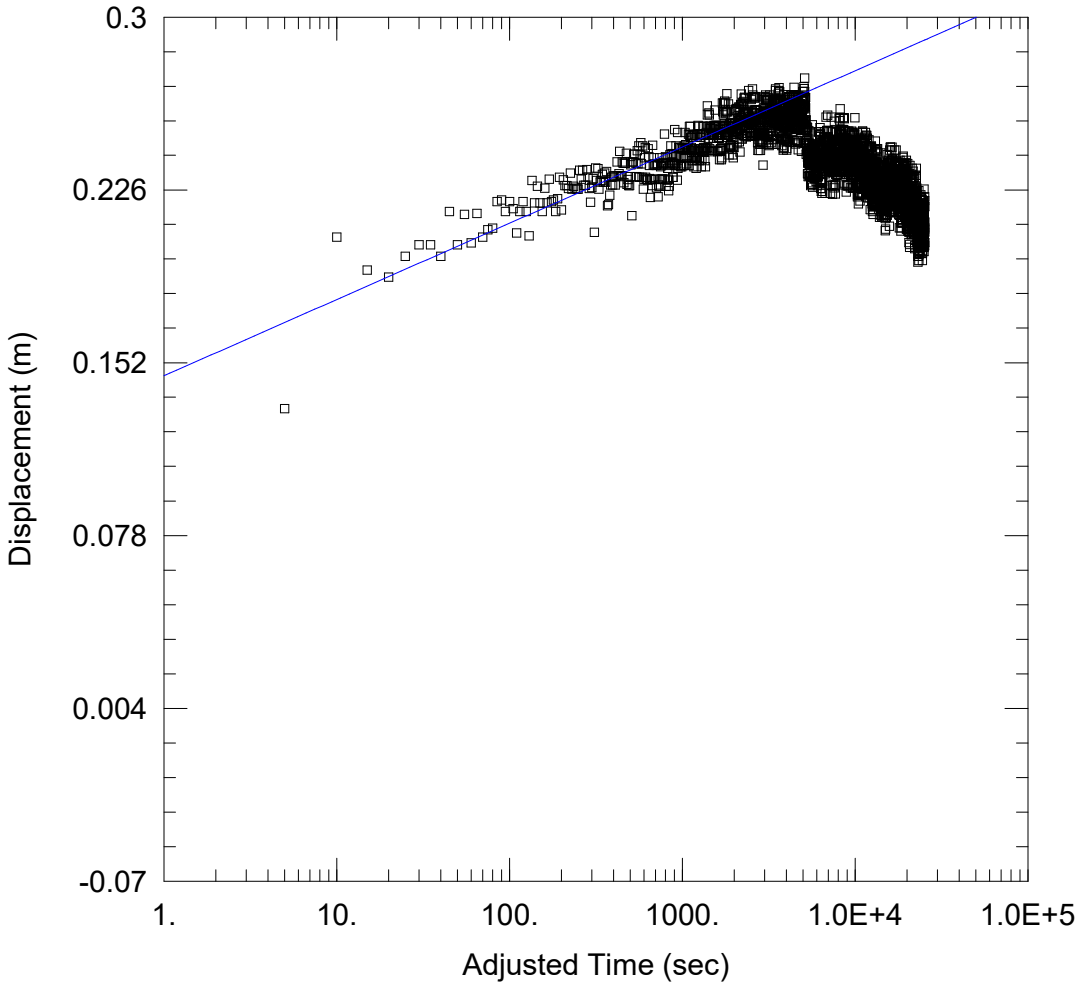
CLIENT	ELIVIA HOMES EASTERN		
PROJECT	FURNERS LANE DEVELOPMENT		
APPENDIX TITLE	**GROUNDWATER LEVELS**		
APPENDIX NO.	DRAWN BY	APPROVED BY	DATE
4	EB		Apr-25



APPENDIX 5

Well Test Analyses



WELL TEST ANALYSIS

Data Set: N:\...\Cooper-Jacob 26m sat thickness.aqt
Date: 04/27/25 Time: 23:29:38

PROJECT INFORMATION

Company: Wardell Armstrong
Client: Elivia Homes
Project: ST21552
Location: Timberley Farm
Test Well: Timberley Farm
Test Date: 03/04/25

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Timberley Farm	502061	114232

