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17/06/2024
ABMH Ref: FC2940/MH

Water Neutrality Statement

For

Erection of a New 3 Bed Residential Dwelling

At

New Barn Nursery, Broadford Bridge Road, West Chiltington, West Sussex, RH20 2LF

Introduction

We have been requested by the client, Mr P A'Barrow, to submit a Water Neutrality Statement.

The Water Neutrality Statement is to accompany a planning application for a new 3 Bed Residential Dwelling at New Barn Nursery, Broadford Bridge Road, West Chiltington, West Sussex, RH20 2LF.

Baseline

The baseline condition from a water neutrality perspective is that the existing water usage on the site of the new dwelling is zero.

Proposed Demand

The proposed water demand for the dwelling has been undertaken using the Building Regulations Part G calculator, realistically based on fixtures and fittings available on the market, and reflective of the proposed use. The calculations together with data sheets of typical available fittings are included within Appendix A.

Water consumption, including external water use, for the dwelling has been calculated at 80 litres per person per day.

If rainwater harvesting was incorporated into the design, then water consumption, including external water use, for the dwelling would reduce to 55 litres per person per day.

The inclusion of grey water use within the scheme would not result in a decrease in water consumption if rainwater harvesting was implemented as the proposed uses of the water, ie washing machine and WC flush use are the same in both the grey water and rainwater harvesting scenarios.

The scheme is currently proposing not to include rainwater harvesting or grey water systems into the proposed drainage systems serving the new residential dwelling.

The 3No Bed House, taking average occupancy rates extrapolated from 2011 census data for Horsham District, has 2.47 occupants.

Taking water consumption as 80 litres per person per day, with an average occupancy rate of 2.47 occupants, then the total dwelling water consumption is 198 Litres per day.

Given that the baseline/existing water usage is zero, the new dwelling represents a net increase in water usage of 198 Litres per day,

The increase in water consumption is intended to be addressed using a private borehole that has been installed at the site in September 2023 to a depth of 45m. The borehole has a test pumping rate of 3m³/hour, as indicated on the EA Borehole Record Form, Appendix B. The borehole's location relative to the proposed dwelling is shown on Drawing D D219/370/02, Appendix B.

It is our understanding that a borehole that would abstract less than 20m³ per day does not require an abstraction licence from the EA.

Furthermore, it is our understanding that the location of the borehole and aquifer that it connects too is outside Hardham Basin (Folkstone Beds) and Chichester and Worthing Chalk, and situated outside and just north of Lower Greensand Arun and Western Streams, thus deemed not affecting flows in the River Rother in the view of the EA.

The borehole water quality has been tested by South East Water Scientific Services, results included in Appendix B.

These results have been utilised by Invicta Water Treatment to assess the viability of the borehole to supply potable water to the new dwelling. Within their report dated April 2024, Appendix B, they confirm that borehole water can be adequately treated to Private Water Supply Regulations delivering 500 Litres per day.

This level of treated potable water supply is more than the water consumption of 80 litres per person per day, with a total dwelling water consumption of 198 Litres per day, based on an average occupancy rate of 2.47 occupants.

In addition, the Invicta Water Treatment report highlights the ongoing maintenance and sampling regime that will be implemented to safeguard the potable water quality going forward.

Conclusion

It is our view that this Water Neutrality Assessment demonstrates that the proposed scheme will not consume mains water but will in fact supply its own potable water needs via an existing borehole on site in a safe and compliant manner.

Therefore, the proposed scheme does not need to consider the use rainwater harvesting and/or greywater/blackwater recycling in order to demonstrate water neutrality.

On this basis we suggest that proposed scheme results in no increase in water consumption from the baseline consumption, and thus satisfies the requirements of the Water Neutrality Assessment as required by HDC.

Appendix A

Building Regulations Part G Water Efficiency calculations

Typical appliance product data

Basin tap

Dishwasher

Kitchen Tap

Shower

Washing Machine

WC Flush Cistern

The Water Efficiency Calculator for New Dwelling (3 Bed)

Project Name:
New Dwelling at
New barn Nursery, West Sussex, RH20 2LF
Table 1

Table 1 The Water Calculator for New Dwellings

Installation Type	Unit of Measure	Capacity/ Flow rate (1)	Use factor (2)	Fixed use (litres/person/day) (3)	Litres/Person /day = [(1) x (2)] + (3) (4)
WC (Single Flush)	Flush Volume (Litres)	0	4.42	0.00	0.00
WC (Dual Flush)	Full Flush Volume (Litres)	4.5	1.46	0.00	6.57
	Part Flush Volume (Litres)	3	2.96	0.00	8.88
WCs (multiple fittings)	Average effective flushing volume (litres)	0	4.42	0.00	0.00
Taps (excluding kitchen & utility room taps)	Flow Rate (litres/minute)	5.7	1.58	1.58	10.59
Bath (where shower also present)	Capacity to Overflow (litres)	0	0.11	0.00	0.00
Shower (Where bath also present)	Flow Rate (litres/minute)	0	4.37	0.00	0.00
Bath Only	Capacity to Overflow (litres)	0	0.50	0.00	0.00
Shower Only	Flow Rate (litres/minute)	5	5.60	0.00	28.00
Kitchen/Utility Room Sink Taps	Flow Rate (litres/minute)	5	0.44	10.36	12.56
Washing Machine	Litres/kg dry load	6	2.10	0.00	12.60
Dishwasher	Litres/place setting	1	3.60	0.00	3.60
Waster Disposal Unit	Litres/use	0	3.08	0.00	0.00
Water Softner	Litres/person/day	0	1.00	0.00	0.00
(5)		Total calculated use (litres/person/day) = (Sum Column 4)			82.80

The Water Efficiency Calculator for New Dwelling (3 Bed)

Project Name:
New Dwelling at
New barn Nursery, West Sussex, RH20 2LF
Table 1

Table 1 The Water Calculator for New Dwellings					
Installation Type	Unit of Measure	Capacity/ Flow rate (1)	Use factor (2)	Fixed use (litres/person/day) (3)	Litres/Person /day = [(1) x (2)] + (3) (4)
	(6)	Contribution from greywater (litres/person/day) from Table 4.6			0.00
	(7)	Contribution from rainwater (litres/person/day) from Table 5.5			0.00
	(8)	Normalisation Factor			0.91
	(9)	Total water consumption = [(5) - (6) - (7)] x (8) (litres/person/day)			75
	(10)	External Water Use			5.00
	(11)	Total water consumption (Building Regulation 36 para (2)a = (9) + (10) (litres/person/day)			80

Design DOES Comply with Building Regs 36 para (2)a

Maximum consumption of potable water (litres/person/day)	Performance Target
125	Reg 36 para (2)a
110	Reg 36 optional para (2)b

Undertaken in accordance with the method set out in
'The Water Efficiency Calculator for New Dwellings'
Building Regulations 2010 - Approved Document G 2015 Edition with 2016 amendments
Appendix A

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Duravit DuraStyle Basic Rimless Close Coupled Toilet (4.5/3 L Flush) + Seat

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Overview

Duravit DuraStyle Basic Rimless Close Coupled Toilet (4.5/3 L Flush) + Seat






The Duravit DuraStyle Basic Rimless close coupled toilet is both innovative and eye-catching. Its rimless design enables an innovative and efficient flush and prevents the formation of germs and the build-up of residue. The toilet features a dual flush cistern giving a four and a half or three litre flush. Comes with a choice of a standard or soft close seat.

