A DETAILED QUANTITATIVE CONTROLLED WATERS RISK ASSESSMENT FOR THE PROPOSED EXTENSION OF THE ANAEROBIC DIGESTION PLANT AT:

ELLINGHAM ROAD, ATTLEBOROUGH, NORFOLK, NR17 1AE

CLIENT: **Privilege Finance Services**

REFERENCE: **JAH/19.287/DQRA/Rev01**

DATE: **19 October 2020**

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APPENDICES

1. INTRODUCTION AND TERMS OF REFERENCE

A F Howland Associates Limited (AFHA) was instructed by Privilege Finance Services (the "Client") to carry out a detailed quantitative controlled waters risk assessment for the proposed extension to the existing anaerobic digestion (AD) plant at Ellingham Road, Attleborough, NR17 1AE (Drawing 19.287/DQRA/01). The proposals include the construction of a reception building, tanks (digestate, pasteurisation, propane, etc.), a gas upgrading unit, a grid entry unit, a gas flare, a site office and parking spaces, and a weighbridge. The proposed plans are indicated on the BioConstruct drawing in Appendix F.

Planning permission, referenced FUL/2019/0056, has been granted with conditions, by Norfolk County Council for the above proposals. This assessment was required to address condition 8. It is particularly pertinent to comments from the Environment Agency, contained within correspondence referenced AE/2019/124747/04-L01, dated 29 May 2020, requesting further assessment of the risks to controlled waters.

The assessment follows on from and supplements the following reports related to the proposed development;

- Ground Investigation Report (AFHA, 2019);
- Flood Risk Assessment (RSK, 2019);
- Preliminary Risk Assessment (RSK, 2020); and,
- Phase II Land Contamination Assessment (AFHA, 2020).

Other reports were also reviewed, related to the original construction of the AD Plant:

- Environmental Summary – An assessment of the impact of an anaerobic digester (Little Green Consulting Limited, 2009);
- Geotechnical site investigation report (Harrison Group Environmental Limited, 2011a); and,
- Ground investigation of the adjacent landfill site (Harrison Group Environmental Limited, 2011b).

This report was prepared for use by the Client and its advisors, any other parties using the contained information do so at their own risk and any duty of care to those parties is specifically excluded subject to copyright as detailed below.

2. BACKGROUND INFORMATION

A summary of the background information pertinent to this report is presented below including the historical site use, geology, hydrogeology, hydrology, various phases of ground investigation, and other pertinent information.

2.1 SITE DESCRIPTION

The site is located on the outskirts of Attleborough, and comprised an active anaerobic digestion plant, including a digestate lagoon and other ancillary facilities. A poultry farm was also noted to occupy the southern portion of the site.

The Client was noted to be in ownership of the site with the AD Plant operated by BioCow and the poultry farm operated by tenants.

2.2 SITE GEOLOGY AND HYDROLOGY

2.2.1 Geology

The regional geology as mapped for the area by the British Geological Survey (BGS, 2020) shows a bedrock geology of the White Chalk Subgroup[1]. Various superficial deposits were mapped across the site, with River Terrace Deposits/Alluvium along the southern site boundary, and an outcrop of the Lowestoft Formation (Sand and Gravel) mapped in the north east corner. The superficial deposits across the remainder of the site were mapped as Lowestoft Formation (Diamicton).

None of the previous exploratory holes on site reached the White Chalk Subgroup, with deeper penetration refused within the dense/very dense Lowestoft Formation (Sand and Gravel). A historic borehole located approximately 640 m to the north-east of the site (BGS, 2020)[2], situated within the mapped Lowestoft Formation/White Chalk Subgroup, encountered the Lowestoft Formation (sand and gravel) down to 8.84 m below ground level (bgl), the Lowestoft Formation (diamicton) down to 56.08 m bgl, and underlying chalk down to at least 60.35 m bgl.

[1] Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation, and Portsdown Chalk Formation (undifferentiated)
[2] BGS Borehole reference TM09NW2, drilled in July 1940 at an approximate elevation of 39.62 m aOD (above Ordnance Datum) [measurements in feet converted to metres using a conversion factor of 0.304785]

The **Alluvium** comprises a sequence of recent silty clays, silts and sands which can be found interspersed with subordinate and sometimes extensive peats. The Alluvium has been laid down since the end of the Pleistocene some 10,000 years ago following the associated general rise in sea level. It is typically normally consolidated and therefore in a soft condition, but at surface the effects of desiccation caused by intermittent drying by weather and vegetation often produces a firmer crust.

The **River Terrace Deposits** were derived from the chalk and younger Eocene deposits during the Pleistocene and laid down while rivers were flowing with greater discharges than today. Subsequent readjustment has left these deposits as terraces along valley sides or as lag deposits along the floor of present day valleys. They comprise a superficial sequence of flint sand and gravel, locally displaying vertical sorting. Terraces may be capped by finer alluvium, but often this has been removed by later erosion. Towards the edges of the terraces the material has often been reworked and transported so that it may be found draped over lower levels than those at which it was originally deposited.

The **Lowestoft Formation** of the Anglian stage glaciation includes a variable sequence of granular deposits (the Sand and Gravel) and cohesive material (the Diamicton, which is a pebbly chalky clay). In its unweathered state, it cohesive material comprises typically bluish grey, variably sandy and silty clay, with abundant flint and chalk gravel. Other gravel lithologies may also be found and fine-grained chalk may be present within the matrix of the deposit. At surface the material may be decalcified, weathering to yellowish brown or brownish grey with a noticeable absence of chalk.

The whole is generally stiff with apparent high degrees of overconsolidation, although it may contain or overlie other glacial materials which can be very much softer. Glacial deposits are irregular in deposition so that extrapolation is not always reliable. Bands of sand and gravel may be found within or above the general sequence and can often be water bearing.

More substantial granular deposits are also present in the Lowestoft Formation. Although such materials are commonly associated with the Diamicton, they can be found separately as a result of deposition by glacial meltwater. Consequently the sand and gravel may vary in grading according to the previous depositional setting. The materials derived from glacial deposits may have travelled long distances and therefore contain exotic material. However, the bulk has been found to comprise predominantly flint.

The **White Chalk Subgroup** is a carbonate rock made up from the debris of microfossil skeletal material laid down during the Cretaceous Period. It contains beds of flint nodules, which developed during early diagenesis. It is also very susceptible to freeze-thaw action and its upper levels may show the evidence of severe disruption and fracturing as a result of the climatic changes in the geological past. Besides an increase in the frequency of fracturing this disruption also allowed an increase in the moisture content producing a softer material, generally referred to as 'putty chalk'. In the disrupted state the chalk was subject to remoulding and transport by hillslope processes and may have produced a mantle of material very different to the underlying intact material.

Weathering effects can manifest in the form of dissolution features where the flow of water has historically been concentrated in certain areas, for example, along joints. Such features are not uncommon in East Anglia and are often present as distinct solution pipes partially or wholly infilled with the unconsolidated superficial deposits. Where only partially infilled, meta-stable cavities may be present. The hydrogeological behaviour of the Chalk is strongly influenced by weathering, which may extend to depths of several metres.

2.2.2 Hydrogeology and Hydrology

The site is underlain by superficial aquifers and a bedrock aquifer.

The superficial aquifers of the Lowestoft Formation (Sand and Gravel), River Terrace Deposits, and Alluvium are classified by the Environment Agency as secondary A. With the Lowestoft Formation (diamicton) classified as a secondary undifferentiated aquifer. The bedrock aquifer, related to the White Chalk Subgroup, is classified as principal. The site is not located within a designated groundwater source protection zone.

A tributary river was located approximately 80 m to the south of the site, flowing in a north-easterly to south-westerly direction. Publically available information from the Environment Agency[3] identifies the River Thet and adjoining tributary is of ‘poor’ grade with respect to ecology parameters and a ‘good’ grade with respect to chemical parameters.

[3] EA Data Catchment Explorer [Accessed 28/04/2020]

Given the general topography of the area, shallow groundwater is anticipated to flow in a southerly direction (towards and in the direction of the flow of the tributary river to the River Thet).

The Preliminary Risk Assessment (RSK, 2020) reported that the closest groundwater abstraction licences were located 157 m to the east and 198 m to the north-west of the site. However, neither of these licences are still active, with the closer licence only being temporary during a construction project and the second being revoked[4]. The closest active groundwater abstraction licence was located approximately 2.66 km to the south-east of the site[5], and as such is unlikely to be at risk from potential contamination migration from the site given the distance.

The Preliminary Risk Assessment (RSK, 2020) reported that the closest surface water abstraction licences were both located 109 m to the east. However, neither of these licences are still active, as they were temporary during a construction project. The closest active surface water abstraction licence was located approximately 1.98 km to the south-west of the site, downstream along the tributary river, for use in spray irrigation[6].

Most of the site is currently covered with buildings and hardstanding and therefore this will limit infiltration to ground and groundwater recharge, except where SUDS are present/proposed. Surface drainage from the site appears to be discharged into the adjacent drainage ditch running along the boundaries of the access track in the north. Drainage within the remainder of the site is likely to comprise throughflow towards the tributary river of the River Thet located in the south. The digestate lagoon of the AD plant is lined and the lagoon and tanks are all sited within their own secondary containment systems in case of leaks or spills.

2.3 OBJECTIVES OF THE CONTROLLED WATERS RISK ASSESSMENT

An initial round of groundwater and surface water sampling and analysis was carried out at the site (AFHA, 2020). This investigation found elevated concentrations of ammonia within the groundwater. Following a review of this data, the Environment Agency

[4] Abstraction licence information provided by the Environment Agency for use under a conditional licence [version AfA135 - dated February 2020]
[5] Licence No. 6/33/44/*G/0218
[6] Licence No. 6/33/44/*S/0299

requested further investigation to determine the spatial distribution of ammonia on the site and, if possible, identify the source of contamination.

The previous investigation found the concentrations of ammonia within the groundwater to be between 0.35 and 0.38 mg/l. The sampling locations for the groundwater samples analysed were located along the southern boundary of the site.

Given the activities occurring on site and within the immediate vicinity, there are multiple different potential sources (acting individually or in varying combinations) that could be causing the elevated concentrations of ammonia within the groundwater:

- Animal waste from the poultry farm sheds (on site);
- A leak in the digestate lagoon liner (on site);
- A leachate plume from the historic landfill site to the north-east (off site); and/or,
- Another unknown source.

The Environment Agency has requested additional information, including monitoring of the superficial aquifer across the northern portion of the site (up gradient), and confirmation of the deeper ground model.

As such further investigation work was proposed and agreed in writing to the Environment Agency[7], Breckland Council[8], and Norfolk County Council[9].

2.4 POTENTIAL SOURCES AND SUSPECTED CONTAMINATION TRENDS

Poultry Farm Sheds

The most westerly poultry farm shed is suspected to have been founded upon the granular soils of the Lowestoft Formation, with the remainder of the sheds sited upon the diamicton of the Lowestoft Formation. The poultry farm on site breed turkeys which were kept indoors within the sheds. The barns were noted to all have a concrete floor, with a concrete drainage channel externally along the southern boundary of the sheds. It is understood that as part of the development proposals the most westerly shed was to be demolished.

[7] E-mail correspondence with Liam Robson (Sustainable Places Planning Advisor) between 16th June 2020 and 2nd July 2020
[8] E-mail correspondence with Varuna Addy (Environmental Protection Officer) between 16th and 17th June 2020
[9] E-mail correspondence with Andrew Sierakowski (Consultant Planner) between 17th June 2020 and 13th July 2020

Nitrogen that is present in livestock and other organic manures either as ammonium or nitrate, or in poultry manure as uric-acid nitrogen, is known as the readily available fraction as it will be taken up more quickly by plants than nitrogen that is bound in organic compounds. Livestock manures, such as cattle and pig slurries and poultry manure, and liquid digested sewage sludge contain a relatively high proportion of readily available nitrogen (i.e. greater than 30% of total nitrogen is present in a readily available form). Ammonia is also released from excreta deposited directly to land by grazing livestock or outdoor pig and poultry units (DEFRA, 2009).

Digestate Lagoon

The ground investigation, carried out by Harrison Group Environmental Limited (2011a) for the original construction of the digestate lagoon, indicated that it would be sited within the granular deposits of the Lowestoft Formation. This report highlighted the requirement for an impermeable liner to prevent leaching of digestate into the underlying natural soils.

Environmental Permitting (England and Wales) produced by the Environment Agency provides regulatory guidance on certain aspects of the construction and running of an AD plant. At the time of the original construction of the AD plant on site, the following regulatory guidance was in place:

- The Environmental Permitting: Chapter 4: Standard rules SR2010No15 Anaerobic digestion facility including use of the resultant biogas (EA, 2010)

Which states the following in relation to the creation and use of digestate lagoons;

"All waste solids, liquids and sludges shall be stored and processed on an impermeable surface with a sealed drainage system. Wastes shall be stored or treated within enclosed containers, reactor vessels or enclosed well ventilated buildings fitted with a biofilter and/or scrubbing system"

And;

"All storage and process tanks shall be located on an impermeable surface (a permeability of at least 10^{-9} m/s) with sealed construction joints within a bunded area. The bunded area shall have a capacity at least 110% of the largest vessel or 25% of the total tankage volume, whichever is the greater. Bunds shall be regularly inspected to ensure that bunds

filled by rainwater are regularly emptied. Connections and fill points should be within the bunded area and no pipework should penetrate the bund wall. Underground tanks shall have secondary containment and appropriate leak detection"

Detailed design drawings for the construction of the lagoon were sought to confirm the exact construction of the lagoon. However, due to the number of times the site has changed ownership, such records were not located. It is, however, assumed that the lagoon was constructed in accordance with the permitting requirements at the time including an impermeable layer beneath and around the lagoon, along with sufficient secondary containment. The above regulatory guidance, and subsequent regulations which supersede it[10], require the operator of the AD plant to inform the Environment Agency of any activities on site, including leaks, that are giving rise to the pollution of land or water. These are registered as 'pollution incidents'.

The following pollution incidents to land or water have been recorded on site, or within the immediate vicinity of the site.

Location	Incident Reference	Details
199 m SE	3758	Incident date: 20 April 1997 An unknown pollutant was recorded entering a freshwater stream/river. No further details are provided
476 m SW	4089	Incident date: 28th April 1998 Crude sewage was reported to have a minor impact (Category 3) upon a tributary for the River Thet from a pumping station, caused by an electrical failure
564 m SW	271470	Incident date: 12th October 2004 Crude sewage from a pumping station was reported to have a significant impact (Category 2) upon water.

Table 1 – Summary of the pollution incidents reported within 1000 m of the site

No pollution incidents relating to the activities of the AD plant on site have been recorded.

Historic Landfill

The ground investigations carried out by Harrison Group Environmental Limited (2011a and 2011b), have proven the composition of the historic landfill to the north of the site,

[10] Standard rules SR2012 No11 version 4, The Environmental Permitting (England & Wales) Regulations 2016 (EA, 2019) [Available here]

as well as proving that it is unlined and sited within the granular deposits of the Lowestoft Formation.

The 2011b investigation was limited to the south-west corner of the landfill, along the boundaries adjacent to the AD plant site. This investigation found the fill materials of the landfill to comprise abundant anthropogenic constituents such as brick, concrete, wire, iron, ceramic tiles, weed killer cans[11], nylon rope, cables, plastic, decomposed wood, glass, ash, polythene sheets, and burnt/decomposed straw.

2.4.1 Suspected contamination trends

The following trends in the chemical results are suspected to be indicative of the contamination originating from their respective source.

Animal waste from the poultry farm sheds

Elevated concentrations of nitrogen (specifically in the form of Nitrate and Ammonia) and phosphorus. Research by Singh et al (2011) indicates that the run-off from poultry effluent is likely to contain a greater concentration of phosphorus than nitrogen.

A leak from the digestate lagoon

Digestate composition can vary depending upon the source of the animal litter utilised. Whilst digestate will include organic matter, phosphorus, nitrogen, and sulphur, the majority indictor of its presence is nitrogen. The organic fraction of nitrogen is typically further digested within the lagoon with any digestate leaks likely to contain a larger concentration of inorganic nitrogen (specifically Ammonia NH4 and Nitrate NO3). Based on 4 year trials carried out by Odlare et al. (2008) found the dominant nitrogen fraction of digestate was nitrate (6%) followed by ammonia (0.3%), and organic nitrogen only contributed marginally.

Landfill leachate plume

A typical landfill leachate will have elevated concentrations of nitrogen, phosphorus, and various metals (such as calcium, magnesium, sodium, potassium, iron, chloride, and sulphate) (Stefanakis, et al., 2014). A Biological Oxgyen Demand (BOD) concentration within the groundwater would also be anticipated (Bodzek et al., 2005). One of the known

[11] A fragment of old labels affixed to several of these cans detailed the product to contain xylene, isoproturon, and trifluralin.

problems within landfill leachate is the extremely high concentrations of ammonia and organic nitrogen (Bulc, 2006; Lavrova and Koumanova, 2010).

3. INTRUSIVE INVESTIGATION, MONITORING AND SAMPLING REGIME

3.1 GENERAL

The purpose of the further investigation was to ascertain the potential source of the elevated concentrations of ammonia previously recorded within the groundwater. As such it was necessary to drill several deep boreholes across the site to install groundwater monitoring standpipes. Following the completion of these boreholes, additional rounds of groundwater collection and analysis were carried out using the new and existing standpipes across the site. In summary, the objectives of the supplementary data collection were as follows:

- To collect additional geological data and provide information on the groundwater flow regime for the site.
- To analyse the groundwater quality recovered from the superficial and bedrock aquifers beneath the site.
- To sample the tributary river and obtain discharge measurements.

3.2 INTRUSIVE INVESTIGATION

Four cable percussive boreholes were proposed in locations across the site using the following rationale

- BH201 – A 15 m deep borehole along the southern boundary to build a ground model to show how the superficial Alluvium/River Terrace Deposits are interacting with the underlying Lowestoft Formation, and possibly the chalk bedrock;
- BH202 - A 20 m deep borehole directly south and down gradient of the existing digestate lagoon;
- BH203 - A 20 m deep borehole directly south and down gradient of the historic landfill; and,
- BH204 - A 25 m deep borehole in the north-west corner of the site (as far as possible from the lagoon and historic landfill to minimise the potential impact and assess groundwater conditions prior to crossing the site).

Due to the site and ground conditions encountered during the fieldwork, the boreholes were adjusted as detailed in Table 2 below.

Location	Rationale
BH201	This borehole was taken to a depth of 17.70 m bgl due to the variable superficial geology encountered.
BH202	Due to the initially dense sand and gravels from surface in the originally proposed location, this borehole was re-located approximately 30 m to the south, still between the digestate lagoon and the turkey farm sheds.
BH203	This borehole was drilled to a depth of 6.80 m bgl where the borehole was terminated due to dense sand and gravel limiting the progression. This borehole was then re-located as BH203A.
BH203A	This borehole was drilled as a replacement for BH203, and was located directly south of the historic landfill. It was taken to a depth of 24.00 m bgl to allow a standpipe response zone within the groundwater.
BH204	This borehole was relocated approximately 8 m from its proposed location due to the activity of heavy plant and machinery accessing and egressing the site. The borehole was drilled to a depth of 25.00 m bgl.

Table 2 – Justification for the re-location of the boreholes from their proposed locations

The locations of the boreholes are shown on Drawing 19.287/DQRA/02 in Appendix F, along with the locations from all the previous ground investigations carried out on site, or adjacent. The details of the strata encountered, sampling, instrumentation, *in situ* testing and monitoring are also presented on the appropriate records in Appendix B.

Groundwater was struck in each of the boreholes during drilling, and in some cases multiple times. Monitoring standpipes were also installed within the boreholes to target the water bearing strata. Details of the groundwater strikes during drilling and the standpipe installations are given in the following table.

Location	Groundwater strike during drilling	Water bearing strata	Standpipe Installation
BH201	1.40 m	Alluvium / River Terrace Deposits	Standpipe sealed through the Alluvium/River Terrace Deposits with a response zone within the Lowestoft Formation
	8.00 m	Lowestoft Formation (Sand and Gravel)	
BH202	6.80 m	Lowestoft Formation (Sand and Gravel)	Standpipe installed with a response zone within the Lowestoft Formation
BH203	None	-	-
BH203A	20.50	Lowestoft Formation (Diamicton) possibly influenced by the underlying chalk	Standpipe installed at depth within the deeper water bearing Lowestoft Formation (Diamicton) / Chalk.
BH204	0.70	Perched water trapped within the initial made ground	Dual standpipe installation. Installation [A] sealed through the made ground, River Terrace Deposits, Lowestoft Formation with a response zone within the chalk. Installation [B] sealed through the made ground with a response Zone within the River Terrace Deposits
	2.90	River Terrace Deposits	
	20.50	Chalk	

Table 3 – Summary of the standpipe installation details

The standpipes installed during the previous phase of investigation were also utilised for ongoing groundwater monitoring. The response zones and target stratum are shown in table 4 below[12].

Exploratory Hole	Standpipe response zone target stratum
WS102	Alluvium / River Terrace Deposits / Lowestoft Formation (Sand and Gravel)
WS103	Alluvium / River Terrace Deposits
WS104	Lowestoft Formation (Sand and Gravel) / Lowestoft Formation Diamicton
WS105	Alluvium / River Terrace Deposits

Table 4 – Summary of the standpipe installation details in the previous investigation (AFHA, 2020)

The standpipes records are appended and should be referred to for the locations of the response zones. The standpipes allow monitoring of groundwater in the Alluvium/River Terrace Deposits in three locations (WS102, WS103, WS105), the River Terrace Deposits

[12] Whilst monitoring standpipes were installed within WS106 and WS107, these were both noted to be dry during each monitoring visit and are therefore not considered further other than with proving the absence of shallow groundwater in this part of the site.

in one location (BH204[B]) the Lowestoft Formation (Sand and Gravel) in three locations (WS104, BH201, and BH202), and the chalk in two locations (BH203A and BH204[A]).

The National Grid references and the elevation relative to Ordnance Datum of the existing hole positions and new boreholes, were measured using a Hemisphere S320 VRS GPS (RTK) system by AFHA.

Falling head tests were conducted within BH201 and BH202 during progression of the borehole.

3.3 GROUNDWATER MONITORING AND SAMPLING

Prior to any groundwater sampling being undertaken, all the monitoring standpipes were purged to ensure that the water within the installations was in hydraulic conductivity with the surrounding groundwater of the target stratum and not influenced by water used during the drilling process. Given the length of time between the initial round of monitoring of positions WS102 through to WS105 (April 2020), these standpipes were purged again prior to monitoring and sampling.

In total groundwater sampling was undertaken on five occasions for WS102, WS103, and WS105 between 17th April 2020 and 2nd October 2020, and four occasions for BH201, BH202, BH203A, BH204[A], and BH204[B] between 21st August 2020 and 2nd October 2020[13]. Samples were taken using low-flow sampling equipment. AFHA utilised the following sampling method.

- Groundwater level and standpipe base level was taken at each location.
- Water was purged from each standpipe at a variable flow rate[14] using low-flow sampling equipment and dedicated tubing. The water quality was measured using a flow cell and an AquaTroll 500 water quality meter. The water column was purged using a low-flow sampling techniques and the following parameters were recorded. A representative groundwater sample was only taken when the repeat readings had stabilised as specified.
    - pH (± 0.1 unit) (USEPA, 2017 and ASTM, 2018);
    - Temperature (± 3%) (USEPA, 2017 and ASTM, 2018);
    - Specific Conductivity (±3%) (USEPA, 2017 and ASTM, 2018;

[13] Groundwater samples were not collected from BH204 on the final visit (2nd October 2020), as the installation was noted to be damaged and the standpipe was no longer serviceable

[14] Flow rate of the sampling varied between 100 and 1333.33 ml/min across the locations to minimise the draw down effect of the sampling methodology. Records of the flow rates adopted are provided in Appendix C.

- Dissolved Oxygen Concentration (± 10% for values greater than 0.5mg/L, three repeat readings less than 0.5 mg/L were taken to be stabilised) (USEPA, 2017);
- Oxidation Reduction (Redox) Potential (± 10 mV) (USEPA, 2017);
- Depth to water (± 0.10 m) (USEPA, 2017);
- Presence of, and depth to LNAPL (Light Non-Aqueous Phase Liquid) or DNAPL (Dense Non-Aqueous Phase Liquid); and,
- Inspection of any water samples recovered to note any discoloration, turbidity, or olfactory evidence of contamination.

Details of the groundwater purging and sampling carried out are provided on the instrument records in Appendix B and C. All groundwater samples were stored in appropriate containers and placed in a cool box for transportation to a UKAS accredited laboratory for analysis.

3.4 SURFACE WATER MONITORING AND SAMPLING

In order to provide an indication of the discharge of the tributary river, the flow rate and depth profile within the river were recorded on 21st August 2020. The river profile and flow measurements were taken at each of the surface water sampling locations (SW01, SW02, and SW03) as shown on drawing 19.287/DQRA/02.

The river profile was measured from south to north along a transect perpendicular to the river bank. The water level was taken as the datum, with all measurements taken below this level. Measurements were taken at 0.5 m intervals where possible, but this had to be extended in places due to areas of very loose sediment which prevented access on foot. The freeboard between the water level and bank was measured and the elevation of the bank was recorded. Subsequently, the wetted perimeter of the river was plotted and the cross sectional flow area calculated.

The river flow was calculated by setting out a 'track' of a known distance using marker posts, and recording the time taken for an orange, high visibility, float to pass between the marker posts. The float was dropped into the channel upstream of the first marker post so that it was able to reach maximum velocity before entering the track. The measurements were repeated in triplicate to allow a representative mean velocity to be measured.

Samples, referenced SW01 through to SW03, were taken from the tributary river to the south of the site. SW01 was located downstream of the site[15], SW02 was located adjacent to the site[16], and SW03 was located upstream[17] at the locations shown on Drawing 19.287/DQRA/02 in Appendix F.

The surface water samples were stored in appropriate containers and placed in a cool box for transportation to a UKAS accredited laboratory for analysis.

[15] NGR 603248, 295290
[16] NGR 603440, 295414
[17] NGR 603693, 295505

4. LABORATORY ANALYSIS

4.1 SOIL

Selected soil samples were analysed for their physical attributes to assist with the derivation of aquifer properties.

The following tests were performed:

- Natural moisture contents;
- Atterberg Limits;
- Particle size distribution (including soil texture analysis);
- Undrained unconsolidated triaxial testing;
- Permeability; and,
- Organic matter content.

The results and test methods are presented on the appropriate records in Appendix D.

4.2 GROUNDWATER AND SURFACE WATER

Analysis was carried out on groundwater and surface water samples for a suite of contaminants as detailed below.

- pH;
- Ammoniacal nitrogen;
- Ammonium;
- Ammonia;
- Chloride;
- Phosphorus;
- Nitrate;
- Nitrite;
- Kjeldahl nitrogen[18] and total organic nitrogen;
- Biochemical oxygen demand (groundwater only);
- Dissolved organic carbon (surface water only); and,
- Total hardness [expressed as $CaCO_3$] (surface water only).

[18] Method for the quantitative determination of nitrogen contained in organic substances plus the nitrogen contained in the inorganic compounds ammonia and ammonium (Kjeldahl, 1883)

The results and test methods are presented on the appropriate records in Appendix D.

5. GROUND MODEL

5.1 GENERAL

The latest geological records across the site and details from historic ground investigations on or adjacent to the site (Harrisons 2011a; Harrisons 2011b; AFHA, 2016; AFHA, 2019; AFHA, 2020; BGS, 2020) have been incorporated into a ground model.

In general, small layers of made ground were encountered across the site overlying either granular deposits towards the centre of the site, or cohesive deposits towards the east and west site boundaries. Based on the geological records it is suspected that a granular channel runs through the cohesive deposits of the Lowestoft Formation. It is likely that this is due to historic fluvial action, as a layers of grey silty clay were encountered within the granular deposits of BH201 and BH202, possibly indicative of fluvial deposition of the surrounding diamicton. The bedrock of Chalk was found to underlie both the granular and cohesive deposits of the Lowestoft Formation.

A layer of Alluvium and/or River Terrace Deposits was noted along the southern site boundary.

Groundwater was encountered within the majority of exploratory holes drilled carried out in the current phase of investigation. It is suspected that the groundwater encountered within the Lowestoft Formation and underlying Chalk is in hydraulic continuity, albeit under differing hydrostatic pressures.

Three cross-sections along paths A-A', B-B', and C-C' are provided on drawings 19.287/DQRA/04, 19.287/DQRA/05, and 19.287/DQRA/06, respectively and are appended in Appendix F. The locations of the paths are shown on drawing 19.287/DQRA/03 along with pertinent annotations relating to the potential sources and suspected extents of the superficial geology.

5.2 SOILS

5.2.1 Made Ground

Made ground was encountered from surface at each of the exploratory holes.

The made ground in the southern portion of the site extended to depths of between 0.15 and 0.65 m and comprised an initial layer of sandy flint gravel with rare fragments of brick, concrete, and tarmacadam (hardcore) overlying a slightly silty sandy gravelly clay with fragments of brick, concrete, and rare tarmacadam.

Some of the holes were located within the areas of soft landscaping immediately surrounding the poultry farm sheds. Each of these positions recorded a thin layer of topsoil-like material overlying a slightly clayey silty slightly gravelly sand, with base depths of between 0.10 and 0.40 m.

The made ground across the northern portion of the site extended to depths of between 0.15 and 0.70 m and comprised a slightly sandy flint gravel/gravelly sand, which had been compacted to form a hardcore, with base depths between 0.10 and 0.40 m.

5.2.2 River Terrace Deposits / Alluvium

River Terrace Deposits / Alluvium were encountered across the southern portion of the site, directly beneath the made ground down to 1.50 m (BH201) and the base of the excavations (4.00 m in the windowless sample holes and 1.00 m in the trial pits).

This geological strata was noted to comprise predominantly granular deposits with interspersed cohesive layers and pockets, with these layers increasing in occurrence and size the further southwards the fieldwork positions were located.

5.2.3 Lowestoft Formation

Two distinct parts of the Lowestoft Formation were recorded across the site; Diamicton and Sand and Gravel.

<u>Lowestoft Formation (Diamicton)</u>

The diamicton was recorded within the boreholes and holes located along the eastern and western site boundaries, such as BH203A, BH204, WS06, and WS104. This diamicton was recorded to be of considerable thickness within the cable percussive holes (between 17.10 and 19.60 m). It comprised a stiff grey silty gravelly clay. The gravel consisted of flint and chalk.

Lab permeability tests were carried out upon two samples of the diamicton which recorded co-efficient of permeability of 1.4×10^{-10} ms^{-1} and 2.1×10^{-10} ms^{-1}. An unconsolidated undrained triaxial test carried out within these materials recorded a

moisture content of 18.8%, a bulk density of 2.11 Mgm^{-3}, and a dry density of 1.77 Mgm^{-3}. The organic matter content within these soils was recorded at 1.89%.

A layer of suspected fluvial deposited diamicton was recorded within BH201 between 1.50 and 8.00 m depth. A falling head test was carried out within these deposits at a depth of 4.20 to 5.50 m, which recorded an infiltration rate 1.1×10^{-7} ms^{-1}. A laboratory permeability test carried out upon a sample at 5.00 m from BH201 recorded a co-efficient of permeability of 4.2×10^{-10} ms^{-1}. The organic matter content within these soils was recorded as 1.03%.

Based upon soil texture analysis, from particle size distribution results, the shallow diamicton within BH201, BH204, and BH203A is considered to be a silty clay loam with an intrinsic permeability of between 1×10^{-7} ms^{-1} and 1×10^{-6} ms^{-1} (USDA, 2003).

Lowestoft Formation (Sand and Gravel)

Granular deposits indicative of the sand and gravel of the Lowestoft Formation were recorded across the centre of the site, in a north to south orientation. They comprised a mixture of gravelly sand and sandy gravel with a variable silt and cobble content. The gravel and cobbles consisted of flint.

A falling head test carried out within the sand and gravel of BH202 at 4.00 m, which recorded an infiltration rare of 1.57×10^{-7} ms^{-1}.

The organic matter content within these soils was recorded between 0.52% and 0.69%.

Based upon soil texture analysis, from particle size distribution results, the shallow sand and gravel within BH02 is considered to be a sandy loam with an intrinsic permeability of between 1×10^{-5} ms^{-1} and 1×10^{-4} ms^{-1} (USDA, 2003).

5.2.4 Chalk

Chalk was encountered beneath the diamicton within BH204 and BH203A, at depth from 23.00 and 24.00 m, respectively.

The chalk was noted to be initially off-white and structureless, recovered as a silty slightly sandy slightly gravelly clay matrix becoming a slightly clayey silty gravel matrix.

The organic matter content of the chalk was recorded at 0.3%.

5.3 GROUNDWATER

Groundwater was struck across the site at a variety of depths and within a variety of different strata. It is believed that the groundwater across the site is all in hydraulic conductivity. The majority of the holes across the site recorded a single water strike. Multiple groundwater strikes were only recorded within BH201 and BH204.

A potential confining layer was noted within BH201 which was 6.50 m in thickness. Given the composition of this confining layer, it is suspected to be a historic fluvial deposition of the diamicton of the Lowestoft Formation. Whilst this layer acts as confining layer in this location, a similar layer was also recorded within BH202, albeit thinner (0.95 m) and leaky. Drilling was unable to seal out the groundwater to separate the groundwater level above and below the clay in BH202. Another confining layer was recorded within BH204, which recorded shallow water strikes/seepages at the base the made ground and within the superficial alluvium/river terrace deposits, and then at depth beneath the diamicton within the chalk.

In both cases, BH201 and BH204, it is assumed that the shallower water strikes are fed by overland flow, and the deeper strikes fed by groundwater from further upgradient.

Apart from the water strikes within the Alluvium/River Terrace Deposits within BH201, WS102, WS103, and WS105, the groundwater was noted to be under pressurised conditions with a piezometric head recorded across the site. As such, the groundwater should be considered to be in hydraulic conductivity, albeit at varying pressures dependent upon the volume of material overlying. The level was found to be variable corresponding to the variance in hydrostatic pressure.

The local hydraulic gradient has been calculated as 4.77×10^{-2} to the south south-east within the sand and gravel of the Lowestoft Formation. This aquifer unit is considered to be homogenous and isotropic, with a single porosity and permeability and intergranular flow. Within the chalk, groundwater flow has been calculated to be to the south east with a hydraulic gradient of 1.24×10^{-2}. It is considered that the Chalk is a homogenous and isotropic aquifer with a dual porosity. The chalk has been described as stuctureless. Intergranular flow is likely to predominate, with any fractures likely to be infilled with silt grade material, but fracture flow cannot be ruled out. Groundwater within the Lowestoft Formation and the Chalk is considered to be in hydraulic continuity, which is supported

by the similar groundwater elevations experienced in both shallow and deep boreholes during monitoring.

5.4 SURFACE WATER

At the location of the depth profiling, the river had a maximum depth of 0.85 m, a cross sectional area of 2.5 m^2, a flow rate of 0.03 ms^{-1} and a discharge rate of 0.075 m^3s^{-1}. The water elevation in the river, at the time of monitoring, was 28.19 m aOD, which is similar to the recorded groundwater levels during the monitoring visits. Recharge into the river is likely to be via the sand and gravel of the Lowestoft Formation with upwelling from the chalk which is under hydrostatic pressure from the overlying Diamicton of the Lowestoft Formation.

There are no Environment Agency gauging stations on the tributary river within a close proximity of the site. Therefore, no representative long term discharge data is available in order to compare the calculated discharge data to the Q_{95} discharge for the tributary river. The Q_{95} discharge is the discharge rate which is exceeded 95% of the time, and thus is indicative of a low flow condition.