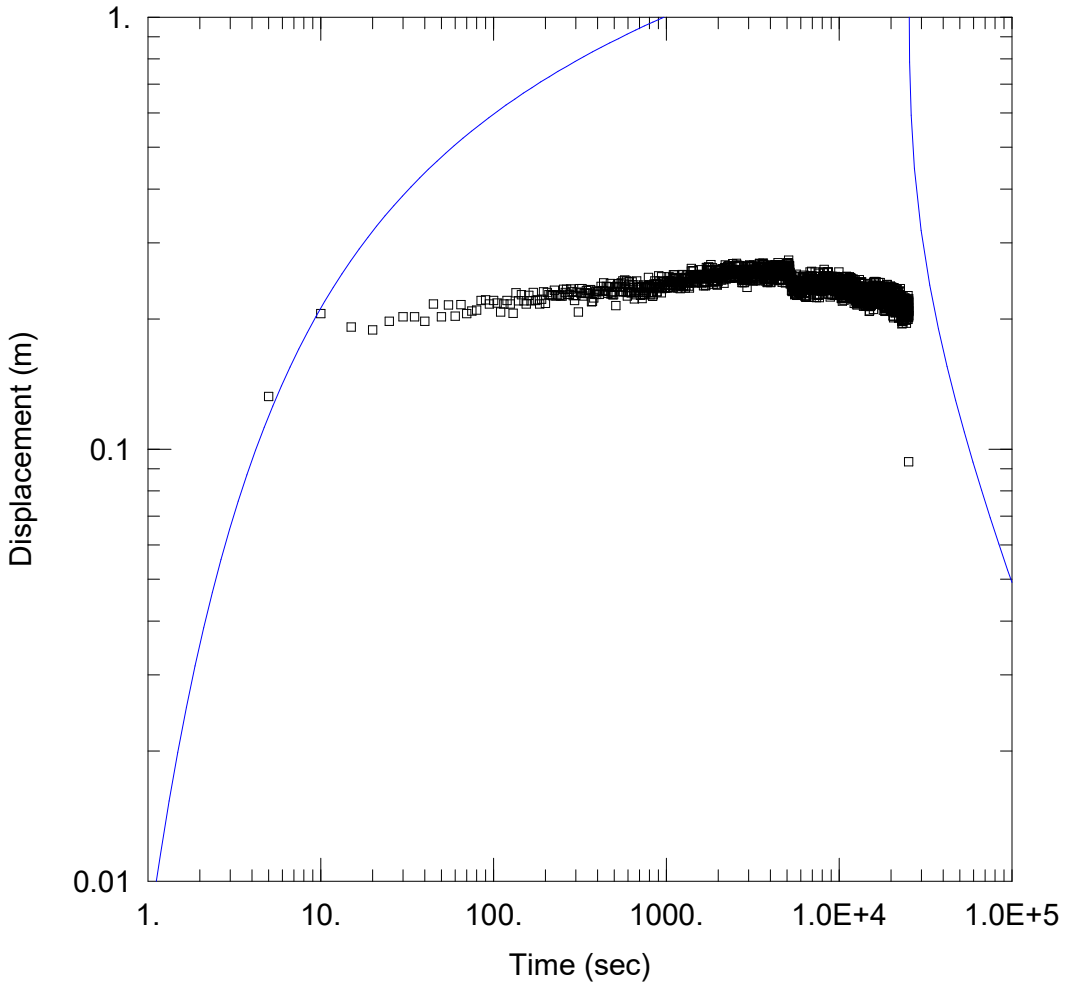
Observation Wells

Well Name	X (m)	Y (m)
Timberley Farm	502061	114232

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 387.8 m^2/day S = 3.32E-5



WELL TEST ANALYSIS

Data Set: N:\...\Theis 160m sat thickness.aqt
Date: 04/27/25 Time: 23:27:06

PROJECT INFORMATION

Company: Wardell Armstrong
Client: Elivia Homes
Project: ST21552
Location: Timberley Farm
Test Well: Timberley Farm
Test Date: 03/04/25

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Timberley Farm	502061	114232