- Product Details
- Brand: Duravit
 - Finish: Alpine White
 - Height: 775mm
 - Width: 390mm
 - Depth: 655mm
 - Material: Ceramic
 - Rimless bowl
 - Dual flush mechanism - 4.5/3 litres
 - Chrome flush button
 - Water inlet located bottom left
 - Horizontal outlet
 - Comes with WC pan fixing kit
 - Standard and soft close seat options
- 5 Year Guarantee

All measurements are approximate

Images are for illustrative purposes only

Product Overview

 Dimensions	+
 Q&A	+
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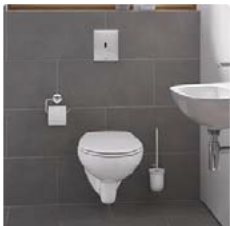
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Coupled Toilet (4.5/...
£387.57



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Grohe Solido Tectron
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Soft-Close Seat
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Product information sheet

COMMISSION DELEGATED REGULATION (EU) 2019/2014

Supplier's name or trade mark ^(a) ^(b) :		Bosch			
Supplier's address ^(a) ^(b) :		BSH Hausgeräte GmbH, Carl-Wery-Str. 34, 81739 Munich, Germany			
Model identifier ^(a) :		WGG254F0GB			
General product parameters:					
Parameter		Value		Parameter	
Rated capacity ^(d) (kg)	10.0	Dimensions in cm ^(a) ^(b)	Height		85
			Width		60
			Depth		59
EEIW ^(d)		51.7		Energy efficiency class ^(d)	
Washing efficiency index ^(d)		1.035		Rinsing effectiveness (g/kg) ^(d)	
Energy consumption in kWh per cycle, based on the eco 40-60 programme. Actual energy consumption will depend on how the appliance is used.		0.511		Water consumption in litre per cycle, based on the eco 40-60 programme. Actual water consumption will depend on how the appliance is used and on the hardness of the water.	
Maximum temperature inside the treated textile ^(d) (°C)	Rated capacity	35	Remaining moisture content ^(d) (%)		52.9
	Half	28			
	Quarter	23			
Spin speed ^(d) (rpm)	Rated capacity	1351	Spin-drying efficiency class ^(d)		B ^(d)
	Half	1400			
	Quarter	1400			
Programme duration ^(d) (h:min)	Rated capacity	3:50	Type		Freestanding
	Half	2:55			
	Quarter	2:30			

Airborne acoustical noise emissions in the spinning phase ^(d) (dB(A) re 1 pW)	74	Airborne acoustical noise emission class ^(d) (spinning phase)	B
Off-mode (W) (if applicable)	0.10	Standby mode (W) (if applicable)	0.40
Delay start (W) (if applicable)	1.00	Networked standby (W) (if applicable)	0.00
Minimum duration of the guarantee offered by the supplier ^{(a) (b)} :			24 months
This product has been designed to release silver ions during the washing cycle			No
Additional information ^{(a) (b)} :			
Weblink to the supplier's website, where the information in point 9 of Annex II to Commission Regulation (EU) 2019/2023 ^(d) ^(b) is found: www.bosch-home.com/energylabel			
<p>^(a) this item shall not be considered relevant for the purposes of Article 2(6) of Regulation (EU) 2017/1369.</p> <p>^(b) changes to these items shall not be considered relevant for the purposes of paragraph 4 of Article 4 of Regulation (EU) 2017/1369.</p> <p>^(c) if the product database automatically generates the definitive content of this cell the supplier shall not enter these data.</p> <p>^(d) for the eco 40-60 programme.</p>			



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Family-friendly showering with reliable performance. Features DreamSpray and TurboStat technology for constant water temperatures.



Saving water at home



- Suitable for High Pressure Water Systems Only
- Delivers 5Ltr/min at 1bar
- Bar Mixer
- 5 Year Manufacturer's Guarantee (T&Cs Apply)
- Thermostatic Temperature Control
- Fixed Head & Riser Rail
- Single-Spray Pattern Shower Head

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SPECIFICATION

Brand	Grohe
Built In Valve/Exposed	Exposed
Colour	Chrome
Fixings Supplied	Fixings Supplied
Green star	Saving water at home
Green star Claim	This shower is regulated to have a maximum flow rate of 8 litres per minute at 3 bar pressure or less. Using an efficient shower head can help manage water use.
Manufacturer Guarantee	5 Year Manufacturer's Guarantee (T&Cs Apply)
Max Water Temperature	43 °C

Max. Shower Flow Rate	20 Ltr/min
Maximum Bar Pressure	10 bar
Min. Shower Flow Rate	5 Ltr/min
Minimum Bar Pressure	1 bar
Mixer Type	Thermostatic
Model Name	Precision Start
No. of Outlets	Single Outlet
Pack Size	1
Parent Colour	Chrome
Pieces in Pack/Case	1
Pipe Centres Size/Range	150 mm
Product Depth	65 mm
Product Height	470-620 mm
Product Type	Shower Mixer
Product Width	304 mm
Range Name	Precision
Shower Head Shape	Round
Shower Head Size	100 mm
Shower Product Type	Mixer
Smart Compatibility	Not Smart
Temperature Control Type	Thermostatic Temperature Control
Total Product Weight	3.500 kg
Water Failure Shutdown	Automatic Water Failure Shutdown

PRODUCT CONTENTS

Precision Start thermostatic shower mixer, 600mm shower rail, single spray-pattern handset and 1.75m shower hose.

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GROHE MINTIA – ELEGANT AND VERSATILE WATER-SAVING KITCHEN TAP

Elegant modern style meets premium performance with the Minta kitchen tap. With its high C-shaped spout that swivels through a full 360°, cleaning the sink or filling tall pots has never been easier. This water-saving tap's pull-down spray head adds to the operating radius for added cleaning convenience. Its integrated GROHE EcoJoy technology means you can enjoy a powerful flow of water yet still cut water usage by up to 50% – an easy way to save a precious natural resource as well as

money! With a lever that moves super smoothly thanks to the integrated GROHE SilkMove technology, the control of water volume and temperature is effortless and precise. Finished in our dazzling and scratch resistant GROHE StarLight chrome, it has a sparkle that will last for many years. With our easy installation system, you'll have it fitted in no time. A perfect kitchen upgrade!

PRODUCT DESCRIPTION



PRODUCT MAIN FEATURES

C-spout	pull out mousseur spout	flexible connection hoses
monobloc installation	adjustable flow rate limiter	
GROHE Long-Life finish	swivel tubular spout	rapid installation system
GROHE SilkMove 46 mm ceramic cartridge	swivel area 360°	maximum flow rate (at 3 bar): 5 l/min
GROHE Water Saving - Less water, perfect flow	integrated non-return valve	optional temperature limiter (46 308 000)
	protected against backflow	



Additional information



Technical Overview

Water consumption 9.5 l	Airborne acoustical noise emissions 44 dB(A) re 1pW
Cutlery system Cutlery drawer	AquaStop¹ ⓘ Yes
Zeolith® ⓘ Yes	Home Connect ⓘ Yes

Go to all technical information

Highlights

Enjoy Energy Efficiency Class A performance.

Perfect drying results with low energy consumption.