6. SPATIAL ANALYSIS

A summary of the chemical analysis on water samples from each of the monitoring wells and surface water monitoring locations is provided in Appendix E. An initial review of the laboratory results for the water samples collected indicates the following patterns across the site.

For the purposes of the review, all statistical analysis conducted using values reported below the appropriate limit of quantification have been processed as the limit of quantification.

6.1 SPATIAL DISTRIBUTION (GROUNDWATER)

6.1.1 Ammonia, Ammonium, and Ammoniacal Nitrogen

The highest concentrations of ammonia, ammonium, and ammoniacal nitrogen recorded within the groundwater, were within BH201, BH202, and WS102, which all had a response zone within the Lowestoft Formation (Sand and Gravel).

6.1.2 Chloride

The highest concentrations of chloride were recorded at depth and upgradient within BH203A and BH204[A]. Chloride was recorded across the remainder of the site across various response zones, but at lower concentrations.

6.1.3 Nitrate (NO_3) and Nitrite (NO_2)

The concentrations of nitrite across the site were predominantly very low or below the limit of quantification (<0.5 mg/l).

The concentrations of nitrate were predominantly below 20 mg/l across the site, with the exception of BH201 (mean 74.85 mg/l), WS103 (mean 51.27 mg/l), and WS105 (mean 101.58 mg/l), which were all located along the southern site boundary.

6.1.4 Kjeldahl Nitrogen and Total Organic Nitrogen

Kjeldahl nitrogen and total organic concentrations were only recorded (above the limit of quantification) within BH201, BH202, and WS102, with response zones within the Lowestoft Formation (Sand and Gravel).

6.1.5 Phosphorus

Elevated concentrations of phosphorus were recorded across the site, within BH201 (mean 175 µg/l), BH203A (283 µg/l), BH204[A] (mean 147 µg/l) and WS102 (mean 251 µg/l).

6.1.6 Biological Oxygen Demand (BOD)

The BOD concentrations were recorded across the site, albeit at low concentrations (<5 – 16 m/l).

6.2 SPATIAL DISTRIBUTION (SURFACE WATERS)

The spatial distribution up, down, and midstream has been reviewed to understand any patterns.

T-tests have also been carried out to compare the up, down, and midstream concentrations to assess whether any individual dataset has recorded concentrations which are statistically significant from another dataset. Only the T-tests from the datasets which have been assessed as significantly different[19] from another dataset have been discussed.

6.2.1 Ammonia, Ammonium, and Ammoniacal Nitrogen

The ammonia, ammonium, and ammoniacal nitrogen concentrations were all noted to be generally similar, with the exception of a single outlier (one round of monitoring (18th September), which recorded a single elevated concentration at SW01 (downstream)).

6.2.2 Chloride

The chloride concentrations were noted to be broadly similar up (SW03) and downstream (SW01), with slightly lower concentrations midstream (SW02).

6.2.3 Nitrate (NO_3) and Nitrite (NO_2)

Nitrite was not recorded above the analytical method of detection (0.5 mg/l) within any of the surface water samples.

[19] Significance level (α) = 5%

The nitrate concentrations downstream (SW01) are statistically significant from the upstream concentrations (SW03)[20].

The nitrate concentrations were highest upstream (SW03) and lowest midstream (SW02).

6.2.4 Kjeldahl Nitrogen and Total Organic Nitrogen

The Kjeldahl nitrogen and total organic nitrogen concentrations recorded similar patterns. The midstream (SW02) concentrations were noted to be highest, with the downstream (SW01) concentrations the lowest. Both species of nitrogen were also noted to be present upstream.

6.2.5 Phosphorus

The lowest concentrations of phosphorus were recorded midstream (SW02), with the concentrations up (SW03) and downstream (SW01) being broadly similar, albeit with a higher variance in concentrations downstream.

6.3 DISCUSSION ON POTENTIAL SOURCES

The presence of chlorine both up and downgradient on site and within the river at all locations, imply that the source of chloride contamination is large or sufficiently far away from the site and river to have dispersed. This is possibly indicative of the landfill leachate being the source of chloride, as none of the other potential sources identified would expect chloride concentrations across the site.

Ammonia and phosphorus were recorded across the entire site, both up and down gradient. This suggests that even if any potential sources of contamination on site are adding to these concentrations, there must be a baseline of contamination entering the groundwater from an off site source, possibly the historic landfill site.

If the source of contamination was the digestate lagoon, a higher nitrate concentration would have been suspected, particularly down gradient. However, the concentrations of nitrate appear to be widespread across the site.

[20] Probability = 0.5%

7. GENERIC QUANTITATIVE RISK ASSESSMENT (Tier 1)

7.1 GENERAL

A generic appraisal of groundwater analysis results with respect to pertinent quality standards is presented below. This allows identification of those contaminants which present the greatest risk to the selected receptors and compliance points. These contaminants have been subject to a detailed quantitative risk assessment and the results are presented in section 8 below.

7.2 ASSESSMENT CRITERIA

The results of the laboratory analysis on samples of groundwater from all phases of monitoring are presented in Appendix D. Summary tables of the results recorded from each of the standpipes and surface water monitoring locations are provided in Appendix E.

The Tier 1 assessment is undertaken in two stages. Firstly, the results are compared to screening values for groundwater. Secondly, the surface water monitoring results are compared to surface water environmental quality standards (EQS).

The screening levels used in the assessment are compliant with the EU Water Framework Directive, as provided in guidance prepared by the Department of the Environment, Food and Rural Affairs (DEFRA, 2015). Where chemical standards do not exist in this document, alternative quality standards UK drinking water standards have been adopted (DWI, 2017).

7.3 DISCUSSION

7.3.1 Groundwater

Considering the results from all the rounds of water sampling, the following contaminants exceed their respective EQSs / Tier 1 screening values; ammonia, nitrate, and phosphorus.

Ammonia

The elevated concentrations of ammonia were recorded within BH201, BH202, and WS102 in excess of the adopted EQS (373 µg/l). The highest concentration recorded within the groundwater was 11300 µg/l within BH201.

Nitrate

The elevated concentrations of nitrate were recorded within BH201, WS103, and WS105 in excess of the adopted EQS (37.5 mg/l). The highest concentration recorded within the groundwater was 117 mg/l within WS105.

Phosphorus

The elevated concentrations of phosphorus were recorded within BH201, BH203A, and WS102 in excess of the adopted EQS (196 µg/l). The highest concentration recorded within the groundwater was 463 µg/l within BH203A.

The risk to controlled waters from the contaminants found to exceed the Tier 1 criteria has been assessed using the Environment Agency Remedial Targets Methodology (EA, 2006) and the results are presented in Section 8 below.

7.3.2 Surface Water

All samples of surface water taken from the tributary river were found to contain concentrations of contaminants below the relevant environmental quality standards, with the exception of ammonia.

Ammonia was recorded at a concentration of 627 µg/l with SW01 (downstream), above the adopted EQS (600 µg/l).

8. DETAILED QUANTITATIVE RISK ASSESSMENT

8.1 INTRODUCTION AND MODEL PARAMETERS

The risk to the selected compliance point has been considered in accordance with the Environment Agency Remedial Targets Methodology (Environment Agency, 2006). This requires the contamination source and pollutant linkages to be considered together with the aquifer properties derived from site investigation to calculate remedial targets and predicted contaminant concentrations at a selected compliance point.

The 'target concentrations' used in the assessment are EQS values which are compliant with the EU Water Framework Directive, as provided in guidance prepared by the Department of the Environment, Food and Rural Affairs (DEFRA, 2015).

The assessment considers the groundwater flow through the superficial and bedrock aquifers and the parameters for the model scenario are summarised in Tables 5 and 6 below.

Remedial Targets Worksheets can be found by following the link below:

Remedial Targets Worksheets

8.2 COMPLIANCE POINT

The hydraulic gradient in the superficial aquifer has been measured to the south south east and in the chalk it is to the south east, based on groundwater level observations in the boreholes. However, the calculated gradients are shallow and it is generally considered that groundwater flow will be towards the river. The superficial deposits are designated a secondary (A) aquifer status whilst the bedrock chalk is designated a principal aquifer status . The site is not within a groundwater source protection zone. Groundwater flow from the site is therefore unlikely to reach a groundwater abstraction and there are unlikely to be any nearby private domestic groundwater abstractions within adjacent properties given the location of the site. Groundwater would, therefore, preferentially enter the river and this has been selected as the compliance point. The groundwater below the site is, however, considered to be sensitive and therefore the potential impact on this has also been assessed below.

Parameter	Unit	Value	Data Source	Comments
Distance to compliance point (x)	m	114	Satellite Data	Closest distance from southern site boundary to the tributary river
Infiltration Factor	%	44	Calculated from site plans	70% of the site area to be covered by impermeable surfaces with all run-off collected in drains or stored in attenuation lagoons prior to discharge into public surface water sewer or soakaway. Site drainage assumed to be 80% watertight. Infiltration factor is therefore 30% + 20% of 70% = 44%
Infiltration Rate (Inf)	m/d	0.0008	Met Office Data + calculation	Annual average rainfall of 664 mm recorded at Santon Downham weather station, multiplied by infiltration factor
Groundwater flow direction	Unitless	South south-east	Calculated from site data	Triangulated from groundwater elevation data recorded from manual measurements from on-site boreholes
Saturated aquifer thickness (da)	m	16	Calculated from site data	Based on measurements of the of the groundwater head within BH201 (considered to be worst case)
Bulk density of aquifer materials (ρ)	Mg/cm^3	1.95	Head et al., 2006	Approximate values for aquifer materials.
Effective porosity of aquifer materials (n)	Fraction	0.3	Head et al., 2006; Hiscock, 2005	Approximate values for aquifer materials.
Fraction organic carbon	%	0.0040	Calculated from site data	Conversion from soil organic matter value using equation FOC = (SOM*0.58)/100
Hydraulic gradient of aquifer (i)	Fraction	0.05	Calculated from site data	Hydraulic gradient in the direction of groundwater flow, as recorded through manual records of groundwater elevation
Hydraulic conductivity of aquifer (K)	m/day	0.0134	Site data	Data from falling head test carried out during the drilling of BH202
Width of contaminant source perpendicular to groundwater flow (w/S_z)	m	361	Measured from site drawings	Maximum width of site perpendicular to groundwater flow
Length of contaminant source in direction of groundwater flow (L)	m	199	Measured from site drawings	Maximum length of site parallel with groundwater flow
Thickness of contaminant plume at source (S_y/M_z)	m	5.30	Calculated	Derived from calculation provided in Environment Agency guidance (EA, 2006)
Area of contamination source (A)	m^2	68098	Measured from site drawings	Assumed whole site area is contaminant source.
Time since pollutant entered groundwater	days	9.90E+99	Default for assumed steady state conditions	Based on Environment Agency guidance (EA, 2006). Set to a very large number to avoid underestimating the remedial target.

Table 5: Aquifer Parameters for Lowestoft Formation (sand and gravel) used in the Remedial Targets Assessment

Parameter	Unit	Value	Data Source	Comments
Distance to compliance point (x)	m	114	Satellite Data	Closest distance from southern site boundary to the tributary river
Infiltration Factor	%	44	Calculated from site plans	70% of the site area to be covered by impermeable surfaces with all run-off collected in drains or stored in attenuation lagoons prior to discharge into public surface water sewer or soakaway. Site drainage assumed to be 80% watertight. Infiltration factor is therefore 30% + 20% of 70% = 44%
Infiltration Rate (Inf)	m/d	0.0008	Met Office Data + calculation	Annual average rainfall of 664 mm recorded at Santon Downham weather station, multiplied by infiltration factor
Groundwater flow direction	Unitless	South-East	-	Direction of surface water receptor
Saturated aquifer thickness (da)	m	100	BGS Archive records	Chalk is known to be >100 m thick throughout East Anglia
Bulk density of aquifer materials (ρ)	Mg/cm^3	1.55	Site data	Bulk density of chalk recovered from BH204
Effective porosity of aquifer materials (n)	Fraction	0.03	Lord et al., 2002	Assumed value for chalk in Norfolk and consistent with EA recommended values
Fraction organic carbon	%	0.0017	Calculated from site data	Conversion from soil organic matter value using equation FOC = (SOM*0.58)/100
Hydraulic gradient of aquifer (i)	Fraction	0.0124	Calculated from site data	Maximum hydraulic gradient as recorded through manual records of groundwater elevation
Hydraulic conductivity of aquifer (K)	m/day	9.42	Site data	Site derived using draw down tests carried out during monitoring
Width of contaminant source perpendicular to groundwater flow (w/S_z)	m	361	Measured from site drawings	Maximum width of site perpendicular to groundwater flow
Length of contaminant source in direction of groundwater flow (L)	m	199	Measured from site drawings	Maximum length of site parallel with groundwater flow
Thickness of contaminant plume at source (S_v/M_z)	m	5.30	Calculated	Derived from calculation provided in Environment Agency guidance (EA, 2006)
Area of contamination source (A)	m^2	68098	Measured from site drawings	Assumed whole site area is contaminant source.
Time since pollutant entered groundwater	days	9.90E+99	Default for assumed steady state conditions	Based on Environment Agency guidance (EA, 2006). Set to a very large number to avoid underestimating the remedial target.

Table 6: Aquifer Parameters for Chalk Bedrock used in the Remedial Targets Assessment

8.3 REMEDIAL TARGETS AND PREDICTED CONCENTRATIONS – SUPERFICIAL AQUIFER FLOW

The potential impact on the compliance point from contaminated groundwater within the superficial aquifer has been modelled using the remedial targets methodology. Models have been prepared for the contaminants which were recorded at concentrations exceeding the Tier 1 assessment criteria. The results of the level 3 remedial target assessment are presented in Table 7 below together with the predicted concentrations at the compliance point.

Contaminant	Target Concentration (TC) µg/l in river	Origin of TC	Maximum Recorded Contaminant Concentration in Groundwater (µg/l)	Level 3 Remedial Target Groundwater (µg/l)	Predicted Concentration at Compliance Point (River) (µg/l)
Ammonia	600	WFD-SW[a]	11300	176,762	0.0000384
Nitrate	37.5	WFD-GW[b]	118	156,572	0.03
Phosphorus	253	WFD-SW[c]	463	361	325

Key

Predicted groundwater concentration at compliance point exceeds target concentration

Maximum groundwater concentration exceeds remedial target

WFD-SW - Water Framework Directive Surface Water Threshold Values

WFD-GW - Water Framework Directive Groundwater Threshold Values

[a] – Schedule 3 Part 1 Table 7

[b] – Schedule 5 Test 4

[c] – Schedule 3 Part 1 Table 5

Table 7: Comparison of maximum recorded contaminant concentrations in the superficial aquifer with level 3 remedial targets for groundwater and predicted concentration at the compliance point

8.3.1 Discussion

A review of the results of the level 3 remedial target assessment for groundwater reveals that only phosphorus exceeded its respective remedial target. The predicted concentration at the compliance point for phosphorus also exceeds the target concentration. The concentrations of ammonia and nitrate were below their respective level 3 remedial target with the predicted concentrations at eh compliance point below their respective target concentrations also.

Therefore phosphorus, has been subject to a level 4 assessment using the approach provided by the Environment Agency (2006). The other contaminants have been run through the same model level for completeness also.

The level 4 assessment takes into account dilution within the receiving watercourse, where the receptor of the contamination is the receptor itself. This is opposed to a theoretical abstraction borehole immediately up-gradient to the river channel – as in level 3 assessment. The level 4 assessment primarily considers the interaction between baseflow and the surface water, specifically the dilution of the contaminant plume by surface water discharge (further iterations could include for hyporehic zone attenuation, but has not been included in this case). The main assumption in this model is that the surface water receives all of the groundwater flow beneath the site.

The Remedial Targets Methodology requires that the background quality of the surface water course and low flow conditions are taken into account in the assessment. As discussed in the Tier 1 assessment and ground model above, it is considered that the Little Ouse River contains only low background concentrations of potential contaminants and the discharge measured is representative of low flow conditions. Also, the assessment requires that there is no demonstrable impact on the receptor, or such an impact would be immeasurable. The surface water analysis results demonstrate both of these criteria to be applicable. Therefore, it is considered that the level 4 assessment is valid in this case.

At level 4, the remedial target is derived by using the following equation:

$$RT = AF \times DF_R \times T_C$$

Where:
RT = Remedial Target
AF = Attenuation Factor (from level 3 assessment)
DF_R = River dilution factor
T_C = Target Concentration.

Also, the predicted concentration of each contaminant within the receiving surface water course is calculated by dividing the predicted concentration at the receptor at level 3 by the dilution factor. The dilution factor is the ratio of infiltration through the contaminated soil to river discharge, which is calculated using the equation:

$$DF = \frac{Q_A}{Inf.A}$$

Where:

DF = Dilution Factor

Q_A = river discharge

Inf = infiltration rate

A = area of contaminant source.

The results of the level 4 assessment are included in Table 8 below.

Contaminant	Target Concentration (TC) µg/l in the river	Origin of TC	Maximum Recorded Contaminant Concentration in Groundwater (µg/l)	Level 3 Remedial Target Groundwater (µg/l)	Predicted Concentration at Compliance Point (River) (µg/l)	Level 4 Remedial Target Surface Water (µg/l)	Predicted Concentration within the river after Dilution (µg/l)	Maximum Recorded Contaminant Concentration in the river (µg/l)
Ammonia	600	WFD-SW[a]	11300	176762	0.0000384	21,025,231,558	0.00032	627
Nitrate	37.5	WFD-GW[b]	118	156572	0.03	18623645	0.0002	39.4
Phosphorus	253	WFD-SW[c]	463	361	325	42900.91	2.73	189

Key

Predicted groundwater concentration at compliance point exceeds target concentration

Maximum groundwater concentration exceeds remedial target

WFD-SW - Water Framework Directive Surface Water Threshold Values

WFD-GW - Water Framework Directive Groundwater Threshold Values

[a] – Schedule 3 Part 1 Table 7

[b] – Schedule 5 Test 4

[c] – Schedule 3 Part 1 Table 5

Table 8: Comparison of maximum recorded contaminant concentrations in the superficial aquifer with level 3 remedial targets for groundwater, predicted concentrations at the compliance point, level 4 remedial targets and predicted concentration in river after dilution

The level 4 assessment of the data reveals that none of the recorded contaminant concentrations in the superficial aquifer exceed their respective level 4 remedial targets. Furthermore, the predicted concentrations within the river, based on concentrations recorded below the site, do not exceed the target concentrations. This assessment is also supported by the recorded concentrations of contaminants within the river which are all below the pertinent EQS, with the exception of ammonia. Typically, concentrations of contaminants were recorded at similar levels in the upstream, mid-stream and downstream samples and there is no attributable impact from any contaminant plume from site. Thus, the concentrations are considered to be representative of background concentrations.

8.4 REMEDIAL TARGETS AND PREDICTED CONCENTRATIONS – CHALK AQUIFER FLOW

The potential impact on the compliance point from contaminated groundwater within the Chalk aquifer has been modelled using the remedial targets methodology. Models have been prepared for the contaminants which were recorded at concentrations exceeding the Tier 1 assessment criteria. The results of the level 3 remedial target assessment are presented in Table 9 below together with the predicted concentrations at the compliance point.

Contaminant	Target Concentration (TC) µg/l in the River	Origin of TC	Maximum Recorded Contaminant Concentration in Groundwater (µg/l)	Level 3 Remedial Target Groundwater (µg/l)	Predicted Concentration at Compliance Point (River) (µg/l)
Ammonia	600	WFD-SW[a]	11300	869	7804
Nitrate	37.5	WFD-GW[b]	118	53.90	82.09
Phosphorus	253	WFD-SW[c]	463	361	325

Key

Predicted groundwater concentration at compliance point exceeds target concentration

Maximum groundwater concentration exceeds remedial target

WFD-SW - Water Framework Directive Surface Water Threshold Values

WFD-GW - Water Framework Directive Groundwater Threshold Values

[a] – Schedule 3 Part 1 Table 7

[b] – Schedule 5 Test 4

[c] – Schedule 3 Part 1 Table 5

Table 9: Comparison of maximum recorded contaminant concentrations in the Chalk aquifer with level 3 remedial targets for groundwater and predicted concentration at the compliance point

8.4.1 Discussion

A review of the results of the level 3 remedial target assessment for groundwater reveals that the all the identified contaminants exceed the respective remedial targets. The predicted concentration at the compliance point of the same contaminants also exceeds their target concentrations.

Therefore, these contaminants have been subject to a level 4 assessment using the approach provided by the Environment Agency (2006). The results of the level 4 assessment are included in Table 10 below.

Contaminant	Target Concentration (TC) µg/l in the river	Origin of TC	Maximum Recorded Contaminant Concentration in Groundwater (µg/l)	Level 3 Remedial Target Groundwater (µg/l)	Predicted Concentration at Compliance Point (River) (µg/l)	Level 4 Remedial Target Surface Water (µg/l)	Predicted Concentration within the river after Dilution (µg/l)	Maximum Recorded Contaminant Concentration in the river (µg/l)
Ammonia	600	WFD-SW[a]	11300	869	7804	103,339.61	65.61	627
Nitrate	37.5	WFD-GW[b]	118	53.90	82.09	6411.36	0.69	39.4
Phosphorus	253	WFD-SW[c]	463	361	325	42900.91	2.73	189

Key

Predicted groundwater concentration at compliance point exceeds target concentration
Maximum groundwater concentration exceeds remedial target

WFD-SW - Water Framework Directive Surface Water Threshold Values
WFD-GW - Water Framework Directive Groundwater Threshold Values
[a] – Schedule 3 Part 1 Table 7
[b] – Schedule 5 Test 4
[c] – Schedule 3 Part 1 Table 5

Table 10: Comparison of maximum recorded contaminant concentrations in the Chalk aquifer with level 3 remedial targets for groundwater, predicted concentrations at the compliance point, level 4 remedial targets and predicted concentration in the river after dilution

The level 4 assessment of the data reveals that none of the recorded contaminant concentrations in the chalk aquifer exceed the remedial target. Furthermore, the predicted concentration within the river, based on concentrations recorded below the site, do not exceed the target concentrations. This assessment is also supported by the recorded concentrations of contaminants within the river which are all below the pertinent EQS, with the exception of ammonia. Typically, concentrations of contaminants were recorded at similar levels in the upstream, mid-stream and downstream samples and there is no attributable impact from any contaminant plume from site. Thus, the concentrations are considered to be representative of background concentrations.

8.5 SENSITIVITY ANALYSIS

Sensitivity analysis has been carried out in order to examine the influence of changing the values of the least certain parameters, hydraulic conductivity and effective porosity. These values have been varied by +/- 25%.

Considering the results of the modelled remedial targets and predicted concentrations, a change in hydraulic conductivity has the biggest impact on the model output. An increase in hydraulic conductivity results in a general lowering of the level 3 remedial target for groundwater and an increase in the predicted concentrations at the compliance points, with a reciprocal effect for reducing hydraulic conductivity.

Similarly, increasing effective porosity increased the remedial target and decreases the predicted concentration at the receptor, with a reciprocal effect for reducing effective porosity.

However the conclusions for each of the Level 3 assessments remain the same as detailed in Sections 8.3.1 and 8.4.1.

The remedial targets worksheets are available for the sensitivity analysis by following the link in Section 8.1.

9. CONCLUSION

Previous investigations have recorded elevated concentrations of ammonia within the groundwater on site. As such further investigation was requested by the Environment Agency to delineate the potential source of contamination and assess the potential risks to controlled waters.

The hydrogeological regime was found to include a superficial aquifer comprising Alluvium/River Terrace Deposits, and the Lowestoft Formation and designated a secondary A aquifer status, overlying a principal Chalk aquifer. The main receptor of any groundwater contamination was considered to be a tributary river, located 114 m to the south of the site.

Groundwater and surface water data has been collected between April 2020 and October 2020. With an agreed suite of chemicals analysed to aid in determining the source(s) of the contamination and to allow further assessment.

Spatial analysis suggests that the primary source of contamination is off site, possibly the historic landfill site. The chemical composition of the groundwater, both up and down gradient across the site does not indicate that there is leak from the digestate lagoon on site. Whilst the on site source are all potentials, or contributers to the contamination of the groundwater, it is understood that through the extension of the AD plant, the poultry farm sheds are to be removed and replaced with ancillary AD equipment. It is anticipated that the removal of this potential source of contamination from will reduce the likelihood of mobilisation of leachable contamination leading to a potential overall increase in groundwater quality via the natural flushing of both the superficial and chalk aquifer.

A detailed quantitative risk assessment has been carried out to assess the risk to controlled waters from contamination in groundwater below the site. For the purposes of this assessment the source is assumed to be present from, or be the site, as this is deemed the worst case scenario given its proximity to the identified receptor.

A generic Tier 1 assessment revealed that concentrations of some contaminants remained at concentrations above their respective screening values, particularly ammonia, nitrate, and phosphorus. The level 3 remedial targets assessment revealed that concentrations

of some contaminants in the groundwater remained above the pertinent remedial target, and predicted concentrations in the tributary river were modelled above environmental quality standards. An assessment of predicted contaminant concentration within the receiving watercourse was undertaken. This level 4 remedial targets assessment shows that none of the contaminant levels in groundwater are above remedial targets and the predicted concentrations of contaminants in the river are all below relevant environmental standards. Furthermore, chemical analysis of water samples from the river show all levels to be below relevant environmental standards. Where results were above laboratory limits of quantification, these are considered to be representative of natural background concentrations as there was no significant difference between any of the upstream or downstream surface water samples.

Based on the results of the detailed quantitative risk assessment, the river sampling and the contaminant levels recorded in the groundwater below the site, a low risk to controlled waters is concluded. Also, it is probable that contaminant concentrations will decline as a result of the removal of the westerly poultry farm shed, and because of natural attenuation and aquifer processes.

Prepared by:	Checked by:	Authorised by:
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A F HOWLAND ASSOCIATES
19 October 2020

APPENDIX A: REFERENCES

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APPENDIX B: EXPLORATORY HOLE AND INSTRUMENTATION RECORDS AND *IN-SITU* TESTING

APPENDIX B1: CABLE PERCUSSIVE BOREHOLE AND INSTRUMENTATION RECORDS

BH01, BH02, BH201, BH202, BH203A, BH204 [B]

APPENDIX B2: DYNAMIC SAMPLER HOLE AND INSTRUMENTATION RECORDS

WS101, WS102, WS103, WS104, WS105, WS106, and WS107

APPENDIX B3: FALLING HEAD TEST RESULTS

APPENDIX B1: CABLE PERCUSSIVE BOREHOLE AND INSTRUMENTATION RECORDS

D	Small disturbed sample
B	Bulk disturbed sample
ES	Environmental sample
dd/mm/yy: 1.0 **dd/mm/yy: dry**	Date, water level at the window sample hole depth at the end of shift and the start of the following shift

Each sample type is numbered sequentially with depth and relates to the depth range quoted

All depths and measurements are given in metres, except as noted

Strata descriptions compiled by visual examination of samples obtained after BS 5930:2015+A1:2020 and modified in accordance with in-house procedures and with laboratory test results where applicable.

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH201**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m 150mm cased to 18.00m **Ground Level (mOD)** 31.53	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603364 E 295533 N **Dates** 10/08/2020- 11/08/2020	**Agent**	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.35)	MADE GROUND (Brown sandy angular to subangular fine to coarse flint gravel with rare rootlets)		
					31.18	0.35			
0.50	D1					(0.75)	Dark brown slightly clayey silty slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint		
1.10-1.20	D2				30.43	1.10			
						(0.40)	Light brown mottled orange-brown silty slightly gravelly fine to coarse SAND. Gravel is subrounded to rounded medium flint		▽1
1.50-2.00	D3			Water seepage(1) at 1.40m.	30.03	1.50	Soft locally firm brown very silty slightly gravelly CLAY. Gravel is subangular to rounded medium to coarse flint		
2.50	D4						...becoming mottled greyish brown from 2.50 m		▼2
						(2.70)			
3.50	D5								
					27.33	4.20	Firm grey silty CLAY		
4.50	D6								
5.00-5.45	U1	4.50	DRY	55 blows		(1.80)			
					25.53	6.00	Grey mottled greyish brown clayey slightly sandy SILT ...becoming stiff		
6.50	D7								
						(2.00)			

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater seepage at 1.40 m
4. Groundwater struck at 8.00 m and rose to 2.74 m in 20 mins
5. Slotted Standpipe installed to 16.80 m

Logged in accordance BS5930:2015+A1:2020

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH201

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH201**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m 150mm cased to 18.00m	**Ground Level (mOD)** 31.53	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603364 E 295533 N	**Dates** 10/08/2020- 11/08/2020	**Agent**	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
8.00-8.50	D8			Fast(2) at 8.00m, rose to 2.74m in 20 mins.	23.53	8.00	Brown slightly clayey slightly silty fine to coarse SAND		▽2
						(0.50)			
8.60	D9				23.03	8.50	Brown sandy subangular to rounded fine to medium occasionally coarse flint and rare subrounded to rounded medium to coarse chalk GRAVEL		
						(0.40)			
9.00	D10				22.63	8.90	Stiff grey slightly silty slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine flint and chalk		
						(0.50)			
9.50	D11				22.13	9.40	Multicoloured slightly sandy angular to subrounded occasional rounded fine to coarse flint and rare subrounded to rounded medium chalk GRAVEL		
						(1.10)			
				10/08/2020:3.50m	21.03	10.50	Firm grey silty slightly gravelly CLAY. Gravel is subangular to subrounded fine flint and subrounded to rounded fine chalk		
				11/08/2020:2.70m		(0.50)			
11.00-11.50	B1				20.53	11.00	Grey silty fine to medium SAND		
						(0.50)			
12.00-12.50	B2				20.03	11.50	Grey slightly silty gravelly fine to coarse SAND with a low cobble content. Gravel is subangular to rounded fine to coarse flint. Cobbles are subangular to subrounded flint		
						(1.50)			
13.00	D12				18.53	13.00	Brown sandy subrounded to rounded fine to coarse flint and subrounded to rounded fine to medium chalk GRAVEL		
						(0.50)			
					18.03	13.50	Greyish brown silty fine to medium SAND with rare gravels. Gravel is subrounded to rounded fine flint and chalk		
						(1.00)			
14.80	D13				17.03	14.50	Brown sandy subrounded to rounded fine to coarse flint and subrounded to rounded fine to medium chalk GRAVEL with a low cobble content. Cobbles are subangular to subrounded flint		
						(1.50)			
15.50-16.00	B3								

Remarks

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH201

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH201**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m 150mm cased to 18.00m	**Ground Level (mOD)** 31.53	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603364 E 295533 N	**Dates** 10/08/2020- 11/08/2020	**Agent**	**Sheet** 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					15.53	16.00	Brown sandy subrounded to rounded fine to coarse flint and subrounded to rounded fine to medium chalk GRAVEL		
						(1.70)			
17.50	D14				13.83	17.70	Complete at 18.00m		
				11/08/2020:3.50m					

Remarks

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH201

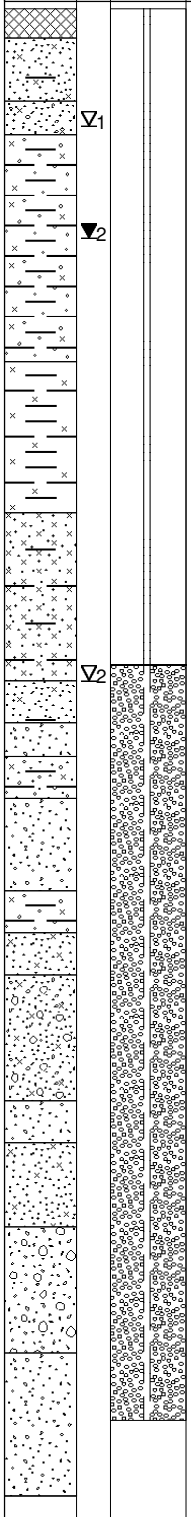
Logged in accordance BS5930:2015+A1:2020

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	BH201

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603364 E 295533 N	31.53		1/1



Instr (A)	Level (mOD)	Depth (m)	Description
	23.73	7.80	Bentonite Seal
	14.73	16.80	Slotted Standpipe

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
		1.40		Water seepage					
		8.00		Fast				2.74	

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
10/08/20							10.50	10.50	3.50	28.03
11/08/20		10.50	10.50	2.70	28.83		18.00	18.00	3.50	28.03

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Remarks
21/08/20	10:20	1.73	29.80	Plumb - 16.50 m. Approximately 85 litres purged
21/08/20	10:35	1.78	29.75	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear and colourless
21/08/20	10:41	2.00	29.53	Draw down water level post sampling
04/09/20	10:47	1.70	29.83	Plumb -16.40 m
04/09/20	10:54	1.70	29.83	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and white
18/09/20	11:16	1.74	29.79	Plumb - 16.28 m
18/09/20	11:27	1.75	29.78	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown
02/10/20	10:53	1.47	30.06	Plumb - 16.28 m
02/10/20	11:05	1.47	30.06	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown

Remarks

A F Howland Associates
Geotechnical Engineers

Site
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Borehole Number
BH202

Machine : Dando 2000
Method : Cable Percussion

Casing Diameter
200mm cased to 6.80m
150mm cased to 15.00m

Ground Level (mOD)
34.86

Client
Privilege Finance Services

Job Number
19.287

Location
603391 E 295621 N

Dates
18/08/2020-
19/08/2020

Agent

Sheet
1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	Dark brown slightly clayey slightly silty gravelly fine to coarse SAND. Gravel is angular to subangular occasionally very angular fine to medium flint		
0.50 0.60-1.00	D1 B1				34.26	0.60 (0.40)	Greyish brown mottled orange-brown slightly silty gravelly fine to coarse SAND. Gravel is angular to subangular occasionally subrounded fine to coarse flint		
1.10-1.20	D2				33.86 33.66	1.00 (0.20) 1.20	Orange-brown silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine occasionally medium flint		
1.50-2.00	B2						Brown slightly silty sandy angular to subrounded occasionally rounded flint GRAVEL with a low cobble content. Cobbles are subrounded flint		
							...rare pockets (<25 mm) of brown clay from 2.50 m		
						(3.30)			
3.00	D3								
4.00	D4								
4.50-5.00	B3				30.36	4.50	Brown sandy subangular to rounded occasionally angular and elongated fine to medium occasionally coarse flint GRAVEL		
									1
						(2.20)			
							...subrounded flint cobble at 5.80 m		
							...rare pockets (<15 mm) of brown clay from 6.00 m		
6.50	D5								
				Moderate(1) at 6.80m, rose to 5.05m in 20 mins. 18/08/2020:5.05m	28.16 28.06	6.70 (0.10) 6.80	Light brown silty slightly gravelly fine to coarse SAND. Gravel is angular to rounded fine to medium flint and subrounded to rounded fine to medium chalk		1
				19/08/2020:5.20m			Brown slightly silty sandy angular to subrounded fine to medium occasionally coarse flint and subrounded to rounded fine to medium chalk GRAVEL		
						(1.20)			

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 6.80 m and rose to 5.76 m in 5 mins, 5.30 m in 10 mins, 5.08 m in 15 mins and 5.05 m in 20 mins
4. Water added from 1.20 m to 6.80 m approx 1500 litres
5. Slotted Standpipe installed to 12.00 m
Water added from 1.20m to 6.80m.

