

**Preliminary Risk Assessment, site Investigation
and Groundwater Risk Assessment** | Residential Development



Report prepared at

Former Sandgate Nurseries
West End Lane
Henfield
West Sussex
BN5 9RD

On behalf of

Littleworth Properties Limited

Report reference

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Prepared by	Vanessa Bell BSc (Hons), MSc	Geo-Environmental Consultant	30/10/2025
Prepared and Checked by	James Burkitt BEng (Hons) CEnv MRICS	Managing Director	30/10/2025

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Aviron Associates Limited
Badgemore House
Badgemore Park
Gravel Hill
Henley on Thames
Oxfordshire
RG9 4NR

Telephone numbers 01491 413 722
07787 771 686

james@aviron.co.uk
www.aviron.co.uk

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1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Littleworth Properties Limited [the “Client”] to prepare a tier 1 Preliminary Risk Assessment (PRA), comment on a Site Investigation (SI) and prepare a Groundwater Risk Assessment (GRA) of the following premises:

Former Sandgate Nurseries, West End Lane, Henfield, West Sussex, BN5 9RD (hereafter referred to as the “site”).

1.1.1 PRA Introduction

The PRA forms a tier 1 assessment by completing a desk-based study inclusive of a review of the following ‘historical’ report below:

*Phase 1 Preliminary Risk Assessment
And
Phase 2 Geotechnical and Environmental Site Investigation
Prepared by RPS Group
Dated May 2015
Referenced HLEI35707/001R*

The PRA is designed to identify potential areas of contaminative concern associated the abstraction of groundwater at the site to form the basis of the GRA and prepare a preliminary Conceptual Site Model (CSM).

1.1.2 SI Introduction

Further to the PRA, SI data following the recent drilling, installation, sampling and testing of a groundwater abstraction well at the site shall be completed to conclude the GRA with the benefit of PRA and SI data and refine the CSM. As such recommendations may be made in regard of further investigation and risk assessment.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

Accordingly, this combined report focuses on assessing the risks to the on-site abstraction borehole, which is proposed for potable water use and will serve the residents of the new development.

1.2 THE SITE

Table 1.2 provides a summary of site details and surrounding area.

Table 1.2: Site Details	
Site Location	The site is located to the south of West End Lane and to the north of Hollands Lane. The site is located on the western edge of the town of Henfield. Figure 1 is presented as the Site Location and Existing Site Layout Plan.
National Grid Ref.	Centred at approximately 520450, 115980.
Current Land Use	The site is a former nursery with glasshouses, remnant polytunnels and a vineyard. Figure 2 is presented as the Site Characterisation Plan. Figures 3 and 4 are enclosed as the Site Photographs, taken in August 2022.
Surrounding Land Use	The site is bound by West End Lane and residential houses to the north, residential housing to the east, Hollands Lane and fields to the south and agricultural land and isolated dwellings to the west.
Proposed Land Use	The proposed development is expected to comprise residential semi-detached homes with private gardens. Figure 5 is enclosed as a Proposed Development Plan.

1.3 SITE WALKOVER SURVEY

A site walkover survey was undertaken in August 2022 and included an inspection of the site and surrounding area, where safe and accessible. The purpose of the survey is to identify any potential on-site or nearby contaminative activities or potential sources of land contamination.

Additionally, as part of the survey any features which may affect site re-development in terms of physical site and ground conditions were noted.

Table 1.3 provides a description of site features observed during the walkover survey and also current Ordnance Survey maps made available at the time of report writing.

Table 1.3: Summary of Site Walkover Survey – August 2022	
Physical Site Characteristics	
Existing Structures	There are two large, adjoined glasshouses in the middle of the site. One small shed is located to north of the glasshouses. Remnant polytunnels were also observed.
Basements	None observed.

Table 1.3: Summary of Site Walkover Survey – August 2022

Visual Topography and Site Surfacing	Site surfacing consists predominantly of flat grass over soil. There is concrete between the shed and glasshouses and there is a concrete path running north-south, through the middle of a site. The site slopes gently downwards (to the west and the south-south-east) to the rear of the glasshouses over a drop of between 2-5 metres (m).
Retaining Structures and Slopes	The site slopes gently downwards to the west and the south-south-east.
Drainage Issues	None observed.
Surface Waters	None observed.
Trees and Hedges	Hedges and mature trees are located around the site's boundary.
Made and Infilled Ground	None observed.
Contaminative Characteristics	
Above or Underground Storage Tanks and Drums	There is an above ground storage tank (AST) outside the north-west corner of the glasshouses. The AST is a metal tank that is supported on breeze blocks and partially covered with brambles, as shown in Photo 4 in Figure 3. Details of the content of the AST could not be obtained but it is speculated that it contained heating oil which would have been used to heat the glasshouses. Given the age of the tank, it is thought to be of single-skin construction with no integral bund. It is not known whether the tank is empty. The vegetation was too dense to determine whether there were any stains to the ground surface underneath the tank.
Fuel Interceptors	None observed.
Waste Storage and Disposal	None observed.
Hazardous Material Storage and Use	None observed.
Asbestos Containing Materials (ACMs)	The roof of the on-site shed is suspected of containing ACMs and review of the RPS report of May 2015 indicated at the time of their inspection fragments of suspected ACMs were in the vicinity of the collapsed storage shed and greenhouse.
Boiler Houses	None observed.
Sub-stations	None observed.
Surface Staining	None observed.
Potentially Contaminative Activities	Aside from the storage of hydrocarbons in the AST, no other potentially contaminative activities were identified.

1.3.1 Summary of Contaminative Site Characteristics

Aside from the potential asbestos in the shed roof, around the shed/greenhouse (RPS) and the fuel storage in the AST, no potentially contaminative characteristics were noted during the site walkover.

2.0 HISTORICAL MAPPING REVIEW

Historical Ordnance Survey (OS) maps were obtained as part of the Envirocheck database search within report package reference 299973637 dated 17 August 2022. The information contained in these maps is summarised in the following sections and included within **Appendix I**.

2.1 SITE AND LOCAL LAND HISTORY

Historical Ordnance Survey (OS) maps were reviewed, and the historical development of the site is summarised in table 2.1. Table 2.1 also provides a summary of historical land uses in the vicinity of the site.

Table 2.1: Site and Local Land History		
Date (scale)	Site History	Local Land History
1876, 1897 (1:2,500) 1879 (1:10,560) 1898-1899 (1:10,560)	The earliest historical mapping shows that the site comprises undeveloped agricultural land.	The settlement of Henfield is located between 400m and one kilometre to the east of the site. The site is bound by roads to the north and south. A gas works is shown 40m from the southeastern corner of the site. A railway station and steam mill (for flour) is shown 100 metres to the east. Other features include a spring 80m to the south and Dears Farm 20m to the west.
1911 (1:2,500) 1912-14 (1:10,560)	No apparent changes from the previous mapping.	The steam mill (for flour) is now disused. The railway station that is adjacent to the former steam mill is associated with small structures labelled as 'cattle pens'.
1938 (1:2,500) 1947-51 (1:10,560)	The western part of the site is shown as being planted with an orchard. The rest of the site remains undeveloped.	Numerous semi-detached residential properties now exist adjacent to the east of the site. The former gas works to the south-east has become disused. Adjacent to the former gas works is a sewage disposal works. To the west, apparent glasshouses labelled as West End Nursery are shown adjacent to the site.
1951 (1:10,560) 1956 (1:2500)	No apparent changes from the previous mapping.	The settlement of Henfield has extended towards the site. Former fields to the east have been developed with mainly residential structures. The gasholders and other structures associated with the previous gas works are still present to the east of the site, however the works is noted to be disused.

Table 2.1: Site and Local Land History

Date (scale)	Site History	Local Land History
1961-63 (1:10,000)	No apparent changes from the previous mapping.	No notable changes from the previous mapping are shown.
1965-1970, 1974 (1:2,500) 1974-77 (1:10,000)	Three structures, labelled as Sandgate Nurseries, are now shown in the western part of the site by 1970.	The railway to the east of the site has been dismantled. The area that was occupied by a sewage disposal works to the south of the site is now labelled as 'refuse tip' in 1970. A depot building is shown in 1974. A pumping station between the refuse tip and the former gas works is shown in the 1970s editions. Beverley Nursery is marked 200m to the west. Ley Spring is located 180m to the south-west.
1982-84 (1:2,500)	No apparent changes from the previous mapping.	A works building and a depot are located on the area of the former gas works to the south-east of the site.
1994 (1:1,250) 1999 (aerial)	No apparent changes from the previous mapping in the early 1990s. By the late 1990s, the area covered by apparent glasshouses or polytunnels has extended southwards.	No notable changes from the previous mapping are shown.
2000 (1:10,000) 2006 (1:10,000) 2021 (1:10,000) - Present	There is no map evidence of the glasshouses or polytunnels shown in the 1999 aerial photograph. However, a single structure labelled Sandgate Nurseries is present until 2006. By 2021 the structure is no longer marked but a long single track, orientated north-south, is present.	Beverley Nursery, previously shown to the west has been removed from the 2000 edition onwards. The housing estate to the north of the site, beyond West End Lane, was built between 2006 and 2021. No other notable changes from the previous mapping are shown.

Note: All distances are approximate.

2.2 SUMMARY OF SITE HISTORY

The site was undeveloped until the 1930s. In the 1930s, the western part of the site was planted as an orchard. The first on-site building appeared between the mid-1960s and 1970. Three small structures labelled as Sandgate Nurseries were shown in 1970. The site continued to be used as horticultural nurseries until 2006. In the 1999 aerial photograph, the south-western part of the site was shown as being covered with apparent glass houses or polytunnels accessed by a long straight path.

Subsequently the mapping indicates that the on-site structures associated with Sandgate Nurseries were removed. The long path is the only feature that is shown in the 2021 mapping edition.

2.3 SUMMARY OF SURROUNDING SITE HISTORY

Development in the surrounding area is mainly residential. Henfield is located to the east of the site, which has gradually expanded its development westwards towards the site over the years. The adjacent residential development to the east appeared in the 1930s. The houses adjacent to the north, beyond West End Lane, were built after 2006.

The following potentially contaminated landuses were observed in the surrounding area: a railway and goods station (100m east), station mill (100m east), a gas works (40m south-east), a sewage disposal works and later refuse tip (50-80m south). The gas works was located off the south-eastern corner of the site whilst the sewage disposal works and later refuse tip was located to the south of the site (and adjacent to the gasworks). The gasworks was later replaced with a depot.

2.4 SUMMARY OF PLANNING APPLICATIONS

Refused residential planning application from 2014.

3.0 GEO-ENVIRONMENTAL SETTING

Unless otherwise stated Geo-Environmental Setting information has been obtained from Landmark's Envirocheck Database within report package reference 299973637 dated 17 August 2022, **Appendix I**.

3.1 GEOLOGY AND HYDROGEOLOGY

3.1.1 Anticipated Geology

The British Geological Survey (BGS) sheet 318 (1:50,000 edition) of Brighton and Worthing was reviewed and presented within table 3.1.1 is the site's anticipated geology.