Customize wash & dry cycles flexibly.

Heavy-duty cleaning for heavy-duty stains.



Your dishwasher listens to your needs.

Quality and flexibility in every detail



Top features

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- Energy Efficiency Class A: our most energy-efficient dishwashers.
- **PerfectDry:** perfect drying results with low energy consumption, even for hard-to-dry items.
- **Intelligent Programme:** individually adapts the washing and drying cycle based on your feedback
- **Extra Clean Zone:** extra cleaning for items in your top basket.
- **Home Connect:** home appliances with smart connectivity for an easier everyday life.



7

Appliance Information

Search technical information



General

Built-in / Free-standing

Freestanding

Installation typology

Free-standing with built under possibility

Colour of appliance

Silver inox

Color / Material panel

Stainless steel colour, lacqu.

Removable top

Yes

Variable hinge

No

Adjustable plinth

No

Energy Efficiency Class²

A

Airborne acoustical noise emission class

B

Energy consumption per cycle of the eco programme

0.543 kWh

The water consumption of the eco programme in liters per cycle

9.5 l

Programme duration³

4:55 h

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Maximum number of place settings

14

List of programmes

Auto 45-65°C, Custom program, Economy, Glass 40°C, Intelligent, Intensive, Night program, Short

Additional operational options

Extra dry, Half Load, Machine Care Programme, Remote Start, varioSpeed Plus

AquaStop¹ ⓘ

Yes

Drying system

Heat exchanger + drying assist, Zeolith

3rd Rack

VarioDrawer - loading of cutlery on 3rd level

rackmatic normal ⓘ

Yes

Tub material

Stainless steel

Included accessories 2

no

Size and weight ▼**Dimensions of the product (HxWxD)**

845 x 600 x 600 mm

Comfort ▼**Drying progress indicator**

status display, Time remaining indicator front, water inlet



Precise Glass Protection

No
Connectivity



Home Connect ⓘ

Yes

Safety

AquaStop¹ ⓘ

Yes

Child safety devices

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 - 2 Scale of Energy Efficiency Classes from A to G
 - 3 Duration of programme Eco 50 °C
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SMS6TCI01G

Series 6 Free-standing dishwasher 60 cm Silver inox

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01

DAYS

14

HRS

28

MINS

14

SECS

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Dimensions



Instructions



Grohe Eurocube Tap Package (Bath + Basin Tap)

Part No.: EUCBTPK

£499.95

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Overview

Grohe Eurocube Tap Package (Bath + Basin Tap)

The Eurocube bath and basin tap pack will make a stunning addition to any contemporary bathroom with its modern design. The taps are equipped with GROHE SilkMove cartridge that delivers gradual and precise control of the water flow and temperature. GROHE QuickFix offers a faster, easier and hassle-free installation. Both taps are crafted from high quality materials and finished in GROHE StarLight chrome coating that is scratch resistant and easy to clean. All Grohe bathroom taps come with a 5 year guarantee.

Basin Tap Details

- Finish: Chrome
- Height: 172mm
- Projection: 133mm
- Medium high spout
- Easy to clean thanks to the GROHE StarLight® chrome coating
- GROHE SilkMove® technology for smooth handling and precise water flow control
- GROHE EcoJoy mousseur 5.7 l/min
- GROHE QuickFix® – quick and easy installation in a few simple steps
- Easy to install
- Minimum Pressure: 1.0 - 5.0 bar
- Waste not included
- Flexible connection hoses

Bath Tap Details

- Finish: Chrome
- Height: 142mm
- Projection: 103mm
- Metal handles
- Bath deck mounted
- Easy to clean thanks to the GROHE StarLight® chrome coating

8



- GROHE SilkMove®technology for smooth handling and precise water flow control
- Minimum Pressure: 0.5 - 5.0 bar

5 Year Guarantee

Please note: Wastes not included.

* Basin tap requires a Pair of 3/8" Inch Flexi Tail Pipe Adapters - 15X38PK (sold separately)

Comprises

- (1) Eurocube Mono Basin Mixer - 23446000
- (1) Eurocube Bath Filler - 25136000

Product Overview

 Dimensions

+

 Q&A

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 Delivery & Returns

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 Reviews

-

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Grohe Eurocube Tap Package (Bath + Basin Tap)

£499.95



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£499.95



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£387.57



Duravit DuraStyle Basic BTW Rimless Close Coupled Toilet
£387.57



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£646.01



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£549.95



EcoDelux Compact Toilet Frame with Matt Black WhirlFlush...
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Appendix B

EA Borehole Record Form

Borehole's location relative to the proposed dwelling - Drawing D D219/370/02

Borehole water quality test - South East Water Scientific Services

Invicta Water Treatment report

Borehole record form



British
Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment
Agency

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

A Site details

Borehole drilled for Mr Paul A'Barrow
 Location New Barn Nurseries Broadford Bridge Road W Chilmington W sussex RH20 2LE
 NGR (ten digits) TQ 09660 21086 Please attach site plan
 Ground level (if known) 27 metres Above Ordnance Datum
 Drilling company SussexBoreholes
 Date drilling commenced 11/09/2023 (DD/MM/YYYY) Completed 15/09/2023 (DD/MM/YYYY)

B Construction details

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

Borehole drilled diameter 225 mm from 0 to 48 m/depth
 _____ mm from _____ to _____ m/depth
 _____ mm from _____ to _____ m/depth
 _____ mm from _____ to _____ m/depth

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

Casing material plain diameter 125 mm from 0 to 23 m/depth

Casing material slotted diameter 125 mm from 24 to 45 m/depth

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

Grouting details gravel pack, bentonite pellets at 14-10 meters and cement groute to surface

Water struck at 1. 23 m (depth below datum – mbd) 2. _____ m (mbd)
 3. _____ m (mbd) 4. _____ m (mbd)

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

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

Pump suction depth _____ mbd

Water level (start of test) 3.65 mbd

Water level (end of test) _____ mbd

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

electric pump

Pumping rate 3 m³/hour ☒ or litres/second ☐. Please tick as appropriate.
 for _____ days, 4 hours, _____ mins

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

Date(s) of measurements Pump started 15/09/2023 (DD/MM/YYYY)

Pump stopped _____ (DD/MM/YYYY)

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

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	sandy yellow clay with sandstone	3	3
	blue clay with hard bands and layers of sandstone	20	23
	grey sand with layers of sandstone	25	48
	(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		
_____	_____		

F The Data Protection Act 1998

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

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

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

We may also process or release the information to:

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

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

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

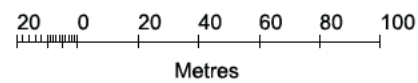
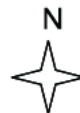
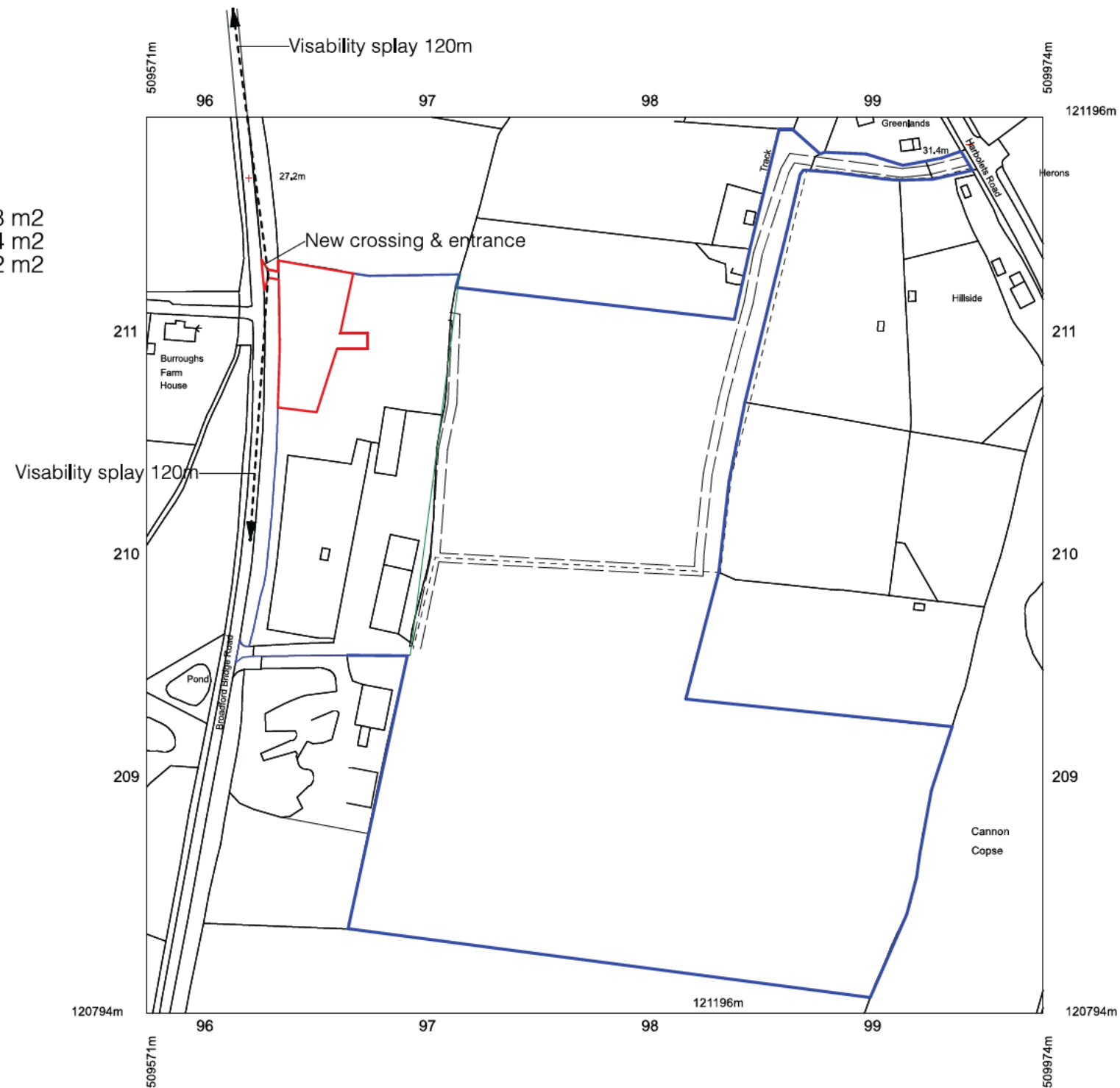
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- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment,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

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

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

Blue Line area 65,358 m2
Red line Application area 1,824 m2
Combined Plot area 67,182 m2



Scale 1:2500. Licence no. OI 1142689



Paul Maggs MCIAT
Hazelwood, Harbolets Road,
West Chilton RH20 2LG
Tel: 01798 813298
paul@pbproperties.co.uk
www.pbproperties.co.uk

Client: Mr P a'Barrow

Site Address:

New Barn Nursery
Broadford Bridge Road
West Chilton
RH20 2LF

Project Name:

Workers Dwelling



Date: 02/01/2025

Scales: PAGE SIZE A3

Plan No. D 0125/370/01

Drawings produced using Vectorworks CAD. Only
written dimensions to be respected.
Copyright protected to PB Properties



Sheet No. D 0125/370/02
Scales Page Size A3: 1:500
Notes:
Project Name: Workers Dwelling
Date: 02/01/2025
Client: Mr P a'Barrow
Site Address: Fill this in
 PB PROPERTIES the design to build on
Paul Maggs MCIAT Hazelwood, Harbolets Road, West Chilmington RH20 2LG Tel: 01798 813298 paul@pbproperties.co.uk www.pbproperties.co.uk Drawings produced using Vectorworks CAD. Only written dimensions to be respected. Copyright protected to PB Properties
 CIAT CHARTERED PRACTICE

ANALYTICAL REPORT

Page 1 of 4

Invicta Water Treatment
89 Castle Drive
Horley
Surrey
RH6 9DD

Date Received: 15/03/2024

Certificate Number: 1224740-3 Final
Supersedes report 1224740-2

Order Number: IWT2709

Date Reported: 12/04/2024

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4723191	RAW WATER	255	Ammonium (Ammonia and Ammonium Ions)	0.568	mg/l	<0.500	F
	Order No: IWT2709	215	Chloride	251.27	mg/l	<250.00	F
	Received Date: 15/03/2024	245	Nitrate	<0.9	mg/l	<50.0	
	Tested Date: 15/03/2024	225	Nitrite	<0.004	mg/l	<0.500	
	Sampling Date: 15/03/2024 11:20	calc	Nitrite/Nitrate	0.000	mg/l	<1.000	*
	Sample Type: GW : Ground Water	305	Sulphate	46.8	mg/l	<250.0	
	Product: SS-DWREGS	205	Total Hardness	12.1	mg/l		
		230	Odour - Qualitative	Stagnant			*
		230	Odour - Quantitative	1			F
		430	Colony Count 3 Days at 22°C	>300	cfu/ml		
		400	E coli	0	mpn/100ml	0	
		400	Total Coliforms	2	mpn/100ml	0	F
		660	Colour	2	mg/l Pt/Co	<20	
		660	Conductivity	1367	uS/cm		
		660	Hydrogen Ion (pH)	8.6	pH_unit	6.5 to 9.5	
		660	Turbidity	56.400	NTU	<4.000	F
		ext	Acrylamide	<0.008	µg / l	<0.100	
		ext	Epichlorohydrin	<0.1	µg / l	<0.10	*
		ext	Vinyl Chloride	<0.113	µg / l	<0.500	
		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	7.0	µg / l	<10.0	
		745	Selenium	<0.8	µg / l	<10.0	
		740	Calcium	3.1	mg/l		
		740	Magnesium	0.6	mg/l		
		3371	Fluoride	1.208	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	

Disclaimers:

Unless otherwise stated, all results apply to the sample as received. Information provided by the customer (includes Date, Time, Sample Matrix & Sample Description) can affect the validity of the result.

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Details of Uncertainty of Measurement and Analytical Quality Control are available on request.