Logged in accordance BS5930:2015+A1:2020

Scale (approx)
1:40

Logged By
JAH

Figure No.
19.287.BH202

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH202**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.80m 150mm cased to 15.00m **Ground Level (mOD)** 34.86	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603391 E 295621 N **Dates** 18/08/2020-19/08/2020	**Agent**	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
8.00-8.50	B4				26.86	8.00	Brown slightly silty sandy angular to subrounded fine to medium occasionally coarse flint and subrounded to rounded fine to medium chalk GRAVEL		
						(0.90)			
9.00-9.50	D6				25.96	8.90	Light brown slightly silty slightly gravelly fine to coarse SAND. Gravel is angular to rounded fine to medium occasionally coarse flint and subrounded to rounded fine to medium occasionally coarse chalk		
						(2.60)			
10.50	D7								
					23.36	11.50	Brown sandy angular to subrounded fine to medium occasionally coarse flint and subrounded to rounded fine to medium chalk GRAVEL		
12.00	D8								
						(1.30)			
					22.06	12.80	Light brown slightly silty SAND and GRAVEL. Sand is fine to coarse. Gravel is angular to rounded fine occasionally medium and coarse flint and subrounded to rounded fine occasionally medium and coarse chalk		
						(0.85)			
13.50	D9				21.21	13.65	Firm grey silty slightly sandy CLAY		
						(0.95)			
14.50	D10				20.26	14.60	Grey slightly silty sandy subangular to rounded fine to coarse flint GRAVEL with a low cobble content. Cobbles are subangular to subrounded flint		
						(0.40)			
15.00	D11			19/08/2020:	19.86	15.00	Complete at 15.00m		

Remarks

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH202

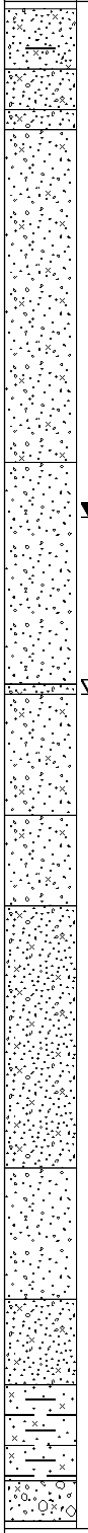
Logged in accordance BS5930:2015+A1:2020

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	BH202

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603391 E 295621 N	34.86		1/1



Instr (A)	Level (mOD)	Depth (m)	Description
	28.86	6.00	Bentonite Seal
	22.86	12.00	Slotted Standpipe
	19.86	15.00	Bentonite Seal

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
18/08/20		6.80	6.80	Moderate	5.76	5.30	5.08	5.05	

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
18/08/20							6.80	6.80	5.05	29.81
19/08/20		6.80	6.80	5.20	29.66		15.00	15.00		

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Remarks
21/08/20	09:15	4.97	29.89	Plumb - 12.00 m. Approximately 40 litres purged
21/08/20	09:25	5.19	29.67	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy with a brown discolouration
21/08/20	09:30	4.98	29.88	Draw down water level post sampling
04/09/20	09:58	4.89	29.97	Plumb - 11.55 m
04/09/20	10:08	4.93	29.93	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown
18/09/20	09:54	5.00	29.86	Plumb - 11.42 m
18/09/20	10:13	5.60	29.26	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown
02/10/20	09:59	4.74	30.12	Plumb - 11.34 m
02/10/20	10:08	4.74	30.12	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown

Remarks

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE			**Borehole Number** BH203
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 6.80m	**Ground Level (mOD)** 37.10	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603419 E 295692 N	**Dates** 11/08/2020	**Agent**	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.45)	Brown silty gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium occasionally coarse flint		
					36.65	0.45			
0.50	D1					(0.50)	Greyish brown silty slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium occasionally coarse flint		
					36.15	0.95			
1.00	D2						Brown sandy angular to rounded fine to coarse flint GRAVEL with a low cobble content. Cobbles are subangular to subrounded flint		
1.50-2.00	B1						...becoming brown from 1.40 m		
						(1.65)			
					34.50	2.60	Stiff brown slightly silty sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium flint		
						(0.30)			
2.75	D3				34.20	2.90	Brown sandy angular to rounded fine to coarse flint GRAVEL with a low cobble content. Cobbles are subangular to subrounded flint		
3.50-4.00	D4					(1.40)			
					32.80	4.30			
						(0.10)			
4.35	D5				32.70	4.40	Stiff brown slightly silty sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium flint		
							Brown sandy angular to rounded fine to coarse flint GRAVEL with a low cobble content. Cobbles are subangular to subrounded flint		
5.00-5.50	D6								
						(2.40)			
6.50-6.80	D7								
				12/08/2020:DRY	30.30	6.80	Terminated at 6.80m		

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. No groundwater encountered
4. Chiselling Required from 5.40 m to 6.80 m for 2.5 hr
5. Water added from 1.20 m to 6.80 m approx 1800 litres
6. Borehole backfilled with arisings

Chiselling from 5.40m to 6.80m for 2.5 hours. Water added from 1.20m to 6.80m.
Logged in accordance BS5930:2015+A1:2020

Scale (approx)	Logged By
1:40	JAH

Figure No. 19.287.BH203

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE			**Borehole Number** BH203A
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.00m Open Hole to 21.00m 150mm cased to 24.00m	**Ground Level (mOD)** 35.45	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603469 E 295678 N	**Dates** 13/08/2020-14/08/2020	**Agent**	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					35.20	(0.25) 0.25	MADE GROUND (Dark brown slightly clayey silty slightly gravelly fine to medium sand. Gravel is angular to subangular fine to medium flint with rare brick fragments)		
0.50	D1					(0.65)	Brown silty gravelly fine to coarse SAND. Gravel is angular to rounded fine to medium occasionally coarse flint		
1.00	D2				34.55	0.90	Firm to stiff brown mottled grey with rare black streaks silty slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium flint		
						(1.20)			
2.10-2.30	D3				33.35	2.10	Stiff light grey mottled orange-brown silty gravelly CLAY. Gravel is subrounded to rounded occasionally subangular fine to medium occasionally coarse chalk and rare angular to subangular occasionally subrounded fine to medium flint		
2.50-2.95	U1	2.50	DRY	75 blows					
							...becoming dark grey from 3.60 m		
						(3.40)			
4.00	D4								
					29.95	5.50	Stiff dark grey siltyslightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded occasionally subangular fine to medium occasionally coarse chalk and rare angular to subangular occasionally subrounded fine to medium flint		
6.00	D5								
6.00-6.45	U2	3.00	DRY	88 blows					
						(2.50)			
7.50	D6								

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 20.50 m and rose to 16.20 m in 20 mins
4. Slotted Standpipe installed to 24.00 m

Scale (approx)	Logged By
1:40	JAH

Figure No. 19.287.BH203A

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number BH203A
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.00m Open Hole to 21.00m 150mm cased to 24.00m **Ground Level (mOD)** 35.45 **Client** Privilege Finance Services	**Job Number** 19.287
	Location 603469 E 295678 N **Dates** 13/08/2020-14/08/2020 **Agent**	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					27.45	8.00	Stiff dark grey siltyslightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded occasionally subangular fine to medium occasionally coarse chalk and rare angular to subangular occasionally subrounded fine to medium flint		
9.00	D7								
10.50	D8								
12.00	D9					(8.00)			
13.50	D10						...subrounded flint cobble at 14.50 m		
15.00	D11								

Remarks	Scale (approx)	Logged By
	1:40	JAH
	Figure No.	
	19.287.BH203A	

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number BH203A

Machine : Dando 2000 Method : Cable Percussion	Casing Diameter 200mm cased to 3.00m Open Hole to 21.00m 150mm cased to 24.00m	Ground Level (mOD) 35.45	Client Privilege Finance Services	Job Number 19.287
	Location 603469 E 295678 N	Dates 13/08/2020- 14/08/2020	Agent	Sheet 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					19.45	16.00	Stiff dark grey slightly silty gravelly CLAY with rare pockets (<3 mm) of orange-brown sand. Gravel is subrounded to rounded occasionally subangular fine to medium occasionally coarse chalk and rare angular to subangular occasionally subrounded fine to medium flint		▼1
16.50	D12								
18.00	D13					(4.50)			
19.50	D14								
				Water strike(1) at 20.50m, rose to 16.20m in 20 mins. 13/08/2020:3.78m	14.95	20.50	Firm locally soft grey mottled light grey slightly silty sandy gravelly CLAY. Gravel is subrounded to rounded fine to coarse chalk and rare subangular to rounded medium to coarse flint		▽1
21.00	D15			14/08/2020:3.78m			...light grey from 21.50		
						(2.50)			
22.00	D16						...subrounded flint cobble at 22.50 m		
23.00-24.00	D17				12.45	23.00	Off-white structureless CHALK recovered as silty slightly sandy slightly gravelly clay. Gravel is fine to medium extremely weak to weak low occasionally medium density chalk		
						(1.00)			
				14/08/2020:6.50m	11.45	24.00			

Remarks	Scale (approx)	Logged By
	1:40	JAH
	Figure No. 19.287.BH203A	

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	BH203A

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603469 E 295678 N	35.45		1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description
					Bentonite Seal
	▼1				
	▽1		14.45	21.00	
					Slotted Standpipe
			11.45	24.00	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
13/08/20		20.50	3.00					16.20	

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
13/08/20							20.50	3.00	3.78	31.67
14/08/20		20.50	3.00	3.78	31.67		24.00	25.00	6.50	28.95

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Remarks
21/08/20	07:50	2.74	32.71	Plumb - 23.00 m. Approximately 95 litres purged
21/08/20	08:15	3.56	31.89	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy with a white discolouration
21/08/20	08:25	4.05	31.40	Draw down water level post sampling
04/09/20	09:17	2.82	32.63	Plumb - 22.60 m
04/09/20	09:42	4.32	31.13	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown
18/09/20	08:57	2.85	32.60	Plumb - 22.45 m
18/09/20	09:38	4.16	31.29	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown
02/10/20	09:00	2.59	32.86	Plumb - 22.63 m
02/10/20	09:39	4.07	31.38	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and white

Remarks

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE			**Borehole Number** BH204
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.50m 150mm cased to 24.00m Open hole to 25.00m	**Ground Level (mOD)** 35.99	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603208 E 295727 N	**Dates** 14/08/2020-17/08/2020	**Agent**	**Sheet** 1/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.70)	MADE GROUND (Grass overlying brown slightly clayey gravelly fine to coarse sand. Gravel is angular to subrounded fine to coarse flint with fragments of brick and concrete) ...concrete block between 0.35 and 0.40 m		
0.50	D1				35.29	0.70			▽1
				Moderate(1) at 0.70m.			Soft brown slightly silty gravelly CLAY. Gravel is angular to subrounded fine to coarse flint		
1.00	D2								
							...gravel is fine to medium from 1.30 m		
1.50	D3								
						(2.30)			
2.00	D4								▼2
									▽2
				Slow(2) at 2.90m, rose to 2.54m in 20 mins, sealed at 3.20m.	32.99	3.00			
3.00-3.10	D5				32.89	(0.10) 3.10	Soft brown slightly silty sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse flint		
							Stiff brown mottled light grey silty gravelly CLAY with rare pockets (<5 mm) of reddish brown fine to coarse sand. Gravel is subrounded to rounded fine to medium chalk and subangular to rounded fine to medium flint		
3.50	D6								
						(1.40)			
4.00-4.45	U1	3.50	DRY	73 blows					
					31.49	4.50	Stiff grey mottled greyish brown silty slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to medium occasionally coarse chalk and rare subangular to subrounded fine to medium occasional coarse flint ...grey from 4.80 m		
5.00	D7								
							...subrounded flint cobble at 6.00 m		
						(3.50)			
6.50	D8								▼3

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 0.70 m
4. Groundwater struck at 2.90 m and rose to 2.68 m in 5 mins, 2.60 m in 10 mins, 2.56 m in 15 mins and 2.54 m in 20 mins
5. Groundwater struck at 20.50 m and rose to 16.15 m in 5 mins, 13.20 m in 10 mins, 9.80 m in 15 mins and 7.50 m in 20 mins
6. Slotted Standpipe (A) installed to 25.00 m
7. Slotted Standpipe (B) installed to 3.00 m

Logged in accordance BS5930:2015+A1:2020

Scale (approx)	Logged By
1:40	JAH

Figure No. 19.287.BH204

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH204**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.50m 150mm cased to 24.00m Open hole to 25.00m	**Ground Level (mOD)** 35.99	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603208 E 295727 N	**Dates** 14/08/2020- 17/08/2020	**Agent**	**Sheet** 2/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
8.00 8.00-8.45	D9 U2	3.50	DRY	100 blows	27.99	8.00	Stiff grey mottled greyish brown silty slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to medium occasionally coarse chalk and rare subangular to subrounded fine to medium occasional coarse flint		
						(1.80)	...subrounded flint cobble at 9.00 m		
9.50	D10				26.19	9.80	Firm locally soft dark grey slightly silty gravelly CLAY. Gravel is subrounded to rounded fine to medium occasionally coarse chalk and rare subangular to subrounded fine to medium occasional coarse flint		
11.00	D11						...firm from 12.00 m		
12.50	D12					(6.20)	...stiff from 13.00 m		
14.00	D13								
15.50	D14			14/08/2020:DRY 17/08/2020:3.52m					

Remarks

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH204

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH204**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.50m 150mm cased to 24.00m Open hole to 25.00m **Ground Level (mOD)** 35.99	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603208 E 295727 N **Dates** 14/08/2020- 17/08/2020	**Agent**	**Sheet** 3/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					19.99	16.00	Firm locally soft dark grey slightly silty gravelly CLAY. Gravel is subrounded to rounded fine to medium occasionally coarse chalk and rare subangular to subrounded fine to medium occasional coarse flint		
17.00	D15					(4.20)			
18.50	D16						...firm and grey from 19.00 m		
20.00	D17				15.79	20.20	Off-white structureless CHALK recovered as silty slightly sandy slightly gravelly clay. Gravel is fine to medium extremely weak to weak low occasionally medium density chalk		
20.50	D18			Fast(3) at 20.50m, rose to 7.50m in 20 mins.		(1.80)			▽3
					13.99	22.00	Off-white structureless CHALK recovered as silty slightly sandy slightly gravelly clay. Gravel is fine to medium extremely weak to weak low occasionally medium density chalk		
23.00	D19					(2.00)			

Remarks

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH204

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates Geotechnical Engineers	Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH204**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 3.50m 150mm cased to 24.00m Open hole to 25.00m **Ground Level (mOD)** 35.99 **Client** Privilege Finance Services	**Job Number** 19.287
	Location 603208 E 295727 N **Dates** 14/08/2020-17/08/2020 **Agent**	**Sheet** 4/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
24.00-25.00	D20				11.99	24.00	Off-white structureless CHALK recovered as slightly clayey silty gravel. Gravel is fine to medium occasionally coarse extremely weak to weak low occasionally medium density chalk		
						(1.00)			
				17/08/2020:7.50m	10.99	25.00	Complete at 25.00m		

Remarks

Scale (approx)	Logged By
1:40	JAH

Figure No.
19.287.BH204

Logged in accordance BS5930:2015+A1:2020

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	BH204

Installation Type	Dimensions	Client	Job Number
Double Installation	Internal Diameter of Tube [A] = 50 mm Internal Diameter of Tube [B] = 50 mm Diameter of Filter Zone = 150-200 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603208 E 295727 N	35.99		1/2

Legend	Water	Instr (A) (B)	Level (mOD)	Depth (m)	Description
	▽1		34.99	1.00	Bentonite Seal
					Slotted Standpipe
	▼2				
	▽2		32.99	3.00	
	▼3				
					Bentonite Seal
	▽3		14.99	21.00	
					Slotted Standpipe
			10.99	25.00	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
17/08/20		0.70		Moderate					
17/08/20		2.90	2.50	Slow	2.68	2.60	2.56	2.54	3.20
18/08/20		20.50	20.00	Fast	16.15	13.20	9.80	7.50	

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
14/08/20							15.50	15.00	DRY	
17/08/20		10.00	15.00	3.52	32.47		25.00	24.00	7.50	28.49

Instrument Groundwater Observations

Inst. [A] Type : Standpipe **Inst. [B] Type :** Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Instrument [B] Time	Instrument [B] Depth (m)	Instrument [B] Level (mOD)	Remarks
21/08/20				12:33	1.92	34.07	Plumb - 3.10 m. Approximately 15 litres purged
21/08/20				12:45	2.15	33.84	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be cloudy with a brown discolouration
21/08/20				13:10	2.40	33.59	Draw down water level post sampling
21/08/20	12:15	3.80	32.19				Plumb - 24.30 m. Approximately 100 litres purged
21/08/20	12:30	4.10	31.89				Sampling undertaken using a Hydrasleeve at 21.00 m. Water sample taken. Sample noted to be cloudy with a white discolouration
04/09/20				13:27	2.18	33.81	Plumb - 3.04 m
04/09/20				13:46	2.62	33.37	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be cloudy with a brown discolouration
04/09/20	13:33	3.90	32.09				Sampling undertaken using a Hydrasleeve at 21.00 m. Water sample taken. Sample noted to be cloudy with a white discolouration
18/09/20				14:10	2.23	33.76	Plumb - 2.90 m
18/09/20				14:30	2.42	33.57	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy and brown

Remarks

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	BH204

Installation Type	Dimensions	Client	Job Number
Double Installation	Internal Diameter of Tube [A] = 50 mm Internal Diameter of Tube [B] = 50 mm Diameter of Filter Zone = 150-200 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603208 E 295727 N	35.99		2/2

Legend	Water	Instr (A) (B)	Level (mOD)	Depth (m)	Description
			34.99	1.00	Bentonite Seal
					Slotted Standpipe
			32.99	3.00	
			14.99	21.00	Bentonite Seal
					Slotted Standpipe
			10.99	25.00	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)

Instrument Groundwater Observations

Inst. [A] Type : Standpipe **Inst. [B] Type :** Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Instrument [B] Time	Instrument [B] Depth (m)	Instrument [B] Level (mOD)	Remarks
18/09/20	14:44	3.79	32.20				Plumb - 21.66 m. Sampling undertaken using a Hydrasleeve at 21.00 m. Water sample taken. Sample noted to be cloudy with a white discolouration
02/10/20	12:06			12:06			Standpipe headworks have been destroyed. Installation assessed as not serviceable

Remarks

APPENDIX B2: DYNAMIC SAMPLER HOLE AND INSTRUMENTATION RECORDS

D	Small disturbed sample
B	Bulk disturbed sample
ES	Environmental sample
dd/mm/yy: 1.0 **dd/mm/yy: dry**	Date, water level at the window sample hole depth at the end of shift and the start of the following shift

Each sample type is numbered sequentially with depth and relates to the depth range quoted

All depths and measurements are given in metres, except as noted

Strata descriptions compiled by visual examination of samples obtained after BS 5930:2015 and modified in accordance with in-house procedures and with laboratory test results where applicable.

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE			**Number** WS102
Machine : Dando Terrier 2002 **Method :** Windowless Dynamic Sampling	**Dimensions** 87mm to 3.00m 75mm to 4.00m	**Ground Level (mOD)** 31.99	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603329 E 295534 N	**Dates** 09/03/2020	**Agent**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.05-0.15	ES1			31.84	(0.15) 0.15	MADE GROUND (Brown sandy angular to subangular fine to coarse flint gravel)		
0.20-0.60	D1					MADE GROUND (Dark brown slightly clayey silty slightly gravelly fine to medium sand. Gravel is angular to subrounded fine occasionally medium flint with rare fragments of brick. With rare rootlets)		
0.30-0.50	ES2				(0.50)			
0.70-1.00	D2			31.34	0.65	Medium dense greyish brown mottled brown silty slightly gravelly fine to medium SAND. Gravel is angular to subrounded fine flint		
1.20-1.65	SPT N=11	DAMP	IP 0/S 2,4 T 3,2,3,3		(0.75)			
1.20-1.40	D4							
1.20-1.65	D3			30.59	1.40	Loose grey with rare brown mottle silty fine to coarse SAND. With rare pockets (<10 mm) of clay		
1.50-2.00	D5					...decayed roots and rootlets at 1.70 m		
2.00-2.45	SPT N=4	DAMP	IP 0/S 1,2 T 2,1,1,0		(1.10)	...rare gravels noted from 1.90 m. Gravel is angular to subangular fine to medium flint ...decayed roots and rootlets at 1.95 m		
2.00-2.50	D6						▼1	
			Moderate(1) at 2.40m, rose to 2.18m in 20 mins.				▽1	
2.50-2.80	D7			29.49	2.50	Brown silty slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint and rare subangular to rounded fine quartz		
					(0.30)	...gravelly from 2.70 m		
2.80-3.00	D8			29.19	2.80	Very loose grey mottled brown slightly clayey gravelly fine to coarse SAND. Gravel is subangular to rounded fine flint and chalk. With rare pockets (<5 mm) orange-brown silty fine to medium sand		
					(0.25)			
3.00-3.45	SPT N=0	2.38	IP 450 Test Failed	28.94	3.05	Very loose brown mottled orange-brown slightly clayey silty fine to medium SAND		
3.00-3.45	D9					...rare dark brown streaks between 3.10 and 3.50 m		
3.00-4.00	D10				(0.95)			
			09/03/2020:2.26m	27.99	4.00	Complete at 4.00m		

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 2.40 m and rose to 2.38 m in 5 mins, 2.35 m in 10 mins, 2.28 m in 15 mins and 2.18 m in 20 mins
4. Slotted standpipe installed between 1.00 and 4.00 m
5. SPT Hammer Energy Ratio = 68.30%

Logged in accordance BS5930:2015

Scale (approx)	Logged By
1:25	JAH

Figure No. 19.287.WS102

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	WS102

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603329 E 295534 N	31.99		1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description
			30.99	1.00	Bentonite Seal
	▼1				
	▽1				Slotted Standpipe
			27.99	4.00	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)
					5 min	10 min	15 min	20 min	
09/03/20		2.40	2.00	Moderate	2.38	2.35	2.28	2.18	

Groundwater Observations During Drilling

Date	Start of Shift					End of Shift				
	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
09/03/20							4.00	4.00	2.26	29.73

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A]			Remarks
	Time	Depth (m)	Level (mOD)	
13/03/20	10:00	1.05	30.94	Plumb - 3.87 m
13/03/20	12:23	1.20	30.79	After developing, 10 litres removed untill borehole dry
20/03/20	10:28	1.27	30.72	
27/03/20	12:36	1.27	30.72	Plumb - 3.85 m
02/04/20	13:04	1.30	30.69	Plumb - 3.85 m
08/04/20	11:08	1.37	30.62	Plumb - 3.82 m
15/04/20	09:54	1.44	30.55	
17/04/20	09:45	1.45	30.54	
10/08/20	08:45	2.67	29.32	Damage to headworks, installation assessed as serviceable. Installation developed, 30 litres removed
11/08/20	08:59	2.34	29.65	
21/08/20	09:45	2.23	29.76	Plumb - 3.70 m. Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear and colourless
21/08/20	10:10	3.05	28.94	Draw down water level post sampling
04/09/20	10:25	1.98	30.01	Plumb - 3.70 m
04/09/20	10:38	2.45	29.54	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be cloudy with a brown discolouration
18/09/20	10:30	2.22	29.77	Plumb - 3.73 m
18/09/20	10:47	2.98	29.01	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be cloudy with a brown discolouration
02/10/20	10:28	1.50	30.49	Plumb - 3.55 m
02/10/20	10:39	1.97	30.02	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be cloudy with a brown discolouration

Remarks

A F Howland Associates
Geotechnical Engineers

Site	Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	**WS103**

Machine / Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine : Dando Terrier 2002 **Method :** Windowless Dynamic Sampling	87mm to 3.00m 75mm to 4.00m	31.19	Privilege Finance Services	19.287
	Location 603422 E 295550 N	**Dates** 10/03/2020	**Agent**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.30	ES1				(0.32)	MADE GROUND (Grass overlying slightly clayey silty slightly gravelly fine to medium sand. Gravel is angular to subrounded fine occasionally medium flint with rare fragments of brick. With rootlets)		
				30.87	0.32			
0.40-0.50	ES2				(0.18)	Firm orange-brown mottled light brown and light grey silty slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine occasionally medium flint		
				30.69	0.50			
0.60-1.20	D1				(0.55)	Dark brown mottled reddish brown clayey slightly silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium flint		
				30.14	1.05			
1.20-1.90	B1				(0.85)	Orange-brown slightly clayey silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine occasionally medium flint. With rare pockets (<8 mm) of light grey silty clay		
				29.29	1.90			
2.00-2.35	D2				(0.45)	Orange-brown mottled light grey slightly clayey sandy SILT		
				28.84	2.35			▼1 ▽1
2.40-2.80	D3		Moderate/Slow(1) at 2.45m, rose to 2.35m in 20 mins.		(0.50)	Orange-brown silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine flint		
				28.34	2.85			
2.85-3.00	D4					Light brown slightly clayey sandy SILT		
3.00-3.20	D5				(0.40)			
				27.94	3.25	Soft light grey silty slightly sandy CLAY		
3.60-3.70	D6				(0.75)			
			10/03/2020:3.49m	27.19	4.00	Complete at 4.00m		

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 2.45 m and rose to 2.35 m in 20 mins
4. Slotted standpipe installed between 0.90 and 3.90 m

Scale (approx)	Logged By
1:25	JAH

Figure No. 19.287.WS103

Logged in accordance BS5930:2015

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	WS103

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603422 E 295550 N	31.19		1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description
			30.29	0.90	Bentonite Seal
	▼1 ▽1				Slotted Standpipe
			27.29	3.90	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
		2.45		Moderate/Slow				2.35	

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
10/03/20							4.00	4.00	3.49	27.70

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Remarks
13/03/20	10:15	1.05	30.14	Plumb - 3.87 m
13/03/20	11:05	1.05	30.14	After developing, 14 litres removed untill borehole dry
27/03/20	10:10	1.18	30.01	Plumb - 3.87 m
02/04/20	12:00	1.20	29.99	Plumb - 3.87 m
08/04/20	11:17	1.21	29.98	Plumb - 3.84 m
15/04/20	09:58	1.25	29.94	Plumb - 3.94 m
17/04/20	10:06	1.30	29.89	
10/08/20	08:55	2.47	28.72	Installation assessed as still serviceable. Installation developed, 20 litres removed
11/08/20	09:02	1.62	29.57	
21/08/20	10:52	1.52	29.67	Plumb - 3.93 m. Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear and colourless
21/08/20	11:16	2.85	28.34	Draw down water level post sampling
04/09/20	11:15	1.30	29.89	Plumb - 3.90 m
04/09/20	11:21	1.73	29.46	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear with a brown discolouration
18/09/20	11:45	1.40	29.79	Plumb - 3.80 m
18/09/20	11:51	1.76	29.43	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear and colourless
02/10/20	11:19	0.94	30.25	Plumb - 3.83 m
02/10/20	11:27	1.29	29.90	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear and colourless

Remarks

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE			**Number** WS104
Machine : Dando Terrier 2002 **Method :** Windowless Dynamic Sampling	**Dimensions** 87mm to 3.00m 75mm to 4.00m	**Ground Level (mOD)** 33.16	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603478 E 295601 N	**Dates** 10/03/2020	**Agent**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.20	ES1			32.91	(0.25) 0.25	MADE GROUND (Grass overlying dark brown slightly clayey slightly silty slightly gravelly fine to medium sand. Gravel is angular to subangular fine to medium flint. With rootlets)		
0.40-0.50	ES2				(0.60)	Brown silty slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint		
0.90-1.20	D1			32.31	0.85	Orange-brown mottled reddish brown and greyish brown slightly silty gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse flint		
1.20-1.50	D2				(0.65)			
1.50-2.00	D3			31.66	1.50	Brown mottled light brown slightly clayey silty fine to coarse SAND ...with black streaks between 1.70 and 1.85 m		
2.00-3.00	B1		Moderate(1) at 2.60m, rose to 2.28m in 20 mins.		(1.50)	...with black streaks between 2.20 and 2.40 m		▼1 ▽1
3.00-4.00	D4			30.16	3.00	Brown mottled light brown silty fine to coarse SAND		
			10/03/2020:2.43m		(1.00)			
				29.16	4.00	Complete at 4.00m		

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 2.60 m and rose to 2.54 m in 5 mins, 2.42 m in 10 mins, 2.33 m in 15 mins and 2.28 m in 20 mins
4. Slotted standpipe installed between 0.30 and 3.30 m

Scale (approx)	Logged By
1:25	JAH

Figure No. 19.287.WS104

Logged in accordance BS5930:2015

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	WS104

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603478 E 295601 N	33.16		1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description
			32.86	0.30	Bentonite Seal
	▼1				
	▽1				
			29.86	3.30	Slotted Standpipe

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)
					5 min	10 min	15 min	20 min	
10/03/20		2.60	3.00	Moderate	2.54	2.42	2.33	2.28	

Groundwater Observations During Drilling

Date	Start of Shift					End of Shift				
	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
10/03/20							4.00	4.00	2.43	30.73

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A]			Remarks
	Time	Depth (m)	Level (mOD)	
13/02/20	10:50	1.60	31.56	Plumb - 3.25 m
13/02/20	12:00	1.65	31.51	After developing, 8 litres removed untill borehole dry
27/03/20	10:20	1.86	31.30	Plumb - 3.25 m
02/04/20	12:10	1.90	31.26	Plumb - 3.25 m
08/04/20	11:22	1.00	32.16	Plumb - 3.19 m
15/04/20	10:08	2.10	31.06	Plumb - 3.32 m
11/08/20	09:09	1.80	31.36	Installation assessed as still serviceable. Installation developed, 20 litres removed
11/08/20	09:14	3.00	30.16	Installation assessed as still serviceable. Installation developed, purged dry 10 litres removed
21/08/20	11:19	DRY		No sampling undertaken
04/09/20	11:26	DRY		No sampling undertaken
18/09/20	12:10	DRY		No sampling undertaken
02/10/20	11:40	DRY		No sampling undertaken

Remarks

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE			**Number** WS105
Machine : Dando Terrier 2002 **Method :** Windowless Dynamic Sampling	**Dimensions** 87mm to 3.00m 75mm to 4.00m	**Ground Level (mOD)** 31.94	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603574 E 295576 N	**Dates** 10/03/2020	**Agent**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	ES1			31.79	(0.15) 0.15	MADE GROUND (Grass overlying slightly clayey silty slightly gravelly fine to medium sand. Gravel is angular to subrounded fine occasionally medium flint with rare fragments of brick. With rootlets)		
0.50-0.60	ES2				(0.75)	Orange-brown mottled light brown and light grey clayey silty slightly slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine occasionally medium flint		
0.70-0.90	D1							
0.90-1.10	D2			31.04	0.90			
					(0.25)	Dark brown mottled reddish brown clayey slightly silty slightly gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium flint		
1.20-1.60	D3			30.79	1.15	Brown slightly clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine occasionally medium flint		
					(0.50)			▼1
1.60-1.90	D4			30.29	1.65	Dark grey slightly clayey silty slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium flint. With rare dark brown streaks and a slight organic odour		
					(0.30)			▽1
2.00-2.70	D5		Moderate(1) at 1.95m, rose to 1.55m in 20 mins.	29.99	1.95	Brown slightly clayey slightly silty gravelly fine to coarse SAND. Gravel is very angular to subangular fine to medium flint		
					(0.75)			
2.70-3.00	D6			29.24	2.70	Brown slight silty slightly gravelly fine to coarse SAND. Gravel is subangular occasionally angular and subrounded fine occasionally medium flint		
3.00-4.00	D7							
					(1.30)	...pocket of grey clay at 3.30 m ...pocket of grey clay at 3.45 m		
			10/03/2020:1.82m	27.94	4.00	Complete at 4.00m		

Remarks
1. Location CAT scanned prior to excavation
2. Hand dug inspection pit to 1.20 m
3. Groundwater struck at 1.95 m and rose to 1.79 m in 5 mins, 1.61 m in 10 mins, 1.55 m in 15 mins and 20 mins
4. Slotted Standpipe installed between 0.50 and 3.25 m

Scale (approx)	Logged By
1:25	JAH

Figure No. 19.287.WS105

Logged in accordance BS5930:2015

A F Howland Associates
Geotechnical Engineers

Site	Borehole Number
Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	WS105

Installation Type	Dimensions	Client	Job Number
Single Installation	Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm	Privilege Finance Services	19.287

Location	Ground Level (mOD)	Agent	Sheet
603574 E 295576 N	31.94		1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description
			31.44	0.50	Bentonite Seal
	▼1				
	▽1				Slotted Standpipe
			28.69	3.25	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)
					5 min	10 min	15 min	20 min	
10/03/20		1.95	2.00	Moderate	1.79	1.61	1.55	1.55	

Groundwater Observations During Drilling

Date	Start of Shift					End of Shift				
	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
10/03/20							4.00	4.00	1.82	30.12

Instrument Groundwater Observations

Inst. [A] Type : Standpipe

Date	Instrument [A]			Remarks
	Time	Depth (m)	Level (mOD)	
13/03/20	10:30	1.05	30.89	Plumb - 3.26 m
13/03/20	11:00	0.92	31.02	After developing, 40 litres removed, water still remaining in borehole
27/03/20	10:15	0.95	30.99	Plumb - 3.26 m
02/04/20	12:10	0.98	30.96	Plumb - 3.26 m
08/04/20	11:27	1.98	29.96	Plumb - 3.24 m
15/04/20	10:02	1.09	30.85	Plumb - 3.30 m
17/04/20	10:18	1.15	30.79	
11/08/20	09:09	1.80	30.14	Installation assessed as still serviceable. Installation developed, 20 litres removed
21/08/20	11:21	1.83	30.11	Plumb - 3.40 m. Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be slightly cloudy with a brown discolouration
21/08/20	11:35	2.35	29.59	Draw down water level post sampling
04/09/20	11:33	1.69	30.25	Plumb - 3.26 m
04/09/20	11:40	1.91	30.03	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear with no discolouration
18/09/20	13:32	1.80	30.14	Plumb - 3.16 m
18/09/20	13:46	2.03	29.91	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear with a brown discolouration
02/10/20	11:46	1.32	30.62	Plumb - 3.17 m
02/10/20	11:52	1.63	30.31	Low-flow groundwater sampling undertaken. Water sample taken. Sample noted to be clear with a brown discolouration

Remarks

APPENDIX B3: FALLING HEAD TEST RESULTS

A F Howland Associates Geotechnical Engineers			Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH201**
In Situ Permeability Type Falling Head	**Test No.** 1	**Ground Level (mOD)** 31.53	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603364 E 295533 N	**Dates** 10/08/2020	**Agent**	**Sheet** 1/2

Height of casing above ground level:	0.00	**m**
Depth to Base of Borehole:	5.50	**m bgl**
Depth to Base of Casing:	4.20	**m bgl**
Depth to equilibrium water level:		**m btoc**
Test Length L:	1.30	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	3.1773	

PERMEABILITY (after Hvorslev, 1951)