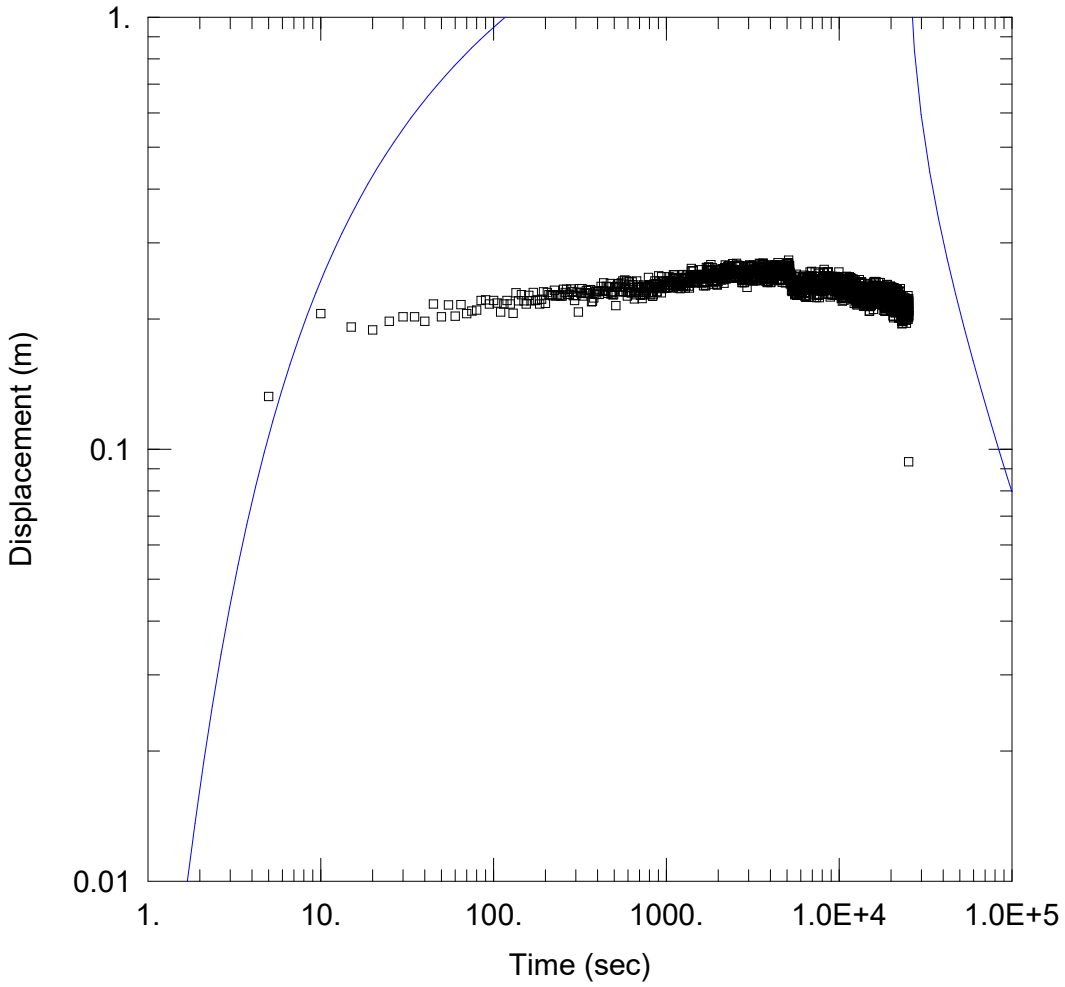
Observation Wells

Well Name	X (m)	Y (m)
□ Timberley Farm	502061	114232

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 32.73 m^2/day
S = 0.3248
Kz/Kr = 1.
b = 26. m



WELL TEST ANALYSIS

Data Set: N:\...\Theis 26m sat thickness.aqt
Date: 04/27/25 Time: 23:24:25

PROJECT INFORMATION

Company: Wardell Armstrong
Client: Elivia Homes
Project: ST21552
Location: Timberley Farm
Test Well: Timberley Farm
Test Date: 03/04/25

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Timberley Farm	502061	114232