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A result of 0 cfu denotes none found in volume analysed

F - Result Exceeds The Maximum Pcv As Defined In The Water Supply (Water Quality) (Amendment) Regulations 2018

doc - individually documented method, details available on request

ext - Analysis subcontracted to an external laboratory



1579

Certificate Number: 1224740-3 Final
Supercedes report 1224740-2

Order Number: IWT2709

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4723191	Continued from Page 1	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 (MCP)	<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	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	<0.003	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	1268.3	µg / l	<200.0	F
		730	Copper	<0.009	mg/l	<2.000	
		730	Iron	2484.8	µg / l	<200.0	F
		730	Lead	1.3	µg / l	<10.0	
		730	Manganese	64.7	µg / l	<50.0	F
		730	Nickel	2.1	µg / l	<20.0	

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1579

Certificate Number: 1224740-3 Final
Supercedes report 1224740-2

Order Number: IWT2709

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4723191	Continued from Page 2	735	Cadmium	<0.12	µg / l	<5.00	
		735	Chromium	3.6	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	1.1	µg / l	<20.0	
		360	Clostridium perfringens (including spore	0	cfu/100ml	0	
		calc	Pesticides - Total Substances	0.000	ug/l		*
		4170	Aldrin	<0.007	µg / l	<0.030	
		4170	Dichlobenil	<0.006	µg / l	<0.100	
		4170	Dieldrin	<0.007	µg / l	<0.030	
		4170	Gamma-HCH (Lindane)	<0.005	µg / l	<0.100	
		4170	Heptachlor	<0.008	µg / l	<0.030	
		4170	Heptachlor Epoxide	<0.005	µg / l	<0.030	
		4170	Propyzamide	<0.005	µg / l	<0.100	
		4170	Tri-allate	<0.005	µg / l	<0.100	
		calc	Total Phosphate	303	µg / l		*
		285	Silica	9.95	mg/l		
		310	Suspended Solids	12.0	mg/l		*
		250	Total Organic Carbon	1.1	mg/l		
		410	Pseudomonas aeruginosa	Competing growth, indicative count 0	cfu/100ml		
		390	Enterococci	25	cfu/100ml	0	F
		430	Colony Count 2 Days at 37°C	232	cfu/ml		
		730	Iron (Free)	19.2	µg / l		
		calc	% Transmission	97.5			*
		doc	UV Abs (10mm) @ 254nm	0.011	abs_unit		*
			Unfiltered				
		doc	Alkalinity	454.0	mg/l		*
		calc	Bicarbonate Alkalinity	0.20	mg/l		*
		740	Boron	1.331	mg/l	<1.000	F
		740	Sodium	357.6	mg/l	<200.0	F
			Findings	Turbidity filtered at 0.45um 0.88NTU			*
		730	Aluminium (Free)	61.3	µg / l		

Disclaimers:

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1579

Certificate Number: 1224740-3 Final
Supercedes report 1224740-2

Order Number: IWT2709

Addition of missing results



Richard Brown
Laboratory Manager

Disclaimers:

Unless otherwise stated, all results apply to the sample as received. Information provided by the customer (includes Date, Time, Sample Matrix & Sample Description) can affect the validity of the result.

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1579

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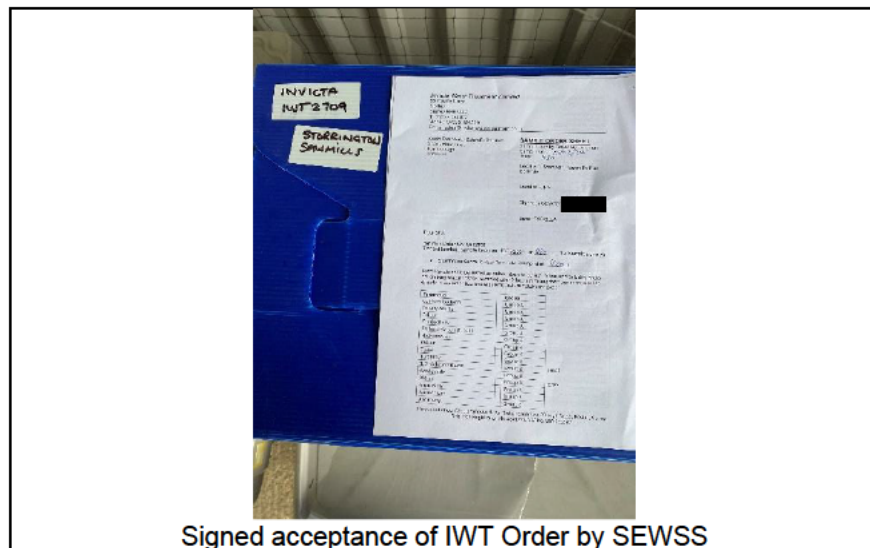
[REDACTED]

[REDACTED]

Re: Private Water Supply at Storrington Sawmills Site, New Barn Nurseries, RH20 2LE – Raw Borehole Water Analyses (to date and inferences); Proposed Design and Compliance with PWS Regs 2016 Amended 2018

Further to the request that a raw borehole sample was taken by an accredited UKAS PWS Sampler, I can confirm that this was performed on 15/03/24 by Stefan Massingham. The borehole was pumped for some 2 hours prior to sampling on the day and had been pumped for several days before hand.

The samples were taken in accordance with DWI requirements (based on Group A & B Schedules PWS Regs 2016), with the correct bottles supplied by the UKAS Accredited lab, SE Water Scientific Services (SEWSS) and then duly transported to the lab thereafter, at the required transit temperatures (between 2°C and 8°C). Additional determinands were tested as requested by HDC for use in RO projections. In addition, we test for UV transmission and also aluminium, once filtered through 0.45 um filter to simulate ultrafiltration if deemed necessary.



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Determinands to Date	Sample Number 1224740-3 Final (sampled 15/03/24 11:20)
Alkalinity, mg/l	454.0
Ammonium (Ammonia and Ammonium ions), mg/l	0.568
Chloride, mg/l	251.27
Nitrate, mg/l	<0.9
Nitrite, mg/l	<0.004
Nitrite/nitrate, mg/l	0.000
Sulphate, mg/l	46.8
Total Hardness, mg/l	12.1
Odour – Qualitative	Stagnant
Odour – Quantitative	1
Colony Count 3 days at 22°C, cfu/ml	>300
Colony Count 2 days at 37°C, cfu/ml	232
E coli, mpn/100 ml	0
Total Coliforms, mpn/100 ml	2
Pseudomonas aeruginosa, cfu/100 ml	Competing growth, indicative count 0
Clostridium perfringens (including spore), cfu/100 ml	0
Enterococci, cfu/100 ml	25
Colour, mg/l Pt/Co	2
Conductivity, uS/cm	1,367
Hydrogen ion, pH	8.6
Turbidity, NTU	56.400
Bromate, ug/l	Not tested
Antimony, ug/l	<0.2
Arsenic, ug/l	7.0
Selenium, ug/l	<0.8
Boron, mg/l	1.331
Calcium, mg/l	3.1
Magnesium, mg/l	0.6
Sodium, mg/l	357.6
Fluoride, mg/l	1.208
Benzo(a)pyrene, ug/l	<0.003
Benzo(1,12)perylene, ug/l	<0.003
Benzo(11,12)fluoranthene, ug/l	<0.003
Benzo(3,4)fluoranthene, ug/l	0.004
Indeno(1,2,3-cd)pyrene, ug/l	<0.003
PAH Total, ug/l	0.000
1,1,1 Trichloroethane, ug/l	<0.60
1,2-Dichloroethane, ug/l	<0.12
Benzene, ug/l	<0.02
Dibromochloromethane, ug/l	<0.50