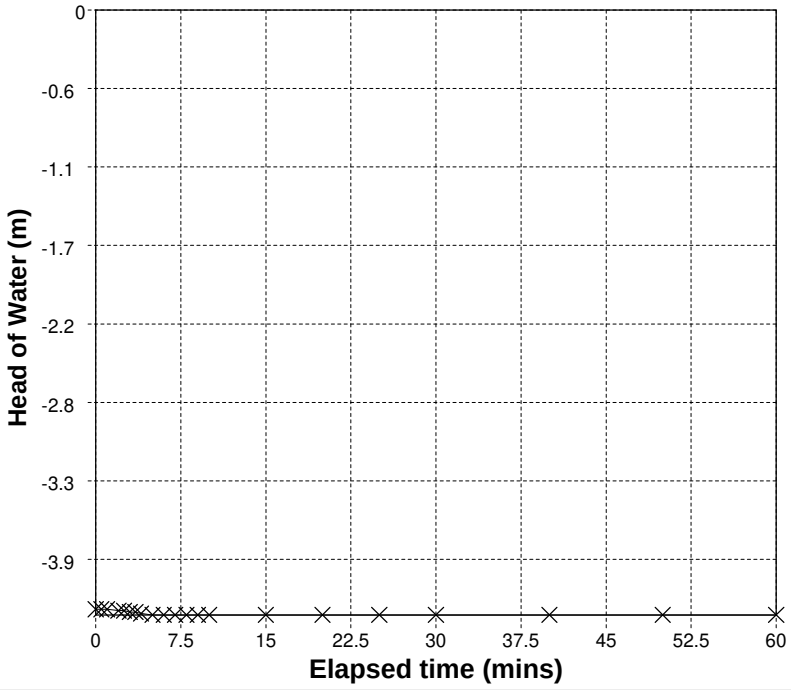
General Approach

H1 selected at t= -4.17 m (=t1 = 5.4 secs)

H2 selected at t= -4.24 m (=t2 = 1501.2 secs)

k = -1.10E-07 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.00	4.200	-4.200	1.000
0.50	4.200	-4.200	1.000
1.00	4.200	-4.200	1.000
2.00	4.210	-4.210	1.002
2.50	4.210	-4.210	1.002
3.00	4.220	-4.220	1.005
3.50	4.220	-4.220	1.005
4.00	4.230	-4.230	1.007
5.00	4.240	-4.240	1.010
6.00	4.240	-4.240	1.010
7.00	4.240	-4.240	1.010
8.00	4.240	-4.240	1.010
9.00	4.240	-4.240	1.010
10.00	4.240	-4.240	1.010
15.00	4.240	-4.240	1.010
20.00	4.240	-4.240	1.010
25.00	4.240	-4.240	1.010
30.00	4.240	-4.240	1.010
40.00	4.240	-4.240	1.010
50.00	4.240	-4.240	1.010
60.00	4.240	-4.240	1.010



Remarks

Key: bgl = Below Ground Level btoc = Below Top of Casing

A F Howland Associates Geotechnical Engineers			Site Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	Borehole Number **BH202**
In Situ Permeability Type Falling Head	**Test No.** 1	**Ground Level (mOD)** 34.86	**Client** Privilege Finance Services	**Job Number** 19.287
	Location 603391 E 295621 N	**Dates** 18/08/2020	**Agent**	**Sheet** 2/2

Height of casing above ground level:	0.00	**m**
Depth to Base of Borehole:	5.00	**m bgl**
Depth to Base of Casing:	4.00	**m bgl**
Depth to equilibrium water level:		**m btoc**
Test Length L:	1.00	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	2.7171	

PERMEABILITY (after Hvorslev, 1951)

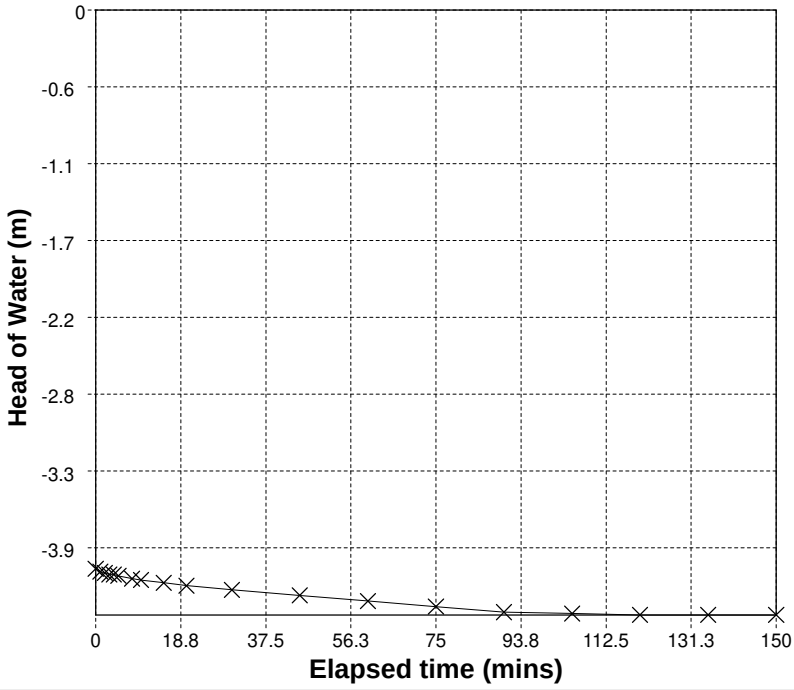
General Approach

H1 selected at t= -4.01 m (=t1 = 55.2 secs)

H2 selected at t= -4.261 m (=t2 = 4512.6 secs)

k = -1.57E-07 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.00	4.000	-4.000	1.000
1.00	4.020	-4.020	1.005
2.00	4.030	-4.030	1.008
3.00	4.040	-4.040	1.010
4.00	4.040	-4.040	1.010
5.00	4.050	-4.050	1.013
8.00	4.070	-4.070	1.018
10.00	4.080	-4.080	1.020
15.00	4.100	-4.100	1.025
20.00	4.120	-4.120	1.030
30.00	4.150	-4.150	1.038
45.00	4.190	-4.190	1.048
60.00	4.230	-4.230	1.058
75.00	4.270	-4.270	1.068
90.00	4.310	-4.310	1.078
105.00	4.320	-4.320	1.080
120.00	4.330	-4.330	1.083
135.00	4.330	-4.330	1.083
150.00	4.330	-4.330	1.083



Remarks

Key: bgl = Below Ground Level btoc = Below Top of Casing

APPENDIX C: GROUNDWATER MONITORING PARAMETERS

APPENDIX C1: GROUNDWATER MONITORING PARAMETERS (21st August 2020)

BH201, BH202, BH203A, BH204[A], BH204[B], WS102, WS103, and WS105

APPENDIX C2: GROUNDWATER MONITORING PARAMETERS (4th September 2020)

BH201, BH202, BH203A, BH204[A], BH204[B], WS102, WS103, and WS105

APPENDIX C3: GROUNDWATER MONITORING PARAMETERS (18th September 2020)

BH201, BH202, BH203A, BH204[A], BH204[B], WS102, WS103, and WS105

APPENDIX C4: GROUNDWATER MONITORING PARAMETERS (2nd October 2020)

BH201, BH202, BH203A, WS102, WS103, and WS105

APPENDIX C1: GROUNDWATER MONITORING PARAMETERS (21st August 2020)

Low-Flow Test Report:

Test Date / Time: 8/21/2020 10:33:41 AM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - BH201 **Well Diameter: 0.15 m** **Screen Length: 9.0 m** **Top of Screen: 7.8 m** **Total Depth: 16.8 m** **Initial Depth to Water: 1.78 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 7920 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 1200 ml/min** **Final Draw Down: 2 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
8/21/2020 10:33 AM	00:00	7.06 pH	11.90 °C	950.04 µS/cm	0.70 mg/L		68.1 mV	178.00 cm	0.47 PSU	1,200.0 ml/min
8/21/2020 10:34 AM	01:06	7.01 pH	11.89 °C	927.69 µS/cm	0.56 mg/L		66.0 mV	178.00 cm	0.46 PSU	1,200.0 ml/min
8/21/2020 10:35 AM	02:12	6.98 pH	11.87 °C	909.89 µS/cm	0.47 mg/L		64.7 mV	178.00 cm	0.45 PSU	1,200.0 ml/min
8/21/2020 10:36 AM	03:18	6.97 pH	11.85 °C	902.71 µS/cm	0.41 mg/L		63.5 mV	178.00 cm	0.45 PSU	1,200.0 ml/min
8/21/2020 10:38 AM	04:24	6.95 pH	11.85 °C	890.92 µS/cm	0.36 mg/L		63.8 mV	178.00 cm	0.44 PSU	1,200.0 ml/min
8/21/2020 10:39 AM	05:30	6.93 pH	11.85 °C	880.17 µS/cm	0.30 mg/L		60.1 mV	178.00 cm	0.43 PSU	1,200.0 ml/min
8/21/2020 10:40 AM	06:36	6.93 pH	11.84 °C	878.33 µS/cm	0.29 mg/L		59.5 mV	178.00 cm	0.43 PSU	1,200.0 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 8/21/2020 9:21:44 AM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - BH202 **Well Diameter: 0.15 m** **Screen Length: 6 m** **Top of Screen: 6 m** **Total Depth: 12 m** **Initial Depth to Water: 5.19 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 11.5 m** **Estimated Total Volume Pumped: 7820 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 1200 ml/min** **Final Draw Down: 4.98 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Sunny with clouds

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
8/21/2020 9:21 AM	00:00	6.63 pH	12.34 °C	926.77 µS/cm	0.20 mg/L		-335.7 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:22 AM	00:23	6.63 pH	12.37 °C	924.14 µS/cm	0.19 mg/L		-356.3 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:22 AM	00:46	6.65 pH	12.35 °C	919.36 µS/cm	0.19 mg/L		-370.7 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:22 AM	01:09	6.65 pH	12.33 °C	918.29 µS/cm	0.18 mg/L		-383.3 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:23 AM	01:32	6.64 pH	12.33 °C	917.04 µS/cm	0.18 mg/L		-390.3 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:23 AM	01:55	6.65 pH	12.32 °C	918.27 µS/cm	0.17 mg/L		-396.9 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:24 AM	02:18	6.65 pH	12.34 °C	914.93 µS/cm	0.17 mg/L		-400.8 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:24 AM	02:41	6.67 pH	12.33 °C	915.59 µS/cm	0.17 mg/L		-405.7 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:24 AM	03:04	6.68 pH	12.33 °C	912.25 µS/cm	0.16 mg/L		-406.9 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:25 AM	03:27	6.68 pH	12.32 °C	910.60 µS/cm	0.16 mg/L		-410.5 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:25 AM	03:50	6.66 pH	12.34 °C	909.89 µS/cm	0.16 mg/L		-411.3 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:25 AM	04:13	6.67 pH	12.34 °C	906.96 µS/cm	0.15 mg/L		-413.2 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:26 AM	04:36	6.65 pH	12.34 °C	907.94 µS/cm	0.15 mg/L		-412.7 mV	519.00 cm	1,200.0 ml/min

8/21/2020 9:26 AM	04:59	6.68 pH	12.32 °C	908.54 µS/cm	0.15 mg/L		-416.7 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:27 AM	05:22	6.65 pH	12.32 °C	907.97 µS/cm	0.15 mg/L		-418.8 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:27 AM	05:45	6.65 pH	12.34 °C	906.58 µS/cm	0.15 mg/L		-418.4 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:27 AM	06:08	6.66 pH	12.33 °C	905.57 µS/cm	0.14 mg/L		-421.4 mV	519.00 cm	1,200.0 ml/min
8/21/2020 9:28 AM	06:31	6.66 pH	12.34 °C	906.45 µS/cm	0.14 mg/L		-421.9 mV	519.00 cm	1,200.0 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 8/21/2020 8:40:35 AM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - BH203A **Well Diameter: 0.15 m** **Screen Length: 3 m** **Top of Screen: 21 m** **Total Depth: 24 m** **Initial Depth to Water: 3.05 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 6225 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 750 ml/min** **Final Draw Down: 4.03 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
8/21/2020 8:40 AM	00:00	7.12 pH	12.35 °C	641.71 µS/cm	0.36 mg/L		35.1 mV	305.00 cm	750.00 ml/min
8/21/2020 8:41 AM	00:28	7.07 pH	12.31 °C	641.00 µS/cm	0.35 mg/L		37.4 mV	305.00 cm	750.00 ml/min
8/21/2020 8:41 AM	00:56	7.03 pH	12.29 °C	640.95 µS/cm	0.34 mg/L		38.0 mV	305.00 cm	750.00 ml/min
8/21/2020 8:41 AM	01:24	7.01 pH	12.30 °C	640.71 µS/cm	0.33 mg/L		38.0 mV	305.00 cm	750.00 ml/min
8/21/2020 8:42 AM	01:52	7.00 pH	12.31 °C	638.97 µS/cm	0.33 mg/L		37.3 mV	305.00 cm	750.00 ml/min
8/21/2020 8:42 AM	02:20	6.98 pH	12.32 °C	639.65 µS/cm	0.33 mg/L		36.9 mV	305.00 cm	750.00 ml/min
8/21/2020 8:43 AM	02:28	6.99 pH	12.31 °C	638.34 µS/cm	0.33 mg/L		36.9 mV	305.00 cm	750.00 ml/min
8/21/2020 8:43 AM	02:51	6.99 pH	12.34 °C	638.72 µS/cm	0.33 mg/L		35.6 mV	305.00 cm	750.00 ml/min
8/21/2020 8:45 AM	04:40	6.99 pH	12.35 °C	636.30 µS/cm	0.32 mg/L		32.2 mV	305.00 cm	750.00 ml/min
8/21/2020 8:47 AM	06:29	7.00 pH	12.37 °C	629.84 µS/cm	0.33 mg/L		29.4 mV	305.00 cm	750.00 ml/min
8/21/2020 8:48 AM	08:18	6.99 pH	12.17 °C	625.92 µS/cm	0.31 mg/L		25.8 mV	305.00 cm	750.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L amber glass bottle

Low-Flow Test Report:

Test Date / Time: 8/21/2020 12:48:17 PM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - BH204B **Well Diameter: 0.2 m** **Screen Length: 2 m** **Top of Screen: 1 m** **Total Depth: 3 m** **Initial Depth to Water: 1.92 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3 m** **Estimated Total Volume Pumped: 2706.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 2.4 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
8/21/2020 12:48 PM	00:00	7.74 pH	21.54 °C	542.31 µS/cm	6.80 mg/L		269.7 mV	192.00 cm	0.26 PSU	100.00 ml/min
8/21/2020 12:50 PM	01:56	7.77 pH	22.10 °C	547.18 µS/cm	6.84 mg/L		266.5 mV	192.00 cm	0.27 PSU	100.00 ml/min
8/21/2020 12:52 PM	03:52	7.28 pH	19.42 °C	574.02 µS/cm	3.40 mg/L		275.5 mV	192.00 cm	0.28 PSU	100.00 ml/min
8/21/2020 12:54 PM	05:48	7.44 pH	19.82 °C	633.40 µS/cm	6.26 mg/L		270.5 mV	192.00 cm	0.31 PSU	100.00 ml/min
8/21/2020 12:56 PM	07:44	7.47 pH	19.94 °C	669.25 µS/cm	6.91 mg/L		272.3 mV	192.00 cm	0.33 PSU	100.00 ml/min
8/21/2020 12:57 PM	09:40	7.48 pH	19.93 °C	671.08 µS/cm	7.27 mg/L		273.3 mV	192.00 cm	0.33 PSU	100.00 ml/min
8/21/2020 12:59 PM	11:36	7.47 pH	19.96 °C	691.55 µS/cm	7.33 mg/L		274.2 mV	192.00 cm	0.34 PSU	100.00 ml/min
8/21/2020 1:01 PM	13:32	7.48 pH	19.71 °C	726.28 µS/cm	7.40 mg/L		274.8 mV	192.00 cm	0.36 PSU	100.00 ml/min
8/21/2020 1:03 PM	15:28	7.53 pH	19.73 °C	746.37 µS/cm	7.58 mg/L		273.9 mV	192.00 cm	0.37 PSU	100.00 ml/min
8/21/2020 1:05 PM	17:24	7.62 pH	19.81 °C	748.52 µS/cm	7.91 mg/L		271.0 mV	192.00 cm	0.37 PSU	100.00 ml/min
8/21/2020 1:07 PM	19:20	7.65 pH	19.89 °C	750.06 µS/cm	8.02 mg/L		269.9 mV	192.00 cm	0.37 PSU	100.00 ml/min
8/21/2020 1:09 PM	21:16	7.66 pH	20.09 °C	748.22 µS/cm	8.02 mg/L		268.9 mV	192.00 cm	0.37 PSU	100.00 ml/min
8/21/2020 1:11 PM	23:12	7.66 pH	20.20 °C	750.72 µS/cm	8.06 mg/L		268.6 mV	192.00 cm	0.37 PSU	100.00 ml/min
8/21/2020 1:13 PM	25:08	7.67 pH	20.13 °C	751.35 µS/cm	8.09 mg/L		268.3 mV	192.00 cm	0.37 PSU	100.00 ml/min
8/21/2020 1:15 PM	27:04	7.70 pH	20.02 °C	747.26 µS/cm	8.15 mg/L		267.6 mV	192.00 cm	0.37 PSU	100.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 8/21/2020 9:50:01 AM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - WS102 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 1 m** **Total Depth: 4 m** **Initial Depth to Water: 2.23 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.7 m** **Estimated Total Volume Pumped: 7700 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 500 ml/min** **Final Draw Down: 3.05 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	
8/21/2020 9:50 AM	00:00	6.87 pH	17.99 °C	565.79 µS/cm	1.05 mg/L		134.3 mV	223.00 cm	500.00 ml/min
8/21/2020 9:51 AM	01:06	6.88 pH	18.05 °C	594.00 µS/cm	1.04 mg/L		131.2 mV	223.00 cm	500.00 ml/min
8/21/2020 9:52 AM	02:12	6.91 pH	17.94 °C	603.67 µS/cm	1.07 mg/L		123.7 mV	223.00 cm	500.00 ml/min
8/21/2020 9:53 AM	03:18	6.95 pH	17.75 °C	588.07 µS/cm	1.11 mg/L		116.4 mV	223.00 cm	500.00 ml/min
8/21/2020 9:54 AM	04:24	6.97 pH	17.45 °C	556.04 µS/cm	0.72 mg/L		100.7 mV	223.00 cm	500.00 ml/min
8/21/2020 9:55 AM	05:30	6.96 pH	17.37 °C	541.08 µS/cm	0.68 mg/L		96.6 mV	223.00 cm	500.00 ml/min
8/21/2020 9:56 AM	06:36	6.68 pH	17.46 °C	532.15 µS/cm	1.34 mg/L		117.2 mV	223.00 cm	500.00 ml/min
8/21/2020 9:57 AM	07:42	6.85 pH	17.45 °C	501.64 µS/cm	1.16 mg/L		113.5 mV	223.00 cm	500.00 ml/min
8/21/2020 9:58 AM	08:48	6.88 pH	17.36 °C	493.91 µS/cm	1.04 mg/L		107.9 mV	223.00 cm	500.00 ml/min
8/21/2020 9:59 AM	09:54	6.81 pH	17.39 °C	496.12 µS/cm	1.62 mg/L		124.0 mV	223.00 cm	500.00 ml/min
8/21/2020 10:01 AM	11:00	6.82 pH	17.39 °C	492.02 µS/cm	1.79 mg/L		129.0 mV	223.00 cm	500.00 ml/min
8/21/2020 10:02 AM	12:06	6.84 pH	17.39 °C	491.39 µS/cm	1.81 mg/L		129.7 mV	223.00 cm	500.00 ml/min
8/21/2020 10:03 AM	13:12	6.83 pH	17.33 °C	499.33 µS/cm	1.95 mg/L		132.7 mV	223.00 cm	500.00 ml/min

8/21/2020 10:04 AM	14:18	6.84 pH	17.34 °C	498.31 µS/cm	2.00 mg/L		134.3 mV	223.00 cm	500.00 ml/min
8/21/2020 10:05 AM	15:24	6.85 pH	17.34 °C	500.97 µS/cm	2.05 mg/L		135.8 mV	223.00 cm	500.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 8/21/2020 10:56:27 AM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - WS103 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.9 m** **Total Depth: 3.9 m** **Initial Depth to Water: 1.52 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.8 m** **Estimated Total Volume Pumped: 12337.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 750 ml/min** **Final Draw Down: 2.85 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
8/21/2020 10:56 AM	00:00	6.98 pH	15.81 °C	699.15 µS/cm	0.88 mg/L		140.1 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 10:57 AM	00:47	6.96 pH	16.18 °C	693.96 µS/cm	0.91 mg/L		155.5 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 10:58 AM	01:34	6.97 pH	16.49 °C	691.73 µS/cm	1.47 mg/L		171.3 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 10:58 AM	02:21	6.99 pH	16.73 °C	691.67 µS/cm	1.76 mg/L		181.2 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 10:59 AM	03:08	6.98 pH	17.06 °C	690.59 µS/cm	1.63 mg/L		187.5 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:00 AM	03:55	6.99 pH	17.28 °C	686.77 µS/cm	1.01 mg/L		186.5 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:01 AM	04:42	7.01 pH	17.21 °C	686.66 µS/cm	0.92 mg/L		186.1 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:01 AM	05:29	7.06 pH	17.07 °C	688.34 µS/cm	1.48 mg/L		190.2 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:02 AM	06:16	7.19 pH	16.66 °C	692.38 µS/cm	3.40 mg/L		198.6 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:03 AM	07:03	7.22 pH	16.64 °C	693.12 µS/cm	4.18 mg/L		197.3 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:04 AM	07:50	7.24 pH	16.82 °C	693.64 µS/cm	4.66 mg/L		198.9 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:05 AM	08:37	7.24 pH	16.92 °C	693.47 µS/cm	4.73 mg/L		203.7 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:05 AM	09:24	7.29 pH	16.95 °C	695.00 µS/cm	5.59 mg/L		188.2 mV	152.00 cm	0.34 PSU	750.00 ml/min

8/21/2020 11:06 AM	10:11	7.29 pH	16.39 °C	696.03 µS/cm	5.92 mg/L		177.0 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:07 AM	10:58	7.29 pH	16.33 °C	696.25 µS/cm	6.31 mg/L		180.1 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:08 AM	11:45	7.30 pH	16.56 °C	697.82 µS/cm	6.66 mg/L		188.3 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:08 AM	12:32	7.31 pH	16.67 °C	698.99 µS/cm	7.07 mg/L		187.7 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:09 AM	13:19	7.31 pH	16.70 °C	699.05 µS/cm	7.42 mg/L		185.2 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:10 AM	14:06	7.30 pH	16.71 °C	698.95 µS/cm	7.63 mg/L		183.9 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:11 AM	14:53	7.30 pH	16.71 °C	700.28 µS/cm	7.74 mg/L		182.8 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:12 AM	15:40	7.29 pH	16.72 °C	700.46 µS/cm	7.77 mg/L		181.5 mV	152.00 cm	0.34 PSU	750.00 ml/min
8/21/2020 11:12 AM	16:27	7.29 pH	16.72 °C	701.01 µS/cm	7.81 mg/L		180.2 mV	152.00 cm	0.34 PSU	750.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 8/21/2020 11:27:08 AM
Project: 19.287 - Attleborough
Operator Name: JAH

Location Name: 19.287 - WS105 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.3 m** **Total Depth: 3.3 m** **Initial Depth to Water: 1.83 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.1 m** **Estimated Total Volume Pumped: 4717.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 850 ml/min** **Final Draw Down: 2.35 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
8/21/2020 11:27 AM	00:00	6.62 pH	16.57 °C	598.34 µS/cm	2.06 mg/L		249.5 mV	183.00 cm	0.29 PSU	850.00 ml/min
8/21/2020 11:27 AM	00:37	6.64 pH	16.55 °C	592.46 µS/cm	1.90 mg/L		247.7 mV	183.00 cm	0.29 PSU	850.00 ml/min
8/21/2020 11:28 AM	01:14	6.64 pH	16.50 °C	595.20 µS/cm	1.81 mg/L		246.4 mV	183.00 cm	0.29 PSU	850.00 ml/min
8/21/2020 11:28 AM	01:51	6.62 pH	16.27 °C	609.26 µS/cm	1.83 mg/L		247.4 mV	183.00 cm	0.30 PSU	850.00 ml/min
8/21/2020 11:29 AM	02:28	6.64 pH	16.31 °C	605.99 µS/cm	1.87 mg/L		247.3 mV	183.00 cm	0.30 PSU	850.00 ml/min
8/21/2020 11:30 AM	03:05	6.64 pH	16.29 °C	608.63 µS/cm	1.90 mg/L		248.2 mV	183.00 cm	0.30 PSU	850.00 ml/min
8/21/2020 11:30 AM	03:42	6.64 pH	16.21 °C	613.62 µS/cm	1.92 mg/L		249.4 mV	183.00 cm	0.30 PSU	850.00 ml/min
8/21/2020 11:31 AM	04:19	6.63 pH	16.16 °C	616.53 µS/cm	1.99 mg/L		251.0 mV	183.00 cm	0.30 PSU	850.00 ml/min
8/21/2020 11:32 AM	04:56	6.64 pH	16.15 °C	618.11 µS/cm	2.03 mg/L		252.5 mV	183.00 cm	0.30 PSU	850.00 ml/min
8/21/2020 11:32 AM	05:33	6.64 pH	16.13 °C	619.39 µS/cm	2.05 mg/L		253.9 mV	183.00 cm	0.30 PSU	850.00 ml/min

Samples

Sample ID:	Description:

W1	1 x 1L plastic bottle 1 x 1L glass bottle

APPENDIX C2: GROUNDWATER MONITORING PARAMETERS (4th SEPTEMBER 2020)

Low-Flow Test Report:

Test Date / Time: 9/4/2020 10:52:48 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH201 **Well Diameter: 0.15 m** **Screen Length: 9 m** **Top of Screen: 7.8 m** **Total Depth: 16.8 m** **Initial Depth to Water: 1.7 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.7 m** **Estimated Total Volume Pumped: 1777.773 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 1333.33 ml/min** **Final Draw Down: 1.7 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 10:52 AM	00:00	6.86 pH	11.88 °C	920.69 µS/cm	0.22 mg/L		182.6 mV	170.00 cm	0.45 PSU	1,333.3 ml/min
9/4/2020 10:53 AM	00:20	6.83 pH	11.87 °C	920.68 µS/cm	0.21 mg/L		181.5 mV	170.00 cm	0.45 PSU	1,333.3 ml/min
9/4/2020 10:53 AM	00:40	6.80 pH	11.86 °C	919.72 µS/cm	0.20 mg/L		180.6 mV	170.00 cm	0.45 PSU	1,333.3 ml/min
9/4/2020 10:53 AM	01:00	6.77 pH	11.86 °C	921.25 µS/cm	0.19 mg/L		179.2 mV	170.00 cm	0.45 PSU	1,333.3 ml/min
9/4/2020 10:54 AM	01:20	6.76 pH	11.86 °C	921.63 µS/cm	0.19 mg/L		177.3 mV	170.00 cm	0.45 PSU	1,333.3 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/4/2020 10:05:46 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH202 **Well Diameter: 0.15 cm** **Screen Length: 6 m** **Top of Screen: 6 m** **Total Depth: 12 m** **Initial Depth to Water: 4.89 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 12 m** **Estimated Total Volume Pumped: 3800 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 750 ml/min** **Final Draw Down: 4.93 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 10:05 AM	00:00	6.73 pH	12.69 °C	910.30 µS/cm	0.32 mg/L		-12.2 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:06 AM	00:38	6.70 pH	12.67 °C	910.35 µS/cm	0.30 mg/L		-12.7 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:07 AM	01:16	6.66 pH	12.66 °C	909.93 µS/cm	0.28 mg/L		-12.8 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:07 AM	01:54	6.64 pH	12.68 °C	910.17 µS/cm	0.28 mg/L		-13.3 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:08 AM	02:32	6.62 pH	12.69 °C	909.99 µS/cm	0.27 mg/L		-13.7 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:08 AM	03:10	6.62 pH	12.68 °C	909.80 µS/cm	0.26 mg/L		-14.7 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:09 AM	03:48	6.62 pH	12.65 °C	909.70 µS/cm	0.25 mg/L		-15.4 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:10 AM	04:26	6.61 pH	12.68 °C	909.83 µS/cm	0.25 mg/L		-16.4 mV	489.00 cm	0.45 PSU	750.00 ml/min
9/4/2020 10:10 AM	05:04	6.61 pH	12.68 °C	909.13 µS/cm	0.24 mg/L		-17.4 mV	489.00 cm	0.45 PSU	750.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/4/2020 9:36:12 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH203A **Well Diameter: 0.15 m** **Screen Length: 3 m** **Top of Screen: 21 m** **Total Depth: 24 m** **Initial Depth to Water: 2.82 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 2997.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 545 ml/min** **Final Draw Down: 4.37 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Weather Conditions:
Sunny with clouds

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 9:36 AM	00:00	7.27 pH	12.23 °C	566.54 µS/cm	1.97 mg/L		253.7 mV	282.00 cm	0.28 PSU	545.00 ml/min
9/4/2020 9:37 AM	01:06	7.29 pH	12.24 °C	566.56 µS/cm	1.96 mg/L		251.9 mV	282.00 cm	0.28 PSU	545.00 ml/min
9/4/2020 9:38 AM	02:12	7.29 pH	12.25 °C	566.91 µS/cm	1.96 mg/L		250.4 mV	282.00 cm	0.28 PSU	545.00 ml/min
9/4/2020 9:39 AM	03:18	7.28 pH	12.26 °C	567.01 µS/cm	1.96 mg/L		249.0 mV	282.00 cm	0.28 PSU	545.00 ml/min
9/4/2020 9:40 AM	04:24	7.29 pH	12.26 °C	566.11 µS/cm	1.96 mg/L		247.5 mV	282.00 cm	0.27 PSU	545.00 ml/min
9/4/2020 9:41 AM	05:30	7.29 pH	12.26 °C	565.92 µS/cm	1.95 mg/L		245.9 mV	282.00 cm	0.27 PSU	545.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/4/2020 1:31:25 PM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH204B **Well Diameter: 0.2 m** **Screen Length: 2 m** **Top of Screen: 1 m** **Total Depth: 3 m** **Initial Depth to Water: 2.18 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3 m** **Estimated Total Volume Pumped: 3889.6 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 286 ml/min** **Final Draw Down: 2.62 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 1:31 PM	00:00	7.09 pH	18.41 °C	598.53 µS/cm	4.97 mg/L		276.7 mV	218.00 cm	0.29 PSU	286.00 ml/min
9/4/2020 1:32 PM	00:48	7.11 pH	18.44 °C	583.55 µS/cm	5.17 mg/L		277.8 mV	218.00 cm	0.29 PSU	286.00 ml/min
9/4/2020 1:33 PM	01:36	7.14 pH	18.43 °C	569.61 µS/cm	5.47 mg/L		277.9 mV	218.00 cm	0.28 PSU	286.00 ml/min
9/4/2020 1:33 PM	02:24	7.12 pH	18.41 °C	576.88 µS/cm	5.46 mg/L		279.3 mV	218.00 cm	0.28 PSU	286.00 ml/min
9/4/2020 1:34 PM	03:12	7.08 pH	18.37 °C	606.92 µS/cm	5.20 mg/L		281.1 mV	218.00 cm	0.30 PSU	286.00 ml/min
9/4/2020 1:35 PM	04:00	7.06 pH	18.31 °C	625.19 µS/cm	4.72 mg/L		282.3 mV	218.00 cm	0.31 PSU	286.00 ml/min
9/4/2020 1:36 PM	04:48	7.04 pH	18.30 °C	643.39 µS/cm	4.48 mg/L		282.8 mV	218.00 cm	0.32 PSU	286.00 ml/min
9/4/2020 1:37 PM	05:36	7.02 pH	18.27 °C	661.81 µS/cm	4.09 mg/L		283.5 mV	218.00 cm	0.33 PSU	286.00 ml/min
9/4/2020 1:37 PM	06:24	7.02 pH	18.24 °C	672.63 µS/cm	3.86 mg/L		283.8 mV	218.00 cm	0.33 PSU	286.00 ml/min
9/4/2020 1:38 PM	07:12	7.02 pH	18.20 °C	679.27 µS/cm	3.74 mg/L		284.0 mV	218.00 cm	0.33 PSU	286.00 ml/min
9/4/2020 1:39 PM	08:00	7.02 pH	18.19 °C	685.17 µS/cm	3.64 mg/L		284.2 mV	218.00 cm	0.34 PSU	286.00 ml/min
9/4/2020 1:40 PM	08:48	7.01 pH	18.17 °C	699.81 µS/cm	3.42 mg/L		284.8 mV	218.00 cm	0.34 PSU	286.00 ml/min
9/4/2020 1:41 PM	09:36	7.00 pH	18.14 °C	712.15 µS/cm	3.19 mg/L		285.7 mV	218.00 cm	0.35 PSU	286.00 ml/min
9/4/2020 1:41 PM	10:24	7.00 pH	18.13 °C	722.01 µS/cm	3.01 mg/L		286.4 mV	218.00 cm	0.36 PSU	286.00 ml/min
9/4/2020 1:42 PM	11:12	6.99 pH	18.13 °C	727.96 µS/cm	2.86 mg/L		286.9 mV	218.00 cm	0.36 PSU	286.00 ml/min

9/4/2020 1:43 PM	12:00	6.99 pH	18.10 °C	734.15 µS/cm	2.74 mg/L		287.7 mV	218.00 cm	0.36 PSU	286.00 ml/min
9/4/2020 1:44 PM	12:48	6.99 pH	18.07 °C	741.46 µS/cm	2.62 mg/L		288.2 mV	218.00 cm	0.37 PSU	286.00 ml/min
9/4/2020 1:45 PM	13:36	6.99 pH	18.05 °C	748.18 µS/cm	2.51 mg/L		288.6 mV	218.00 cm	0.37 PSU	286.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/4/2020 10:29:21 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - WS102 **Well Diameter: 0.087 cm** **Screen Length: 3 m** **Top of Screen: 1 m** **Total Depth: 4 m** **Initial Depth to Water: 1.98 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.7 m** **Estimated Total Volume Pumped: 1425 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 375 ml/min** **Final Draw Down: 2.45 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 10:29 AM	00:00	7.50 pH	17.21 °C	274.84 µS/cm	2.90 mg/L		101.8 mV	198.00 cm	0.13 PSU	375.00 ml/min
9/4/2020 10:29 AM	00:38	7.51 pH	17.21 °C	276.52 µS/cm	2.80 mg/L		109.9 mV	198.00 cm	0.13 PSU	375.00 ml/min
9/4/2020 10:30 AM	01:16	7.46 pH	17.28 °C	297.34 µS/cm	2.60 mg/L		117.2 mV	198.00 cm	0.14 PSU	375.00 ml/min
9/4/2020 10:31 AM	01:54	7.41 pH	17.32 °C	311.62 µS/cm	2.34 mg/L		123.4 mV	198.00 cm	0.15 PSU	375.00 ml/min
9/4/2020 10:31 AM	02:32	7.41 pH	17.34 °C	311.06 µS/cm	2.18 mg/L		124.8 mV	198.00 cm	0.15 PSU	375.00 ml/min
9/4/2020 10:32 AM	03:10	7.42 pH	17.31 °C	309.62 µS/cm	2.08 mg/L		123.2 mV	198.00 cm	0.15 PSU	375.00 ml/min
9/4/2020 10:33 AM	03:48	7.43 pH	17.28 °C	305.39 µS/cm	2.00 mg/L		121.3 mV	198.00 cm	0.15 PSU	375.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/4/2020 11:19:35 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - WS103 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.9 m** **Total Depth: 3.9 m** **Initial Depth to Water: 1.3 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.8 m** **Estimated Total Volume Pumped: 471.9 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 429 ml/min** **Final Draw Down: 1.73 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 11:19 AM	00:00	7.11 pH	15.96 °C	717.69 µS/cm	0.51 mg/L		150.8 mV	130.00 cm	0.35 PSU	429.00 ml/min
9/4/2020 11:20 AM	00:33	7.10 pH	16.08 °C	716.37 µS/cm	0.48 mg/L		151.6 mV	130.00 cm	0.35 PSU	429.00 ml/min
9/4/2020 11:20 AM	01:06	7.08 pH	16.22 °C	713.15 µS/cm	0.47 mg/L		153.4 mV	130.00 cm	0.35 PSU	429.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/4/2020 11:38:24 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - WS105 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.3 m** **Total Depth: 3.3 m** **Initial Depth to Water: 1.69 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.1 m** **Estimated Total Volume Pumped: 458.9 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 353 ml/min** **Final Draw Down: 1.91 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/4/2020 11:38 AM	00:00	6.63 pH	16.56 °C	595.00 µS/cm	1.64 mg/L		254.9 mV	169.00 cm	0.29 PSU	353.00 ml/min
9/4/2020 11:39 AM	00:39	6.65 pH	16.40 °C	601.37 µS/cm	1.65 mg/L		255.1 mV	169.00 cm	0.29 PSU	353.00 ml/min
9/4/2020 11:39 AM	01:18	6.64 pH	16.39 °C	596.21 µS/cm	1.58 mg/L		255.8 mV	169.00 cm	0.29 PSU	353.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