Table 3.1.1: Anticipated Geology				
Stratum	Age	Possible Thickness Metres (m)	Typical Description	Aquifer Status
Artificial/Made Ground None indicated on site	N/A	N/A	N/A	N/A.
Superficial Head – (NW and the SW part of the site only)	Quaternary – Epoch age.	Up to about 15m.	Clay, silt, sand and gravel.	Secondary (undifferentiated) aquifer.
Solid Lower Greensand Group	Quaternary – Aptian to Alban.	Up to 250m.	Mainly sands and sandstones (varying from well-sorted fine-grained to poorly sorted medium- to coarse-grained) with silts and clays in some intervals.	Principal aquifer.

The understanding of the site geology is supplemented by information from the site investigation which is discussed in section 6.0.

There are no landslips or fault lines recorded within 250m of the site, and no Made Ground (aside from an historical landfill) or artificial ground noted within 250m of the site.

3.1.2 Ground Conditions - Borehole and Trial Pit Records

There are eight BGS recorded logs for historical drilling or excavation works for premises located within 1000m of the site. A summary of the logs of the nearest recorded boreholes is provided in table 3.1.2 below.

Table 3.1.2: BGS Borehole and Trial Pit Records

BGS Reference	Distance from Site (Direction)	Geology (Depth to base, below ground level (bgl))	Groundwater Depth (bgl)
TQ11NE6	500m (NW)	Clay to 6.7m Stiff blue clay to 7.9m Hard shaley clay to 12.2m Stiff blue clay with layers of shale to 19.2m Sandstone with hard veins (Hythe Beds) to 30.5m	Groundwater strike at 19.2m Groundwater rest level at 3.0m
TQ21NW2	563m (SE)	Topsoil to 0.35m Sandgate beds (comprising layers of sandy clay, sandy loam, grey sandstone, sandy loam, grey sandstone, greensand, sandstone and sand) to finished depth of 16.3m	7.41m
TQ21NW21	568m (SE)	Brown sandy clay to 3m Grey clay with bands of mudstone to 9m Sandstone to 10m Running sands to 11m Mudstone to 16m	9.0m
TQ21NW1	660m (SE)	Coarse yellow sands to 6.3m Silt, sandy clay to 6.4m Fine silty sand to 7m Sand to 14m Clay to 14.1m Sand to 16.3m	Not recorded
TQ21NW5	748m (SE)	Folkestone Sand (yellow sand, running sand) to 17.4m Sandgate Beds (blue clay intermixed with sand) to 55.8m Hythe Beds (very hard rock) at 55.9m	14.3m

3.1.3 Ground Conditions – RPS Site Investigation

RPS completed a ground investigation between 26 and 27 March 2015 which comprised:

- 🌱 Twelve window sample boreholes (WS1 to WS12) to maximum depths of up to 5.2m below ground level (bgl) with the installation of six groundwater/ground gas monitoring wells at positions WS1, WS3, WS6, WS8, WS11 and WS12.

- The machine excavation of four trial pits (TP1 to TP4) to maximum depths of up to 4.2m bgl with infiltration testing within TP1 and TP4.

Ground conditions encountered by RPS are summarised within table 3.1.3.

Table 3.1.3: Summary of RPS Ground Conditions			
Strata	Depth to Top of Strata (bgl)	General Description	Thickness
Topsoil	Ground Level	Sandy, gravelly Clay with rootlets.	0.2m - 0.5m
Head Deposits	0.2m – 0.5m	Sandy, gravelly CLAY and sandy CLAY and silty SAND and gravelly SAND.	3.3m – >4.5m
Lower Greensand Group	3.7m – 4.9m	Sandy CLAY and clayey SAND.	>0.1m - >1.3m

RPS commented that the Head Deposits were unusually thick.

3.2 Hydrogeology

The hydrogeology of the site has been determined by the superficial geology of the Head deposits (sand, clay, silt) and the solid geology of the Lower Greensand Formation, which are classified as a secondary (undifferentiated) aquifer and a principal aquifer respectively. The principal aquifer is described as layers of rock or drift deposits that have high intergranular and/or fracture permeability which may support water supply and/or river base flow on a strategic scale.

The RPS site investigation of April 2015 recorded groundwater strikes/seepages within exploratory holes at depths between 1m bgl and 4m bgl. During return monitoring of wells WS1, WS3, WS6, WS11 and WS12 groundwater was recorded between 0.88m bgl and 1.74m bgl. Monitoring well WS8 recorded outlying results of depths between 4.41m bgl and 4.54m bgl.

The Envirocheck report indicates that the groundwater vulnerability is noted beneath the site as 'principal bedrock aquifer - high vulnerability' and 'productive superficial aquifer'.

The Envirocheck report and the ArcGIS website (viewed in August 2022) indicates that the site is not located within an Environment Agency Source Protection Zone.

The Envirocheck report indicates that the nearest reference to groundwater abstraction are licences for premises 484m to the west of the site. The purposes of the abstractions were for 'horticulture and nurseries: general use (very low loss)'. The licences are dated 1990 and 2005, no permit end date is supplied.

The Envirocheck report indicates that the site is not located in a BGS groundwater flooding susceptibility area. The nearest groundwater flooding susceptibility area is indicated 117m to the south, where there is noted to be 'potential for groundwater flooding to occur'.

3.3 HYDROLOGY AND FLOODING

The nearest surface water feature (pond) is noted approximately 34m to the north-west of the site. A drain and a spring are shown approximately 50m to the south. The nearest land drain joins a larger network of landrains 250m to the south. Despite the numerous drains, no main rivers are shown within 500m of the site.

The Envirocheck report indicates that there are no surface water abstractions within 1000m of the site.

The Envirocheck report indicates that the site is not located in an area of 'extent of flooding or extreme flooding from river without defences'. The site is not located in an area that benefits from flood defences and the site is not in use for flood water storage.

Information from the Envirocheck report and the GOV.UK website (August 2022) indicates that the site is not located in a Flood Zone 2 or a Flood Zone 3. The site is located in a Flood Zone 1; noted as 'land and property in this flood zone have a low probability of flooding'. However, there is indicated to be small areas to the NW and SW that are at 'medium risk' of flooding from surface water.

The Envirocheck report indicates that the site is not located in a 'surface water flood extent'.

3.4 LANDFILLS

The Envirocheck report indicates that there is a historical landfill located 13m to the south-east of the site. This landfill is considered to be the same landfill shown on the maps as being between 50-80m from the site. The Envirocheck record indicated that the landfill operated between 1960 and 1965 and that it received commercial and household waste.

The Envirocheck report indicates that there are two records of local authority recorded landfills located 45m to the south-east. No other details are provided.

In regard of the above entries it is considered the entries relate to the same landfill (land mass) to the south-east of the site. The varying distance measurements provided by varying third parties are likely a result of varies data entries from various points of boundary measurement.

4.0 REGULATORY INFORMATION, CONSULTATIONS AND OTHER

Unless otherwise stated regulatory database information has been obtained from the Envirocheck report, which is included as **Appendix I**.

4.1 STATUTORY REGISTERS AND AUTHORISATIONS

Table 4.1 describes the records in the statutory registers and authorisations that relate to the site and surrounding area.

Table 4.1: Statutory Registers and Authorisations		
Item	0 – 250m	251 – 500m
Contaminated Land Register Entries and Notices	0	0
Records of Licensed Discharge Consents	8 (5 'on-site' but which relate to the pumping station of the sewage network adjacent to the SE of the site.)	9
Prosecutions Relating to Controlled Waters	0	0
Enforcements and Prohibition Notices	0	0
Integrated Pollution Controls	0	0
Integrated Pollution Prevention and Control	0	0
Local Authority Integrated Pollution Prevention and Control	0	0
Local Authority Pollution Prevention and Controls	0	1
Local Authority Pollution Prevention and Control Enforcements	0	0
Pollution Incidents to Controlled Waters	1 (sewage in river 209m to the SW)	1
Substantiated Pollution Incident	0	0
Prosecutions Relating to Authorised Processes	0	0
Registered Radioactive Substances	0	0

Table 4.1: Statutory Registers and Authorisations		
Records of Water Industry Act Referrals	0	0
Explosive Sites	0	0
Planning Hazardous Substance Consents/Planning Hazardous Substance Enforcements	0	0
Notification of Installations Handling Hazardous Substances (NIHHS) Facilities and Control of Major Accident Hazards Facilities (COMAH)	0	0
Fuel Stations	0	0
Contemporary Trade Directory Entries	The following Contemporary Trade Directory Entries are noted within 250m of the site: 30m SE - Grommets Ltd - manufacturers rubber & plastic products - active 85m E - Grommets Ltd - manufacturers rubber & plastic products - inactive 133m E - Simon Benjamin Furniture - manufacturers of homefurnishings- active 137m E - Braziers Autos Ltd -Mot Testing Centres - active 172m NE - Eazy Mix – concrete & mortar ready mixed - inactive 174m NE - T Miles & Son – blacksmiths and forgemasters - active	
National Grid High Voltage Underground Electricity Transmission Cables	0	0
National Grid High Pressure Gas Transmission Pipelines	0	0
Item	Immediate Vicinity	
Sensitive Land Uses	The site is located in a nitrate vulnerable zone, which is a classification designed to protect surface water from agricultural pollution.	

4.2 CONSULTEES

4.2.1 Local Authority - Contaminated Land Officer

The Local Environmental Health Department requested, following issue of version 2 of the PRA report, that the RPS report of May 2015 was reviewed and incorporated into this assessment.

4.2.2 Local Authority - Building Control Officer

The Local Planning Authority Building Control Officer has not been contacted as part of our project instruction.

4.2.3 Local Authority - Petroleum Officer

The Local Planning Authority Petroleum Officer has not been contacted as part of our project instruction.

4.2.4 Environment Agency - Contaminated Land and Groundwater

The relevant Contaminated Land and Groundwater Team at the Environment Agency has not been contacted as part of our project instruction.

4.2.5 Coal Authority and Mining Searches UK

The Coal Authority and Mining Searches UK have not been contacted as part of our project instruction.

4.3 EXAMINATION OF LAND CONTAMINATION – RPS MAY 2015

4.3.1 Soil Contamination

No visual or olfactory evidence of soil contamination was observed during the investigation.

RPS indicated that chemical analysis was completed upon five samples collected from the overlying Topsoil and eighteen from the underlying Head Deposits.

It is Aviron's opinion that the total number of samples is suitable. However, the overlying Topsoil would possess the greatest risk of being contaminated from site use and also has greatest exposure risk to end users. On the basis the overlying Topsoil (if contaminated) would present the greatest exposure risk human health and is also likely to be retained on-site for landscaping an improved human health risk assessment would have been achieved if the balance of soil sampling and testing was targeted to the Topsoil as opposed to the Head Deposits.

Figure 6 is enclosed as a Characterisation and Contamination Plan.

An exceedance of arsenic was recorded within TP3 at 1m bgl at a concentration of 47mg/kg when compared to the S4UL of 32mg/kg. It is likely the arsenic recorded within the Head Deposits is naturally occurring due to mineralisation.

An exceedance of lead was recorded within WS10 at 0.3m bgl at a concentration of 340mg/kg when compared to the C4SL of 200mg/kg. The lead recorded may be an historical lead-based paint spillage given the absence of hydrocarbons within the same sample.