Observation Wells

Well Name	X (m)	Y (m)
□ Timberley Farm	502061	114232

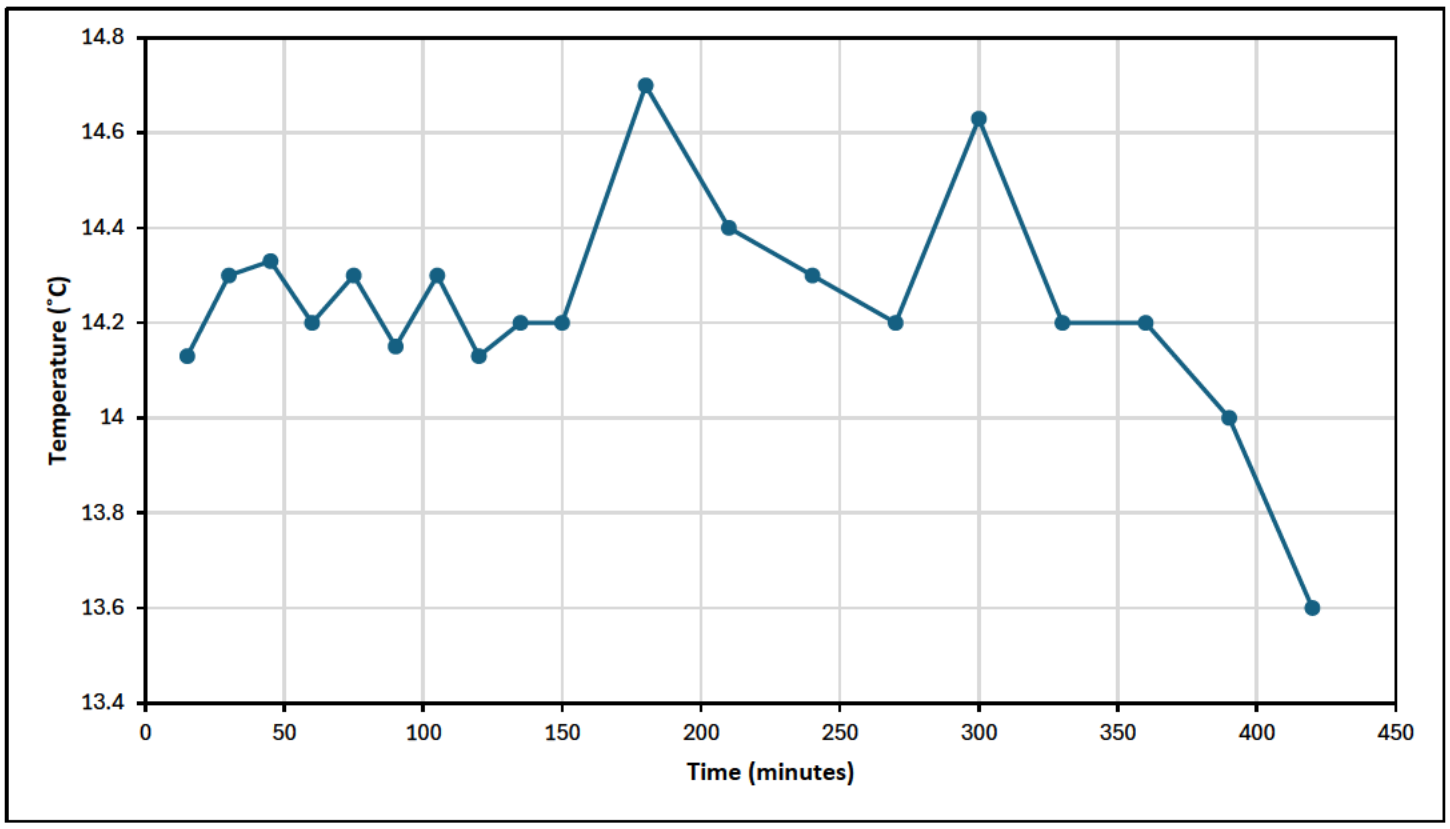
SOLUTION

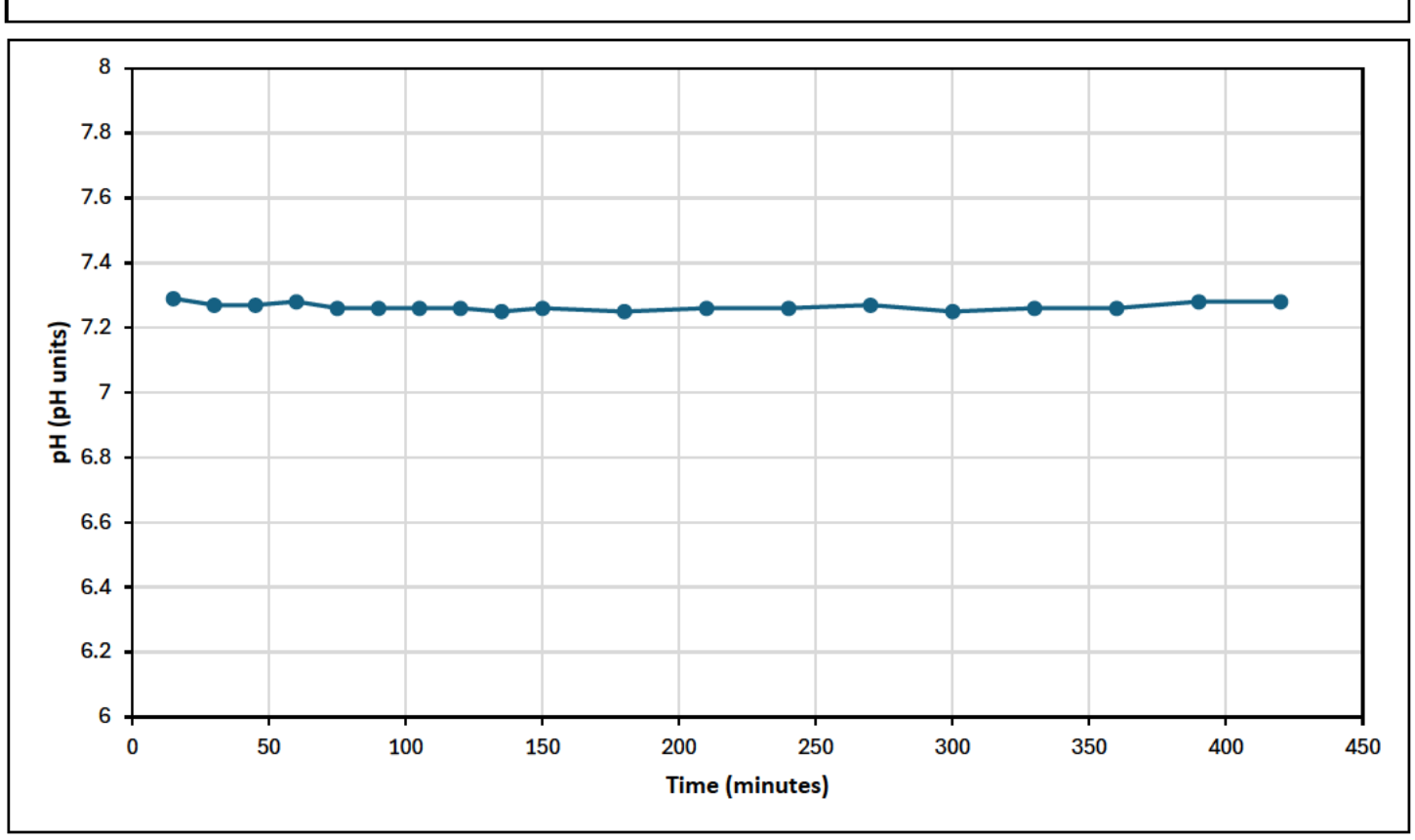
Aquifer Model: Confined
Solution Method: Theis