APPENDIX C3: GROUNDWATER MONITORING PARAMETERS (18th September 2020)

Low-Flow Test Report:

Test Date / Time: 9/18/2020 11:25:10 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH201 **Well Diameter: 0.15 m** **Screen Length: 9 m** **Top of Screen: 7.8 m** **Total Depth: 16.8 m** **Initial Depth to Water: 1.74 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 1777.773 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 1333.33 ml/min** **Final Draw Down: 1.75 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 11:25 AM	00:00	6.99 pH	14.42 °C	841.97 µS/cm	1.13 mg/L		98.9 mV	174.00 cm	0.42 PSU	1,333.3 ml/min
9/18/2020 11:25 AM	00:20	6.99 pH	13.28 °C	846.32 µS/cm	0.62 mg/L		96.6 mV	174.00 cm	0.42 PSU	1,333.3 ml/min
9/18/2020 11:25 AM	00:40	6.99 pH	12.81 °C	850.40 µS/cm	0.43 mg/L		93.5 mV	174.00 cm	0.42 PSU	1,333.3 ml/min
9/18/2020 11:26 AM	01:00	6.99 pH	12.59 °C	848.80 µS/cm	0.35 mg/L		90.6 mV	174.00 cm	0.42 PSU	1,333.3 ml/min
9/18/2020 11:26 AM	01:20	6.99 pH	12.44 °C	847.80 µS/cm	0.32 mg/L		87.1 mV	174.00 cm	0.42 PSU	1,333.3 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/18/2020 9:58:07 AM
Project: 19.287 - Attleborough
Operator Name: DGWD

Location Name: 19.287 - BH202 **Well Diameter: 0.15 cm** **Screen Length: 6 m** **Top of Screen: 6 m** **Total Depth: 12 m** **Initial Depth to Water: 5 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 12 m** **Estimated Total Volume Pumped: 2375 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 750 ml/min** **Final Draw Down: 5 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 9:58 AM	00:00	7.00 pH	16.91 °C	818.91 µS/cm	5.32 mg/L		41.9 mV	500.00 cm	0.40 PSU	750.00 ml/min
9/18/2020 9:58 AM	00:38	6.86 pH	15.42 °C	891.38 µS/cm	2.15 mg/L		18.8 mV	500.00 cm	0.44 PSU	750.00 ml/min
9/18/2020 9:59 AM	01:16	6.83 pH	14.45 °C	899.61 µS/cm	0.98 mg/L		5.0 mV	500.00 cm	0.45 PSU	750.00 ml/min
9/18/2020 10:00 AM	01:54	6.82 pH	13.93 °C	905.58 µS/cm	0.69 mg/L		-3.6 mV	500.00 cm	0.45 PSU	750.00 ml/min
9/18/2020 10:00 AM	02:32	6.80 pH	13.82 °C	906.25 µS/cm	0.62 mg/L		-8.8 mV	500.00 cm	0.45 PSU	750.00 ml/min
9/18/2020 10:01 AM	03:10	6.77 pH	13.82 °C	907.69 µS/cm	0.61 mg/L		-12.6 mV	500.00 cm	0.45 PSU	750.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/18/2020 9:26:47 AM
Project: 19.287 - Attleborough (14)
Operator Name: DGWD

Location Name: 19.287 - BH203A **Well Diameter: 0.15 m** **Screen Length: 3 m** **Top of Screen: 21 m** **Total Depth: 24 m** **Initial Depth to Water: 2.85 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 2398 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 545 ml/min** **Final Draw Down: 4.16 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 9:26 AM	00:00	7.37 pH	17.85 °C	587.13 µS/cm	3.21 mg/L		277.7 mV	285.00 cm	0.29 PSU	545.00 ml/min
9/18/2020 9:27 AM	01:06	7.29 pH	13.00 °C	604.09 µS/cm	0.53 mg/L		277.2 mV	285.00 cm	0.29 PSU	545.00 ml/min
9/18/2020 9:28 AM	02:12	7.25 pH	12.50 °C	608.30 µS/cm	0.37 mg/L		275.6 mV	285.00 cm	0.30 PSU	545.00 ml/min
9/18/2020 9:30 AM	03:18	7.22 pH	12.41 °C	609.31 µS/cm	0.34 mg/L		272.8 mV	285.00 cm	0.30 PSU	545.00 ml/min
9/18/2020 9:31 AM	04:24	7.20 pH	12.43 °C	609.19 µS/cm	0.33 mg/L		270.3 mV	285.00 cm	0.30 PSU	545.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/18/2020 2:22:22 PM
Project: 19.287 - Attleborough
Operator Name: DGWD

Location Name: 19.287 - BH204B **Well Diameter: 0.2 m** **Screen Length: 2 m** **Top of Screen: 1 m** **Total Depth: 3 m** **Initial Depth to Water: 2.23 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3 m** **Estimated Total Volume Pumped: 1372.8 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 286 ml/min** **Final Draw Down: 2.42 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 2:22 PM	00:00	6.92 pH	18.97 °C	876.45 µS/cm	2.53 mg/L		184.7 mV	223.00 cm	0.44 PSU	286.00 ml/min
9/18/2020 2:23 PM	00:48	6.93 pH	18.41 °C	895.19 µS/cm	1.91 mg/L		188.8 mV	223.00 cm	0.44 PSU	286.00 ml/min
9/18/2020 2:23 PM	01:36	6.91 pH	17.96 °C	904.52 µS/cm	1.79 mg/L		194.5 mV	223.00 cm	0.45 PSU	286.00 ml/min
9/18/2020 2:24 PM	02:24	6.89 pH	17.82 °C	913.83 µS/cm	1.56 mg/L		200.5 mV	223.00 cm	0.45 PSU	286.00 ml/min
9/18/2020 2:25 PM	03:12	6.85 pH	17.73 °C	931.96 µS/cm	1.16 mg/L		205.7 mV	223.00 cm	0.46 PSU	286.00 ml/min
9/18/2020 2:26 PM	04:00	6.84 pH	17.67 °C	935.54 µS/cm	0.98 mg/L		210.1 mV	223.00 cm	0.47 PSU	286.00 ml/min
9/18/2020 2:27 PM	04:48	6.84 pH	17.63 °C	936.93 µS/cm	0.93 mg/L		213.6 mV	223.00 cm	0.47 PSU	286.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/18/2020 10:36:50 AM
Project: 19.287 - Attleborough
Operator Name: DGWD

Location Name: 19.287 - WS102 **Well Diameter: 0.087 cm** **Screen Length: 3 m** **Top of Screen: 1 m** **Total Depth: 4 m** **Initial Depth to Water: 2.22 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.7 m** **Estimated Total Volume Pumped: 3562.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 375 ml/min** **Final Draw Down: 2.98 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 10:36 AM	00:00	6.70 pH	17.39 °C	695.68 µS/cm	1.25 mg/L		83.2 mV	222.00 cm	0.34 PSU	375.00 ml/min
9/18/2020 10:37 AM	00:38	6.68 pH	16.94 °C	690.91 µS/cm	0.45 mg/L		69.0 mV	222.00 cm	0.34 PSU	375.00 ml/min
9/18/2020 10:38 AM	01:16	6.66 pH	16.91 °C	682.77 µS/cm	0.43 mg/L		67.0 mV	222.00 cm	0.34 PSU	375.00 ml/min
9/18/2020 10:38 AM	01:54	6.66 pH	16.87 °C	684.02 µS/cm	0.43 mg/L		55.5 mV	222.00 cm	0.34 PSU	375.00 ml/min
9/18/2020 10:39 AM	02:32	6.67 pH	16.89 °C	683.99 µS/cm	0.44 mg/L		41.1 mV	222.00 cm	0.34 PSU	375.00 ml/min
9/18/2020 10:40 AM	03:10	6.69 pH	16.91 °C	681.88 µS/cm	0.43 mg/L		25.0 mV	222.00 cm	0.33 PSU	375.00 ml/min
9/18/2020 10:40 AM	03:48	6.74 pH	16.84 °C	666.76 µS/cm	0.43 mg/L		1.5 mV	222.00 cm	0.33 PSU	375.00 ml/min
9/18/2020 10:41 AM	04:26	6.75 pH	16.81 °C	633.04 µS/cm	0.67 mg/L		-15.3 mV	222.00 cm	0.31 PSU	375.00 ml/min
9/18/2020 10:41 AM	05:04	6.77 pH	16.76 °C	638.40 µS/cm	0.69 mg/L		-27.8 mV	222.00 cm	0.31 PSU	375.00 ml/min
9/18/2020 10:42 AM	05:42	6.76 pH	16.74 °C	625.36 µS/cm	0.78 mg/L		-32.5 mV	222.00 cm	0.31 PSU	375.00 ml/min
9/18/2020 10:43 AM	06:20	6.68 pH	16.86 °C	612.44 µS/cm	1.78 mg/L		-17.8 mV	222.00 cm	0.30 PSU	375.00 ml/min
9/18/2020 10:43 AM	06:58	6.68 pH	16.86 °C	600.47 µS/cm	2.42 mg/L		-12.1 mV	222.00 cm	0.29 PSU	375.00 ml/min
9/18/2020 10:44 AM	07:36	6.67 pH	16.83 °C	597.40 µS/cm	2.67 mg/L		-9.2 mV	222.00 cm	0.29 PSU	375.00 ml/min
9/18/2020 10:45 AM	08:14	6.67 pH	16.82 °C	584.59 µS/cm	2.83 mg/L		-6.1 mV	222.00 cm	0.29 PSU	375.00 ml/min
9/18/2020 10:45 AM	08:52	6.67 pH	16.81 °C	569.55 µS/cm	2.93 mg/L		-2.5 mV	222.00 cm	0.28 PSU	375.00 ml/min

9/18/2020 10:46 AM	09:30	6.68 pH	16.78 °C	575.12 µS/cm	2.94 mg/L		-2.0 mV	222.00 cm	0.28 PSU	375.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/18/2020 11:48:37 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - WS103 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.9 m** **Total Depth: 3.9 m** **Initial Depth to Water: 1.4 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.8 m** **Estimated Total Volume Pumped: 471.9 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 429 ml/min** **Final Draw Down: 1.76 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 11:48 AM	00:00	7.13 pH	15.56 °C	703.55 µS/cm	0.66 mg/L		133.7 mV	140.00 cm	0.35 PSU	429.00 ml/min
9/18/2020 11:49 AM	00:33	7.11 pH	15.64 °C	703.88 µS/cm	0.50 mg/L		132.3 mV	140.00 cm	0.35 PSU	429.00 ml/min
9/18/2020 11:49 AM	01:06	7.08 pH	15.78 °C	703.18 µS/cm	0.46 mg/L		133.5 mV	140.00 cm	0.35 PSU	429.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

Low-Flow Test Report:

Test Date / Time: 9/18/2020 1:42:32 PM
Project: 19.287 - Attleborough
Operator Name: DGWD

Location Name: 19.287 - WS105 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.3 m** **Total Depth: 3.3 m** **Initial Depth to Water: 1.8 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.1 m** **Estimated Total Volume Pumped: 688.35 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 353 ml/min** **Final Draw Down: 2.03 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
9/18/2020 1:42 PM	00:00	6.67 pH	16.14 °C	595.04 µS/cm	1.68 mg/L		291.7 mV	180.00 cm	0.29 PSU	353.00 ml/min
9/18/2020 1:43 PM	00:39	6.65 pH	15.93 °C	595.85 µS/cm	1.08 mg/L		292.6 mV	180.00 cm	0.29 PSU	353.00 ml/min
9/18/2020 1:43 PM	01:18	6.65 pH	15.89 °C	589.96 µS/cm	1.02 mg/L		292.5 mV	180.00 cm	0.29 PSU	353.00 ml/min
9/18/2020 1:44 PM	01:57	6.66 pH	15.89 °C	581.33 µS/cm	1.03 mg/L		291.8 mV	180.00 cm	0.28 PSU	353.00 ml/min

Samples

Sample ID:	Description:
W1	1 x 1L plastic bottle 1 x 1L glass bottle

APPENDIX C4: GROUNDWATER MONITORING PARAMETERS (2nd October 2020)

Low-Flow Test Report:

Test Date / Time: 10/2/2020 11:01:40 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH201 **Well Diameter: 0.15 m** **Screen Length: 9 m** **Top of Screen: 7.8 m** **Total Depth: 16.8 m** **Initial Depth to Water: 1.47 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 3999.99 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 1333.33 ml/min** **Final Draw Down: 1.47 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
10/2/2020 11:01 AM	00:00	6.88 pH	14.40 °C	968.54 µS/cm	2.30 mg/L		267.8 mV	147.00 cm	0.48 PSU	1,333.3 ml/min
10/2/2020 11:02 AM	00:20	6.87 pH	13.87 °C	1,072.1 µS/cm	1.08 mg/L		253.3 mV	147.00 cm	0.53 PSU	1,333.3 ml/min
10/2/2020 11:02 AM	00:40	6.88 pH	13.23 °C	1,084.5 µS/cm	0.56 mg/L		237.6 mV	147.00 cm	0.54 PSU	1,333.3 ml/min
10/2/2020 11:02 AM	01:00	6.89 pH	12.96 °C	1,066.0 µS/cm	0.36 mg/L		223.3 mV	147.00 cm	0.53 PSU	1,333.3 ml/min
10/2/2020 11:03 AM	01:20	6.90 pH	12.84 °C	1,055.2 µS/cm	0.28 mg/L		210.9 mV	147.00 cm	0.52 PSU	1,333.3 ml/min
10/2/2020 11:03 AM	01:40	6.90 pH	12.76 °C	1,051.2 µS/cm	0.24 mg/L		198.2 mV	147.00 cm	0.52 PSU	1,333.3 ml/min
10/2/2020 11:03 AM	02:00	6.90 pH	12.71 °C	1,059.5 µS/cm	0.22 mg/L		189.3 mV	147.00 cm	0.53 PSU	1,333.3 ml/min
10/2/2020 11:04 AM	02:20	6.90 pH	12.67 °C	1,066.8 µS/cm	0.21 mg/L		183.3 mV	147.00 cm	0.53 PSU	1,333.3 ml/min
10/2/2020 11:04 AM	02:40	6.90 pH	12.63 °C	1,068.3 µS/cm	0.20 mg/L		178.4 mV	147.00 cm	0.53 PSU	1,333.3 ml/min
10/2/2020 11:04 AM	03:00	6.90 pH	12.60 °C	1,066.0 µS/cm	0.19 mg/L		174.0 mV	147.00 cm	0.53 PSU	1,333.3 ml/min

Samples

Sample ID:	Description:

W1	1x glass bottle 1x plastic bottle

Low-Flow Test Report:

Test Date / Time: 10/2/2020 10:03:53 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH202 **Well Diameter: 0.15 cm** **Screen Length: 6 m** **Top of Screen: 6 m** **Total Depth: 12 m** **Initial Depth to Water: 4.74 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 12 m** **Estimated Total Volume Pumped: 1900 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 750 ml/min** **Final Draw Down: 4.74 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
10/2/2020 10:03 AM	00:00	6.87 pH	14.10 °C	761.12 µS/cm	3.87 mg/L		228.7 mV	474.00 cm	0.37 PSU	750.00 ml/min
10/2/2020 10:04 AM	00:38	6.83 pH	13.52 °C	762.22 µS/cm	1.22 mg/L		226.9 mV	474.00 cm	0.37 PSU	750.00 ml/min
10/2/2020 10:05 AM	01:16	6.81 pH	13.34 °C	763.81 µS/cm	0.59 mg/L		223.0 mV	474.00 cm	0.38 PSU	750.00 ml/min
10/2/2020 10:05 AM	01:54	6.82 pH	13.31 °C	764.49 µS/cm	0.48 mg/L		219.3 mV	474.00 cm	0.38 PSU	750.00 ml/min
10/2/2020 10:06 AM	02:32	6.81 pH	13.33 °C	765.15 µS/cm	0.42 mg/L		216.4 mV	474.00 cm	0.38 PSU	750.00 ml/min

Samples

Sample ID:	Description:
W1	1x glass bottle 1x plastic bottle

Low-Flow Test Report:

Test Date / Time: 10/2/2020 9:27:38 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - BH203A **Well Diameter: 0.15 m** **Screen Length: 3 m** **Top of Screen: 21 m** **Total Depth: 24 m** **Initial Depth to Water: 2.59 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 16 m** **Estimated Total Volume Pumped: 5395.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 545 ml/min** **Final Draw Down: 4.07 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
10/2/2020 9:27 AM	00:00	7.37 pH	13.36 °C	620.02 µS/cm	1.69 mg/L		320.3 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:28 AM	01:06	7.33 pH	11.91 °C	619.44 µS/cm	0.30 mg/L		304.7 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:29 AM	02:12	7.33 pH	11.94 °C	620.09 µS/cm	0.27 mg/L		293.3 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:30 AM	03:18	7.33 pH	12.12 °C	620.98 µS/cm	0.29 mg/L		285.0 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:32 AM	04:24	7.33 pH	12.16 °C	621.56 µS/cm	0.29 mg/L		278.5 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:33 AM	05:30	7.32 pH	12.16 °C	622.49 µS/cm	0.28 mg/L		272.6 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:34 AM	06:36	7.33 pH	12.16 °C	622.91 µS/cm	0.28 mg/L		266.9 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:35 AM	07:42	7.33 pH	12.14 °C	622.70 µS/cm	0.27 mg/L		261.0 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:36 AM	08:48	7.33 pH	12.14 °C	622.90 µS/cm	0.26 mg/L		255.7 mV	259.00 cm	0.30 PSU	545.00 ml/min
10/2/2020 9:37 AM	09:54	7.33 pH	12.14 °C	624.86 µS/cm	0.26 mg/L		251.2 mV	259.00 cm	0.30 PSU	545.00 ml/min

Samples

Sample ID:	Description:
W1	1x glass bottle 2x plastic bottle

Low-Flow Test Report:

Test Date / Time: 10/2/2020 10:32:30 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - WS102 **Well Diameter: 0.1 cm** **Screen Length: 3 m** **Top of Screen: 1 m** **Total Depth: 4 m** **Initial Depth to Water: 1.5 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.7 m** **Estimated Total Volume Pumped: 2137.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 375 ml/min** **Final Draw Down: 1.97 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
10/2/2020 10:32 AM	00:00	7.41 pH	15.11 °C	268.79 µS/cm	3.68 mg/L		229.6 mV	150.00 cm	0.13 PSU	375.00 ml/min
10/2/2020 10:33 AM	00:38	7.47 pH	15.26 °C	260.17 µS/cm	3.01 mg/L		224.7 mV	150.00 cm	0.12 PSU	375.00 ml/min
10/2/2020 10:33 AM	01:16	7.48 pH	15.28 °C	261.81 µS/cm	2.92 mg/L		222.2 mV	150.00 cm	0.13 PSU	375.00 ml/min
10/2/2020 10:34 AM	01:54	7.47 pH	15.29 °C	274.20 µS/cm	2.81 mg/L		220.9 mV	150.00 cm	0.13 PSU	375.00 ml/min
10/2/2020 10:35 AM	02:32	7.45 pH	15.29 °C	287.81 µS/cm	2.63 mg/L		220.5 mV	150.00 cm	0.14 PSU	375.00 ml/min
10/2/2020 10:35 AM	03:10	7.45 pH	15.27 °C	294.78 µS/cm	2.43 mg/L		218.9 mV	150.00 cm	0.14 PSU	375.00 ml/min
10/2/2020 10:36 AM	03:48	7.44 pH	15.24 °C	295.44 µS/cm	2.33 mg/L		217.0 mV	150.00 cm	0.14 PSU	375.00 ml/min
10/2/2020 10:36 AM	04:26	7.43 pH	15.24 °C	303.89 µS/cm	2.26 mg/L		215.2 mV	150.00 cm	0.15 PSU	375.00 ml/min
10/2/2020 10:37 AM	05:04	7.41 pH	15.25 °C	311.98 µS/cm	2.25 mg/L		214.6 mV	150.00 cm	0.15 PSU	375.00 ml/min
10/2/2020 10:38 AM	05:42	7.41 pH	15.23 °C	308.66 µS/cm	2.33 mg/L		213.8 mV	150.00 cm	0.15 PSU	375.00 ml/min

Samples

Sample ID:	Description:
W1	1x glass bottle 1x plastic bottle

Low-Flow Test Report:

Test Date / Time: 10/2/2020 11:24:48 AM
Project: 19.287 - Attleborough (25)
Operator Name: DGWD/JAH

Location Name: 19.287 - WS103 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 1 m** **Total Depth: 4 m** **Initial Depth to Water: 0.94 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.8 m** **Estimated Total Volume Pumped: 707.85 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 429 ml/min** **Final Draw Down: 1.29 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
10/2/2020 11:24 AM	00:00	7.12 pH	15.12 °C	698.58 µS/cm	2.70 mg/L		226.6 mV	94.00 cm	0.34 PSU	429.00 ml/min
10/2/2020 11:25 AM	00:33	7.11 pH	15.33 °C	685.78 µS/cm	1.80 mg/L		227.8 mV	94.00 cm	0.34 PSU	429.00 ml/min
10/2/2020 11:25 AM	01:06	7.11 pH	15.50 °C	682.65 µS/cm	1.72 mg/L		228.9 mV	94.00 cm	0.33 PSU	429.00 ml/min
10/2/2020 11:26 AM	01:39	7.11 pH	15.62 °C	681.42 µS/cm	1.73 mg/L		230.0 mV	94.00 cm	0.33 PSU	429.00 ml/min

Samples

Sample ID:	Description:
W1	1x glass bottle 1x plastic bottle

Low-Flow Test Report:

Test Date / Time: 10/2/2020 11:49:10 AM
Project: 19.287 - Attleborough
Operator Name: DGWD/JAH

Location Name: 19.287 - WS105 **Well Diameter: 0.087 m** **Screen Length: 3 m** **Top of Screen: 0.3 m** **Total Depth: 3.3 m** **Initial Depth to Water: 1.32 m**	**Pump Type: Peristaltic** **Tubing Type: HDPE** **Tubing Inner Diameter: 0.5 cm** **Tubing Length: 3.1 m** **Estimated Total Volume Pumped: 688.35 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 353 ml/min** **Final Draw Down: 1.63 m**	**Instrument Used: Aqua TROLL 500** **Serial Number: 755044**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Salinity	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 5	+/- 10	
10/2/2020 11:49 AM	00:00	6.75 pH	15.15 °C	600.45 µS/cm	2.51 mg/L		283.6 mV	132.00 cm	0.29 PSU	353.00 ml/min
10/2/2020 11:49 AM	00:39	6.73 pH	15.12 °C	599.80 µS/cm	1.44 mg/L		287.3 mV	132.00 cm	0.29 PSU	353.00 ml/min
10/2/2020 11:50 AM	01:18	6.72 pH	15.11 °C	598.55 µS/cm	1.28 mg/L		288.5 mV	132.00 cm	0.29 PSU	353.00 ml/min
10/2/2020 11:51 AM	01:57	6.72 pH	15.11 °C	596.05 µS/cm	1.26 mg/L		289.3 mV	132.00 cm	0.29 PSU	353.00 ml/min

Samples

Sample ID:	Description:
W1	1x glass bottle 1x plastic bottle

APPENDIX D: LABORATORY ANALYSIS RESULTS

Geotechnical Laboratory Results

Moisture content / Atterberg Limits

Particle size distributions and soil texture analysis

Laboratory permeability

Unconsolidated undrained multistage triaxial testing

Saturation moisture content / Porosity / Bulk and dry density

Fraction of organic carbon / Organic matter content

Results for water samples from WS102, WS103, WS105, SW01, SW02, and SW03 (17th April 2020)

Analytical Report 20-04564 (Issue number 2)

Results for water samples from BH201, BH202, BH203A, BH204A, BH204B, WS102, WS103, WS105, SW01, SW02, and SW03 (21st August 2020)

Analytical Report 20-09707 (Issue number 3)

Analytical Report 20-09708 (Issue number 2)

Analytical Report 20-09792 (Issue number 2)

Results for water samples from BH201, BH202, BH203A, BH204A, BH204B, WS102, WS103, WS105, SW01, SW02, and SW03 (4th September 2020)

Analytical Report 20-10304 (Issue number 1)

Analytical Report 20-10305 (Issue number 2)

Results for water samples from BH201, BH202, BH203A, BH204A, BH204B, WS102, WS103, WS105, SW01, SW02, and SW03 (18th September 2020)

Analytical Report 20-10991 (Issue number 1)

Analytical Report 20-10992 (Issue number 1)

Results for water samples from BH201, BH202, BH203A, BH204A, BH204B, WS102, WS103, WS105, SW01, SW02, and SW03 (2nd October 2020)

Analytical Report 20-11642 (Issue number 1)

Analytical Report 20-11643 (Issue number 1)

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX

Borehole/ Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Sample Passing 425µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Group Symbol	Laboratory Description
				Percentage %	Moisture Content %						
BH201	4.50	D6	19	99	19	26	17	9	0.22	CL	Grey fine sandy silty CLAY with rare fine gravel.
BH203A	2.10	D3	18	97	18	35	17	18	0.06	CL/CI	Grey and brown fine sandy silty CLAY with rare chalk gravel.
BH203A	18.00	D13	15	96	16	40	20	20	-0.20	CI	Grey fine sandy silty CLAY with rare chalk and flint gravel.
BH203A	22.00	D16	20	64	31	24	15	9	1.78	CL	Light grey fine sandy silty CLAY with rare gravel.
BH204	6.50	D8	17	96	17	35	16	19	0.05	CL/CI	Grey fine sandy silty CLAY with rare chalk gravel.

Method of Preparation : BS EN ISO 17892:PART 1:2014:5.1 Test specimen preparation (moisture content). BS EN ISO 17892:PART 1:2018:5.2 Preparation of samples for classification tests

Method of Test : BS EN ISO 17892:PART 1:2014:5.2 Test execution (moisture content) BS EN ISO 17892: PART 12:5.3 & 6.2 Determination of the liquid limit BS EN ISO 17892:PART 5.5, 6.4 & 6.5 Determination of the plastic limit and plasticity index

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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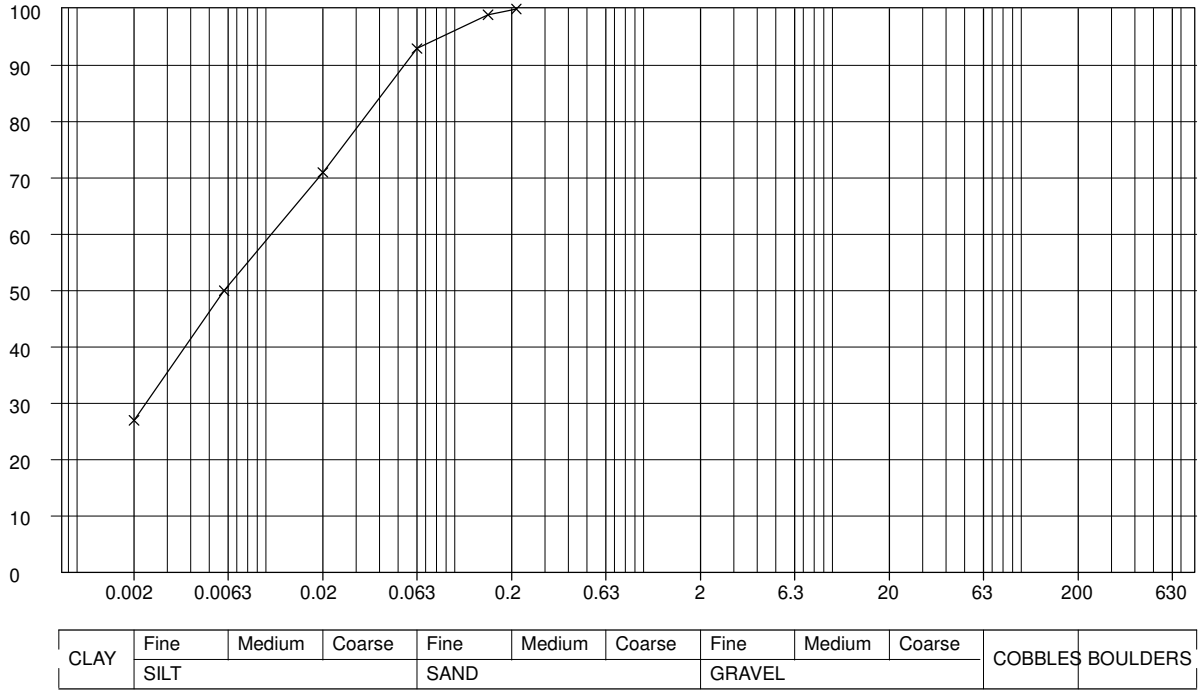
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH201	6.50	D7	Brownish grey silty CLAY.



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
212 µm	100.0
150 µm	99.0
63 µm	93.0
20 µm	71.0
6 µm	50.0
2 µm	27.0

Grading Analysis	
D85	47.4 µm
D60	12.7 µm
D10	<2.0 µm
Uniformity Coefficient	-

Particle Proportions	
Cobbles + Boulders	-
Gravel	-
Sand	7.0%
Silt	66.0%
Clay	27.0%

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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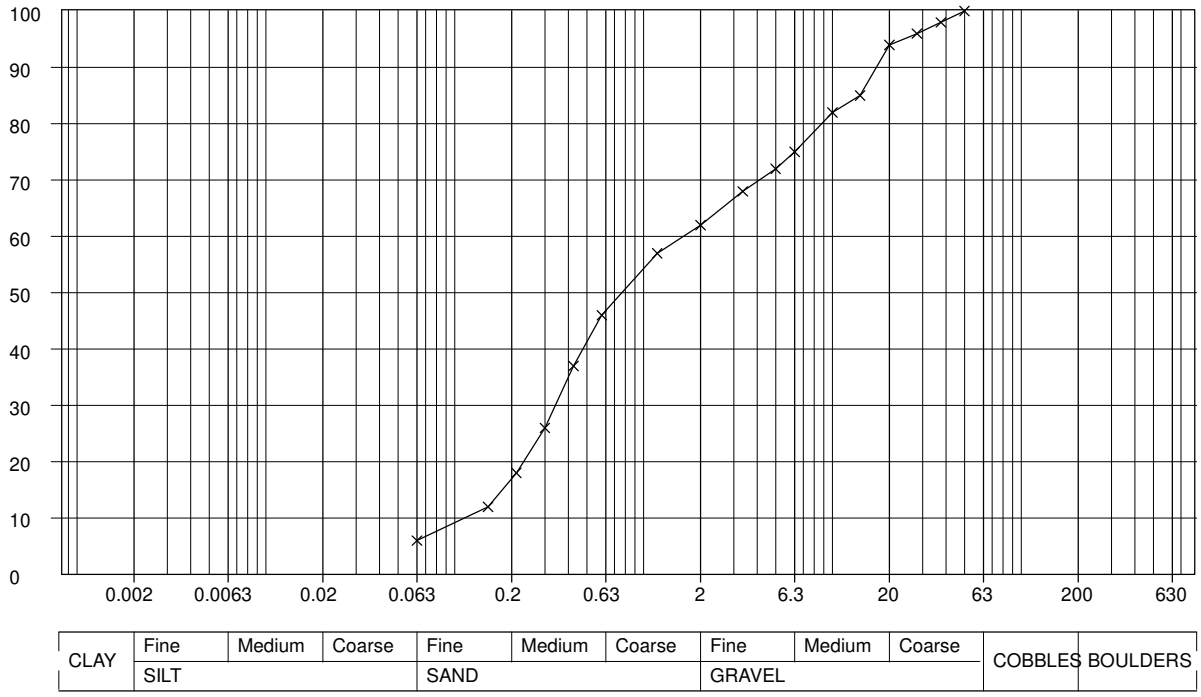
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH201	12.00	B2	Grey sandy GRAVEL.



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
50 mm	100.0
37.5 mm	98.0
28 mm	96.0
20 mm	94.0
14 mm	85.0
10 mm	82.0
6.3 mm	75.0
5 mm	72.0
3.35 mm	68.0
2 mm	62.0
1.18 mm	57.0
600 µm	46.0
425 µm	37.0
300 µm	26.0
212 µm	18.0
150 µm	12.0
63 µm	6.0

Grading Analysis	
D85	14.0 mm
D60	1.7 mm
D10	121.0 µm
Uniformity Coefficient	13.8

Particle Proportions	
Cobbles + Boulders	-
Gravel	38.0%
Sand	56.0%
Silt	-
Clay	-

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

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Job Number 19.287

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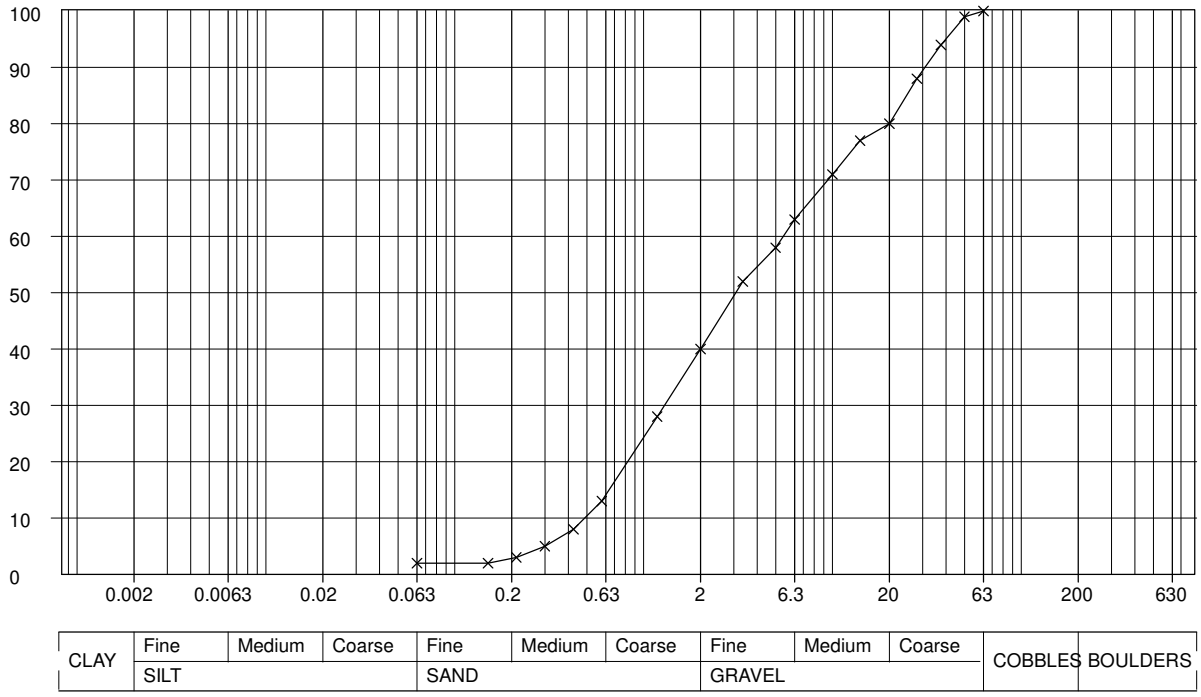
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH201	15.50	B3	Grayish brown sandy GRAVEL.