All remaining concentrations of determinands including hydrocarbons, volatile organic compounds, pesticides and herbicides were not recorded at concentrations above the respective guidance.

Asbestos was not detected within seventeen samples submitted for analysis, however, it is noted no exploratory holes were targeted to the dilapidated shed with RPS observed suspected ACMs upon the ground.

Whilst RPS indicated WS6 was completed in the vicinity of the unbunded AST, review of their exploratory hole location plan suggests WS6 is some 20-30m to the west of the AST and thus the results from WS6 cannot be considered indicative of the soil chemistry local to the AST.

4.3.2 Groundwater Contamination – Shallow Aquifer

A slight sheen was observed on the groundwater sampled from borehole WS3 during subsequent monitoring. It is noted this monitoring well was not located in close proximity to the unbunded AST.

In relation to WS3 no hydrocarbon or organic contamination was recorded within the groundwater sample submitted for analysis.

RPS completed as single round of groundwater sampling and testing upon the wells installed, which generally recorded parameters below respective guidance.

Only chromium and selenium were recorded at concentrations above the screening values in at least one of the groundwater samples from the shallow aquifer.

5.0 PRELIMINARY GROUNDWATER RISK ASSESSMENT

5.1 METHODOLOGY

A tier 1 PRA and CSM have been prepared in accordance with the technical approach on Land Contamination Risk Management (LCRM), which replaced 'CLR11'. Possible hazards identified by a potential source of contamination and sensitive receptors have been assessed via a source-pathway-receptor (SPR) model in accordance with current UK protocols. A risk may only exist where a plausible SPR linkage is viable and where the quantity or concentration of a contaminant (source) is sufficient to cause harm. Under the statutory definition "Contamination" may only exist where contaminants pose a risk of harm to a receptor. Risk may be defined as a function of the likelihood and severity of any adverse effects resulting from a contamination event in accordance with CIRIA C552. A summary of how risk is derived, and the associated definition, is presented in tables 5.1.1 and 5.1.2.

Table 5.1.1 : Risk Ratings Matrix				
	Consequence			
Probability	Severe	Medium	Mild	Minor
High Likelihood	Very high risk	High risk	Moderate Risk	Moderate/low risk
Likely	High risk	Moderate Risk	Moderate/low risk	Low risk
Low Likelihood	Moderate Risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 5.1.2 : Risk Ratings Definition	
Risk Rationale	Definition
Very high risk	A high probability that severe harm could occur to determined receptor from identified contaminant - OR - evidence exists that severe harm to receptor is currently occurring. Urgent investigation and remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
High risk	Harm is likely to occur to determined receptor from identified contaminant. Urgent investigation and short-term risk minimisation remediation followed by longer term fit for purpose remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
Moderate Risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is relatively unlikely that any harm would be severe or should harm occur it is likely to be relatively mild.
Moderate/low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that any harm would be severe or should harm occur it is probable to be relatively mild.
Low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that such harm, if indeed present, would at worst be mild.
Very low risk	There is a low possibility that harm could occur to a receptor. In such event the harm would not be severe.

5.2 POTENTIAL SOURCES OF CONTAMINATION

Based on the desk study and walkover survey completed, table 5.2 presents a summary of the potential sources identified, ***which are only considered to present a potential risk to the potable abstraction water source, being the objective of this Groundwater Risk Assessment.***

Table 5.2: Potential Sources		
Source	Description	Key Contaminants of Concern
1. Soil contamination	Risk which soil contamination within the site associated with potential historical horticultural use, presence of any Made Ground and AST may present to potable groundwater.	Metals, hydrocarbons (TPH/PAH). Hydrocarbons, Lead (WS10) and Arsenic (TP3).
2. On-site groundwater contamination	Contamination identified in the RPS report.	Chromium and Selenium identified by RPS within the shallow aquifer.
3. Off-site groundwater/leachate/mobile contamination	Risk of groundwater (mobile) contamination arising from the off-site gas works and landfill.	PAHs (naphthalene through high-MW PAHs incl. BaP). BTEX and other VOCs (e.g., styrene). TPH (aliphatic/aromatic fractions). Naphthalene. Phenols (incl. cresols) and other tar acids/bases. Cyanide (free/complex), thiocyanate, ammoniacal nitrogen. Metals/metalloids: As, Cr, Pb, Hg, Cu, Zn, etc.

5.3 PATHWAYS

A pathway is one or more routes or means that a receptor can be exposed to, or affected by, a contaminant.

Table 5.3: Plausible Pathways
On-Site and Locally
Direct contact; to humans, plants, vegetation and infrastructure.
Ingestion; to humans and ecology (pets).
Underlying geology/hydrogeology; mobile migration through underlying hydrogeology (groundwater) to the potable abstraction well.
<i>*Generally, all pathways are interwoven which ultimate lead to migration within the underlying groundwater sourced within the potable abstraction well.</i>

5.4 RECEPTORS

A receptor is either a living organism, a group of organisms, an ecological system, controlled waters or property that could be harmed or polluted by a contaminant. Table 5.4 examines the potential receptors.

Table 5.4: Potential Receptors				
	Receptor	Description	Comments	Plausible
1. Human Health	Construction workers	Groundworkers and general construction works.	Construction workers may ingest (drink) water from the potable borehole.	Yes
	End users	Occupants and visitors of the proposed development.	Users/visitors may ingest (drink) water from the potable borehole.	Yes
2. Plants/vegetation/ecology	Soft landscaping	Areas of new planting including lawns.	Gardens and planted borders proposed around the site which may be 'watered' from the potable borehole.	Yes
	Ecological receptors	Sensitive areas of ecological significance defined under Part 2A of EPA 1990.	Ecological receptors (or pets) may ingest the potable water.	Yes
3. Infrastructure	Water supply pipes	Plastic pipework for potable water supply to housing may be affected if laid in contaminated soils/waters.	New supply required for redevelopment.	Yes
	Buildings & infrastructure	Buried concrete for new foundations may be in contact with aggressive ground (sulphur attack).	New building works proposed.	Yes

5.5 SUMMARY OF POLLUTANT LINKAGES FOR PROPOSED LAND USE - INITIAL CSM

The initial CSM is based upon the proposed site end use and the information currently consulted relating to various risk sources and plausible pollutant linkages and is presented within table 5.5.

Table 5.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)					
Source	Receptor	Pathway	Probability	Consequence	Risk & Justification
1. Soil contamination	Human Health	Leaching into underlying hydrogeology, becoming mobile and migrating into the potable well prior abstraction leading to direct contact and ingestion.	Low likelihood	Mild	Low <i>Note 1.</i> Historical appraisal and site inspection of 2022 recorded limited evidence of contamination which may be significant to impact groundwater. No evidence of staining around AST. Impact of any fuel leak expected to be limited and very local. RPS recorded shallow Lead at WS10 and Arsenic at TP3.
	Plants/vegetation/ecology		Low likelihood	Minor	Very Low <i>See Note 1.</i>
	Infrastructure		Low likelihood	Minor	Very Low <i>See Note 1.</i>
2. On-site groundwater contamination	Human Health	Migration within the underlying waterbody into the potable well prior abstraction leading to direct contact and ingestion.	Low likelihood	Mild	Low <i>Note 2.</i> Historical appraisal and site inspection of 2022 recorded limited evidence of contamination which may be significant to impact groundwater. No evidence of staining around AST. RPS recorded limited groundwater contamination, specifically only local exceedances of Chromium and Selenium.
	Plants/vegetation/ecology		Low likelihood	Minor	Very Low <i>See Note 2.</i>
	Infrastructure		Low likelihood	Minor	Very Low <i>See Note 2.</i>

Table 5.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification
3. Off-site site groundwater/ leachate/ mobile contamination	Human Health	Migration within the underlying waterbody into the potable well prior abstraction leading to direct contact and ingestion.	Low likelihood	Mild	Low <i>Note 3.</i> The former gasworks and landfill are at least 250m from the abstraction borehole. Groundwater flow is considered to be in a southerly direction, away from the abstraction borehole towards the surface water network of the River Adur. Should contaminants of the off-site landfill/gas works have mobilised to site they would also have been identified within the chemical analysis of the RPS (source 2) groundwater sampling, which they were not.
	Plants/vegetation/ ecology		Low likelihood	Minor	Very Low <i>See Note 3.</i>
	Infrastructure		Low likelihood	Minor	Very Low <i>See Note 3.</i>

The overall environmental risk classification for the site is considered to be generally **LOW**.

6.0 SITE INVESTIGATION WORK

6.1 METHOD STATEMENT AND SITE INVESTIGATION APPROACH

It is assumed for the purposes of this assessment that the site investigation was conducted in accordance with British Standards; BS5930:2015+A1 'Code of Practice for Ground Investigation' and BS10175:2011+A2:2017 'Investigation of Potentially Contaminated sites'.

6.2 SITE INVESTIGATION METHODS

Invicta Water Treatment commissioned OT Drilling Limited to drill a borehole at the site. Borehole BH1 was rotary drilled by OT Drilling Limited between 22 July 2024 and 5 August 2024 using 200mm diameter equipment and 219mm casing to a depth of 55.0m bgl. The purpose of the borehole was to evaluate ground conditions at a depth suitable to enable the construction of a groundwater borehole well.

The borehole was completed in the north of the site under the advice of the Client's design team to determine ground conditions and enable the construction of a Groundwater Borehole Well, which was installed to 55m bgl with a response zone between 24m bgl and 52.5m bgl.

The Groundwater Borehole Well Location Plan is enclosed as **Figure 7**.

6.3 GROUND CONDITIONS

The borehole log is presented within **Appendix II**. In general, the ground conditions comprise:

-  Topsoil to a depth of 0.3m bgl.
-  Brown sandy CLAY to 4.0m bgl.
-  Angular GRAVEL to 4.5m bgl.
-  Hard Blue CLAY (Sandgate) to 18.0m bgl.
-  Grey SANDSTONE with thin interbedded LIMESTONE horizons (Hythe) to the termination depth of the borehole at 55.0m bgl.

No improved strata descriptions can be provided.

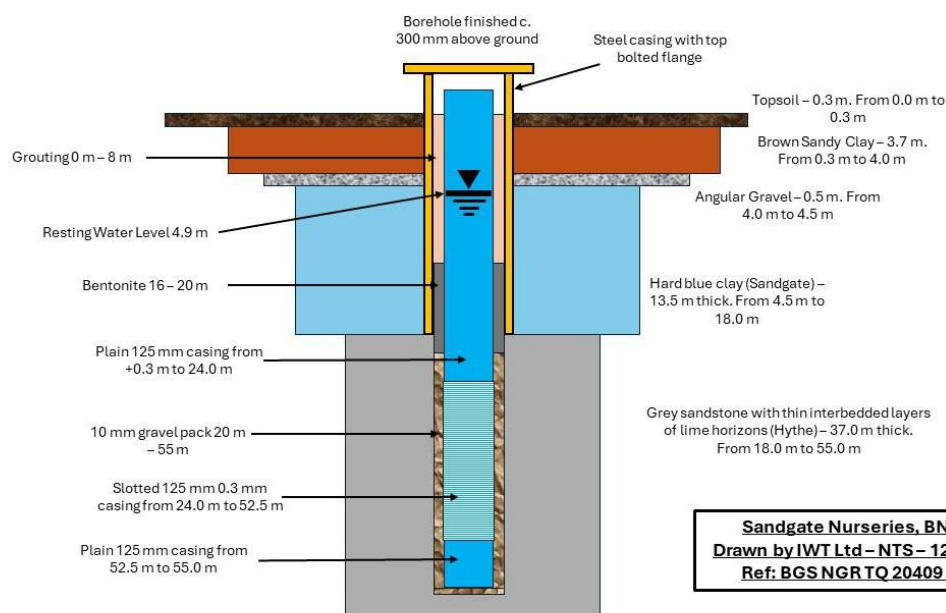
6.4 GROUNDWATER LEVELS

6.4.1 Groundwater Levels: During Drilling Works

Groundwater was encountered during the drilling works at 18m bgl. During a 2-hours (hr) pumping test on 5 August 2023 (suction at 42m bgl) the water level at the start and end of the test was noted at 4.9m bgl. the pumping rate was record as 5.3m³/hr.