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Dichlorobromomethane, ug/l	<0.43
Tetrachloroethene	<0.15
Tetrachloroethene/Trichloroethene- SUM, ug/l	0.00
Tetrachloromethane, ug/l	<0.11
Total Trihalomethane, ug/l	0.00
Tribromomethane, ug/l	<0.60
Trichloroethene, ug/l	<0.10
Trichloromethane, ug/l	<0.50
Aluminium, ug/l	1,268.3
Copper, mg/l	<0.009
Iron, ug/l	2,484.8
Iron (free), ug/l	19.2
Lead, mg/l	1.3
Manganese, ug/l	64.7
Nickel, ug/l	2.1
Cadmium, ug/l	<0.12
Chromium, ug/l	3.6
First Draw Copper, mg/l	<0.009
First Draw Lead, mg/l	<0.9
First Draw Nickel, mg/l	1.1
Calc Pesticides – Total Substances	0.000
Aldrin, ug/l	<0.007
Dichlobenil, ug/l	<0.006
Gamma-HCH (Lindane), ug/l	<0.005
Heptachlor, ug/l	<0.008
Heptachlor Epoxide, ug/l	<0.005
Propyzamide, ug/l	<0.005
Tri-allate, ug/l	<0.005
2,4,5-T, ug/l	<0.007
2,4-D, ug/l	<0.007
Bentazone, ug/l	<0.007
Bromoxynil, ug/l	<0.007
Dicamba, ug/l	<0.020
Dichlorprop, ug/l	<0.003
Fluroxypyr, ug/l	<0.008
MCPA, ug/l	<0.008
MCPB, ug/l	<0.008
Mecoprop(MCPP), ug/l	<0.005
Triclopyr, ug/l	<0.015
Atrazine, ug/l	<0.002
Carbendazim, ug/l	<0.001
Carbetamide, ug/l	<0.002
Chlorotoluron, ug/l	<0.003

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Diuron, ug/l	<0.004
Epoxiconazole, ug/l	<0.003
Flutriafol, ug/l	<0.003
Isoproturon, ug/l	<0.003
Linuron, ug/l	<0.003
Oxadixyl, ug/l	<0.003
Pendimethalin, ug/l	<0.007
Prometryn, ug/l	<0.002
Simazine, ug/l	<0.003
Terbutryn, ug/l	<0.002
Trietazine, ug/l	<0.004
% transmission	97.5
UV Abs (10 mm) @ 254 nm unfiltered	0.011 abs_unit
Bicarbonate Alkalinity, mg/l	459.47
Total Phosphate, ug/l	303
Total Organic Carbon, mg/l	0.6
Silica, mg/l	9.95
Suspended Solids, mg/l	12.0
Aluminium (free), mg/l (after filtering through 0.45 um filter paper giving 0.88 NTU filtrate)	61.3
Total Organic Carbon, mg/l	1.1

Invicta Water Treatment

89 Castle Drive

Horley

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Treatment Prognosis

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

- Turbidity (56.400 NTU, maximum 1.000 NTU leaving works)
- iron (2,484.8 ug/l, maximum 200.0 ug/l)
- manganese (64.7 ug/l, maximum 50.0 ug/l)
- aluminium (1,268.3 ug/l, maximum 200.0 ug/l)
- sodium (357.6 mg/l, maximum 200.0 mg/l)
- chloride (251.27 mg/l, maximum 250.00 mg/l)
- boron (1.331 mg/l, maximum 1.000 mg/l)
- Bacteria (see above)

The recommended treatment will be extensive particle filtration followed by softening prior to a 350 lph (approximate) RO unit (see emailed attachment for full RO design calculations) with remineralisation thereafter of the permeate. The balanced permeate will be disinfected by UV and stored in a tank. The water is then boosted into supply through a second filter and UV. All backwash and regen waters will use treated water to ensure filters are kept in the best possible condition. The treatment train will be similar to that for the Brook Hill Development, recently accepted by HDC and reported on by HDC consultant Dr. G. Pearce. Please also refer to correspondence for Limekiln Farm Copsale, as the design is very similar indeed and where I have addressed several issues that will be relevant to this site as well.

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

The treated water will meet the PWS Regs requirements. The system can supply sufficient drinking water for the proposed 4 person property (c. 500 litres per day drinking water consumption). We have not seen any Water Neutrality documents to make any further comment at this stage.

Ongoing Maintenance & Sampling

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

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

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Nitto

HYDRANAUTICS
Nitto Group Company

Permeate Throttling (Variable), Concentrate Recirculation

Project name
Storington Sawmills

Calculated by
Stefan
Massingham

HP Pump flow
2.50 m3/h

Feed pressure
6.6 bar

Feed temperature
10.0 °C(50.0°F)

Concentrate recirculation
2.00 m3/h

Feed water pH
8.60

Chem dose, mg/l, -
None

Specific energy
1.63 kWh/m3

Pass NDP
3.6 bar

Average flux rate
15.7 l/mh

Permeate flow/train
0.35 m3/h

Raw water flow/train
0.50 m3/h

Permeate recovery
14.00 %

Total system recovery
70.00 %

Element age
0.0 years

Flux decline %, per year
7.0

Fouling factor
1.00

SP Increase, per year
7.0 %

Page : 1/3

Feed type
Brackish Well High Fouling

Pass - Stage	Perm. Flow m3/h	Flow / Vessel Feed m3/h	Conc m3/h	Flux l/mh	DP bar	Flux Max l/mh	Beta	Stagewise Pressure Perm. bar	Boost bar	Conc bar	Perm. TDS mg/l	Element Type	Element Quantity	PV# x Elem #
1-1	0.4	0.8	0.7	15.6	0.1	15.6	1.15	1	0	6.5	80.2	ESPA4-LD-4040	3	3 x 1M

Ion (mol/l)	Raw Water	Feed Water	Permeate Water	Concentrate 1
Hardness, as CaCO3	0.00	0.00	0.000	0.0
Ca	0.00	0.00	0.000	0.0
Mg	0.00	0.00	0.000	0.0
Na	359.06	971.57	30.857	1124.7
K	0.00	0.00	0.000	0.0
NH4	0.57	1.09	0.056	1.3
Ba	0.000	0.000	0.000	0.0
Sr	0.000	0.000	0.000	0.0
Al+3	1.268	3.632	0.002	4.2
H	0.00	0.00	0.000	0.0
CO3	0.00	0.04	0.000	0.0
HCO3	0.20	0.52	0.017	0.6
SO4	46.80	133.39	0.443	155.0
Cl	522.16	1410.88	46.806	1633.0
F	1.21	2.96	0.275	3.4
NO3	0.08	0.18	0.029	0.2
PO4	0.30	0.86	0.001	1.0
OH	0.02	0.05	0.002	0.1
SiO2	9.95	27.77	0.407	32.2
B	1.33	1.44	1.273	1.5
CO2	0.00	0.00	0.00	0.00
NH3	0.04	0.19	0.19	0.19
TDS	842.85	2664.32	88.17	2967.17
pH	8.80	8.98	7.67	8.84

Saturations	Raw Water	Feed Water	Concentrate	Limits
CaSO4 / ksp * 100, %	0	0	0	400
SrSO4 / ksp * 100, %	0	0	0	1200
BaSO4 / ksp * 100, %	0	0	0	10000
SiO2 saturation, %	8	17	19	140
CaF2 / ksp * 100, %	0	0	0	50000
Ca3(PO4)2 saturation Index	0.0	0.0	0.0	2.4
CCPP, mg/l	0.00	0.00	0.00	850
Langelier saturation Index	0.00	0.00	0.00	2.8
Ionic strength	0.02	0.04	0.05	
Osmotic pressure, bar	0.7	1.8	2.1	