Sieve / Particle Size	% Passing
63 mm	100.0
50 mm	99.0
37.5 mm	94.0
28 mm	88.0
20 mm	80.0
14 mm	77.0
10 mm	71.0
6.3 mm	63.0
5 mm	58.0
3.35 mm	52.0
2 mm	40.0
1.18 mm	28.0
600 µm	13.0
425 µm	8.0
300 µm	5.0
212 µm	3.0
150 µm	2.0
63 µm	2.0

Grading Analysis	
D85	25.0 mm
D60	5.5 mm
D10	495.0 µm
Uniformity Coefficient	11.2

Particle Proportions	
Cobbles + Boulders	0.2%
Gravel	59.8%
Sand	38.0%
Silt	-
Clay	-

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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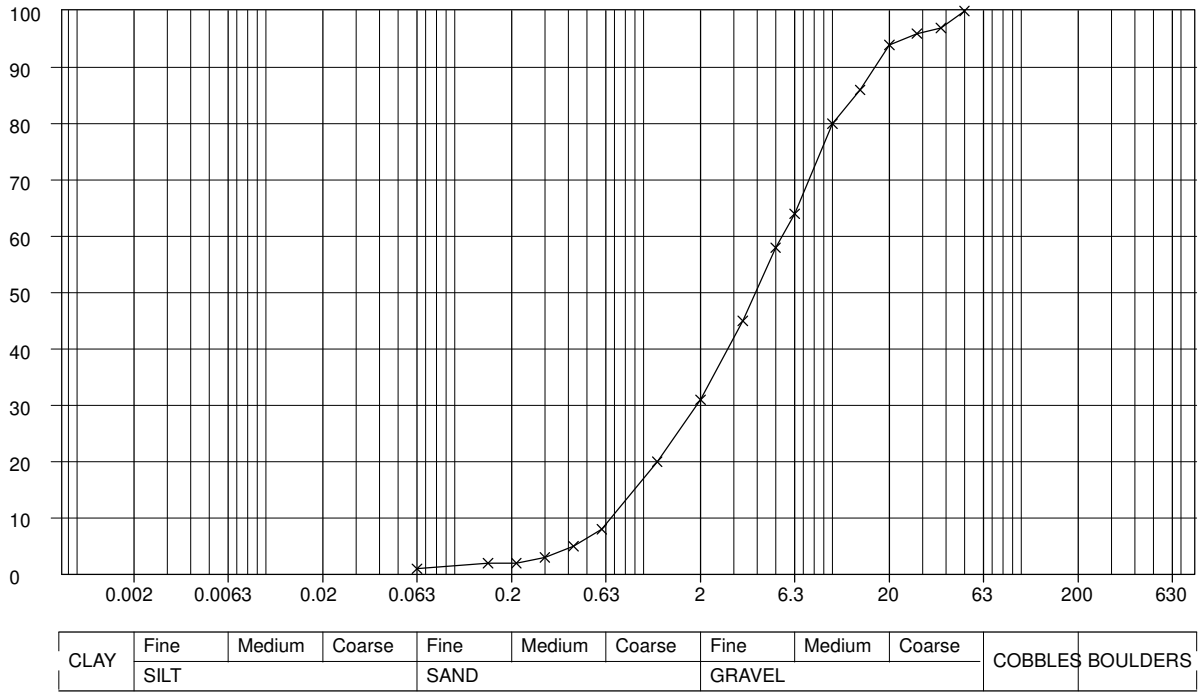
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH202	4.50	B3	Brown very sandy flint GRAVEL.



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
50 mm	100.0
37.5 mm	97.0
28 mm	96.0
20 mm	94.0
14 mm	86.0
10 mm	80.0
6.3 mm	64.0
5 mm	58.0
3.35 mm	45.0
2 mm	31.0
1.18 mm	20.0
600 µm	8.0
425 µm	5.0
300 µm	3.0
212 µm	2.0
150 µm	2.0
63 µm	1.0

Grading Analysis	
D85	13.3 mm
D60	5.4 mm
D10	696.7 µm
Uniformity Coefficient	7.8

Particle Proportions	
Cobbles + Boulders	-
Gravel	69.0%
Sand	30.0%
Silt	-
Clay	-

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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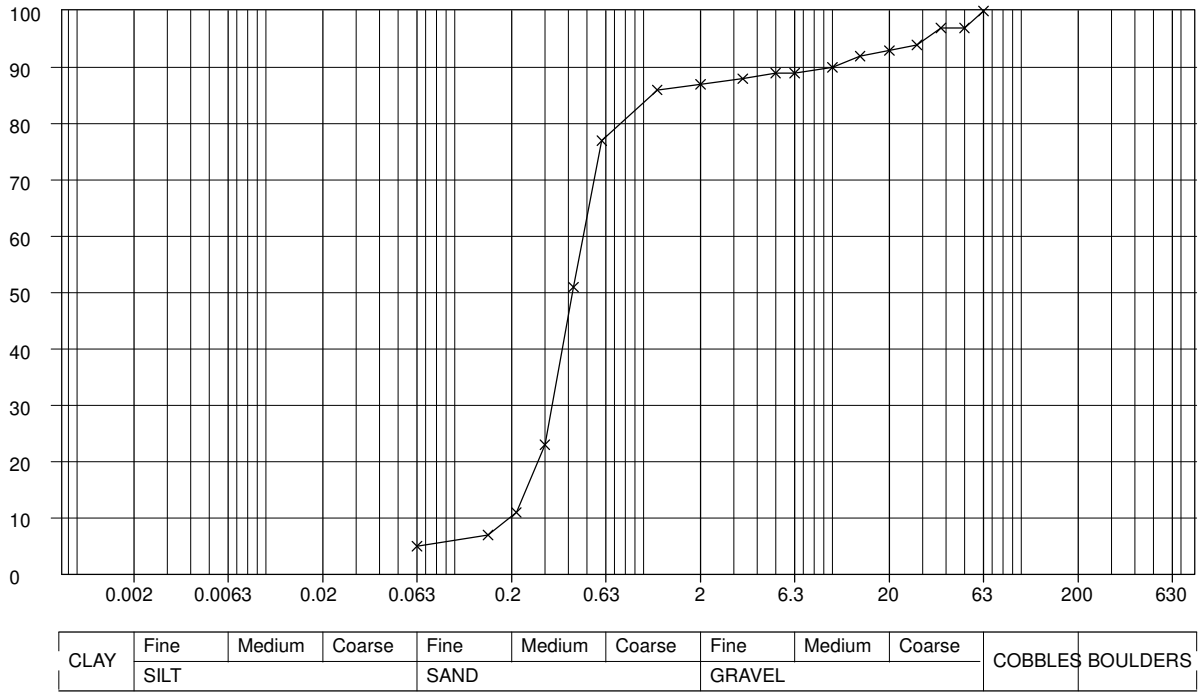
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH202	9.00	D6	Yellowish brown gravely SAND.



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
63 mm	100.0
50 mm	97.0
37.5 mm	97.0
28 mm	94.0
20 mm	93.0
14 mm	92.0
10 mm	90.0
6.3 mm	89.0
5 mm	89.0
3.35 mm	88.0
2 mm	87.0
1.18 mm	86.0
600 µm	77.0
425 µm	51.0
300 µm	23.0
212 µm	11.0
150 µm	7.0
63 µm	5.0

Grading Analysis	
D85	1.1 mm
D60	485.6 µm
D10	196.5 µm
Uniformity Coefficient	2.5

Particle Proportions	
Cobbles + Boulders	0.6%
Gravel	12.4%
Sand	82.0%
Silt	-
Clay	-

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
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Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

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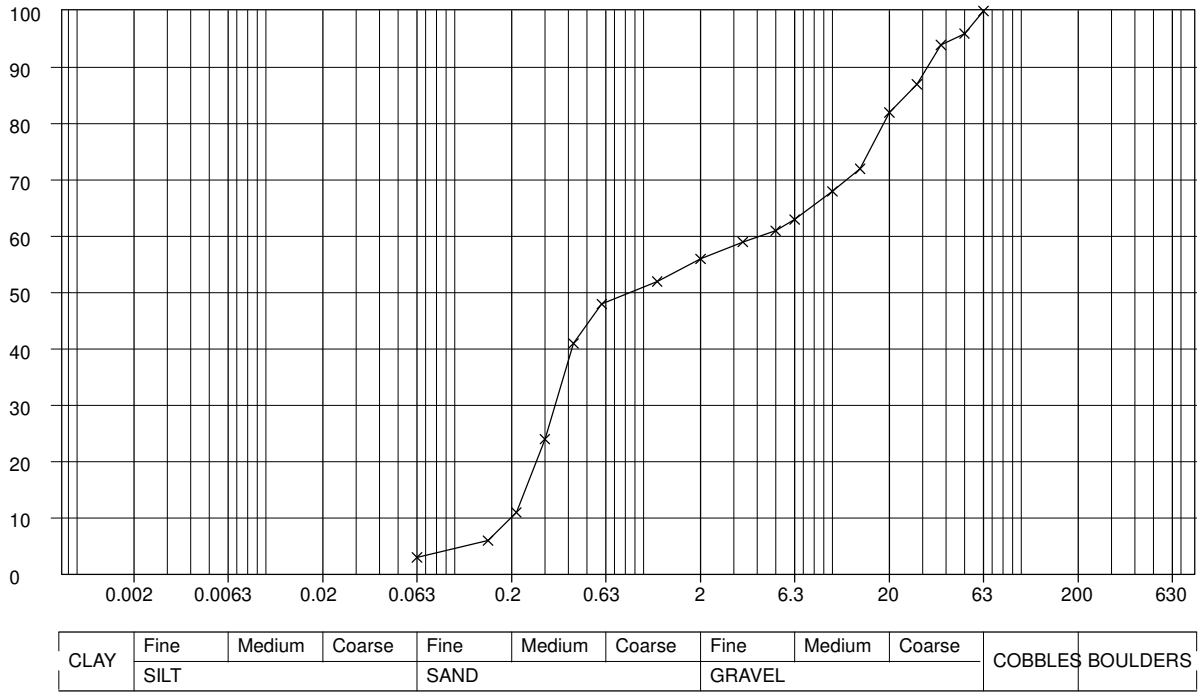
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH202	13.50	D9	Greyish brown SAND and GRAVEL. Gravel is black grassy flint.



Sieve / Particle Size	% Passing
63 mm	100.0
50 mm	96.0
37.5 mm	94.0
28 mm	87.0
20 mm	82.0
14 mm	72.0
10 mm	68.0
6.3 mm	63.0
5 mm	61.0
3.35 mm	59.0
2 mm	56.0
1.18 mm	52.0
600 µm	48.0
425 µm	41.0
300 µm	24.0
212 µm	11.0
150 µm	6.0
63 µm	3.0

Grading Analysis	
D85	24.8 mm
D60	4.2 mm
D10	199.6 µm
Uniformity Coefficient	20.9

Particle Proportions	
Cobbles + Boulders	0.8%
Gravel	43.2%
Sand	53.0%
Silt	-
Clay	-

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
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Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

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Job Number 19.287

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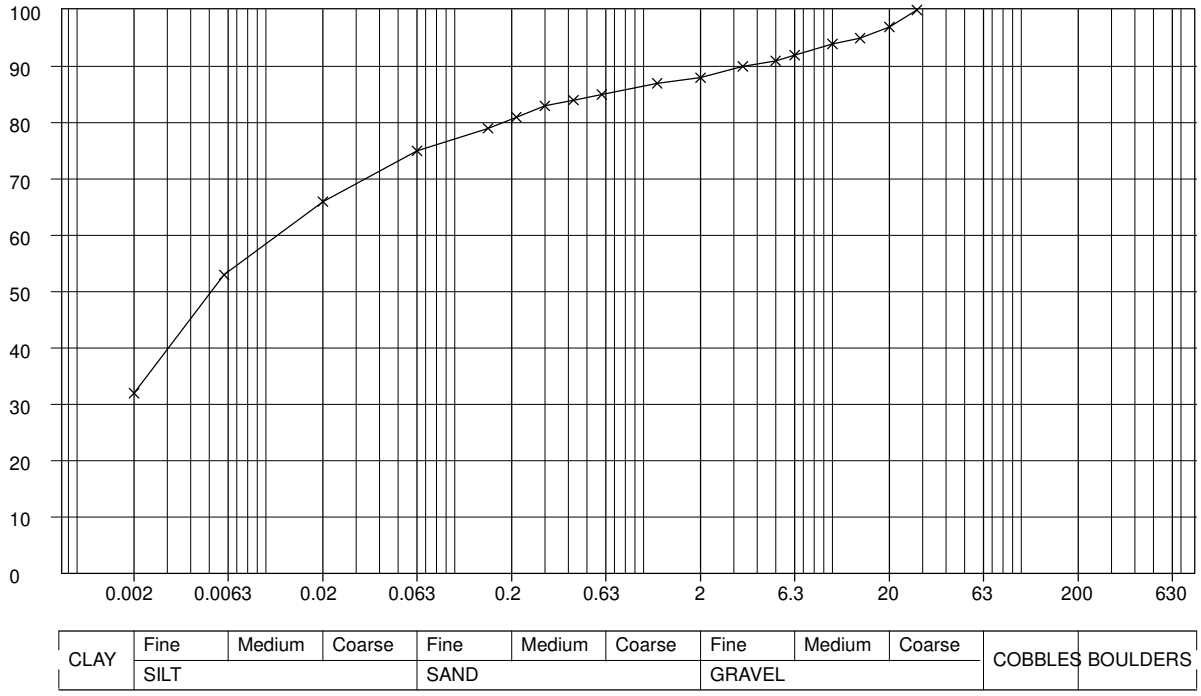
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH203A	7.50	D6	Dark grey sandy silty CLAY with rare gravel sized chalk.



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
28 mm	100.0
20 mm	97.0
14 mm	95.0
10 mm	94.0
6.3 mm	92.0
5 mm	91.0
3.35 mm	90.0
2 mm	88.0
1.18 mm	87.0
600 µm	85.0
425 µm	84.0
300 µm	83.0
212 µm	81.0
150 µm	79.0
63 µm	75.0
20 µm	66.0
6 µm	53.0
2 µm	32.0

Grading Analysis	
D85	600.0 µm
D60	13.5 µm
D10	<2.0 µm
Uniformity Coefficient	-

Particle Proportions	
Cobbles + Boulders	-
Gravel	12.0%
Sand	13.0%
Silt	43.0%
Clay	32.0%

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

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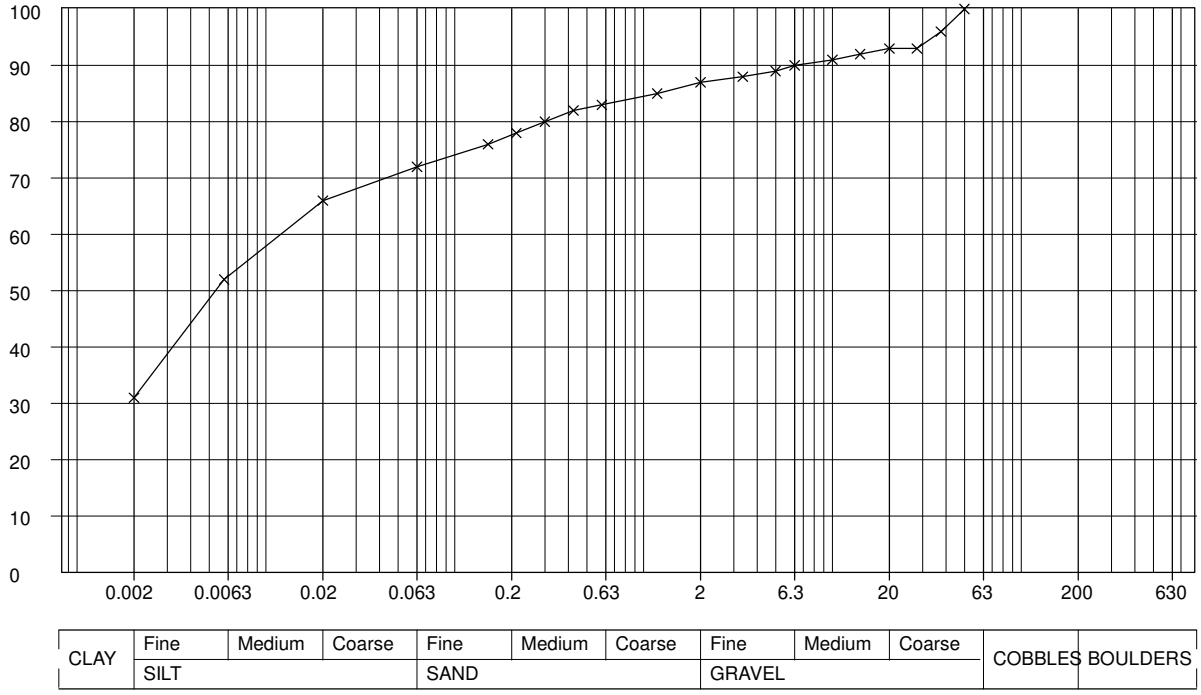
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH204	5.00	D7	Grey sandy silty CLAY with occasional gravel sized chalk.



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieve / Particle Size	% Passing
50 mm	100.0
37.5 mm	96.0
28 mm	93.0
20 mm	93.0
14 mm	92.0
10 mm	91.0
6.3 mm	90.0
5 mm	89.0
3.35 mm	88.0
2 mm	87.0
1.18 mm	85.0
600 µm	83.0
425 µm	82.0
300 µm	80.0
212 µm	78.0
150 µm	76.0
63 µm	72.0
20 µm	66.0
6 µm	52.0
2 µm	31.0

Grading Analysis	
D85	1.2 mm
D60	14.0 µm
D10	<2.0 µm
Uniformity Coefficient	-

Particle Proportions	
Cobbles + Boulders	-
Gravel	13.0%
Sand	15.0%
Silt	41.0%
Clay	31.0%

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

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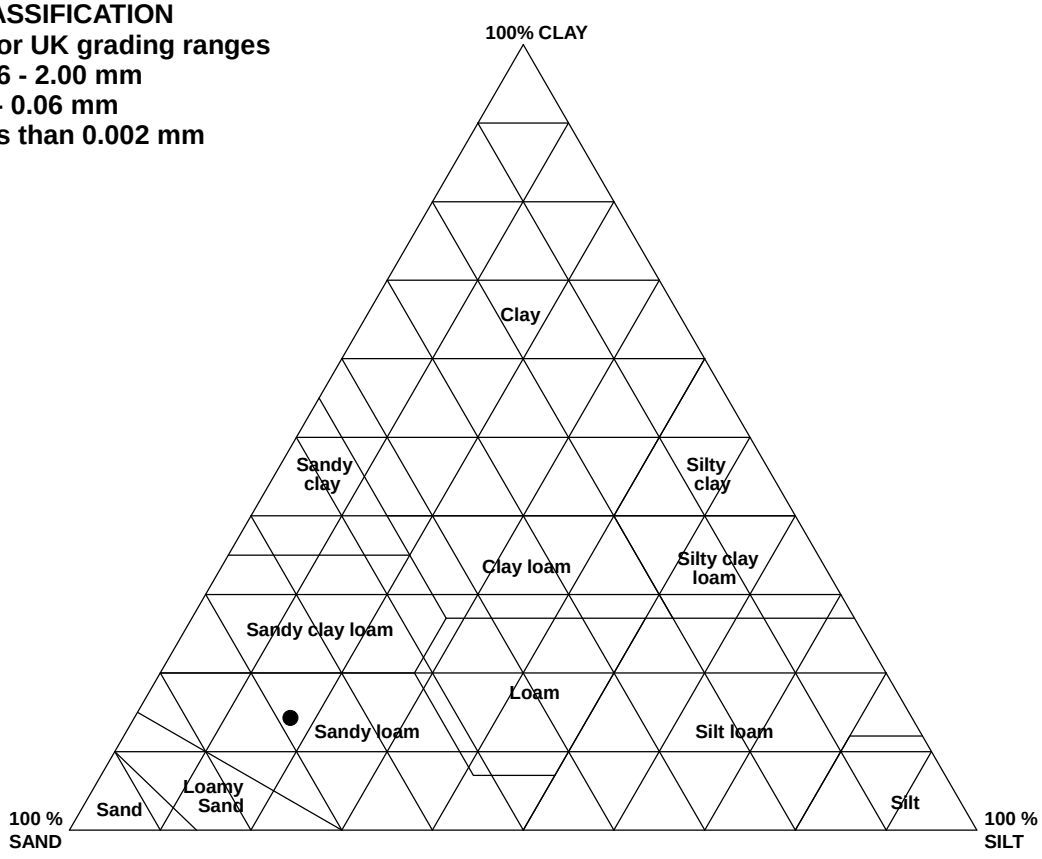
MECHANICAL ANALYSIS & SOIL TEXTURE

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH02	2.50	B3	Orange brown slightly gravelly clayey silty SAND.

USDA CLASSIFICATION
Modified for UK grading ranges
Sand : 0.06 - 2.00 mm
Silt : 0.02 - 0.06 mm
Clay : Less than 0.002 mm



Grading Analysis Particle Proportions	
Cobbles + Boulders	0.3 %
Gravel	8.7 %
Sand	62.3 %
Silt	15.7 %
Clay	13.0 %

USDA Classification Particle Proportions	
Cobbles + Boulders	Excluded
Gravel	Excluded
Sand	68.5 %
Silt	17.2 %
Clay	14.3 %

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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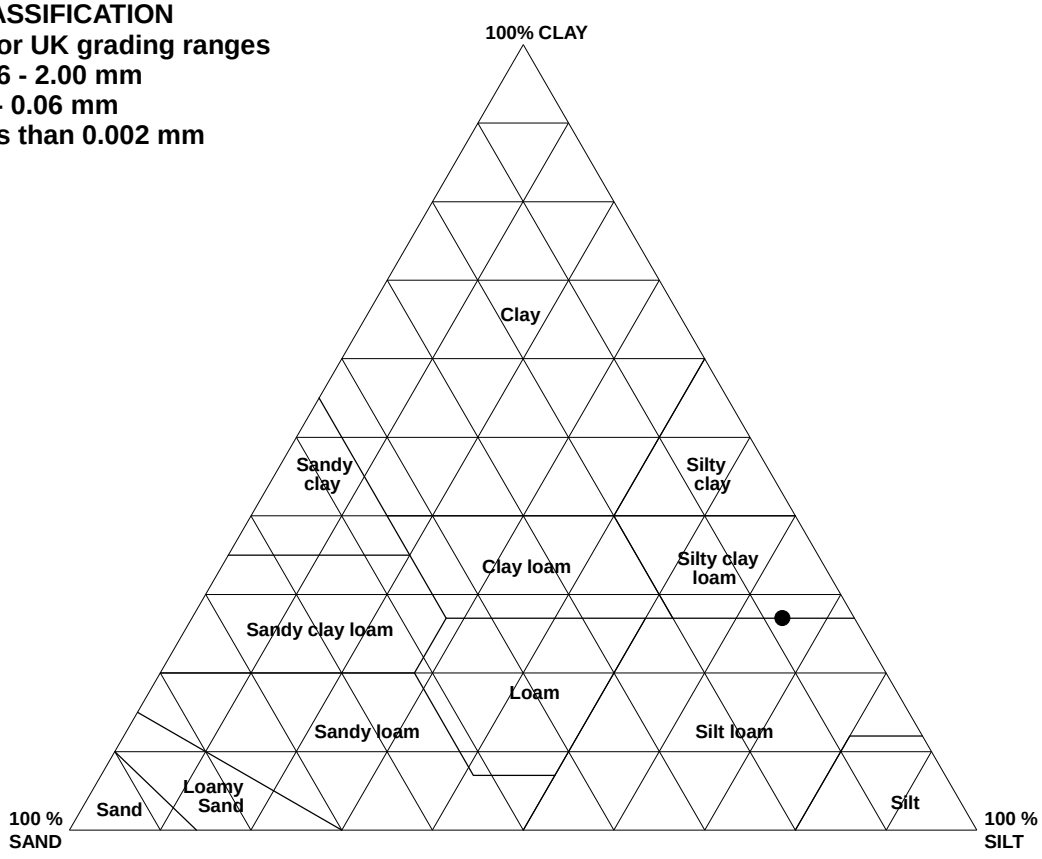
MECHANICAL ANALYSIS & SOIL TEXTURE

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH201	6.50	D7	Brownish grey silty CLAY.

USDA CLASSIFICATION
Modified for UK grading ranges
Sand : 0.06 - 2.00 mm
Silt : 0.02 - 0.06 mm
Clay : Less than 0.002 mm



Grading Analysis Particle Proportions	
Cobbles + Boulders	0.0 %
Gravel	0.0 %
Sand	7.9 %
Silt	65.1 %
Clay	27.0 %

USDA Classification Particle Proportions	
Cobbles + Boulders	Excluded
Gravel	Excluded
Sand	7.9 %
Silt	65.1 %
Clay	27.0 %

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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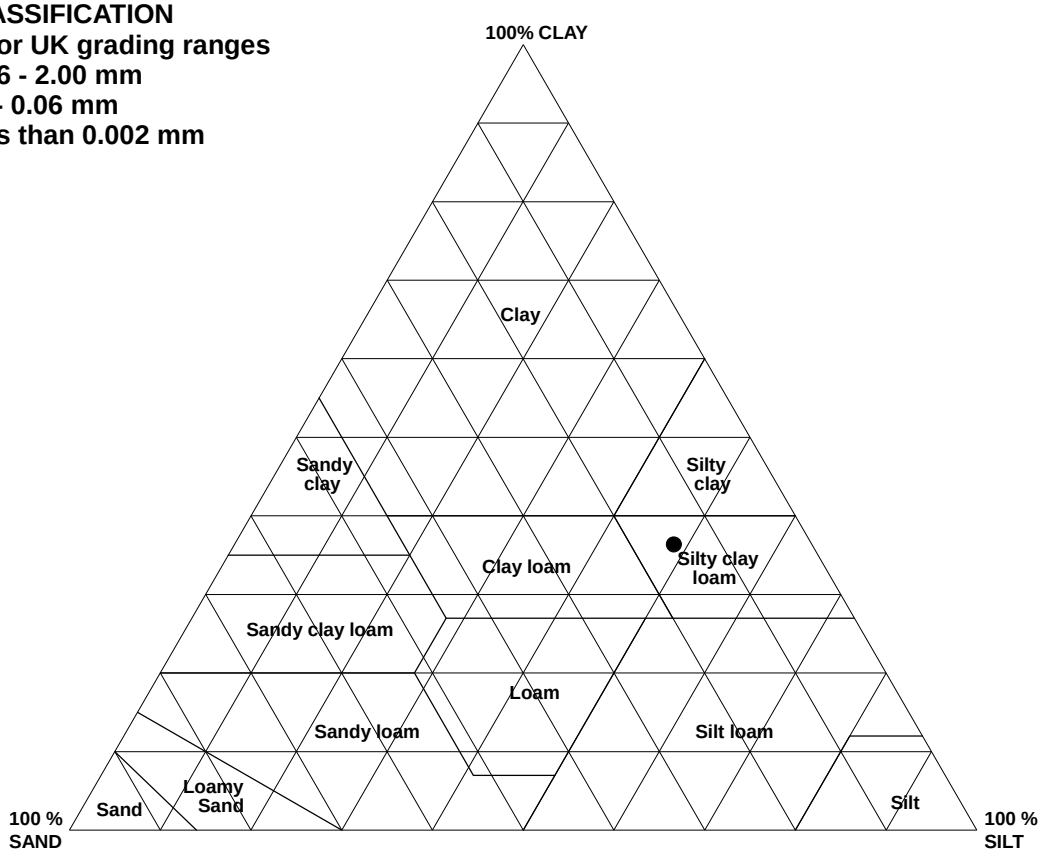
MECHANICAL ANALYSIS & SOIL TEXTURE

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH203A	7.50	D6	Dark grey sandy silty CLAY with rare gravel sized chalk.

USDA CLASSIFICATION
Modified for UK grading ranges
Sand : 0.06 - 2.00 mm
Silt : 0.02 - 0.06 mm
Clay : Less than 0.002 mm



Grading Analysis Particle Proportions	
Cobbles + Boulders	0.0 %
Gravel	12.0 %
Sand	13.4 %
Silt	42.6 %
Clay	32.0 %

USDA Classification Particle Proportions	
Cobbles + Boulders	Excluded
Gravel	Excluded
Sand	15.2 %
Silt	48.4 %
Clay	36.4 %

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

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Job Number 19.287

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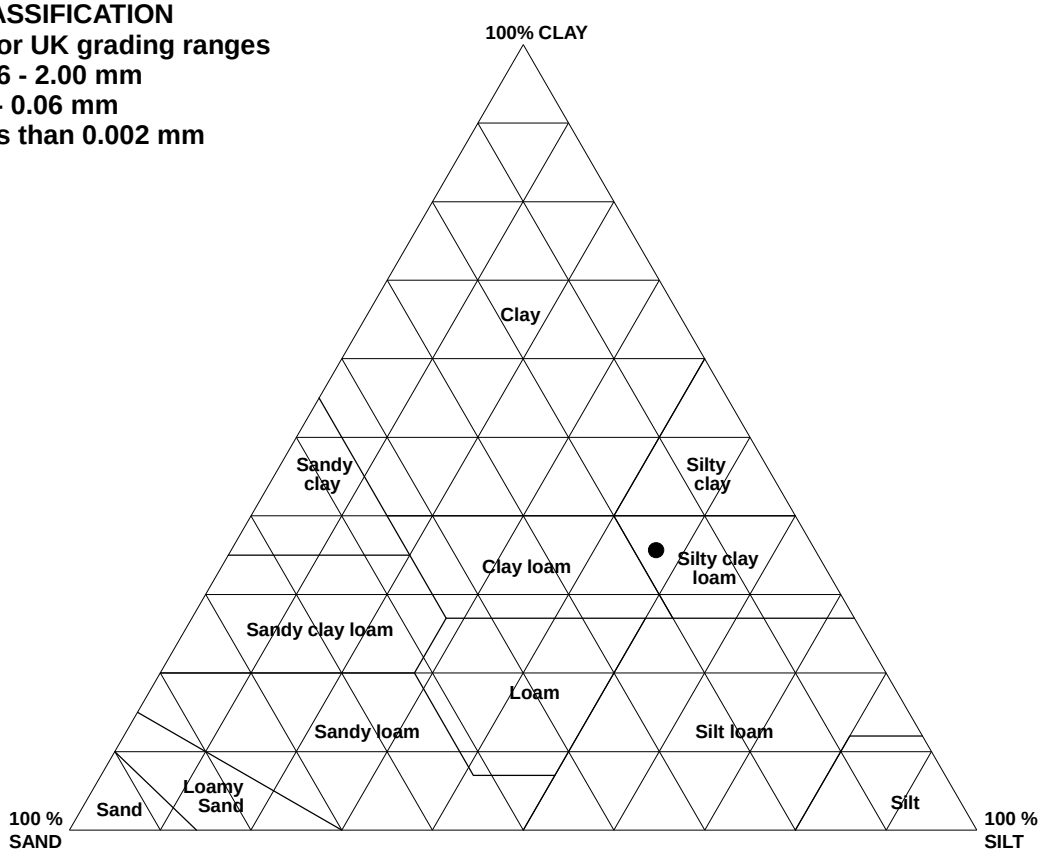
MECHANICAL ANALYSIS & SOIL TEXTURE

Borehole / Trial Pit	Depth (m)	Sample	Laboratory Description
BH204	5.00	D7	Grey sandy silty CLAY with occasional gravel sized chalk.