6.4.2 Groundwater Borehole Well

The borehole was converted to a groundwater well installed into the 200mm diameter borehole using 125mm diameter UPVC standpipe to 52.5m bgl, assumed on a gravel bed between 52.5m bgl and the base of the borehole at 55.0m bgl. Below is a diagram of the well installation detail.



In correspondence from Invicta, dated 10 February 2025, to Momentum Planning Limited it was confirmed that the well was cased to 18m bgl to prevent surface contamination coming into contact with the groundwater in the borehole.

7.0 LABORATORY ANALYSIS

7.1 SOIL GEOCHEMICAL TESTING

Soil geochemical testing was not completed during the rotary drilling of BH1, however, reference be made to the to the previously completed 'RPS' site investigation summarised in section 4.3.1.

RPS indicated that chemical analysis was completed upon five samples collected from the overlying Topsoil and eighteen from the underlying Head Deposits.

7.2 GROUNDWATER CHEMICAL TESTING

One round of groundwater sampling and testing was completed on 5 August 2024 by Invicta during the pump test described in **Appendix III**, a letter report prepared by Invicta, where the borehole was allowed to flow for 2 hours prior to sampling.

The water sample was analysed for SS-DWREGS suites of analysis. It is understood the analytical suite was chosen to provide a suitable screening for the purposed of determining water quality for potable use.

The groundwater sample for environmental quality analysis was delivered directly to South East Water Scientific Services on the day of sampling.

Table 7.2 details the groundwater sample which was collected and submitted for geochemical analysis.

Table 7.2: Groundwater Geochemical Testing			
Location	Certificate No.	Objective	Analysis
BH1	1287680-4 Final	Groundwater sample to determine baseline concentrations in accordance with Drinking Water Standards	SS-DWREGS

8.0 ENVIRONMENTAL INTERPRETATIVE GUIDANCE

8.1 GENERIC QUANTITATIVE RISK ASSESSMENT

The purpose of a tier 2 GQRA is to determine the suitability of the site for proposed development and end use.

The site investigation shall collect soil samples whereby determinant chemical measured in the soil through laboratory analysis have been compared with guidance values which are appropriate to the receptor under consideration. The guidance values or screening criteria applied shall be industry adopted generic values which following a screening of the laboratory analysis shall determine whether or not a site is contaminated, as defined under Part IIA of the EPA 1990 and specification in regard of the proposed development and identified receptors.

Where exceedances of guidance values or recorded a GQRA it is can be used to appraise risk and make recommendations in regard of further investigation, remediation and/or tier 3 Detailed Quantitative Risk Assessment (DQRA).

8.2 GUIDANCE USED FOR ASSESSING SOIL CONTAMINATION

Aviron has followed the technical approach on Land Contamination Risk Management (LCRM), accessed on gov.uk website and other available guidance to assess contaminant concentrations.

Details of the methodology and Aviron's position on the adoption of guidance values is outlined below.

The available chemical data, from soil samples tested, is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial GQRA is completed using the relevant and industry available screening criteria and where appropriate, statistical modelling. Risks to human health shall be initially assessed by comparing soil chemical data against various published screening criteria. These have been sourced from the following and in order of preference:

-  Category 4 Screening Levels (C4SLs) prepared by the Department of Environmental Food and Rural Affairs (DEFRA) and published March 2014.
-  Phase 2 C4SLs prepared by CL:AIRE and published May 2021.
-  Suitable 4 Use Levels (S4ULs) prepared by Land Quality Management/Chartered Institute of Environmental Health (LQM/CEIH) and published December 2014. LQM acknowledgement for use of S4ULs. *"Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3275. All rights reserved".*

-  Soil Guidance Values (SGVs) prepared by the Environment Agency (EA)/DEFRA and published 2009.
-  Soil Generic Assessment Criteria (GAC) prepared by Environment Industries Commission (EIC)/Association of Geotechnical and Geoenvironmental Specialists (AGS)/Contaminated Land: Application In Real Environments (CL:AIRE) and published 2010.

Aviron have adopted the above hierarchy in response to LCRM recommendations.

8.3 GUIDANCE USED FOR THE ASSESSMENT OF CONTROLLED WATERS

In accordance with LCRM guidance, environmental quality standards (EQS) and drinking water standards can be used as generic assessment values for controlled water receptors. These criteria are used by the Environment Agency.

Specifically, to this project the 'Driver' which shall be selected as appropriate to determine the most suitable chemical standard shall be for the protection of aquatic life. Generally, these are the Environmental Quality Standards (EQS) and are 'hardness' related. Where the suitable EQS does not exist, the UK Drinking Water Standard (UK DWS) shall be applied to make a conservative assessment.

Application of these standards shall provide a useful screening tool in the absence of other published guidance or site-specific detailed risk assessment.

The assessment criteria used to assess the quality of groundwater beneath a given site should take into account the nature of the receptors which could be affected by the groundwater. The most sensitive receptors are regarded as abstractions, particularly for drinking water, followed by surface waters and sensitive ecosystems. Water supply services are also considered a receptor and should be considered where the services are likely to be in direct contact.

The most sensitive receptors are the underlying secondary and principal aquifers of the Head deposits (clay, silt, sand and gravel) and Lower Greensand formation.

Where there are exceedances, the contaminants of concern will be subject to further consideration in a tier 2 assessment using site-specific criteria and the EAs Remedial Target Methodology (RTM) model to further determine risk.

9.0 ASSESSMENT OF RPS GEOCHEMICAL SOIL RESULTS

Soil geochemical testing was not completed during the rotary drilling of BH1, however, reference can be made to the to the previously completed 'RPS' site investigation summarised in section 3.1.3.

Risk assessment of the geochemical results can be made in terms of potential risks to groundwater (controlled waters):

-  No visual or olfactory evidence of soil contamination was observed during the RPS investigation. Accordingly, a low risk can be applied to groundwater.
-  RPS indicated that chemical analysis was completed upon five samples collected from the overlying Topsoil and eighteen from the underlying Head Deposits. Pertinently the eighteen test results from the underlying Head Deposits would be considered to present the greatest risk to groundwater given the proximity to the aquifer (4.9m) or saturated zone.
-  An exceedance of arsenic was recorded within TP3 at 1m bgl at a concentration of 47mg/kg when compared to the S4UL of 32mg/kg. It is likely the arsenic recorded within the Head Deposits is naturally occurring due to mineralisation. TP3 central to the site and remote from BH1 in the north of the site. Accordingly, the risk from arsenic at TP3 can be dismissed.
-  An exceedance of lead was recorded within WS10 at 0.3m bgl at a concentration of 340mg/kg when compared to the C4SL of 200mg/kg. The lead recorded may be an historical lead based paint spillage given the absence of hydrocarbons within the same sample. WS10 central-east to the site and remote from BH1 in the north of the site. Accordingly, the risk from lead at WS10 can be dismissed.
-  All remaining concentrations of determinands including hydrocarbons, volatile organic compounds, pesticides and herbicides were recorded at acceptable concentrations. Accordingly, a very low risk can be applied to groundwater.

Based on the RPS dataset is it considered potential soil contamination at the site possessed a very low risk to groundwater (controlled waters) and soil contamination is not considered to be a potential source of contamination.

10.0 ASSESSMENT OF ABSTRACTION GROUNDWATER LABORATORY RESULTS

Laboratory certificates of analysis for the groundwater sample are presented in **Appendix IV**.

Groundwater in the Head deposits (secondary aquifer) rests at approximately 4.9m bgl. The site is not within an SPZ.

As previously discussed, a single round of monitoring and testing has been completed upon a sample obtained from the Lower Greensand (principal aquifer) from the borehole during a pump test of 5 August 2024.

With the exception of a microbiological exceedance, all chemical determinands were recorded at concentrations within acceptable limits:

- **Total Coliforms** were detected at 3 MPN/100 ml, compared to the Drinking Water Standard (DWS) of 0 MPN/100 ml.

A comparison of analytical results against the DWS is presented in **Appendix IV**, where the 'Result' column lists the measured concentration and the 'Limit' column shows the corresponding DWS. Any exceedance is highlighted in the 'Flag' column to clearly indicate where an issue has been identified.

The absence of Nitrites and Nitrates (0.00 mg/l) is not considered to pose a risk to the water supply or to controlled (ground) waters. Similarly, the absence of odour, assessed qualitatively (olfactory), is not considered to present a risk.

For Epichlorohydrin, the laboratory method limit of detection (LOD) is 0.10 µg/l, with a reported result of <0.10 µg/l. These values are effectively identical aside from the expression of decimal places. Epichlorohydrin is therefore not considered to pose a risk to the water supply or to controlled (ground) waters.

To ensure compliance with the DWS for Total Coliforms (0 MPN/100 ml), a suitable water treatment system will be installed on the borehole to remove the biological contamination.

A schematic of the water treatment system is enclosed within **Appendix III**.

11.0 GROUNDWATER RISK ASSESSMENT

11.1 REVISED CONCEPTUAL SITE MODEL

Following interpretation of the laboratory results, and investigation information a revised conceptual model has been prepared and is presented in table 11.1.

Table 11.1: Refined Conceptual Site Model (for plausible pollutant linkage pathways)					
Source	Receptor	Pathway	Probability	Consequence	Risk & Justification
1. Soil contamination	Human Health	Leaching into underlying hydrogeology becoming mobile and migrating into the potable well prior abstraction leading to direct contact and ingestion.	Low likelihood	Minor	Very Low <i>Note 4.</i> In addition to <i>Note 1</i> ; the well is sealed to 20m bgl and the hard blue CLAY within the abstraction borehole between 4.5m bgl and 18m bgl will perform as an aquitard preventing migration into the lower aquifer where water is abstracted. Groundwater analysis completed by Invicta has not recorded chemical soil contamination (notable arsenic and lead which was identified by RPS).
	Plants/vegetation/ecology		Low likelihood	Minor	Very Low <i>See Note 2.</i>
	Infrastructure		Low likelihood	Minor	Very Low <i>See Note 2.</i>
S2. On-site groundwater contamination	Human Health	Migration within the underlying water body into the potable well prior abstraction leading to direct contact and ingestion.	Low likelihood	Minor	Very Low <i>Note 5.</i> In addition to <i>Note 4</i> ; Groundwater analysis completed by Invicta has not recorded chemical contamination (notably hydrocarbons given the oily sheen encountered by RPS).
	Plants/vegetation/ecology		Low likelihood	Minor	Very Low <i>See Note 5.</i>
	Infrastructure		Low likelihood	Minor	Very Low <i>See Note 5.</i>
3. Off-site site groundwater/leachate/	Human Health	Migration within the underlying water body into the	Low likelihood	Minor	Very Low <i>Note 6.</i> In addition to <i>Notes 3, 4 and 5</i> ; Groundwater analysis

Table 11.1: Refined Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification
mobile contamination		potable well prior abstraction leading to direct contact and ingestion.			completed by Invicta has not recorded chemical contamination comparable with the landfill of gas works.
	Plants/vegetation/ecology		Low likelihood	Minor	Very Low <i>See Note 6</i>
	Infrastructure		Low likelihood	Minor	Very Low <i>See Note 6.</i>
S4. Coliforms	Human Health	Ingestion	Low likelihood	Mild	Low <i>Note 7. Coliforms identified in the groundwater.</i> Groundwater shall be treated following abstraction and prior to use to remove coliforms.