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

Email : invicta-support@hydronauticsprojections.net

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RO Design Calculations (see email attachment for full set)

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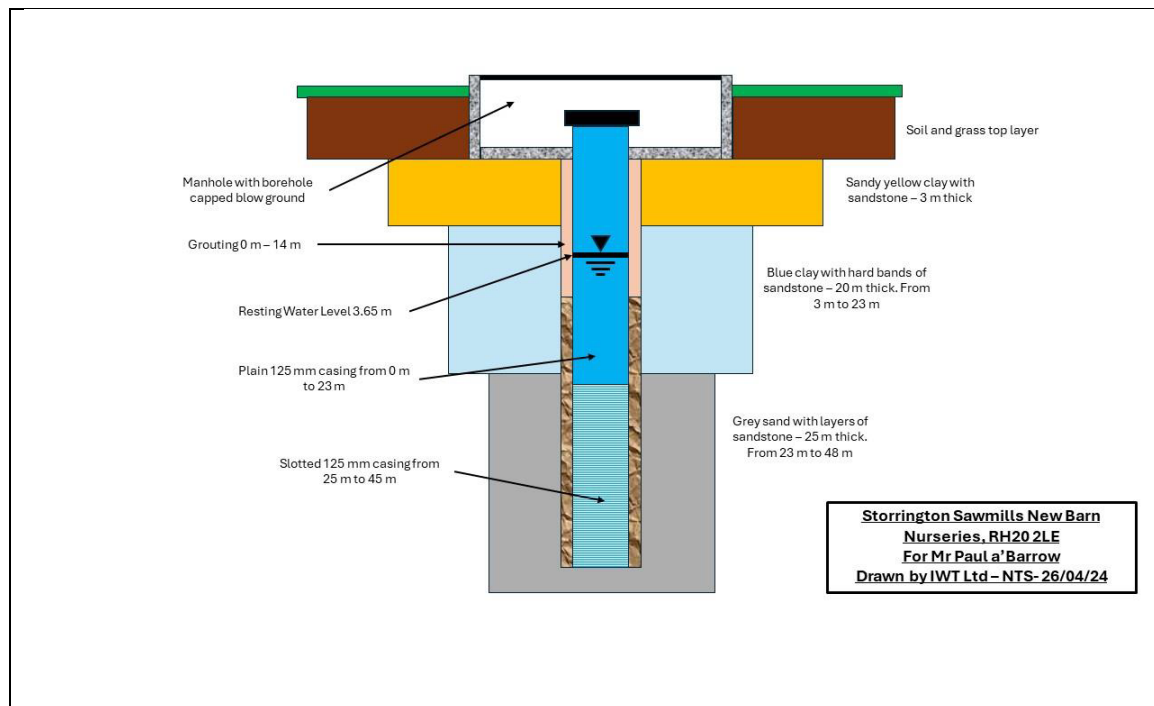
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Compliance

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

Borehole Design As Drilled On Site by Sussex Boreholes



We do not have a hydrogeological report to cross-reference with.

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Borehole Record Form

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 [REDACTED]

Location New Barn Nurseries Broadford Bridge Road W Chilington W Sussex RH20 2LE

NGR (ten digits) TQ 09660 21086 Please attach site plan

Ground level (if known) 27 metres Above Ordnance Datum

Drilling company SussexBoreholes

Date drilling commenced 11/09/2023 (DD/MM/YYYY) Completed 15/09/2023 (DD/MM/YYYY)

B Construction details

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

Borehole drilled diameter 225 mm from 0 to 48 m/depth

_____ mm from _____ to _____ m/depth

_____ mm from _____ to _____ m/depth

_____ mm from _____ to _____ m/depth

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

Casing material plain diameter 125 mm from 0 to 23 m/depth

Casing material slotted diameter 125 mm from 24 to 45 m/depth

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

Grouting details gravel pack, bentonite pellets at 14-10 meters and cement grout to surface

Water struck at 1. 23 m (depth below datum – mbd) 2. _____ m (mbd)

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

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

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

Pump suction depth _____ mbd

Water level (start of test) 3.65 mbd

Water level (end of test) _____ mbd

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

electric pump

Pumping rate 3 m³/hour ☒ or litres/second ☐. Please tick as appropriate.

for _____ days, 4 hours, _____ mins

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

Date(s) of measurements Pump started 15/09/2023 (DD/MM/YYYY)

Pump stopped _____ (DD/MM/YYYY)

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

WR38 Version 2, February 2011

page 1 of 3

Page 1 of 3 – see email attachments for full document

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Summary

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

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

Regards

Stefan Massingham BSc (Hons Chem.) MSc (Cran) MWMSoc

Director - Invicta Water Treatment Limited

Qualified UKAS Private Water Supply Sampler

[Recent Projects with Photos - Click Here](#)

Disclaimer

Liability: This document contains information and may contain conclusions and recommendations. Every effort has been made to ensure that the information is accurate and that the opinions expressed are sound. However, Invicta Water Treatment Limited cannot be made liable for any errors or omissions or for any losses or consequential losses resulting from decisions based on the information.

Permeate Throttling (Variable), Concentrate Recirculation

Project name	Storrington Sawmills		Page : 1/3
	Stefan	Permeate flow/train	0.35 m3/h
Calculated by	Massingham	Raw water flow/train	0.50 m3/h
HP Pump flow	2.50 m3/h	Permeate recovery	14.00 %
Feed pressure	6.6 bar	Total system recovery	70.00 %
Feed temperature	10.0 °C(50.0°F)	Element age	0.0 years
Concentrate recirculation	2.00 m3/h	Flux decline %, per year	7.0
Feed water pH	8.60	Fouling factor	1.00
Chem dose, mg/l, -	None	SP increase, per year	7.0 %
Specific energy	1.63 kwh/m3		
Pass NDP	3.6 bar		
Average flux rate	15.7 l/mh		

Feed type											Brackish Well High Fouling			
Pass -	Perm.	Flow / Vessel		Flux	DP	Flux	Beta	Stagewise Pressure			Perm.	Element	Element	PV# x
Stage	Flow	Feed	Conc			Max		Perm.	Boost	Conc	TDS	Type	Quantity	Elem #
	m3/h	m3/h	m3/h	lmh	bar	lmh		bar	bar	bar	mg/l			
1-1	0.4	0.8	0.7	15.6	0.1	15.6	1.15	1	0	6.5	80.2	ESPA4-LD-4040	3	3 x 1M