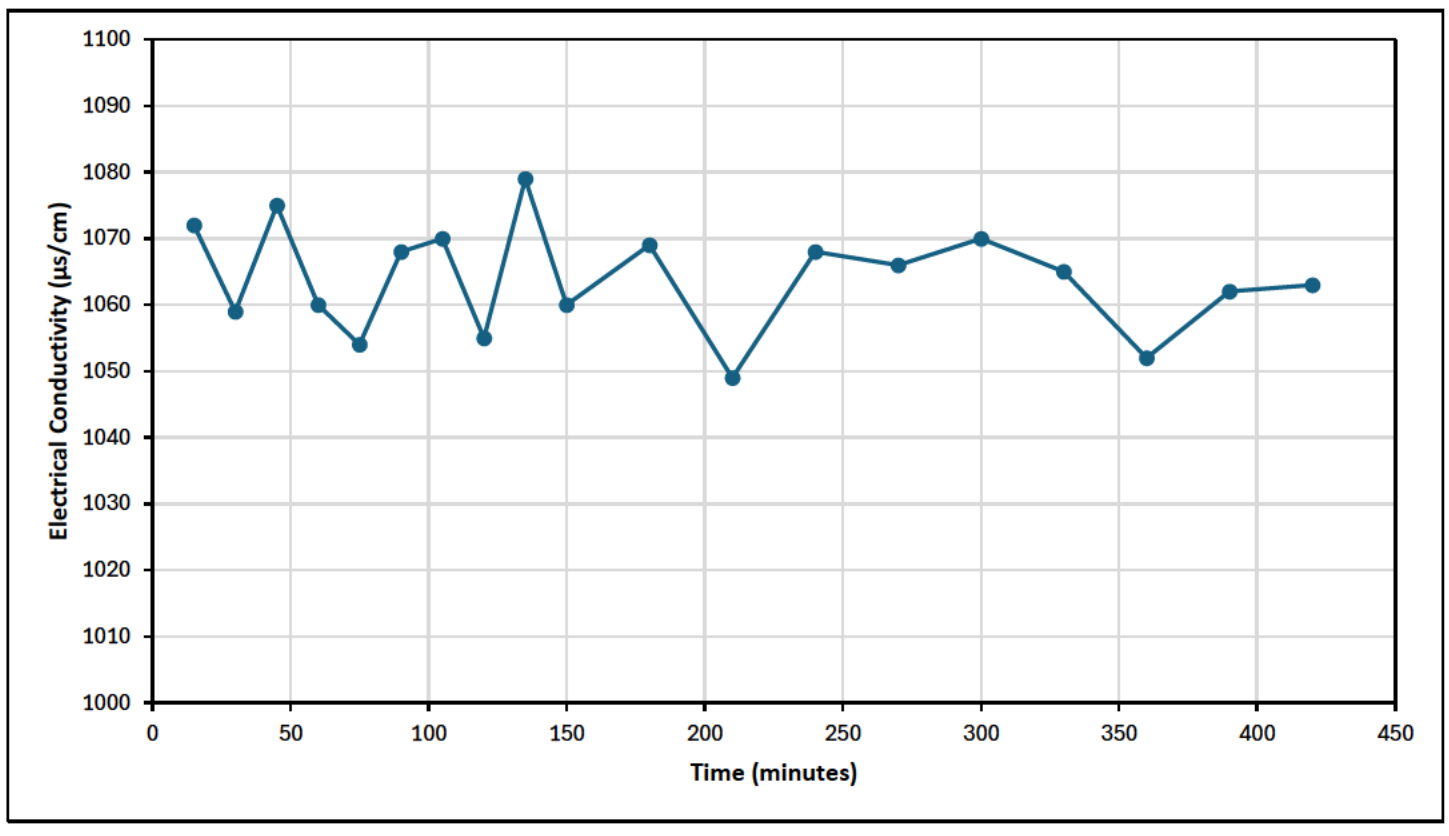
T = 102.1 m^2/day
S = 1.931
Kz/Kr = 1.
b = 160. m

APPENDIX 6

Field Groundwater Quality Data







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CLIENT	**ELIVIA HOMES EAST**		
PROJECT	**FURNERS LANE DEVELOPMENT**		
APP TITLE	**FIELD GROUNDWATER QUALITY DATA**		
APP NO	DRAWN BY	APRROVED BY	Date
5	EB		Apr-25