11.2 RISK COMMENTARY

The construction and use of the groundwater well borehole is not considered to present an environmental risk, principally to humans via ingestion of potable water from the well, as defined by the investigative results and the CSM above.

Abstraction groundwater shall be protected following installation of the well, by the design of the well, which is sealed off to 20m bgl beneath an aquitard of hard CLAY from 4.5m bgl to 18m bgl. In effect a unit of hard CLAY is expected to provide an aquitard to protect the underlying aquifer where abstraction shall occur from the potential sources to the south of the site; being the former landfill and gas works. It is unlikely the landfill or gas works would have been excavated to depth of greater than 18m bgl, penetrating the CLAY aquitard.

The statement made by Invicta Water Treatment Limited within their letter is considered to be accordance in regard of protection to controlled waters from the well installation.

'The borehole has been drilled by a reputable and experienced drilling company, OT Drilling (ref competency statement). The borehole has been sealed against surface water ingress by both a steel casing, extending 18 m into to the aquifer, and a bentonite plug with grouting (ref Drill Log and Diagram). This physically protects surface water or contamination from any building work above, as foundations are highly unlikely to reach 18 m depth.

All manmade surfaces on site will be impermeable, directing runoff to the surface water drains for discharge

some distance from the borehole. Likewise, the retention ponds will have impermeable membranes, with overflow water directed off site (ref. P&M Report P05 section 6.1.3; drawings Price & Meyers Below Ground Drainage Layouts 1 & 2; 30512/6000 and 6001). All sewage is piped off site to the Southern Water sewer network. Flooding from sewerage systems, surface water and other sources are negligible (ref. P&M Report P05 Section 4).

These design features more than alleviate the requirements for the EA SPZ criteria (see EA report).

The physical evidence that there is no ingress from potential surface activities or pollution is confirmed by the initial raw samples from the borehole showing no contamination from the requested Group A&B pesticides, herbicides and organics (ref. SEWSS Report 1287680-4 Final). The robust water treatment design includes a multi-barrier approach, with fine particulate filtration, and both UV and chlorine disinfection. This correctly designed, installed, monitored and maintained system, will last many years.'

12.0 CONCLUSIONS AND RECOMMENDATIONS

It is considered that the historical offsite use of the former gas works and the landfill do not present a risk to site users via the pathway of drinking water from the private water supply well.

Abstraction groundwater shall be protected following installation of the well, by the design of the well, which is sealed off to 20m bgl beneath an aquitard of hard CLAY from 4.5m bgl to 18m bgl. In effect a unit of hard CLAY is expected to provide an aquitard to protect the underlying aquifer where abstraction shall occur from the potential sources to the south of the site; being the former landfill and gas works. It is unlikely the landfill or gas works would have been excavated to depth of greater than 18m bgl, penetrating the CLAY aquitard.

With respect to the other pollutant linkages previously identified, the associated risks are considered Very Low, reflecting the site investigation findings.

Coliforms, which were identified in the groundwater sampled from the deeper aquifer are not considered to be from the former gas works or the landfill. Although they present a source of contamination that was not been identified in the initial conceptual model their presence can be eliminated through on-site treatment.

No further action, such as additional site investigation in this regard is considered necessary.

13.0 PROJECT INSTRUCTION AND LIMITATIONS

13.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed brief set out in Aviron's proposal and involves the following:

-  Review client supplied information previously submitted to the Local Planning Authority in order to prepare a suitable Groundwater Risk Assessment.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

13.2 PUBLISHED GUIDANCE

This report follows the technical approach presented on Land Contamination Risk Management (LCRM), accessed on gov.uk website. The guidance replaced the Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11, which was withdrawn in 2020, provided guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in LCRM.

This report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant contaminant linkages as defined in Part IIA of the Environmental Protection Act 1990.

13.3 LIMITATIONS

The information used in this report has been derived from the site investigation, which in turn were based on known current and historical land uses identified at the site and surrounding area, available to Aviron at the time of the investigation.

Intrusive points chosen relate to the data collected and the risk assessment and recommendations will rely on these points only. It therefore follows that some areas of the site will not be examined. It is always possible that some areas not investigated may contain conditions which would be impossible to determine due to lack

of evidence or time and budget restrictions.

Should changes in legislation, statutory requirements or industry practices occurred following issue of this report, this report should be viewed in light of these changes.

Should a notable time period elapse between the date issue of this report and the date of application of this report changes to site dynamics may occur and in particular the site inspection notes may no longer be applicable should any change of use occur to the site in the interim.

14.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Previous Reports

Aviron, Preliminary Risk Assessment, Version 3, reference 22-200.01, dated August 2022

RPS, Phase 1 Preliminary Risk Assessment and Phase 2 Geotechnical and Environmental Site Investigation, reference HLEI35707/001R, dated May 2015

References

British Geological Survey Website.

Landmark Envirocheck database search report package reference 299973637 dated 17 August 2022.

Land Contamination Risk Management (LCRM) - LCRM: Stage 1 risk assessment - GOV.UK (www.gov.uk)

BS5930:2015+A1:2020. British Standards Institute. Code of Practice for Ground Investigations

BS10175:2011+A2:2017. British Standards Institute. Investigation of Potentially Contaminated Land - Code of Practice

Environment Agency. July 2005. Guidance on Requirements for Land Contamination Reports.

CIRIA. C552. Contaminated Land Risk Assessment. A Guide to Good Practice. January 2001.

LQM/CIEH: Paul Nathanail, Caroline McCaffrey, Andy Gillett, Richard Ogden and Judith Nathanail. 2014. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. ISBN 978-0-9931084-0-2. "Copyright Land Quality Management Limited reproduced with permission; Publication number S4UL3275. All rights reserved"

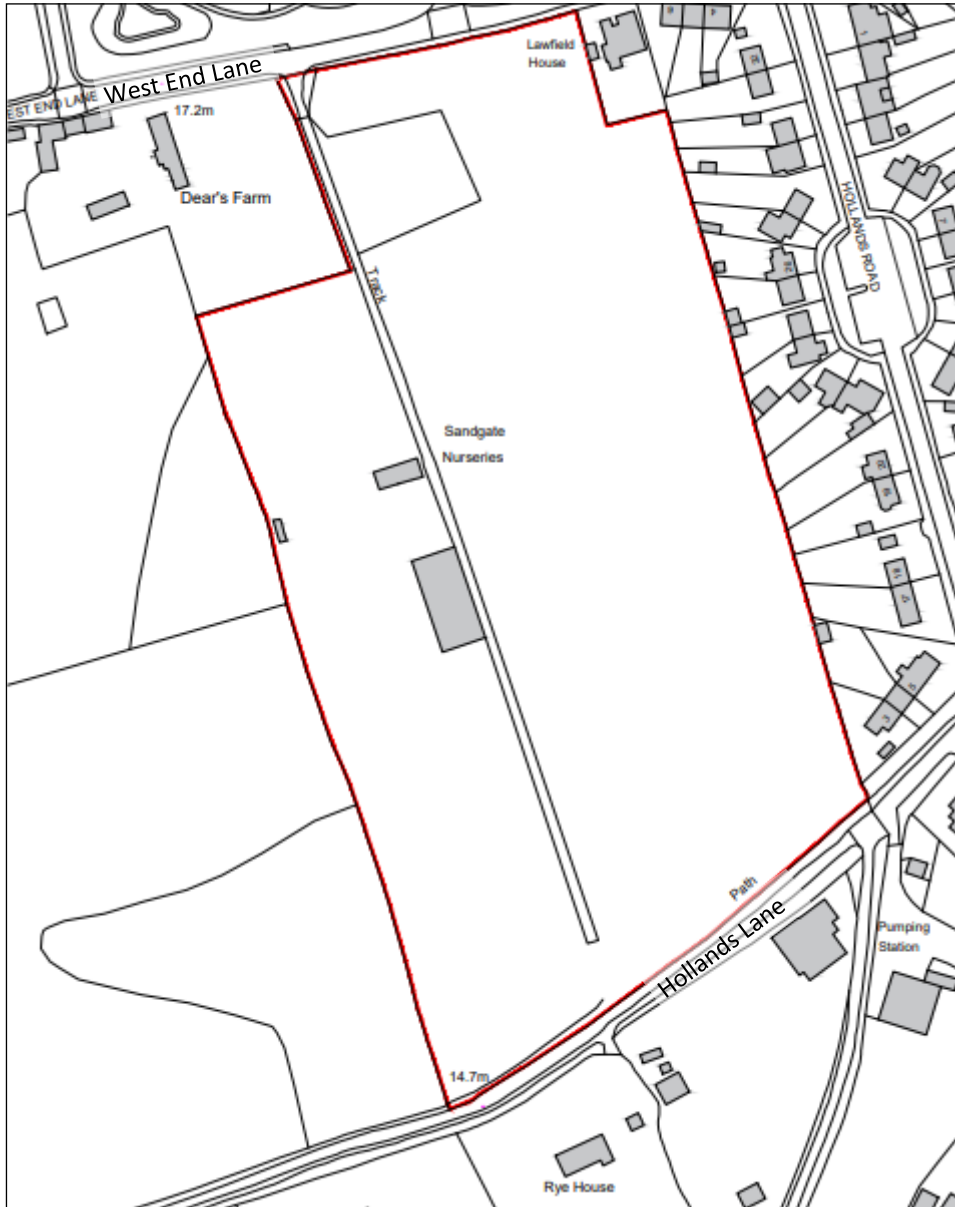
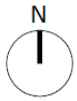
SP1010 - Development of Category 4 Screening Levels for Land Affected by Contamination. Final Project Report (Revision 2). Contaminated Land: Applications In Real Environmental (CL:AIRE). September 2014

SR2: Human health toxicological assessment of contaminants in soil, Science Report SC050021/SR2, Environment Agency, August 2008

SR7: Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values, Science Report SC050021/SR7, Environment Agency, November 2008.