Ion (mg/l)	Raw Water	Feed Water	Permeate Water	Concentrate 1
Hardness, as CaCO3	0.00	0.00	0.000	0.0
Ca	0.00	0.00	0.000	0.0
Mg	0.00	0.00	0.000	0.0
Na	359.06	971.57	30.857	1124.7
K	0.00	0.00	0.000	0.0
NH4	0.57	1.09	0.056	1.3
Ba	0.000	0.000	0.000	0.0
Sr	0.000	0.000	0.000	0.0
Al+3	1.268	3.632	0.002	4.2
H	0.00	0.00	0.000	0.0
CO3	0.00	0.04	0.000	0.0
HCO3	0.20	0.52	0.017	0.6
SO4	46.80	133.39	0.443	155.0
Cl	522.16	1410.88	46.806	1633.0
F	1.21	2.96	0.275	3.4
NO3	0.08	0.18	0.029	0.2
PO4	0.30	0.86	0.001	1.0
OH	0.02	0.05	0.002	0.1
SiO2	9.95	27.77	0.407	32.2
B	1.33	1.44	1.273	1.5
CO2	0.00	0.00	0.00	0.00
NH3	0.04	0.19	0.19	0.19
TDS	942.93	2554.32	80.17	2957.17
pH	8.60	8.99	7.57	9.04

Saturations	Raw Water	Feed Water	Concentrate	Limits
CaSO4 / ksp * 100, %	0	0	0	400
SrSO4 / ksp * 100, %	0	0	0	1200
BaSO4 / ksp * 100, %	0	0	0	10000
SiO2 saturation, %	8	17	19	140
CaF2 / ksp * 100, %	0	0	0	50000
Ca3(PO4)2 saturation index	0.0	0.0	0.0	2.4
CCPP, mg/l	0.00	0.00	0.00	850
Langelier saturation index	0.00	0.00	0.00	2.8
Ionic strength	0.02	0.04	0.05	
Osmotic pressure, bar	0.7	1.8	2.1	

Permeate Throttling (Variable), Concentrate Recirculation

Project name	Storrington Sawmills		Page : 2/3
	Stefan	Permeate flow/train	0.35 m3/h
Calculated by	Massingham	Raw water flow/train	0.50 m3/h
HP Pump flow	2.50 m3/h	Permeate recovery	14.00 %
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Feed temperature	10.0 °C(50.0°F)	Element age	0.0 years
Concentrate recirculation	2.00 m3/h	Flux decline %, per year	7.0
Feed water pH	8.60	Fouling factor	1.00
Chem dose, mg/l, -	None	SP increase, per year	7.0 %
Specific energy	1.63 kwh/m3		
Pass NDP	3.6 bar		
Average flux rate	15.7 l/mh		

Feed type										Brackish Well High Fouling				
Pass -	Perm.	Flow / Vessel		Flux	DP	Flux	Beta	Stagewise Pressure			Perm.	Element	Element	PV# x
Stage	Flow	Feed	Conc			Max		Perm.	Boost	Conc	TDS	Type	Quantity	Elem #
	m3/h	m3/h	m3/h	lmh	bar	lmh		bar	bar	bar	mg/l			
1-1	0.4	0.8	0.7	15.6	0.1	15.6	1.15	1	0	6.5	80.2	ESPA4-LD-4040	3	3 x 1M
Pass -	Element	Feed	Pressure	Conc	NDP	Permeate	Permeate	Beta			Permeate (Stagewise cumulative)			
Stage	no.	Pressure	Drop	Osmo.		Flow	Flux		TDS	Ca	Mg	Na	Cl	
		bar	bar	bar	bar	m3/h	lmh							
1-1	1	6.6	0.06	2.1	3.6	0.1	15.6	1.15	80.2	0	0	30.851	46.798	

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

Permeate Throttling (Variable), Concentrate Recirculation

Project name

Storrington Sawmills

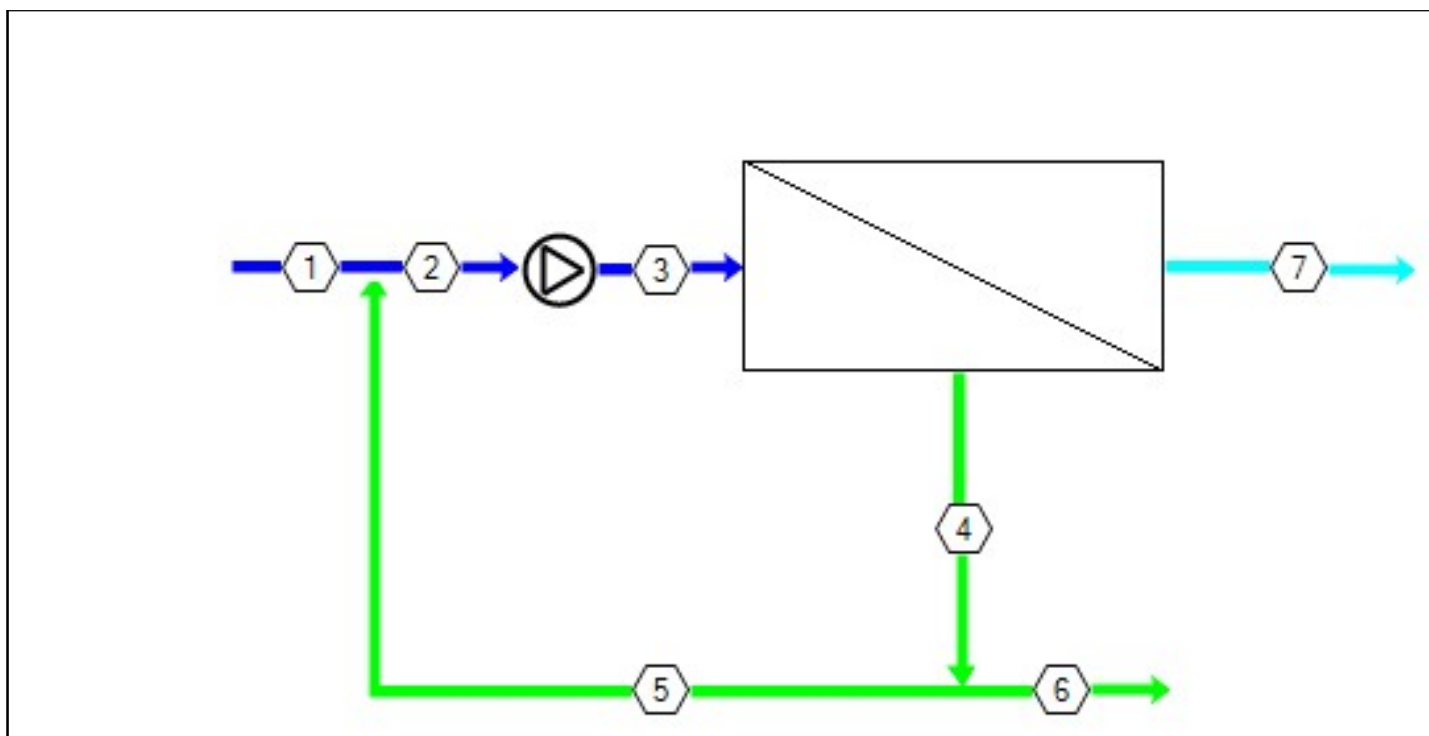
Page : 3/3

Temperature :

10.0 °C

Element age, P1 :

0.0 years



Stream No.	Flow (m3/h)	Pressure (bar)	TDS (mg/l)	pH	Econd (µs/cm)
1	0.500	0	943	8.60	1927
2	2.50	0	2554	8.99	4677
3	2.50	6.55	2554	8.99	4677
4	2.15	6.50	2957	9.04	5340
5	2.00	0	2957	9.04	5340
6	0.150	0	2957	9.04	5340
7	0.350	1.00	80.2	7.57	171