USDA CLASSIFICATION
Modified for UK grading ranges
Sand : 0.06 - 2.00 mm
Silt : 0.02 - 0.06 mm
Clay : Less than 0.002 mm



Grading Analysis Particle Proportions	
Cobbles + Boulders	0.4 %
Gravel	12.6 %
Sand	15.3 %
Silt	40.7 %
Clay	31.0 %

USDA Classification Particle Proportions	
Cobbles + Boulders	Excluded
Gravel	Excluded
Sand	17.5 %
Silt	46.8 %
Clay	35.6 %

Method of Preparation : BS EN ISO 17892:2016 Part 4. Determination of particle size distribution

Method of Test : BS EN ISO 17892: Part 4: 2016: Clause 5.2 Wet or dry sieve. Clause 5.4 Sedimentation by pipette

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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DETERMINATION OF DENSITY, MOISTURE CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Borehole/ Trial Pit	Depth (m)	Sample	Moisture Content %	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Cell Pressure (kN/m^2)	Deviator Stress (kN/m^2)	Apparent Cohesion (kN/m^2)	Angle of Shearing Resistance (degrees)	Laboratory Description
BH201	5.00	U1	19	2.13	1.79					Firm brownish grey slightly sandy very silty CLAY.
BH203A	2.50	U1	19	2.11	1.77	25 50 100	181 183 183	89	1.0	Firm to stiff yellowish brown mottled grey very gravelly silty CLAY. Gravel is chalk.
BH203A	6.00	U2	19	2.13	1.79					Stiff dark grey gravelly slightly sandy CLAY. Gravel and sand are made of chalk and rare black flint
BH204	4.00	U1	19	2.10	1.76					Stiff dark grey gravelly slightly sandy CLAY. Gravel and sand are made of off-white chalk and rare black flint

Method of Preparation : BS EN ISO 17892:PART 1:2014:5.1 Test specimen preparation (moisture content). BS EN ISO 17892:PART 8:2018: 6.2 Preparation of undisturbed samples for testing

Method of Test : BS EN ISO 17892:PART 1:2014:5.2 Test execution (moisture content) and PART 2:2014 Determination of density. BS EN ISO 17892: PART 8: 2018: 6,7 + 8 Undrained shear strength (Single stage). BS 1377:PART 7:1990:9 Multistage loading

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

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DETERMINATION OF SATURATION MOISTURE CONTENT

Borehole/ Trial Pit	Depth (m)	Sample	Water Content %	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	Saturation Moisture Content %	Porosity %	Laboratory Description
BH204	23.00	D19	29.9	1.93	1.49	30	45	Off-white CHALK
BH204	24.00	D20	29.4	1.94	1.5	30	44	Off-white CHALK

Method of Preparation : BS 1377:PART 1:1990:7.3 and 7.4 Preparation of samples for classification tests

Method of Test : BS 1377:PART 2:1990:3 Determination of Saturation moisture content and water content 1990:7 Determination of density

Remarks :

A F Howland Associates
Geotechnical Engineers

Laboratory Test Results

Site : Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE

Client : Privilege Finance Services

Agent :

Job Number 19.287

Sheet 1 / 1

DETERMINATION OF CHLORIDE CONTENT, ORGANIC MATTER CONTENT AND LOSS ON IGNITION

Borehole/ Trial Pit	Depth (m)	Sample	Concentration of Chloride			Percentage of sample passing 2mm Sieve %	Organic Matter Content %	Mass Loss on Ignition %	Laboratory Description
			Soil		Groundwater mg/l				
			Acid Soluble %	Water Soluble mg/l					
BH201	3.50	D5					1.0		Brown clay
BH201	13.00	D12					0.7		Brown sandy gravel with stones
BH202	6.50	D5					0.5		Light brown sandy gravel with stones
BH202	10.50	D7					0.5		Light brown sandy gravel with stones
BH203A	4.00	D4					1.9		Brown clay with chalk
BH204	24.00	D20					0.3		Off-white CHALK

Method of Preparation : BS 1377:PART 1:1990:7.5 Preparation of soil for chemical tests BS 1377:PART 3:1990:7.2.3.2 Water-soluble, 7.3.3.3 Acid-soluble

Method of Test : Lab in-house method based on BS 1377:PART 3:1990:7 for Determination of chloride content, 1990:3 for Determination of organic matter content, BS 1377:PART 3:1990:4 for Determination of loss on ignition and an in-house method for soluble nitrate

Remarks :

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t: 01622 850410

DETS Report No: 20-04564

Site Reference:	SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites
Project / Job Ref:	19.287
Order No:	JAH/19.287/01/02
Sample Receipt Date:	21/04/2020
Sample Scheduled Date:	21/04/2020
Report Issue Number:	2
Reporting Date:	29/04/2020

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.
This report supersedes 20-04564, issue no.1.
Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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Water Analysis Certificate						
DETS Report No: 20-04564	**Date Sampled**	17/04/20	17/04/20	17/04/20	17/04/20	17/04/20
AF Howland Associates Ltd	**Time Sampled**	1105	1051	1041	0945	1006
Site Reference: SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites	**TP / BH No**	SW01	SW02	SW03	WS102	WS103
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/01/02	**Depth (m)**	GL	GL	GL	1.45	1.30
Reporting Date: 29/04/2020	**DETS Sample No**	473954	473955	473956	473957	473958

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	8.3	8.2	8.3	6.9	7.5
Total Cyanide	ug/l	< 5	NONE	< 5		< 5		< 5
Complex Cyanide	ug/l	< 5	NONE	< 5		< 5		< 5
Free Cyanide	ug/l	< 5	NONE	< 5		< 5		< 5
Thiocyanate as SCN	ug/l	< 10	NONE	< 10		< 10		< 10
Sulphate as SO_4	mg/l	< 1	ISO17025		60		26	
Sulphide	mg/l	< 0.1	NONE		< 0.1		< 0.1	
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE		< 50		494	
Ammonia as NH_4	ug/l	< 50	NONE		< 50		494	
Ammonium as NH_4	ug/l	< 50	NONE		< 50		494	
Ammonium as NH_4	mg/l	< 0.05	NONE		< 0.05		0.49	
Nitrate as NO_3	mg/l	< 0.5	ISO17025		14.1		15.2	
Nitrite as NO_2	mg/l	< 0.5	NONE		< 0.5		< 0.5	
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE	5.9	6	6.1		
Hardness - Total	mgCaCO3/l	< 1	NONE	429	438	438		
Antimony (dissolved)	ug/l	< 5	ISO17025	< 5		< 5		< 5
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Beryllium (dissolved)	ug/l	< 3	ISO17025	< 3		< 3		< 3
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium (dissolved)	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	< 5
Chromium (hexavalent)	ug/l	< 20	NONE	< 20	< 20	< 20	< 20	< 20
Copper (dissolved)	ug/l	< 5	ISO17025	< 5		< 5		< 5
Lead (dissolved)	ug/l	< 5	ISO17025	< 5		< 5		< 5
Mercury (dissolved)	ug/l	< 0.05	ISO17025	< 0.05		< 0.05		< 0.05
Nickel (dissolved)	ug/l	< 5	ISO17025	< 5		< 5		< 5
Phosphorus (dissolved)	ug/l	< 100	NONE		< 100		171	
Selenium (dissolved)	ug/l	< 5	ISO17025	< 5		< 5		< 5
Vanadium (dissolved)	ug/l	< 5	ISO17025	< 5		< 5		< 5
Zinc (dissolved)	ug/l	< 2	ISO17025	4		5		4
Potassium (dissolved)	mg/l	< 0.2	ISO17025		4		26.1	
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	< 10

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-04564	**Date Sampled**	17/04/20				
AF Howland Associates Ltd	**Time Sampled**	1018				
Site Reference: SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites	**TP / BH No**	WS105				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/01/02	**Depth (m)**	1.15				
Reporting Date: 29/04/2020	**DETS Sample No**	473959				

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	7.0				
Total Cyanide	ug/l	< 5	NONE					
Complex Cyanide	ug/l	< 5	NONE					
Free Cyanide	ug/l	< 5	NONE					
Thiocyanate as SCN	ug/l	< 10	NONE					
Sulphate as SO_4	mg/l	< 1	ISO17025	11				
Sulphide	mg/l	< 0.1	NONE	< 0.1				
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	458				
Ammonia as NH_4	ug/l	< 50	NONE	458				
Ammonium as NH_4	ug/l	< 50	NONE	458				
Ammonium as NH_4	mg/l	< 0.05	NONE	0.46				
Nitrate as NO_3	mg/l	< 0.5	ISO17025	28.6				
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5				
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE					
Hardness - Total	mgCaCO3/l	< 1	NONE					
Antimony (dissolved)	ug/l	< 5	ISO17025					
Arsenic (dissolved)	ug/l	< 5	ISO17025	< 5				
Beryllium (dissolved)	ug/l	< 3	ISO17025					
Cadmium (dissolved)	ug/l	< 0.4	ISO17025	< 0.4				
Chromium (dissolved)	ug/l	< 5	ISO17025	< 5				
Chromium (hexavalent)	ug/l	< 20	NONE	< 20				
Copper (dissolved)	ug/l	< 5	ISO17025					
Lead (dissolved)	ug/l	< 5	ISO17025					
Mercury (dissolved)	ug/l	< 0.05	ISO17025					
Nickel (dissolved)	ug/l	< 5	ISO17025					
Phosphorus (dissolved)	ug/l	< 100	NONE	< 100				
Selenium (dissolved)	ug/l	< 5	ISO17025					
Vanadium (dissolved)	ug/l	< 5	ISO17025					
Zinc (dissolved)	ug/l	< 2	ISO17025					
Potassium (dissolved)	mg/l	< 0.2	ISO17025	2.5				
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Speciated PAH						
DETS Report No: 20-04564	**Date Sampled**	17/04/20	17/04/20	17/04/20		
AF Howland Associates Ltd	**Time Sampled**	1105	1041	1006		
Site Reference: SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites	**TP / BH No**	SW01	SW03	WS103		
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1		
Order No: JAH/19.287/01/02	**Depth (m)**	GL	GL	1.30		
Reporting Date: 29/04/2020	**DETS Sample No**	473954	473956	473958		

Determinand	Unit	RL	Accreditation					
Naphthalene	ug/l	< 0.01	NONE	0.02	0.05	0.04		
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	ug/l	< 0.008	NONE	< 0.008	< 0.008	< 0.008		
Total EPA-16 PAHs	ug/l	< 0.01	NONE	0.02	0.05	0.04		

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Water Analysis Certificate - TPH CWG Banded						
DETS Report No: 20-04564	**Date Sampled**	17/04/20	17/04/20	17/04/20		
AF Howland Associates Ltd	**Time Sampled**	1105	1041	1006		
Site Reference: SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites	**TP / BH No**	SW01	SW03	WS103		
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1		
Order No: JAH/19.287/01/02	**Depth (m)**	GL	GL	1.30		
Reporting Date: 29/04/2020	**DETS Sample No**	473954	473956	473958		

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C6 - C8	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic (C5 - C34)	ug/l	< 70	NONE	< 70	< 70	< 70		
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic >C8 - C10	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic >C21 - C35	ug/l	< 10	NONE	< 10	< 10	< 10		
Aromatic (C5 - C35)	ug/l	< 70	NONE	< 70	< 70	< 70		
Total >C5 - C35	ug/l	< 140	NONE	< 140	< 140	< 140		

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Water Analysis Certificate - BTEX / MTBE						
DETS Report No: 20-04564	Date Sampled	17/04/20	17/04/20	17/04/20		
AF Howland Associates Ltd	Time Sampled	1105	1041	1006		
Site Reference: SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites	TP / BH No	SW01	SW03	WS103		
Project / Job Ref: 19.287	Additional Refs	W1	W1	W1		
Order No: JAH/19.287/01/02	Depth (m)	GL	GL	1.30		
Reporting Date: 29/04/2020	DETS Sample No	473954	473956	473958		

Determinand	Unit	RL	Accreditation					
Benzene	ug/l	< 1	ISO17025	< 1	< 1	< 1		
Toluene	ug/l	< 5	ISO17025	< 5	< 5	< 5		
Ethylbenzene	ug/l	< 5	ISO17025	< 5	< 5	< 5		
p & m-xylene	ug/l	< 10	ISO17025	< 10	< 10	< 10		
o-xylene	ug/l	< 5	ISO17025	< 5	< 5	< 5		
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10		

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-04564
AF Howland Associates Ltd
Site Reference: SSagr AD Plant, Ellingham Road, Attleborough, NR17 1AE - AFHA Suites
Project / Job Ref: 19.287
Order No: JAH/19.287/01/02
Reporting Date: 29/04/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-09707

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE - BRE Tests
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/01
Sample Receipt Date:	25/08/2020
Sample Scheduled Date:	25/08/2020
Report Issue Number:	3
Reporting Date:	22/09/2020

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.
This report supersedes 20-09707, issue no.2.

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Water Analysis Certificate						
DETS Report No: 20-09707	**Date Sampled**	21/08/20	21/08/20	21/08/20	21/08/20	21/08/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE - BRE Tests	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/01	**Depth (m)**	2.00	4.98	4.05	21.00	2.40
Reporting Date: 22/09/2020	**DETS Sample No**	494910	494911	494912	494913	494914

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	7.5	7.2	7.5	7.5	7.8
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	11300	414	230	134	157
Ammonia as NH_4	ug/l	< 50	NONE	11300	414	230	134	157
Chloride	mg/l	< 1	**ISO17025**	14	21	30	38	37
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	111	27.4	4.2	3.4	2.1
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	0.8	0.8
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE					
Hardness - Total	mgCaCO3/l	< 1	NONE					
Biological Oxygen Demand	mg/l	< 5	NONE	< 5	8	8	< 5	< 5

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-09707	**Date Sampled**	21/08/20	21/08/20	21/08/20	21/08/20	21/08/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE - BRE Tests	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/01	**Depth (m)**	3.05	2.85	2.35	None Supplied	None Supplied
Reporting Date: 22/09/2020	**DETS Sample No**	494915	494916	494917	494918	494919

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	7.2	7.5	7.0	7.8	7.7
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	882	104	85	198	221
Ammonia as NH_4	ug/l	< 50	NONE	882	104	85	198	221
Chloride	mg/l	< 1	**ISO17025**	8	12	13	54	54
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	4.5	52.7	117	10.1	11.1
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE				9.3	10.7
Hardness - Total	mgCaCO3/l	< 1	NONE				314	305
Biological Oxygen Demand	mg/l	< 5	NONE	< 5	< 5	< 5		

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Tel : 01622 850410

UKAS TESTING
4480

Water Analysis Certificate						
DETS Report No: 20-09707	**Date Sampled**	21/08/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE - BRE Tests	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/01	**Depth (m)**	None Supplied				
Reporting Date: 22/09/2020	**DETS Sample No**	494920				

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	7.7				
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	143				
Ammonia as NH_4	ug/l	< 50	NONE	143				
Chloride	mg/l	< 1	**ISO17025**	54				
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	12.4				
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5				
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE	10.3				
Hardness - Total	mgCaCO3/l	< 1	NONE	310				
Biological Oxygen Demand	mg/l	< 5	NONE					

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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UKAS TESTING
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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-09707
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE - BRE Tests
Project / Job Ref: 19.287
Order No: JAH/19.287/02/01
Reporting Date: 22/09/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-09708

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE - BRE Tests
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/01
Sample Receipt Date:	25/08/2020
Sample Scheduled Date:	25/08/2020
Report Issue Number:	2
Reporting Date:	07/09/2020

Authorised by:

Kevin Old
General Manager

Dates of laboratory activities for each tested analyte are available upon request.
This report supersedes 20-09708, issue no.1.

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Water Analysis Certificate						
DETS Report No: 20-09708	**Date Sampled**	21/08/20	21/08/20	21/08/20	21/08/20	21/08/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE - BRE Tests	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/01	**Depth (m)**	2.00	4.98	4.05	21.00	2.40
Reporting Date: 07/09/2020	**DETS Sample No**	494921	494922	494923	494924	494925

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	7.1	2.3	< 0.2	< 0.2	< 0.2
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	0.8	2.3	< 0.1	< 0.1	< 0.1

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-09708	**Date Sampled**	21/08/20	21/08/20	21/08/20	21/08/20	21/08/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE - BRE Tests	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/01	**Depth (m)**	3.05	2.85	2.35	None Supplied	None Supplied
Reporting Date: 07/09/2020	**DETS Sample No**	494926	494927	494928	494929	494930

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	3.7	< 0.2	< 0.2	7.1	14
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	3.4	< 0.1	< 0.1	7.1	14

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

DETS Ltd
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Water Analysis Certificate						
DETS Report No: 20-09708	**Date Sampled**	21/08/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE - BRE Tests	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/01	**Depth (m)**	None Supplied				
Reporting Date: 07/09/2020	**DETS Sample No**	494931				

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	15				
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	15				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-09708
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE - BRE Tests
Project / Job Ref: 19.287
Order No: JAH/19.287/02/01
Reporting Date: 07/09/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-09792

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/01
Sample Receipt Date:	25/08/2020
Sample Scheduled Date:	26/08/2020
Report Issue Number:	2
Reporting Date:	22/09/2020

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.
This report supersedes 20-09792, issue no.1.
Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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Water Analysis Certificate						
DETS Report No: 20-09792	**Date Sampled**	21/08/20	21/08/20	21/08/20	21/08/20	21/08/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/01	**Depth (m)**	2.00	4.98	4.05	21.00	2.40
Reporting Date: 22/09/2020	**DETS Sample No**	495297	495298	495299	495300	495301

Determinand	**Unit**	**RL**	**Accreditation**					
Phosphorus (dissolved)	ug/l	< 100	NONE	285	< 100	< 100	< 100	< 100

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
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Tel : 01622 850410

Water Analysis Certificate						
DETS Report No: 20-09792	**Date Sampled**	21/08/20	21/08/20	21/08/20	21/08/20	21/08/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/01	**Depth (m)**	3.05	2.85	2.35	None Supplied	None Supplied
Reporting Date: 22/09/2020	**DETS Sample No**	495302	495303	495304	495305	495306

Determinand	**Unit**	**RL**	**Accreditation**					
Phosphorus (dissolved)	ug/l	< 100	NONE	333	< 100	< 100	< 100	< 100

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Water Analysis Certificate						
DETS Report No: 20-09792	**Date Sampled**	21/08/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/01	**Depth (m)**	None Supplied				
Reporting Date: 22/09/2020	**DETS Sample No**	495307				

Determinand	**Unit**	**RL**	**Accreditation**					
Phosphorus (dissolved)	ug/l	< 100	NONE	146				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-09792
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref: 19.287
Order No: JAH/19.287/02/01
Reporting Date: 22/09/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-10304

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/04
Sample Receipt Date:	08/09/2020
Sample Scheduled Date:	08/09/2020
Report Issue Number:	1
Reporting Date:	15/09/2020

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Water Analysis Certificate						
DETS Report No: 20-10304	**Date Sampled**	04/09/20	04/09/20	04/09/20	04/09/20	04/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/04	**Depth (m)**	1.70	4.93	4.37	21.00	2.62
Reporting Date: 15/09/2020	**DETS Sample No**	497120	497121	497122	497123	497124

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	7.5	7.3	7.8	7.7	7.5
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	2750	1050	66	< 50	< 50
Ammonia as NH_4	ug/l	< 50	NONE	2750	1050	66	< 50	< 50
Ammonium as NH_4	mg/l	< 0.05	NONE	2.75	1.05	0.07	< 0.05	< 0.05
Chloride	mg/l	< 1	ISO17025	16	25	31	17	18
Nitrate as NO_3	mg/l	< 0.5	ISO17025	42.8	< 0.5	9.9	4.1	1.7
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE					
Hardness - Total	mgCaCO3/l	< 1	NONE					
Biological Oxygen Demand	mg/l	< 5	NONE	16	6	< 5	10	< 5
Phosphorus (dissolved)	ug/l	< 100	NONE	215	< 100	463	< 100	< 100

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10304	**Date Sampled**	04/09/20	04/09/20	04/09/20	04/09/20	04/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/04	**Depth (m)**	2.45	1.73	1.91	None Supplied	None Supplied
Reporting Date: 15/09/2020	**DETS Sample No**	497125	497126	497127	497128	497129

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025	7.8	7.5	7.2	7.9	8.1
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	87	< 50	< 50	71	< 50
Ammonia as NH_4	ug/l	< 50	NONE	87	< 50	< 50	71	< 50
Ammonium as NH_4	mg/l	< 0.05	NONE	0.09	< 0.05	< 0.05	0.07	< 0.05
Chloride	mg/l	< 1	ISO17025	7	8	12	73	65
Nitrate as NO_3	mg/l	< 0.5	ISO17025	5.2	53.2	97.8	3.3	5.4
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE				9.3	8.8
Hardness - Total	mgCaCO3/l	< 1	NONE				252	236
Biological Oxygen Demand	mg/l	< 5	NONE	< 5	< 5	< 5		
Phosphorus (dissolved)	ug/l	< 100	NONE	283	< 100	< 100	< 100	127

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10304	**Date Sampled**	04/09/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/04	**Depth (m)**	None Supplied				
Reporting Date: 15/09/2020	**DETS Sample No**	497130				

Determinand	**Unit**	**RL**	**Accreditation**					
pH	pH Units	N/a	**ISO17025**	8.2				
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	73				
Ammonia as NH_4	ug/l	< 50	NONE	73				
Ammonium as NH_4	mg/l	< 0.05	NONE	0.07				
Chloride	mg/l	< 1	**ISO17025**	66				
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	4.4				
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5				
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE	8.8				
Hardness - Total	mgCaCO3/l	< 1	NONE	237				
Biological Oxygen Demand	mg/l	< 5	NONE					
Phosphorus (dissolved)	ug/l	< 100	NONE	126				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-10304
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref: 19.287
Order No: JAH/19.287/02/04
Reporting Date: 15/09/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by c	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detect	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethan	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-10305

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/04
Sample Receipt Date:	08/09/2020
Sample Scheduled Date:	08/09/2020
Report Issue Number:	2
Reporting Date:	22/09/2020

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.
This report supersedes 20-10305, issue no.1.
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Water Analysis Certificate						
DETS Report No: 20-10305	**Date Sampled**	04/09/20	04/09/20	04/09/20	04/09/20	04/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/04	**Depth (m)**	1.70	4.93	4.37	21.00	2.62
Reporting Date: 22/09/2020	**DETS Sample No**	497131	497132	497133	497134	497135

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	2.4	2.4	< 0.2	< 0.2	< 0.2
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	0.2	1.7	< 0.1	< 0.1	< 0.1

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10305	**Date Sampled**	04/09/20	04/09/20	04/09/20	04/09/20	04/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/04	**Depth (m)**	2.45	1.73	1.91	None Supplied	None Supplied
Reporting Date: 22/09/2020	**DETS Sample No**	497136	497137	497138	497139	497140

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10305	**Date Sampled**	04/09/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/04	**Depth (m)**	None Supplied				
Reporting Date: 22/09/2020	**DETS Sample No**	497141				

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	< 0.2				
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	< 0.1				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-10305
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref: 19.287
Order No: JAH/19.287/02/04
Reporting Date: 22/09/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-10991

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/05
Sample Receipt Date:	22/09/2020
Sample Scheduled Date:	22/09/2020
Report Issue Number:	1
Reporting Date:	28/09/2020

Authorised by:

Kevin Old
General Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Water Analysis Certificate						
DETS Report No: 20-10991	**Date Sampled**	18/09/20	18/09/20	18/09/20	18/09/20	18/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/05	**Depth (m)**	1.75	5.60	4.16	21.00	2.42
Reporting Date: 28/09/2020	**DETS Sample No**	500438	500439	500440	500441	500442

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	7.6	7.2	7.7	7.2	7.4
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	828	1290	199	81	< 50
Ammonia as NH_4	ug/l	< 50	NONE	828	1290	199	81	< 50
Chloride	mg/l	< 1	**ISO17025**	16	22	36	22	23
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	27.6	< 0.5	10.8	< 0.5	< 0.5
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE					
Hardness - Total	mgCaCO3/l	< 1	NONE					
Biological Oxygen Demand	mg/l	< 5	NONE	7	< 5	< 5	10	< 5
Phosphorus (dissolved)	ug/l	< 100	NONE	< 100	< 100	391	< 100	< 100

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING
4480

Water Analysis Certificate						
DETS Report No: 20-10991	**Date Sampled**	18/09/20	18/09/20	18/09/20	18/09/20	18/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/05	**Depth (m)**	2.98	1.76	2.03	None Supplied	None Supplied
Reporting Date: 28/09/2020	**DETS Sample No**	500443	500444	500445	500446	500447

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	7.1	7.5	7.2	7.9	8.2
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	671	247	251	627	176
Ammonia as NH_4	ug/l	< 50	NONE	671	247	251	627	176
Chloride	mg/l	< 1	**ISO17025**	13	8	12	61	53
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	1.3	59.6	101	< 0.5	4.4
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	0.9	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE				30.4	33.2
Hardness - Total	mgCaCO3/l	< 1	NONE				363	345
Biological Oxygen Demand	mg/l	< 5	NONE	< 5	13	8		
Phosphorus (dissolved)	ug/l	< 100	NONE	< 100	< 100	< 100	189	< 100

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10991	**Date Sampled**	18/09/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/05	**Depth (m)**	None Supplied				
Reporting Date: 28/09/2020	**DETS Sample No**	500448				

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	8.3				
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	171				
Ammonia as NH_4	ug/l	< 50	NONE	171				
Chloride	mg/l	< 1	**ISO17025**	53				
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	3.2				
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5				
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE	29.3				
Hardness - Total	mgCaCO3/l	< 1	NONE	369				
Biological Oxygen Demand	mg/l	< 5	NONE					
Phosphorus (dissolved)	ug/l	< 100	NONE	147				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-10991
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref: 19.287
Order No: JAH/19.287/02/05
Reporting Date: 28/09/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-10992

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/05
Sample Receipt Date:	22/09/2020
Sample Scheduled Date:	22/09/2020
Report Issue Number:	1
Reporting Date:	01/10/2020

Authorised by:

Kevin Old
General Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Water Analysis Certificate						
DETS Report No: 20-10992	**Date Sampled**	18/09/20	18/09/20	18/09/20	18/09/20	18/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	BH201	BH202	BH203A	BH204A	BH204B
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/05	**Depth (m)**	1.75	5.60	4.16	21.00	2.42
Reporting Date: 01/10/2020	**DETS Sample No**	500449	500450	500451	500452	500453

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10992	**Date Sampled**	18/09/20	18/09/20	18/09/20	18/09/20	18/09/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	WS102	WS103	WS105	SW01	SW02
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/05	**Depth (m)**	2.98	1.76	2.03	None Supplied	None Supplied
Reporting Date: 01/10/2020	**DETS Sample No**	500454	500455	500456	500457	500458

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	< 0.2	< 0.2	< 0.2	5.3	30
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	< 0.1	< 0.1	< 0.1	5.3	30

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate						
DETS Report No: 20-10992	**Date Sampled**	18/09/20				
AF Howland Associates Ltd	**Time Sampled**	None Supplied				
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE	**TP / BH No**	SW03				
Project / Job Ref: 19.287	**Additional Refs**	W1				
Order No: JAH/19.287/02/05	**Depth (m)**	None Supplied				
Reporting Date: 01/10/2020	**DETS Sample No**	500459				

Determinand	**Unit**	**RL**	**Accreditation**					
Kjeldahl Nitrogen (S)	mg/l	< 0.2	NONE	3.4				
Total Organic Nitrogen (S)	mg/l	< 0.1	NONE	3.4				

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-10992
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Atteborough, NR17 1AE
Project / Job Ref: 19.287
Order No: JAH/19.287/02/05
Reporting Date: 01/10/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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DETS Report No: 20-11642

Site Reference:	Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE
Project / Job Ref:	19.287
Order No:	JAH/19.287/02/06
Sample Receipt Date:	06/10/2020
Sample Scheduled Date:	06/10/2020
Report Issue Number:	1
Reporting Date:	12/10/2020

Authorised by:

Kevin Old
General Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Water Analysis Certificate						
DETS Report No: 20-11642	**Date Sampled**	02/10/20	02/10/20	02/10/20	02/10/20	02/10/20
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	**TP / BH No**	BH201	BH202	BH203A	WS102	WS103
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	W1
Order No: JAH/19.287/02/06	**Depth (m)**	1.47	4.74	4.07	1.97	1.29
Reporting Date: 12/10/2020	**DETS Sample No**	503387	503388	503389	503390	503391

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	8.1	7.9	8.2	8.1	8.0
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	617	820	199	156	96
Ammonia as NH_4	ug/l	< 50	NONE	617	820	199	156	96
Chloride	mg/l	< 1	**ISO17025**	19	25	33	9	7
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	118	1.6	4.7	1.3	39.6
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE					
Hardness - Total	mgCaCO3/l	< 1	NONE					
Biological Oxygen Demand	mg/l	< 5	NONE	14	< 5	< 5	< 5	< 5
Phosphorus (dissolved)	ug/l	< 100	NONE	< 100	< 100	179	288	< 100

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Unit 1, Rose Lane Industrial Estate
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Water Analysis Certificate						
DETS Report No: 20-11642	**Date Sampled**	02/10/20	02/10/20	02/10/20	02/10/20	
AF Howland Associates Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE	**TP / BH No**	SW01	SW02	SW03	WS105	
Project / Job Ref: 19.287	**Additional Refs**	W1	W1	W1	W1	
Order No: JAH/19.287/02/06	**Depth (m)**	None Supplied	None Supplied	None Supplied	1.63	
Reporting Date: 12/10/2020	**DETS Sample No**	503392	503393	503394	503395	

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	8.4	8.4	8.4	7.7	
Ammoniacal Nitrogen as NH_4	ug/l	< 50	NONE	104	99	69	< 50	
Ammonia as NH_4	ug/l	< 50	NONE	104	99	69	< 50	
Chloride	mg/l	< 1	**ISO17025**	75	75	80	10	
Nitrate as NO_3	mg/l	< 0.5	**ISO17025**	37.3	37.3	39.4	90.5	
Nitrite as NO_2	mg/l	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	NONE	9.6	9.9	9.8		
Hardness - Total	mgCaCO3/l	< 1	NONE	371	372	367		
Biological Oxygen Demand	mg/l	< 5	NONE				< 5	
Phosphorus (dissolved)	ug/l	< 100	NONE	104	< 100	< 100	< 100	

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-11642
AF Howland Associates Ltd
Site Reference: Anaerobic Digestor Plant Extension at Ellingham Road, Attleborough, NR17 1AE
Project / Job Ref: 19.287
Order No: JAH/19.287/02/06
Reporting Date: 12/10/2020

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR dete	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichlorometha	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

APPENDIX E: SUMMARY OF GROUNDWATER ANALYSIS RESULTS AND TREND ANALYSIS

Tables E1 to E3 – Summary of Groundwater and Surface Water Analysis

Graphs of groundwater and surface water results

Contaminant	Units	Detection Limit	EQS		Borehole and standpipe reference														
					BH201			BH202			BH203A			BH204[A]			BH204[B]		
					Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
pH	-	N/A	-		7.5	8.1	7.675	7.2	7.9	7.4	7.5	8.2	7.8	7.2	8.1	7.625	7.4	7.8	7.566667
Ammoniacal Nitrogen (NH_4)	µg/l	< 50	-		617	11300	3873.75	414	1290	893.5	66	230	173.5	< 50	156	105.25	< 50	157	85.66667
Ammonia (NH_4)	µg/l	< 50	373	WFD 2015	617	11300	3873.75	414	1290	893.5	66	230	173.5	< 50	156	105.25	< 50	157	85.66667
Chloride	mg/l	< 1	188	WFD 2015	14	19	16.25	21	25	23.25	30	36	32.5	9	38	21.5	18	37	26
Nitrate (NO_3)	mg/l	< 0.5	37.5	WFD 2015	27.6	118	74.85	< 0.5	27.4	7.5	4.2	10.8	7.4	< 0.5	4.1	2.325	< 0.5	2.1	1.433333
Nitrite (NO_2)	mg/l	< 0.5	500	UK DWS	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.8	0.575	< 0.5	0.8	0.6
Biological Oxgen Demand (BOD)	mg/l	< 5	-		< 5	16	10.5	< 5	8	6	< 5	8	5.75	< 5	10	7.5	< 5	< 5	< 5
Phosphorus	µg/l	< 100	196	WFD 2015	< 100	285	175	< 100	< 100	100	< 100	463	283.25	< 100	288	147	< 100	< 100	< 100
Ammonium (NH_4)	mg/l	< 0.05	-		0.617	11.3	3.87425	0.41	1.29	0.8925	0.07	0.23	0.17475	< 0.05	0.13	0.086667	< 0.05	0.16	0.086667
Kjeldahl Nitrogen	mg/l	< 0.2	-		< 0.2	7.1	2.475	< 0.2	2.4	1.275	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Organic Nitrogen	mg/l	< 0.1	-		< 0.1	0.8	0.3	< 0.1	2.3	1.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Table E1: Summary of groundwater analysis for BH201, BH202, BH203A, BH204[A], and BH204[B]

Contaminant	Units	Detection Limit	EQS		Borehole and standpipe reference								
					WS102			WS103			WS105		
					Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
pH	-	N/A	-		7.1	8.1	7.55	7.5	8	7.625	7	7.7	7.275
Ammoniacal Nitrogen (NH_4)	µg/l	< 50	-		87	882	449	< 50	247	124.25	< 50	251	109
Ammonia (NH_4)	µg/l	< 50	373	WFD 2015	87	882	449	< 50	247	124.25	< 50	251	109
Chloride	mg/l	< 1	188	WFD 2015	7	13	9.25	7	12	8.75	10	13	11.75
Nitrate (NO_3)	mg/l	< 0.5	37.5	WFD 2015	1.3	5.2	3.075	39.6	59.6	51.275	90.5	117	101.575
Nitrite (NO_2)	mg/l	< 0.5	500	UK DWS	< 0.5	< 0.5	< 0.5	< 0.5	0.9	0.6	< 0.5	< 0.5	< 0.5
Biological Oxgen Demand (BOD)	mg/l	< 5	-		< 5	< 5	< 5	< 5	13	7	< 5	8	5.75
Phosphorus	µg/l	< 100	196	WFD 2015	< 100	333	251	< 100	< 100	< 100	< 100	< 100	< 100
Ammonium (NH_4)	mg/l	< 0.05	-		0.09	0.88	0.449	< 0.05	0.25	0.124	< 0.05	0.25	0.11
Kjeldahl Nitrogen	mg/l	< 0.2	-		< 0.2	3.7	1.075	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Organic Nitrogen	mg/l	< 0.1	-		< 0.1	3.4	0.925	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

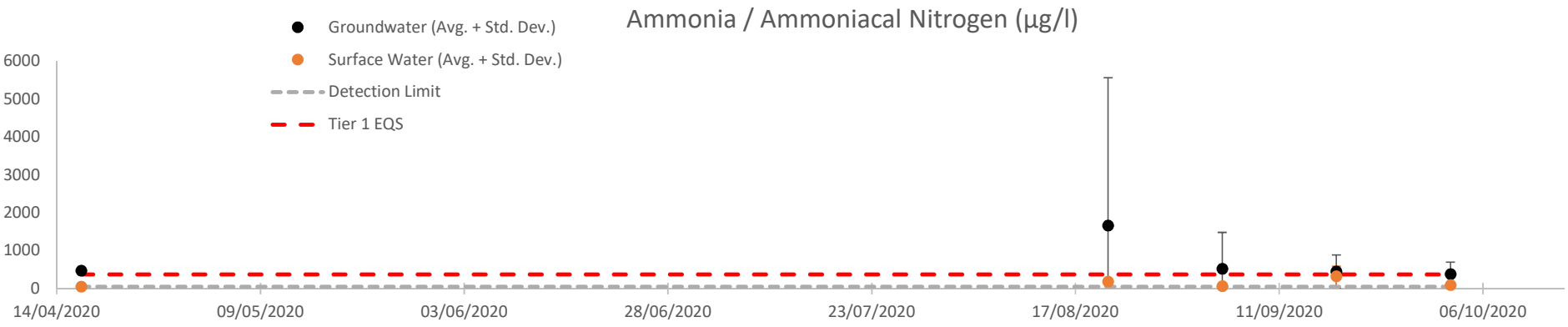
Table E2: Summary of groundwater analysis for WS102, WS103, and WS105

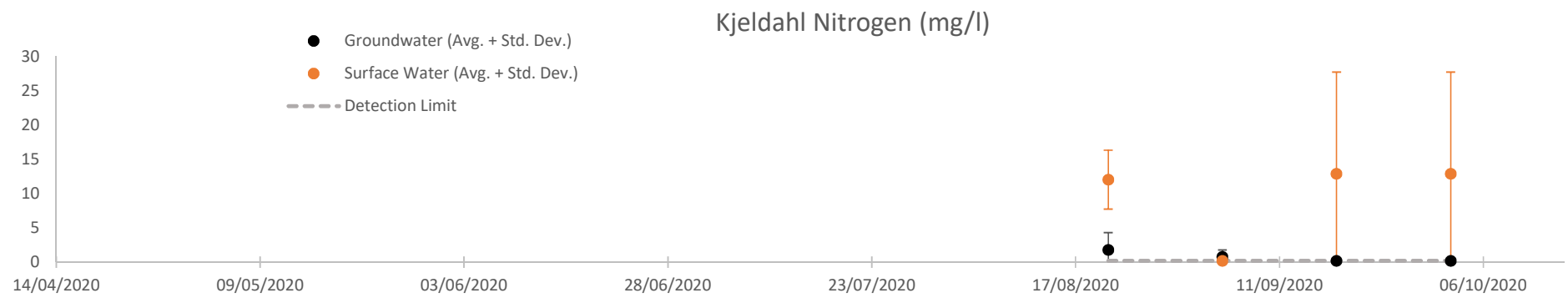
Key
Concentration exceedes the EQS
WFD - Water Framework Directive - Groundwater
UK DWS - United Kingdom Drinking Water Standards