Figures

- | | |
|---|---|
| 1 | Site Location and Existing Site Layout Plan |
| 2 | Site Characterisation Plan |
| 4 | Site Photographs |
| 4 | Site Photographs |
| 5 | Feasibility Site Plan |
| 6 | Characterisation and Contamination Plan |
| 7 | Groundwater Well Location Plan |



Legend



Approximate Site Boundary

Notes

Plan provided by the Client

Figure 1

Drawing Title

Site Location and Existing Site Layout Plan

Project Number 22-200.02

Project Title

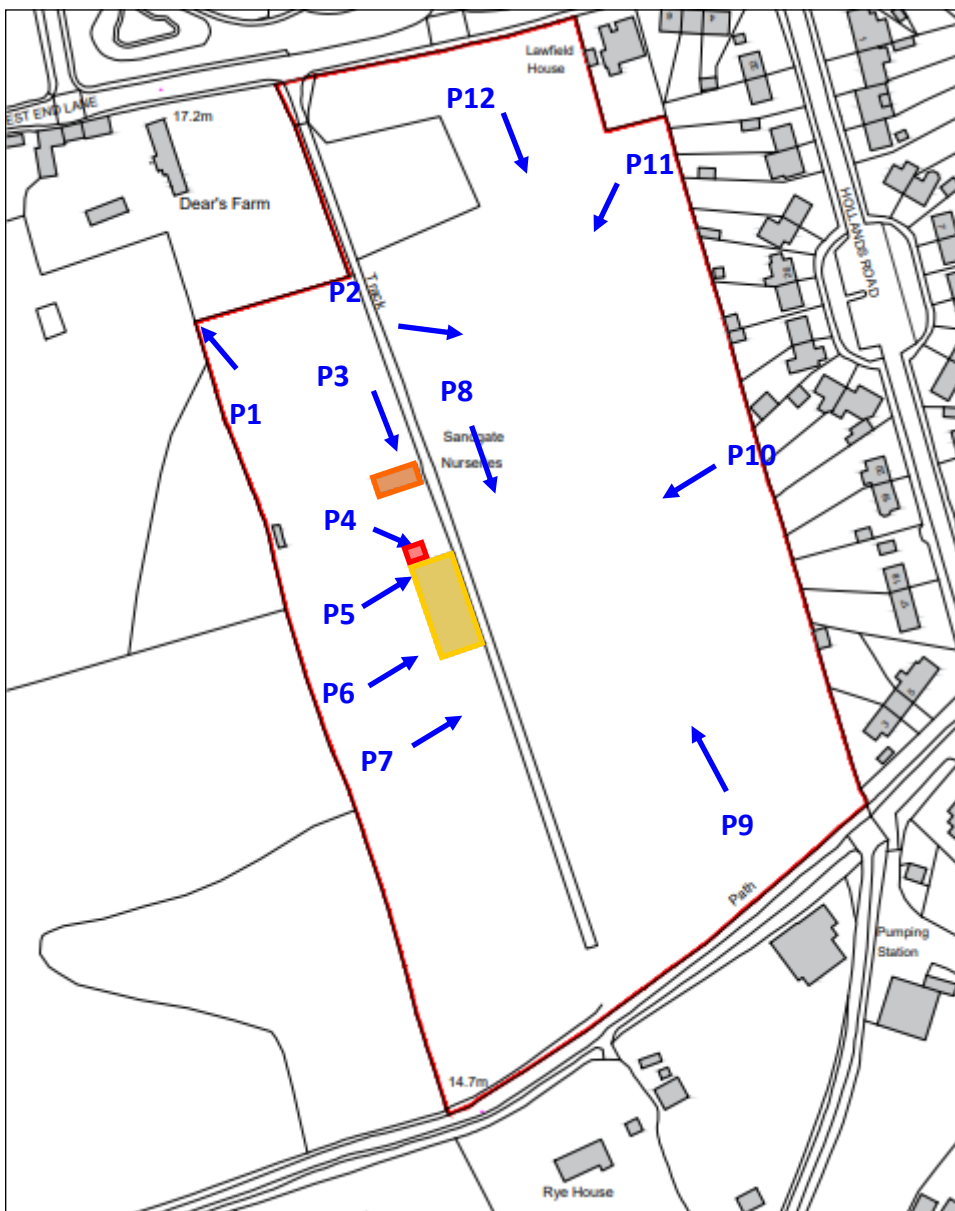
Former Sandgate Nursery, West End Lane,
Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale NTS





Approximate
location of former
Gas Works, and
Landfill (Refuse Tio)

Legend

-  Approximate Site Boundary
-  Photo direction
-  AST
-  Shed
-  Glasshouse

Notes

Plan provided by the Client

Figure 2

Drawing Title

Site Characterisation Plan

Project Number 22-200.02

Project Title

Former Sandgate Nursery, West End Lane,
Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale NTS





Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

Legend

Notes

Figure 3

Drawing Title

Site Photographs

Project Number 22-200.02

Project Title

Former Sandgate Nursery, West End Lane,
Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale





Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12

Legend

Notes

Figure 4

Drawing Title

Site Photographs

Project Number 22-200.02

Project Title

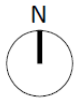
Former Sandgate Nursery, West End Lane, Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale





Legend



Approximate Site Boundary

Notes

Plan provided by the Client

Figure 5

Drawing Title

Feasibility Site Plan

Project Number 22-200.02

Project Title

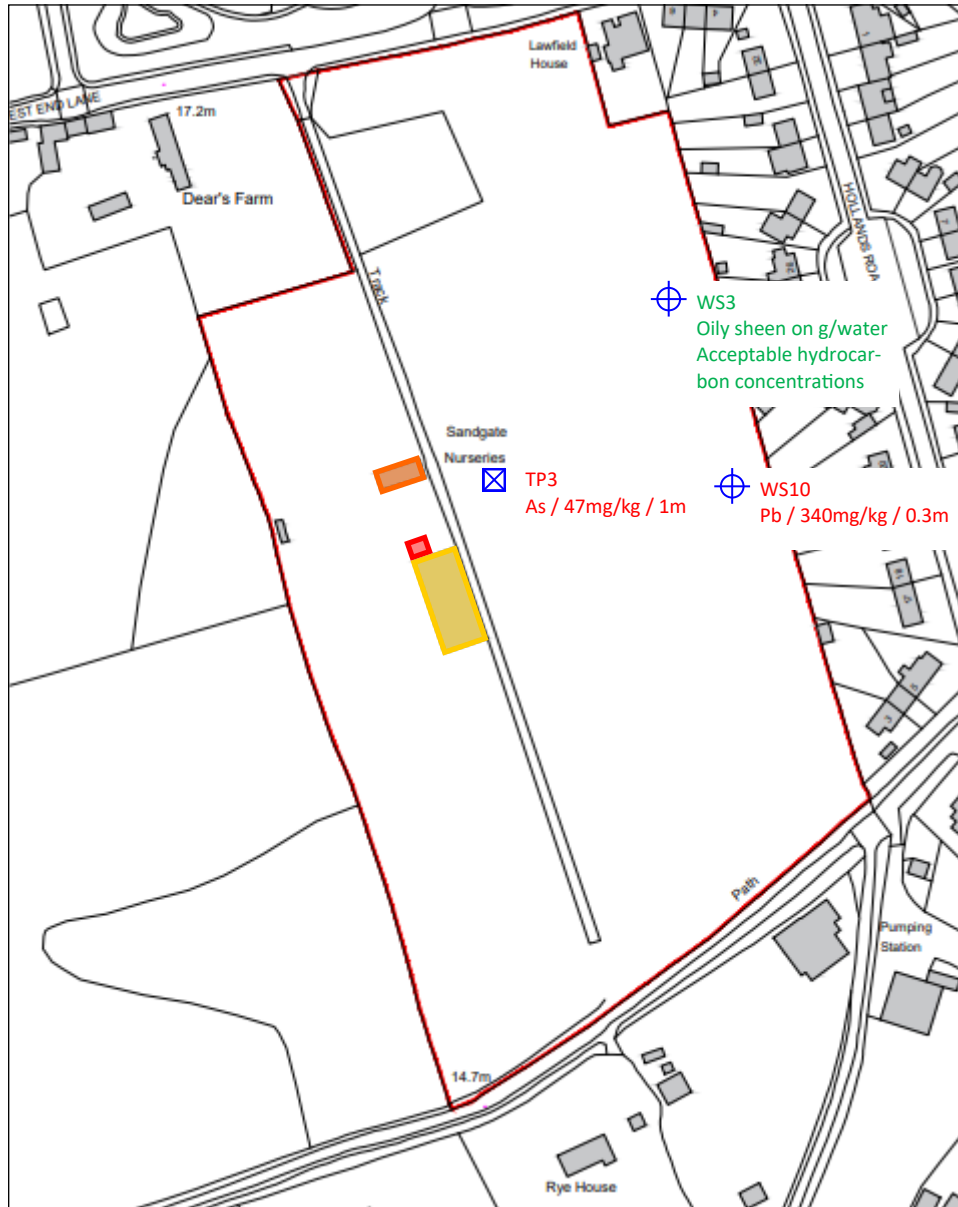
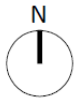
Former Sandgate Nursery, West End Lane,
Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale NTS





Approximate
location of former
Gas Works, and
Landfill (Refuse Tio)

Legend

-  RPS Trial Pit
-  RPS Window Sample
-  AST
-  Shed
-  Glasshouse

Notes

Plan provided by the Client
RPS locations are approximate.

Figure 6

Drawing Title

Characterisation and Contamination Plan

Project Number 22-200.02

Project Title

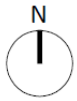
Former Sandgate Nursery, West End Lane,
Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale NTS





Legend

 Groundwater Borehole Well

Notes

Plan provided by the Client

Figure 7

Drawing Title

Groundwater Borehole Well Location Plan

Project Number 22-200.02

Project Title

Former Sandgate Nursery, West End Lane,
Henfield, West Sussex, BN5 9RD

Drawn by VB

Checked by JB

Scale NTS



Appendices

- I Envirocheck Database Report
- II Groundwater Borehole Well Log
- III Information from Invicta Water Treatment
- IV Potable Well Groundwater Laboratory Results

Appendix

I	Envirocheck Database Report
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Appendix

II	Groundwater Borehole Well Log
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Appendix

III Information from Invicta Water Treatment

Invicta Water Treatment

89 Castle Drive

Horley

Surrey RH6 9DD

T. 01293 781077

Mobile. 07970 154529

Email. sales@invictawatertreatment.co.uk

www.invictawatertreatment.co.uk

Chris Green

Littleworth Properties Limited

3c High Street

Esher

Surrey KT10 9RL

By email: chris.green@team-green.co.uk

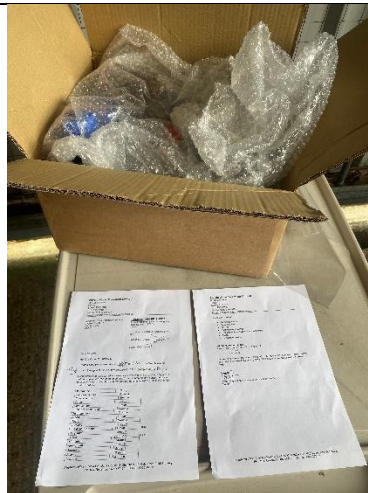
03/09/24

Dear Mr Green,

Re: Private Water Supply at Sandgate Nurseries Site – Raw Borehole Water Analysis (to date and inferences); Proposed Design and Compliance with PWS Regs 2016 Amended 2018 – Rev A

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 05/08/24 by Stefan Massingham. The borehole was allowed to flow for some 2 hours prior to sampling. It has been frequently flushed and allowed to develop during drilling prior to sampling. Visually, the water was turbid and grey in colour.