APPENDIX 7

Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Wardell Armstrong LLP
Sir Henry Doulton House
Forge Lane
Etruria
Stoke on Trent
Staffordshire
ST1 5BD

Attention: Ethan Brown

CERTIFICATE OF ANALYSIS

Date of report Generation:	12 April 2025
Customer:	Wardell Armstrong LLP
Sample Delivery Group (SDG):	250405-49
Your Reference:	ST21552
Location:	Timberley Farm
Report No:	762065
Order Number:	ST34872

We received 2 samples on Saturday April 05, 2025 and 2 of these samples were scheduled for analysis which was completed on Saturday April 12, 2025. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

[redacted]

Justin Keeton
Business Unit Leader - Land

CERTIFICATE OF ANALYSIS

SDG: 250405-49 **Report Number:** 762065 **Superseded Report:**
Client Ref.: ST21552 **Location:** Timberley Farm

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
31336617	001			03/04/2025
31336618	002			03/04/2025

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 250405-49 **Report Number:** 762065 **Superseded Report:**
Client Ref.: ST21552 **Location:** Timberley Farm

Results Legend

X Test

N No Determination Possible

Sample Types
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)							
			31336617				31336618			
			Customer Sample Reference							
			001				002			
			AGS Reference							
			Depth (m)							
			Container	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)
			Sample Type	GW	GW	GW	GW	GW	GW	GW	GW
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 2		X				X		
Anions by Kone (w)	All	NDPs: 0 Tests: 2	X				X			
Dissolved Metals by ICP MS	All	NDPs 0 Tests: 2			X				X	
Fluoride	All	NDPs: 0 Tests: 2	X				X			
Nitrite by Kone (w)	All	NDPs: 0 Tests: 2				X				X
pH Value	All	NDPs: 0 Tests 2	X				X			
pH Value of Filtered Water	All	NDPs: 0 Tests: 2	X				X			
Total Dissolved Solids (Grav)	All	NDPs: 0 Tests: 2	X				X			

Validated

CERTIFICATE OF ANALYSIS

SDG: 250405-49 **Report Number:** 762065 **Superseded Report:**
Client Ref.: ST21552 **Location:** Timberley Farm

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
***	6:2 FTAB (see appendix)
1-4+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	001	002				
			Depth (m)	.	.				
			Sample Type	Ground Water (GW)	Ground Water (GW)				
			Date Sampled	03/04/2025	03/04/2025				
			Sample Time	2:45:00	18:45:00				
			Date Received	05/04/2025	05/04/2025				
			SDG Ref	250405-49	250405-49				
			Lab Sample No.(s)	31336617	31336618				
			AGS Reference						
Disso ved solids, Total (gravimetric)	<40 mg/l	TM021		636 #	635 #				
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		0.667 #	0.674 #				
Fluoride	0 5 mg/l	TM104		0 5 #	0 5 #				
Arsenic (diss.filt)	<0.5 µg/l	TM152		3.05 #	3.11 #				
Manganese (diss.filt)	<3 µg/l	TM152		11.1 #	1.1 #				
Sodium (Dis Filt)	<0.076 mg/l	TM152		143 #	143 #				
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		10.5 #	0.4 #				
Potassium (Dis.Filt)	<0.2 mg/l	TM152		10.5 #	0.5 #				
Calcium (Dis.Filt)	<0.2 mg/l	TM152		43.2 #	43.3 #				
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.939 #	0.948 #				
Nitrite as NO2	<0.05 mg/l	TM184		<0.05 #	<0.05 #				
Sulphate	<2 mg/l	TM184		5.5 #	5.4 #				
Chloride	2 mg/l	TM184		279 #	278 #				
Nitrate as NO3	<0.3 mg/l	TM184		<0.3 #	<0.3 #				
pH	<1 pH Units	TM256		7.47 #	7.53 #				
Alkalinity,Total as CaCO3 (diss filt)	<3 mg/l	TM256		93.4	93.5				

Table of Results - Appendix

Method No	Description
TM152	Analysis of Aqueous Samples by ICP-MS
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM021	Determination of total dissolved solids in waters by gravimetry.
TM104	Determination of Fluoride using the Kone Analyser
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM099	Determination of Ammonium in Water Samples using the Kone Analyser

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM)

CERTIFICATE OF ANALYSIS

SDG: 250405-49 **Report Number:** 762065 **Superseded Report:**
Client Ref.: ST21552 **Location:** Timberley Farm

Test Completion Dates

Lab Sample No(s)	31336617	31336618
Customer Sample Ref.	001	002
AGS Ref.		
Depth		
Type	Ground Water	Ground Water
Ammoniacal Nitrogen	09 Apr 2025	09 Apr 2025
Anions by Kone (w)	08-Apr-2025	08-Apr-2025
Dissolved Metals by ICP-MS	08-Apr-2025	08-Apr-2025
Fluoride	12-Apr-2025	08-Apr-2025
Nitrite by Kone (w)	08-Apr-2025	08-Apr-2025
pH Value	09-Apr-2025	10-Apr-2025
pH Value of Filtered Water	10-Apr-2025	10-Apr-2025
Total Dissolved Solids (Grav)	08-Apr-2025	08-Apr-2025

Appendix General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2 If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur - e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis.
The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l.
Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only.
It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of 75% are reported based on the best mass spectral library match When a non target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

If during the search of the two 'pinch' samples by PLM only 1 or 2 fibres or fibre bundles are seen and identified as asbestos, the term 'trace asbestos identified' is reported.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Potentially respirable fibres are identified by using a Phase Contrast Microscope.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.
The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

21. 6:2 FTAB

Recovery of 6:2 FTAB in the quality control samples has been observed to be <50% of the target value. Please note the 6:2 FTAB result is supplied as indicative only.