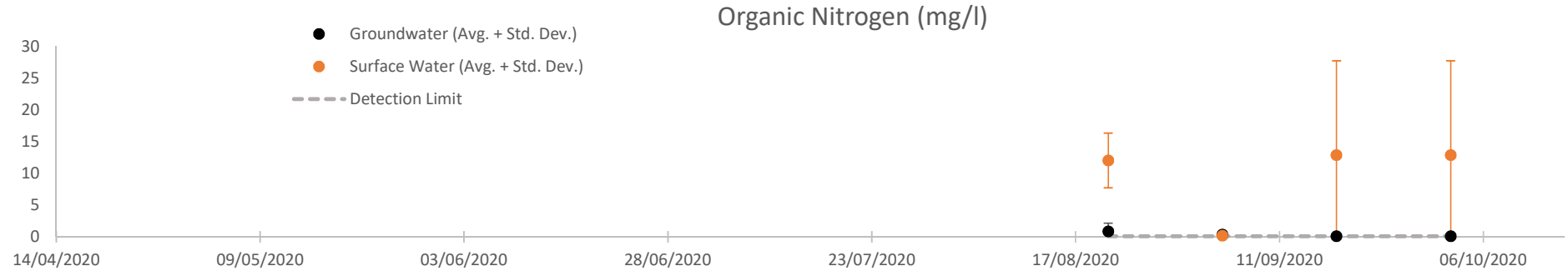
Contaminant	Units	Detection Limit	EQS (Good)		Surface water sampling point reference								
					SW01			SW02			SW03		
					Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
pH	-	N/A	6 to 9	WFD 2015	7.8	8.4	8	7.7	8.4	8.1	7.7	8.4	8.15
Ammoniacal Nitrogen (NH_4)	µg/l	< 50	-		71	627	250	< 50	221	136.5	69	171	114
Ammonia (NH_4)	µg/l	< 50	600	WFD 2015	71	627	250	< 50	221	136.5	69	171	114
Chloride	mg/l	< 1	-		54	75	65.75	53	75	61.75	53	80	63.25
Nitrate (NO_3)	mg/l	< 0.5	-		< 0.5	37.3	12.8	4.4	37.3	14.55	3.2	39.4	14.85
Nitrite (NO_2)	mg/l	< 0.5	-		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dissolved Organic Carbon (DOC)	mg/l	< 0.1	-		9.3	30.4	14.65	8.8	33.2	15.65	8.8	29.3	14.55
Total Hardness	mgCaCO3/l	< 1	-		252	371	325	236	372	314.5	237	369	320.75
Phosphorus	µg/l	< 100	253	WFD 2015	< 100	189	123.25	< 100	127	106.75	< 100	147	129.75
Ammonium (NH_4)	mg/l	< 0.05	-		0.07	0.63	0.251	< 0.05	0.22	0.13725	0.069	0.17	0.11225
Kjeldahl Nitrogen	mg/l	< 0.2	-		< 0.2	7.1	4.475	< 0.2	30	18.55	< 0.2	15	5.5
Total Organic Nitrogen	mg/l	< 0.1	-		< 0.1	7.1	4.45	< 0.1	30	18.525	< 0.1	15	5.475

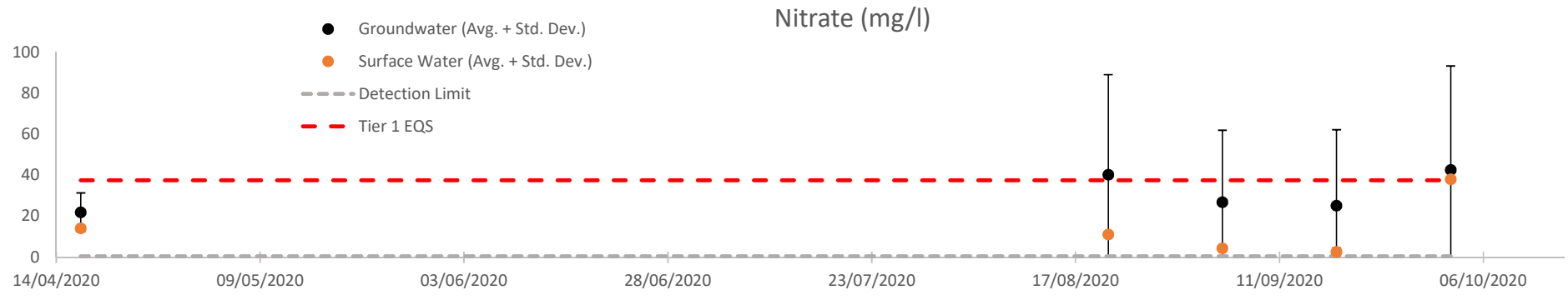
Key	
Concentration exceedes the EQS	
WFD - Water Framework Directive - Surface Water (Good)	

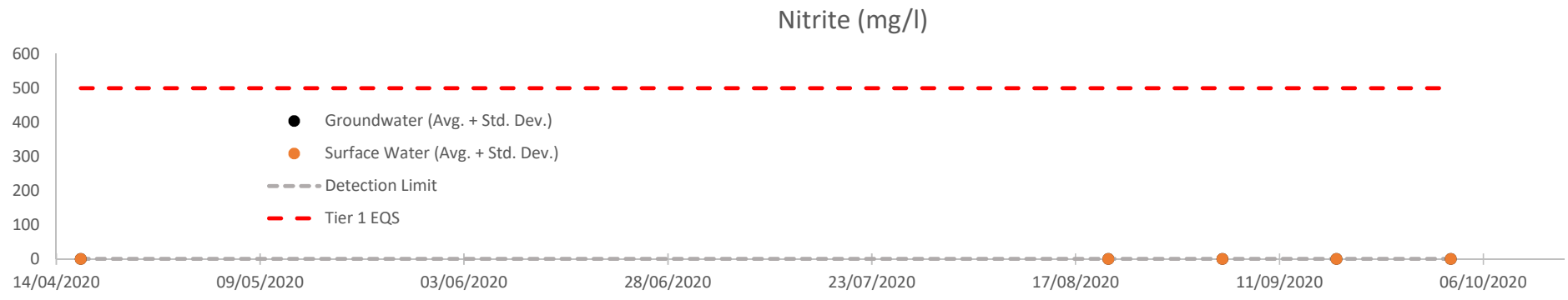
Table E3: Summary of surface water analysis

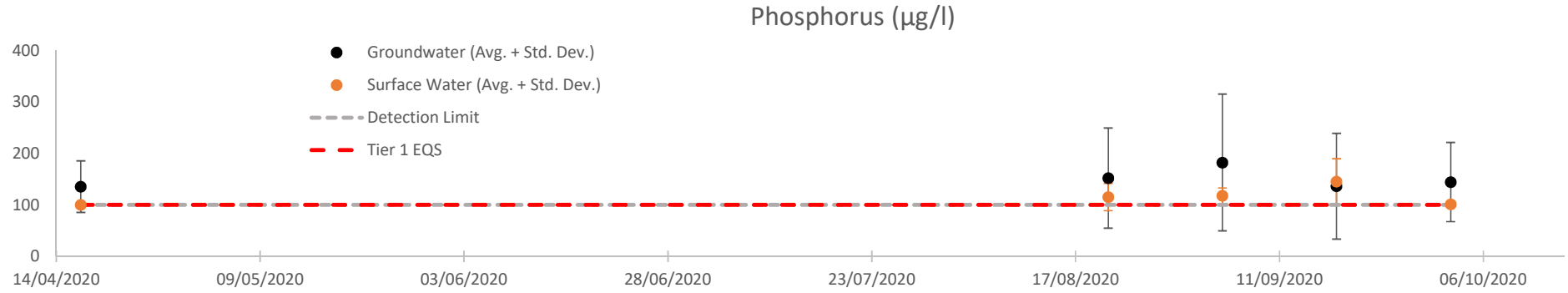


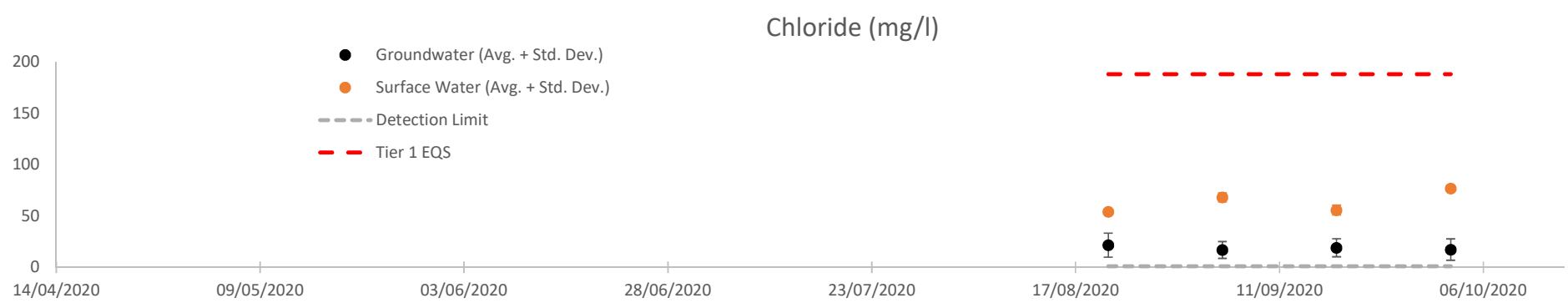






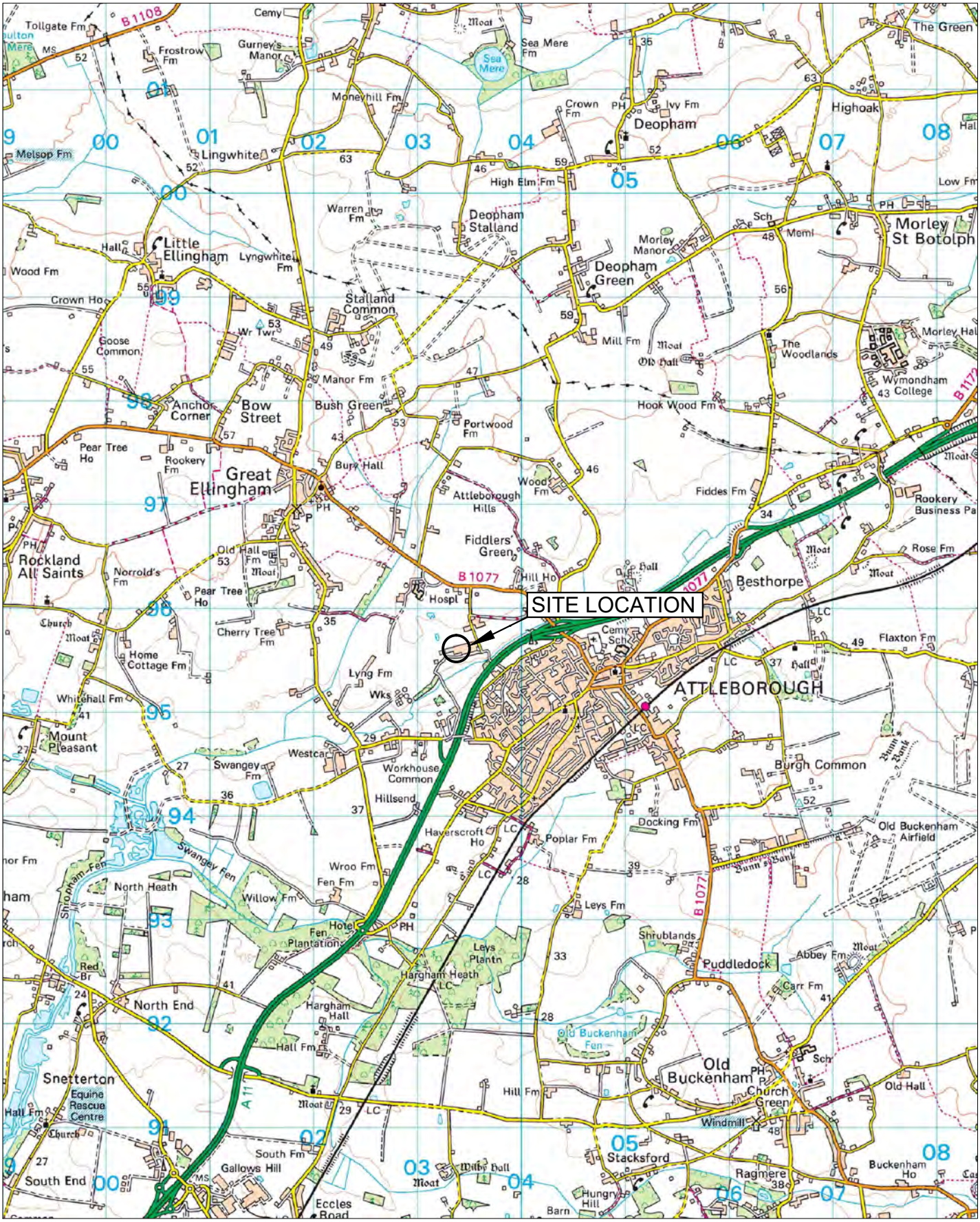






APPENDIX F: DRAWINGS

Drawing 19.287/DQRA/01	Site Location Plan
Drawing 19.287/DQRA/02	Exploratory Hole Location Plan
Drawing 19.287/DQRA/03	Exploratory Hole Location Plan (annotated)
Drawing 19.287/DQRA/04	Long Section (A-A')
Drawing 19.287/DQRA/05	Long Section (B-B')
Drawing 19.287/DQRA/06	Long Section (C-C')
Proposed Site Layout (Revision G)	BioConstruct, dated 30 August 2019



North

Circle indicates approximate location of site

Scale 1: 50,000 @ A4

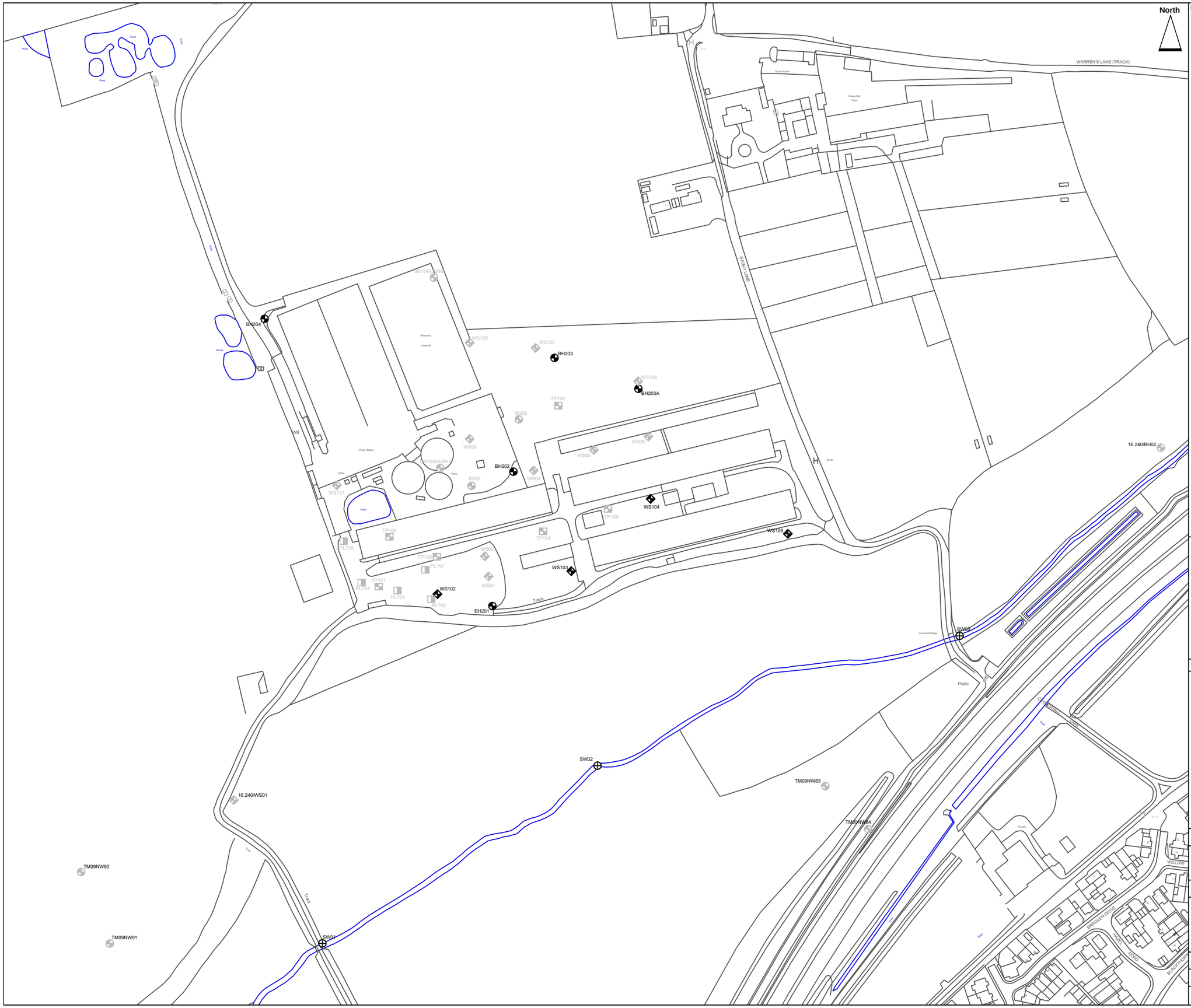
A F Howland Associates
Geotechnical Engineers

Site: SSAgri AD Plant, Ellingham Road, Attleborough

SITE LOCATION PLAN

Client : Privilege Finance Services

Date : October 2020 **Dwg :** 19.287/DQRA/01



Key:

- Borehole location and reference (including groundwater monitoring installation)
- Surface water sampling location and reference
- Previous window sample exploratory hole location and reference (including groundwater monitoring installation) (AFHA, 2020)
- Previous ground investigations (Harrison Group Environmental Limited, 2011a; AFHA 2016; AFHA, 2019; AFHA, 2020; BGS 2020)

Rev	Date	Revision Description	Drwn	Chkd

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mail: admin@howland.co.uk

Client: Privilege Finance Services

Site: AD Plant at Ellingham Road, Attleborough

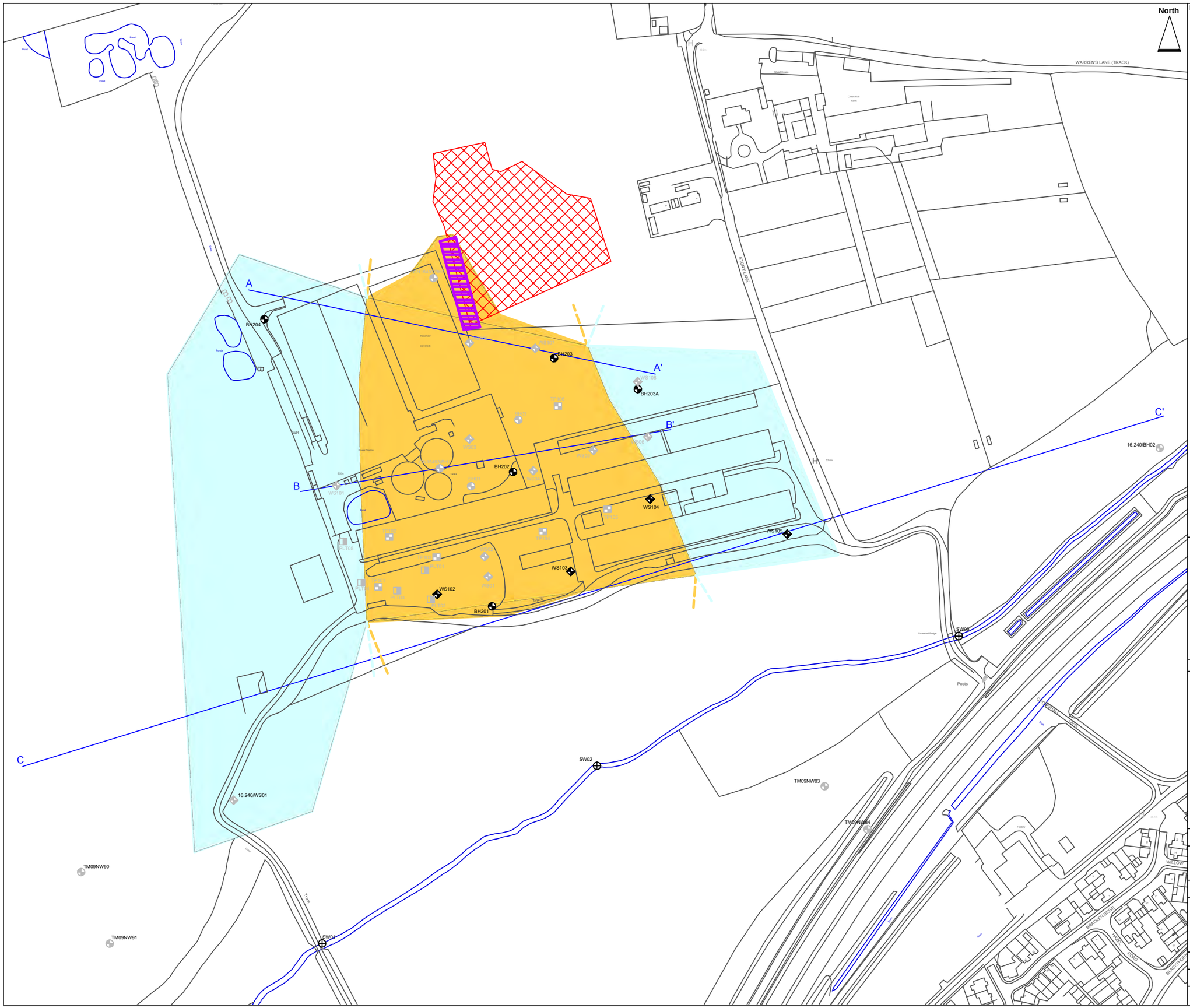
Job No.: 19.287

Drawing Title: EXPLORATORY HOLE LOCATION PLAN

Date: October 2020

Drawing No: 19.287/DQRA/02

Scale: 1:2,500 @ A3



Key:

- Borehole location and reference (including groundwater monitoring installation)
- Surface water sampling location and reference
- Previous window sample exploratory hole location and reference (including groundwater monitoring installation) (AFHA, 2020)
- Previous ground investigations (Harrison Group Environmental Limited, 2011a; AFHA 2016; AFHA, 2019; AFHA, 2020; BGS 2020)
- Area mapped as historic landfill
- Lowestoft Formation (Sand and Gravel)
- Lowestoft Formation (Diamicton)
- Approximate area covered by Harrison Group Enviromental Limited ground investigation (2011b)
- A A' Path of long section

Rev	Date	Revision Description	Drwn	Chkd

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Client: Privilege Finance Services

Site: AD Plant at Ellingham Road, Attleborough

Job No.: 19.287

Drawing Title: EXPLORATORY HOLE LOCATION PLAN

Date: October 2020

Drawing No: 19.287/DQRA/03

Scale: 1:2,500 @ A3

Elevation (mOD)

39.00 38.00 37.00 36.00 35.00 34.00 33.00 32.00 31.00 30.00 29.00 28.00 27.00 26.00 25.00 24.00 23.00 22.00 21.00 20.00 19.00 18.00 17.00 16.00 15.00 14.00 13.00 12.00 11.00 10.00

A

A'

603199E 295751N
(Corridor 70.00m, Bearing 103.04°)

603484E 295685N
(Total Distance 292.54m)

BH204 19.287

GN15493/BH2 19.287

WS106 19.287

WS107 19.287

BH203 19.287

WS108 19.287

BH203A 19.287

Key

- Water Strike
- Water Rise
- Highest Recorded Piezo Level
- Piezo Tip
- TOPSOIL
- MADE GROUND
- Silty gravelly CLAY
- Silty sandy gravelly CLAY
- Gravelly SAND
- Clayey silty gravelly SAND
- Clayey gravelly SAND
- Silty gravelly SAND
- Clayey GRAVEL
- Silty sandy GRAVEL
- Sandy cobbly GRAVEL
- Silty sandy cobbly GRAVEL
- CHALK

Additional Parameter: No Additonal Parameters

Horizontal Scale: 0 6 12 18 23

A F Howland Associates
Geotechnical Engineers

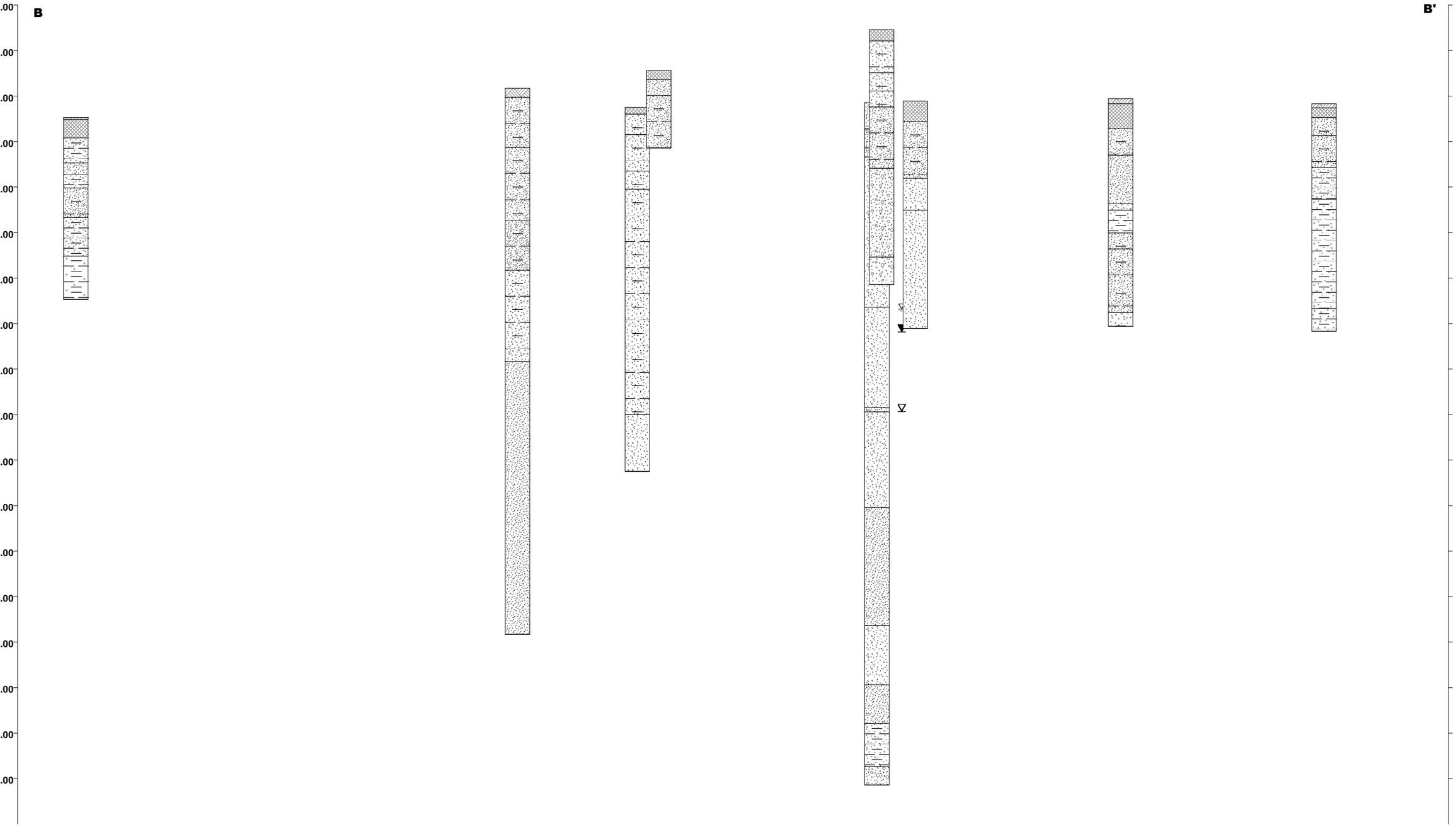
Site Anaerobic Digestor Plant Extension at Ellingham Road, Attlebor				
Title Long Section (A-A')				
Scale 1:791 [H] 1:137 [V]	**Drawn**	**Checked**	**Approved**	**Job No.** 19.287
Sheet 1 / 1	**Date** 13/10/2020	**Date**	**Date**	**Figure No.** 19.287/DQRA/04

Elevation (mOD)

37.00
36.00
35.00
34.00
33.00
32.00
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00

B

B'



603250E 295614N
(Corridor 52.00m, Bearing 81.77°)

603485E 295648N
(Total Distance 237.45m)

WS101 19.287
GN15493/BH1 19.287
BH01 19.287
WS03 19.287
BH202 19.287
WS04 19.287
BH02 19.287
WS05 19.287
WS06 19.287

Key

- Water Strike
- Water Rise
- Highest Recorded Piezo Level
- Piezo Tip
- TOPSOIL
- MADE GROUND
- Silty CLAY
- Gravelly CLAY
- Silty sandy CLAY
- Silty gravelly CLAY
- Silty sandy gravelly CLAY
- Clayey sandy SILT
- Gravelly SAND
- Clayey silty gravelly SAND
- Clayey silty gravelly cobbly SAND
- Clayey gravelly SAND
- Silty gravelly SAND
- Sandy GRAVEL
- Cobbly GRAVEL
- Clayey silty GRAVEL
- Clayey sandy GRAVEL
- Clayey silty sandy GRAVEL
- Silty sandy GRAVEL
- Sandy cobbly GRAVEL
- Silty sandy cobbly GRAVEL

Additional Parameter: No Additonal Parameters

Horizontal Scale: 0 5 10 15 19

A F Howland Associates
Geotechnical Engineers

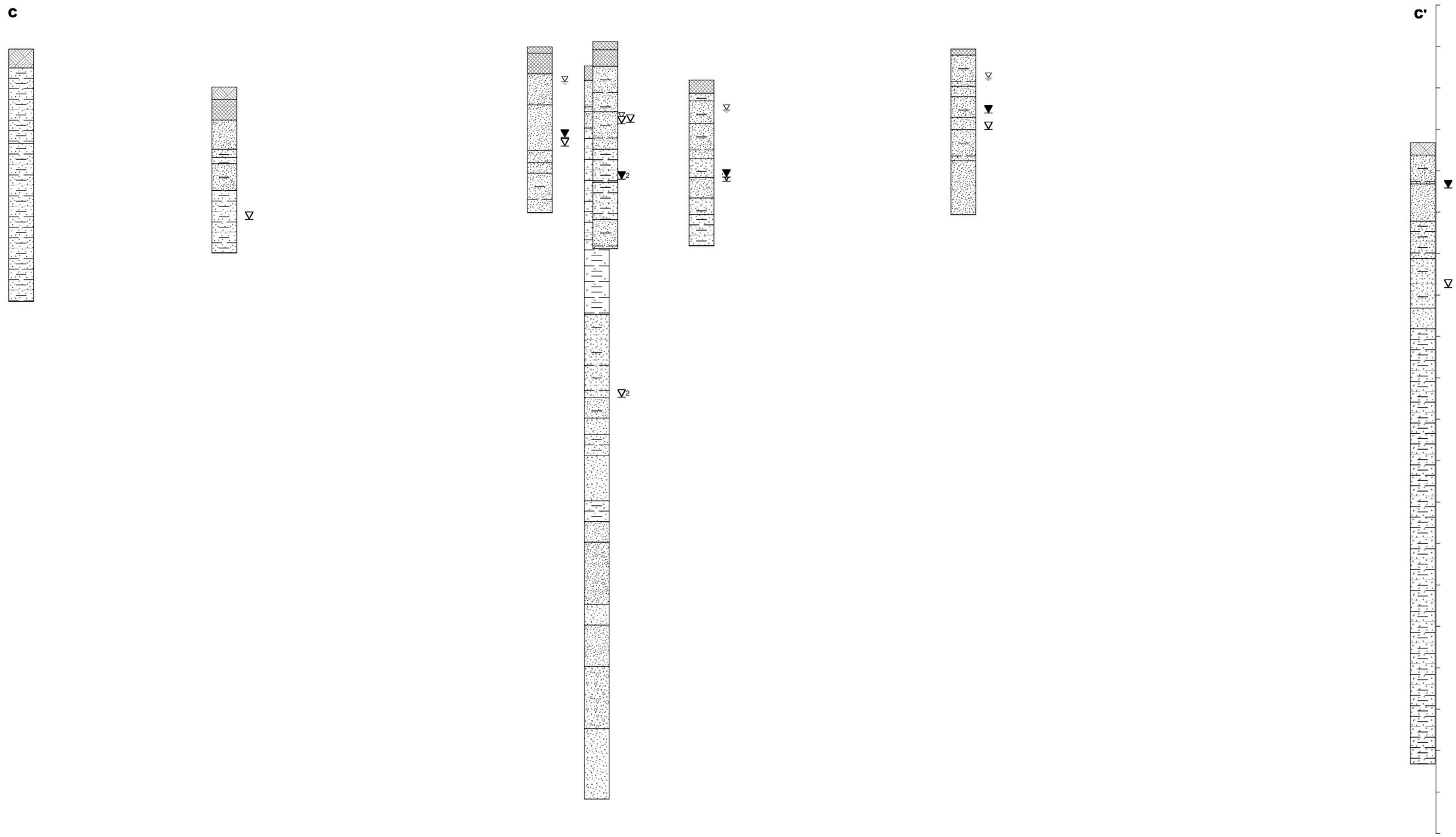
Site Anaerobic Digestor Plant Extension at Ellingham Road, Attlebor				
Title Long Section (B-B')				
Scale 1:641 [H] 1:85 [V]	**Drawn**	**Checked**	**Approved**	**Job No.** 19.287
Sheet 1 / 1	**Date** 13/10/2020	**Date**	**Date**	**Figure No.** 19.287/DQRA/05

Elevation (mOD)

33.00
32.00
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00

C

C'



603051E 295385N
(Corridor 115.00m, Bearing 70.29°)

603838E 295667N
(Total Distance 836.00m)

Key

- Water Strike
- Water Rise
- Highest Recorded Piezo Level
- Piezo Tip
- TOPSOIL
- MADE GROUND
- Silty CLAY
- Sandy CLAY
- Gravelly CLAY
- Silty sandy CLAY
- Silty gravelly CLAY
- Silty sandy gravelly CLAY
- Sandy gravelly CLAY
- Clayey sandy SILT
- Silty SAND
- Gravelly SAND
- Clayey silty SAND
- Clayey silty gravelly SAND
- Clayey gravelly SAND
- Silty gravelly SAND
- Silty gravelly cobbly SAND
- Sandy GRAVEL
- Sandy cobbly GRAVEL

Additional Parameter: No Additonal Parameters

Horizontal Scale: 0 17 34 51 67

A F Howland Associates
Geotechnical Engineers

Site Anaerobic Digestor Plant Extension at Ellingham Road, Attlebor				
Title Long Section (C-C')				
Scale 1:2257 [H] 1:94 [V]	**Drawn**	**Checked**	**Approved**	**Job No.** 19.287
Sheet 1 / 1	**Date** 13/10/2020	**Date**	**Date**	**Figure No.** 19.287/DQRA/06

BIOCONSTRUCT

building owner:	plan drafter:
SS Agri Power Ltd Ellingham Road, Attleborough, Norfolk, NR17 1AE	BioConstruct GmbH Wellingstraße 66 D-49328 Melle Tel.: +49 (0)5226 / 5932-0 Fax: +49 (0)5226 / 5932-11

place: Ellingham Road, Attleborough, Norfolk, NR17 1AE

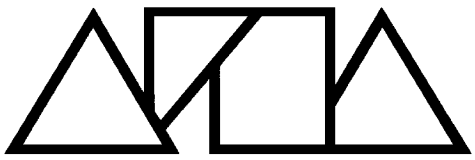
SS Agri Power AD Facility Extension

proposed site plan

filename:
plant layout_SS Agri (Privilege)_JAS_190927.dwg

project-nr. / plan-nr.:	scale:	plan size:
figure 3	1:500	DIN A1

		date:	name:
designed:		12.07.19	M.Jenkner
changed:			
nr.	kind of change:	date:	name:
a	revision layout	17.07.19	S.Striewski
b	revision layout	23.07.19	M.Jenkner
c	revision layout	31.07.19	M.Jenkner
d	revision layout	09.08.19	M.Jenkner
e	revision layout	26.08.19	M.Jenkner
f	revision layout	29.08.19	M.Jenkner
g	revision layout	30.08.19	M.Jenkner



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