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



Signed acceptance of IWT Order by SEWSS

Invicta Water Treatment

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Determinands to Date	Sample Number 1287680-3 Interim, 03/09/24
Alkalinity, mg/l	257.0
Ammonium (Ammonia and Ammonium ions), mg/l	0.081
Chloride, mg/l	33.50
Nitrate, mg/l	<0.9
Nitrite, mg/l	<0.004
Nitrite/nitrate, mg/l	0.000
Sulphate, mg/l	77.2
Total Hardness, mg/l	107.3
Odour – Qualitative	None
Odour – Quantitative	0
Colony Count 3 days at 22°C, cfu/ml	>300
Colony Count 2 days @ 37°C, cfu/ml	>300
E coli, mpn/100 ml	0
Total Coliforms, mpn/100 ml	3
Pseudomonas aeruginosa, cfu/100 ml	Competing growth, indicative count 0
Clostridium perfringens (including spore), cfu/100 ml	0
Enterococci, cfu/100 ml	0
Colour, mg/l Pt/Co	<2
Conductivity, uS/cm	569
Hydrogen ion, pH	7.5
Turbidity, NTU	2.770
Bromate, ug/l	<0.8
Antimony, ug/l	<0.2
Arsenic, ug/l	<1.0
Selenium, ug/l	1.5
Boron, mg/l	<0.040
Calcium, mg/l	105.3
Magnesium, mg/l	4.8
Sodium, mg/l	18.7
Fluoride, mg/l	0.121
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	<0.003
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
Tetrachloroethen/Trichloroethene- SUM, ug/l	0.00
Tetrachloromethane, ug/l	<0.11
Total Trihalomethane, ug/l	0.00
Tribromomethane, ug/l	<0.60
Trichloroethene, ug/l	<0.10
Trichloromethane, ug/l	<0.50
Aluminium, ug/l	<6.1
Copper, mg/l	<0.009
Iron, ug/l	325.5
Iron (free), ug/l	<7.3
Lead, mg/l	<0.9
Manganese, ug/l	41.1
Nickel, ug/l	4.1
Cadmium, ug/l	<0.12
Chromium, ug/l	0.8
Calc Pesticides – Total Substances	0.000
Aldrin, ug/l	<0.007
Dichlobenil, ug/l	<0.004
Heptachlor, ug/l	<0.009
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
Epichlorohydrin, ug/l	<0.1
Atrazine, ug/l	<0.002
Carbendazim, ug/l	<0.001
Carbetamide, ug/l	<0.002
Chlorotoluron, ug/l	<0.003
Diuron, ug/l	<0.004
Epoxiconazole, ug/l	<0.003
Flutriafol, ug/l	<0.003

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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
Mercury, ug/l	<0.04
% transmission	92.7
UV Abs (10 mm) @ 254 nm unfiltered, abs_unit	0.033
Bicarbonate Alkalinity, mg/l	256.17
Total Phosphate, ug/l	178
Total Organic Carbon, mg/l	1.2
Silica, mg/l	8.79
Suspended Solids, mg/l	6.4
Filtered Turbidity 0.45 um, NTU	0.0053
Filtered Aluminium 0.45 um, ug/l	<6.1

Treatment Prognosis

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

- iron (325.5 ug/l, maximum 200.0 ug/l)
- turbidity (2.770 NTU, maximum 1.000 NTU)
- suspended solids
- Bacteria – failures for Coliforms and general bacteria

The recommended treatment will be:

- Filtration to 5 um
- UV disinfection
- Chlorination

We propose the following equipment design:

- Borehole pump feeding
- Automatic backwashable media filter for sediment removal to 5 um or lower feeding
- 5 um security sediment filter for any stray particulate matter
- UV disinfection chamber with UV sensor for spore forming micro-organisms
- Automatic proportional chlorine dosing to provide disinfection residual to all points of use
- 30,000 litre treated water tank with level controls
- Booster pumps (duty/standby/assist)
- 5 um sediment filter
- Control panel with tank level indicators and pH/chlorine residual monitoring
- PVC rigid solvent weld pipework, MDPE pipework

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- High strength chlorination of all filtration pipework prior to use
- UKAS sampling of treated water as per PWS Regs

The total volume of treated water required is 17,216 litres per day. No EA abstraction licence is required as the volume is less than the 20,000 litre per day threshold. The yield is some 5.4 m³/h, so there is plenty of scope for future development, if required, subject to licence approval.

The filtration equipment is modular in nature and so upgrades are quite straight forward. The treated water will meet the PWS Regs requirements.

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.

Ongoing Maintenance & Sampling

The water treatment system will require maintenance. We will provide a bespoke O&M manual, with specific procedures 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.

Regarding headings 3,4,5 in HDC Water Neutrality Compliance requirements. Please note 3 and 4 will be detailed at contract phase in the O&M manual. The manual will also cover recording. We have other applications/systems passed based on the same wording as in this report. With regard to recording: the designated maintenance contractor/owner/agent looking after the system will take necessary samples and record in the site log book, which forms part of the O&M manual. Until the system is commissioned, we cannot say which determinands need to be tracked but it is highly likely it is those which have failed and highlighted below. Specific SOPs, contained in the O&M, will be written once the system has been commissioned and will cover inspection, cleaning and maintenance. We will comply with PWS Regs 2016 amended 2018.

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.

Invicta Water Treatment

89 Castle Drive

Horley

Surrey RH6 9DD

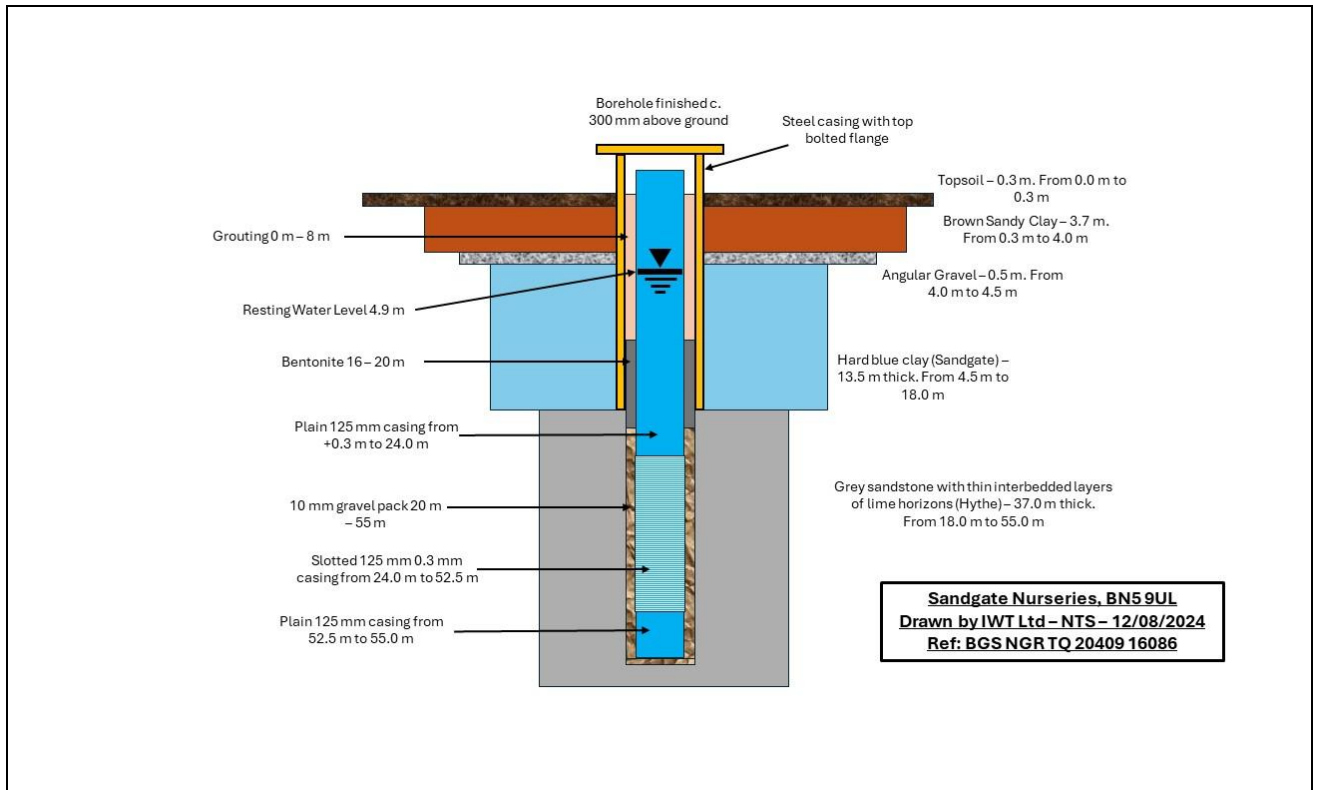
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Borehole Design As Drilled On Site



The borehole has been drilled as per the drill log attached to the email and as below (page 1 of log). The borehole produces water from the grey sands/sandstone and red clay. The borehole has been finished above ground. There are no known sewage systems or ground contamination sources nearby.

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WR39a 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 Littleworth Properties Ltd
Location Sandgate Nurseries, West End Lane, Henfield West Sussex, BN5 9UL
NGR (ten digits) 10 20408 16086 Please attach site plan
Ground level (if known) 20 metres Above Ordnance Datum
Drilling company OT Drilling Ltd
Date drilling commenced 22/07/2024 (DD/MM/YYYY) Completed 05/08/2024 (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) GL 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 55 m/depth
1 mm from 0 to 0 m/depth
1 mm from 0 to 0 m/depth
1 mm from 0 to 0 m/depth

Casing material Mild Steel diameter 219 mm from +0.0 to 18.0 m/depth
and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material UPVC Plain diameter 125 mm from +0.0 to 24.0 m/depth

Casing material UPVC Slotted 0.3mm diameter 125 mm from 24.0 to 52.5 m/depth

Casing material 125 mm from 0 to 0 m/depth

Grouting details 50mm gravel placed in annulus around screen. Bentonite pellet grout placed 20-16m

Water struck at 1. 18.0 m (depth below datum - m(bd)) 2. 0 m (mbd)
3. 0 m (mbd) 4. 0 m (mbd)

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

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

Pump suction depth 42 m(bd)

Water level (start of test) 4.8 m(bd)

Water level (end of test) 4.9 m(bd)

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

Pumping rate 5.4 m³/hour ☒ or litres/second ☐. Please tick as appropriate.
for 1 days, 2 hours, 0 mins

Recovery to 4.8 m(bd) in 1 days, 0 hours, 0 mins
(from end of pumping)

Date(s) of measurements Pump started 05/08/2024 (DD/MM/YYYY)

Pump stopped 05/08/2024 (DD/MM/YYYY)

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

WR39a Version 2, February 2011

page 1 of 3

Page 1 of 3 – see email attachments for full document

Summary

Invicta Water Treatment Limited registered office: Cheeld Wheeler & Co, Redhill Chambers, 2D High Street, Redhill, Surrey, RH1 1 RJ. Registration No. 4571271. VAT No. 920 2302 82

Invicta Water Treatment

89 Castle Drive

Horley

Surrey RH6 9DD

T. 01293 781077

Mobile. 07970 154529

Email. sales@invictawatertreatment.co.uk www.invictawatertreatment.co.uk

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 07970 154529 if you need any parts of the report clarified.