APPENDIX 8

Water Quality Piper Plot

CLIENT	ELIVIA HOMES EASTERN		
PROJECT	TIMBERLEY FARM PUMPING TEST		
APPENDIX TITLE	**WATER QUALITY PIPER PLOT**		
APPENDIX NO.	DRAWN BY	APPROVED BY	DATE
8	EB	RI	Apr-25

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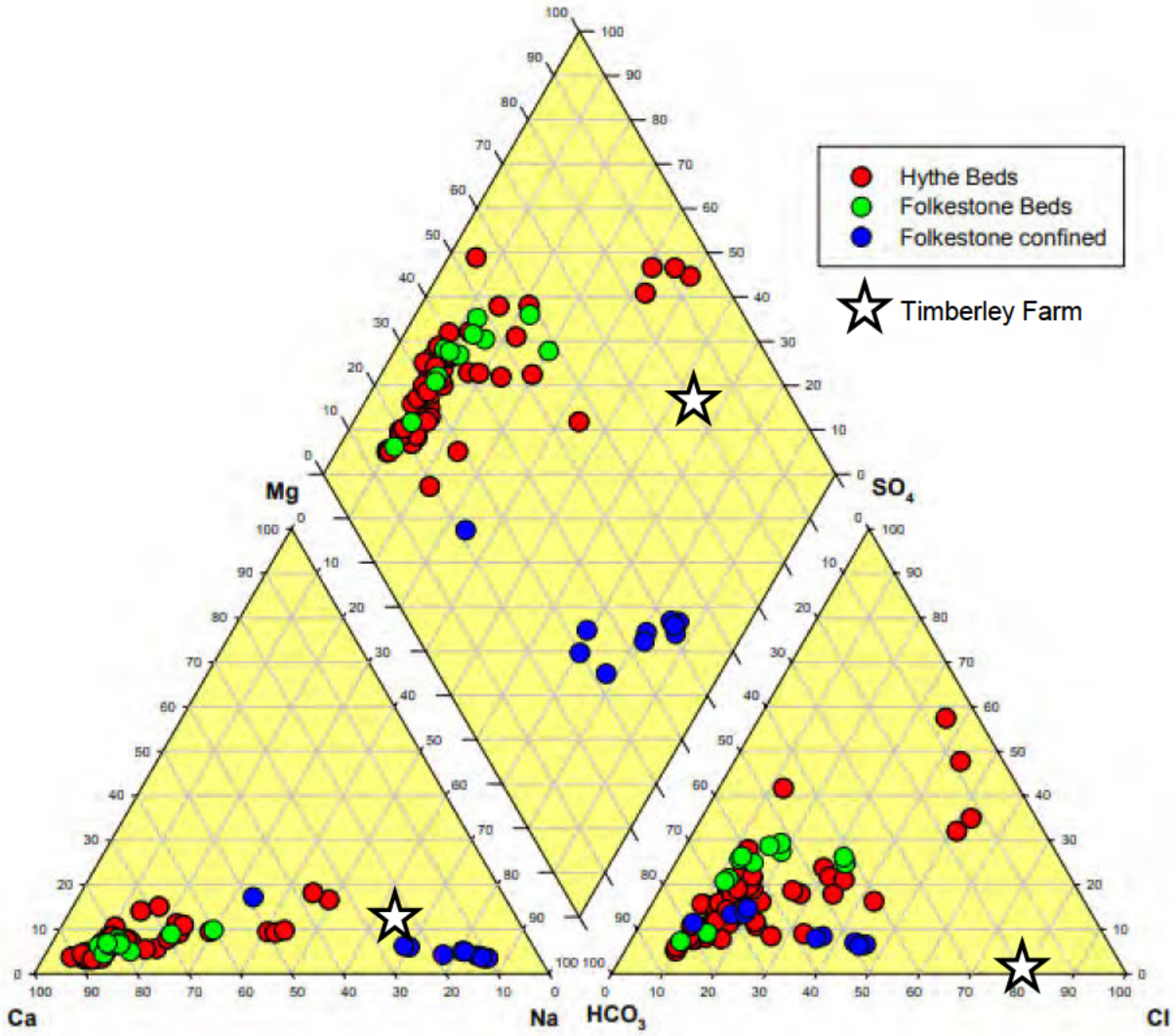
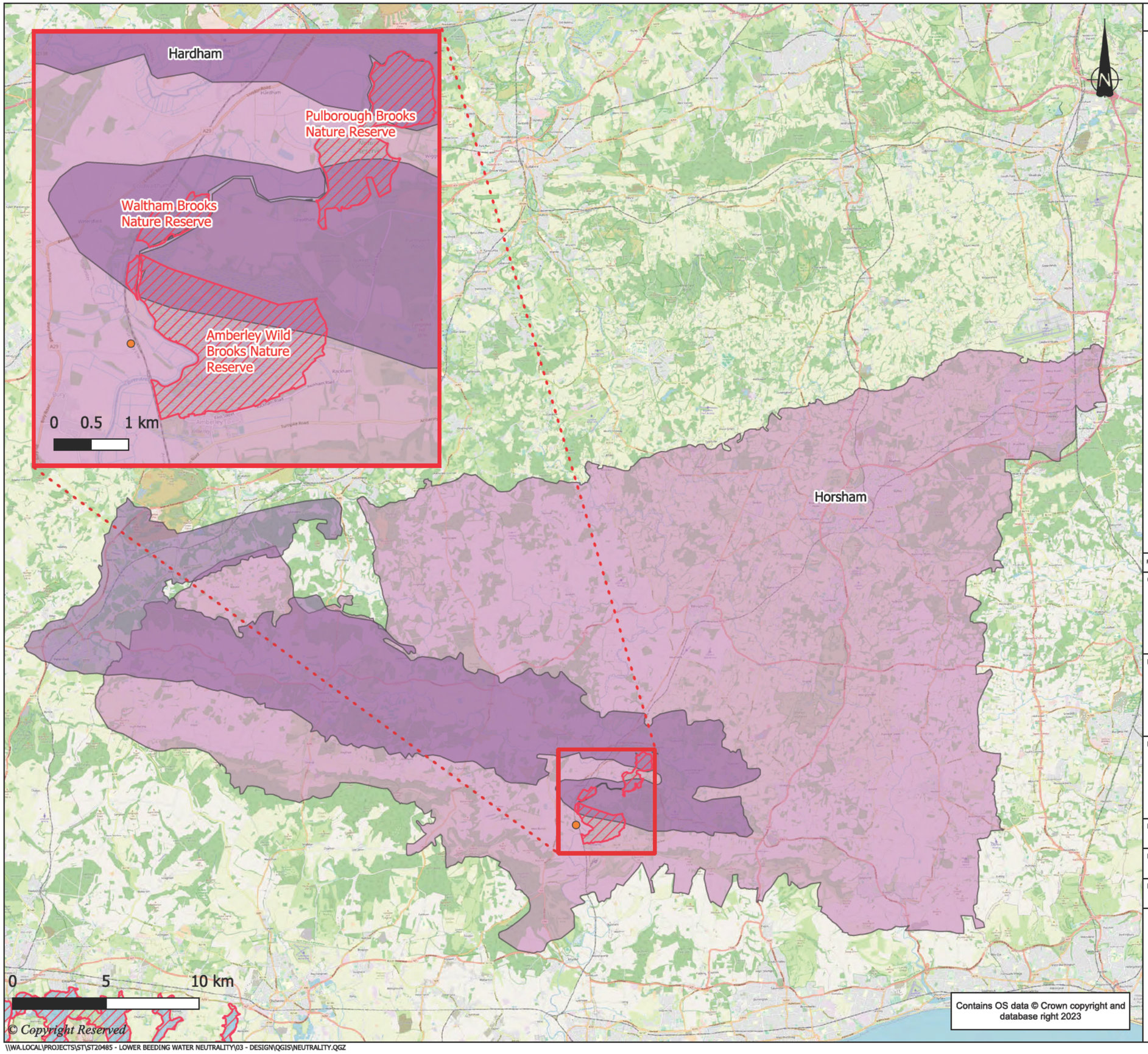


Base diagram from Figure 5.1 in Shand, P, Cobbing, J, Tyler-Whittle, R, Tooth, A F & Lancaster, A 2003. Baseline Report Series 9: The Lower Greensand of southern England British Geological Survey Commissioned Report No. CR/03/273N

Data for Timberley Farm added by Wardell Armstrong. See Appendix 7 for quality data.

DRAWINGS



DO NOT SCALE FROM THIS DRAWING

KEY

- Sussex North Water Resource Zone
- Lower Greensand Arun & Western Streams Water Body
- Site of Special Scientific Interest
- Abstraction well at Timberley Farm

REVISION	DETAILS	DATE	DRN	CHK'D	APP'D

CLIENT: ELIVIA HOMES

PROJECT: WATER NEUTRALITY

DRAWING TITLE: AREA OF INTEREST

DRG No.	REV
ST20845-001	-

DRG SIZE	SCALE	DATE
A3	1:200,000	December 2023

DRAWN BY	CHECKED BY	APPROVED BY
NB	CS	CS

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