Regards

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

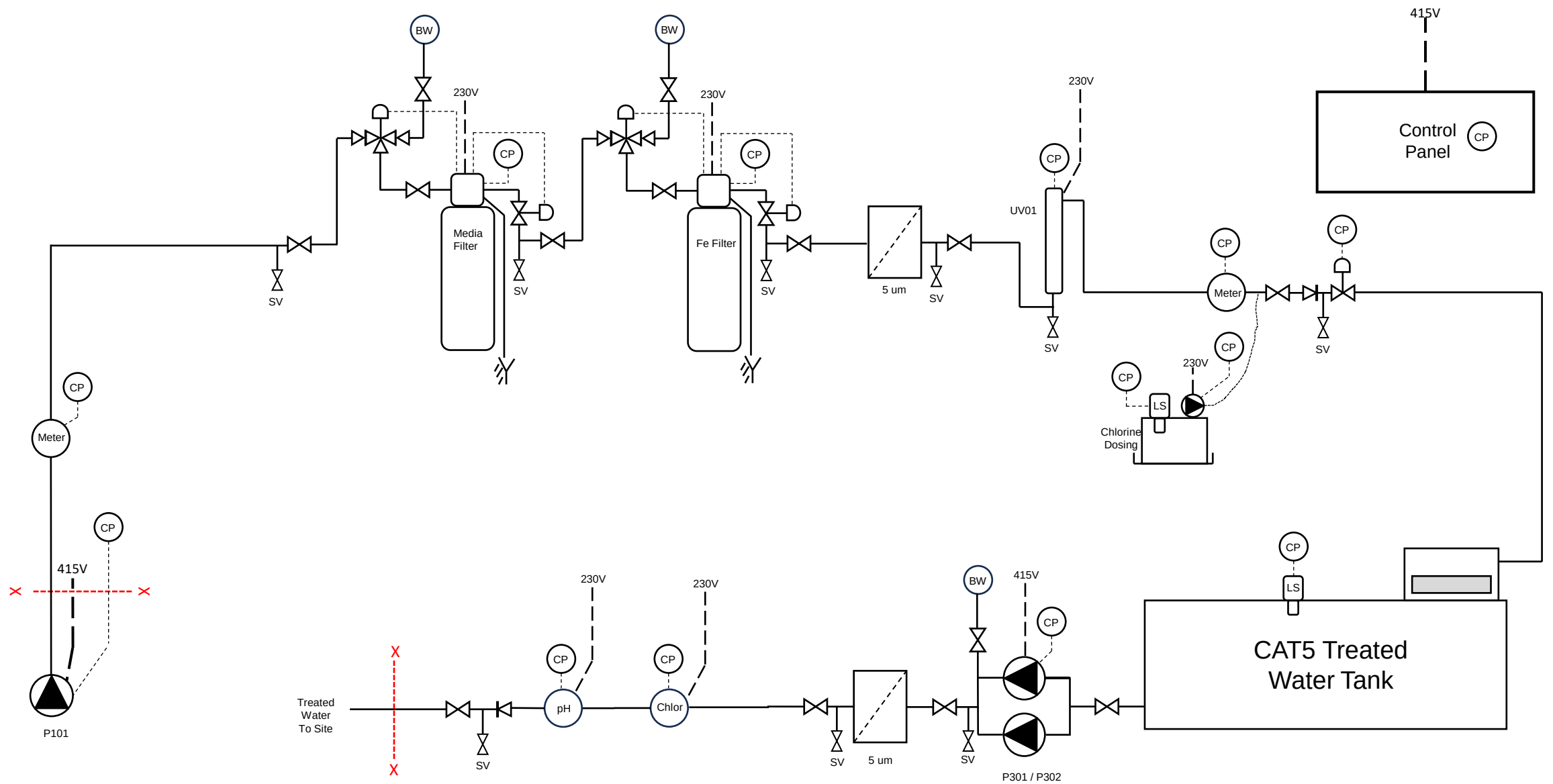
Director - Invicta Water Treatment Limited

Qualified UKAS Private Water Supply Sampler

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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.



Sandgate Nurseries PWS Water Treatment
PFD – Invicta Water Treatment Ltd – NTS –
24/10/24

Appendix

IV Groundwater Contamination Results

ANALYTICAL REPORT

Invicta Water Treatment
89 Castle Drive
Horley
Surrey
RH6 9DD
Date Received: 05/08/2024

Certificate Number: 1287680-4 Final
Supersedes report 1287680-3
Order Number: IWT 2724
Date Reported: 12/09/2024

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4824855	Desc: SANDGATE NURSERIES RAW BOREHOLE BN5 9UL Order No: IWT 2724 Received Date: 05/08/2024 Tested Date: 05/08/2024 Sampling Date: 05/08/2024 15:30 Sample Type: GW : Ground Water Product: SS-DWREGS	255	Ammonium (Ammonia and Ammonium Ions)	0.081	mg/l	<0.500	
		215	Chloride	33.50	mg/l	<250.00	
		245	Nitrate	<0.9	mg/l	<50.0	
		225	Nitrite	<0.004	mg/l	<0.500	
		calc	Nitrite/Nitrate	0.000	mg/l	<1.000	*
		305	Sulphate	77.2	mg/l	<250.0	
		205	Total Hardness	107.3	mg/l		
		230	Odour - Qualitative	None			*
		230	Odour - Quantitative	0			
		430	Colony Count 3 Days at 22°C	>300	cfu/ml		
		400	E coli	0	mpn/100ml	0	
		400	Total Coliforms	3	mpn/100ml	0	F
		660	Colour	<2	mg/l Pt/Co	<20	
		660	Conductivity	569	uS/cm		
		660	Hydrogen Ion (pH)	7.5	pH_unit	6.5 to 9.5	
		660	Turbidity	2.770	NTU	<4.000	
		ext	Acrylamide	<0.006	µg / l	<0.100	
		ext	Epichloroydrin	<0.1	µg / l	<0.10	*
		ext	Vinyl Chloride	<0.113	µg / l	<0.500	
		3401	Bromate	<0.8	µg / l	<10.0	
		390	Enterococci	0	cfu/100ml	0	
		5413	Total Cyanide	<4.1	µg / l	<50.0	
		765	Mercury	<0.04	µg / l	<1.00	
		745	Antimony	<0.2	µg / l	<5.0	
		745	Arsenic	<1.0	µg / l	<10.0	
		745	Selenium	1.5	µg / l	<10.0	
		740	Boron	<0.040	mg/l	<1.000	
		740	Calcium	105.3	mg/l		
		740	Magnesium	4.8	mg/l		
		740	Sodium	18.7	mg/l	<200.0	
		3371	Fluoride	0.121	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	

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.
Opinions and interpretations expressed in this report are outside the scope of UKAS accreditation.
Details of Uncertainty of Measurement and Analytical Quality Control are available on request.
Where a statement of conformity to a Regulatory Standard or customer limit is provided, the uncertainty of measurement is not taken into account unless shown on the certificate.
* - denotes non UKAS accredited test
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



Certificate Number: 1287680-4 Final
 Supercedes report
 1287680-3
Order Number: IWT 2724

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4824855	Continued from Page 1	3545	Bentazone	<0.007	µg / l	<0.100	
		3545	Bromoxynil	<0.007	µg / l	<0.100	
		3545	Dicamba	<0.020	µg / l	<0.100	
		3545	Dichlorprop	<0.003	µg / l	<0.100	
		3545	Fluroxypyr	<0.008	µg / l	<0.100	
		3545	MCPA	<0.008	µg / l	<0.100	
		3545	MCPB	<0.008	µg / l	<0.100	
		3545	Mecoprop (MCPB)	<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	<6.1	µg / l	<200.0	
		730	Copper	<0.009	mg/l	<2.000	

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* - denotes non UKAS accredited test

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: 1287680-4 Final
Supercedes report
1287680-3
Order Number: IWT 2724

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4824855	Continued from Page 2	730	Iron	325.5	µg / l	<200.0	F
		730	Lead	<0.9	µg / l	<10.0	
		730	Manganese	41.1	µg / l	<50.0	
		735	Cadmium	<0.12	µg / l	<5.00	
		735	Chromium	0.8	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	4.3	µg / l	<20.0	
		360	Clostridium perfringens (including spore	0	cfu/100ml	0	
		calc	Pesticides - Total Substances	0.000	ug/l		*
		5823	Aldrin	<0.007	µg / l	<0.030	
		5823	Dichlobenil	<0.004	µg / l	<0.100	
		5823	Dieldrin	<0.006	µg / l	<0.030	
		5823	Heptachlor	<0.009	µg / l	<0.030	
		5823	Heptachlor Epoxide	<0.005	µg / l	<0.030	
		5823	Propyzamide	<0.005	µg / l	<0.100	
		5823	Tri-allate	<0.005	µg / l	<0.100	
		430	Colony Count 2 Days at 37°C	>300	cfu/ml		
		410	Pseudomonas aeruginosa	Competing growth, indicative count 0	cfu/100ml		
		285	Silica	8.79	mg/l		
		310	Suspended Solids	6.4	mg/l		*
		doc	Alkalinity	257.0	mg/l		*
		calc	Bicarbonate Alkalinity	256.17	mg/l		*
		calc	% Transmission	92.7			*
		doc	UV Abs (10mm) @ 254nm Unfiltered	0.033	abs_unit		*
		calc	Total Phosphate	178	µg / l		*
		250	Total Organic Carbon	1.2	mg/l		
		730	Iron (Free)	<7.3	µg / l		
		730	Nickel	4.1	µg / l	<20.0	
		730	Aluminium (Free)	<6.1	µg / l		
			Findings	Filtered Turbidity result of 0.0053 NTU			*
			Indicative Results	See #1 below			*

The sample has exceeded its maximum stability time and as a result the test result(s) may be invalid.

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doc - individually documented method, details available on request

ext - Analysis subcontracted to an external laboratory

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Certificate Number: 1287680-4 Final
Supercedes report
1287680-3
Order Number: IWT 2724

#1 - Due to Quality Control failures an indicative result of <0.010 µg/L for Gamma-HCH (Lindane) has been provided



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.
Opinions and interpretations expressed in this report are outside the scope of UKAS accreditation.
Details of Uncertainty of Measurement and Analytical Quality Control are available on request.
Where a statement of conformity to a Regulatory Standard or customer limit is provided, the uncertainty of measurement is not taken into account unless shown on the certificate.

* - denotes non UKAS accredited test

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

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AVIRON ASSOCIATES LIMITED

Badgemore House
Badgemore Park
Gravel Hill
Henley on Thames
Oxfordshire
RG9 4NR

TELEPHONE: 07787 771 686 / 01491 413 722

FAX : 01491 413 722

ENQUIRIES: james@aviron.co.uk

WEB: www.aviron.co.uk