



BOREHOLE CONSIDERATIONS



BOREHOLE WELL HEAD ACCESS



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1:00 Preamble

Before digging a borehole for domestic, commercial, or industrial extraction, many considerations need to be made.

A landowner in England or Wales needs help choosing where a borehole should be located. Environment Agency consent is required in England.

Consent should be sought based on several parameters:

1. The optimal location should be as far from contamination as possible, regardless of whether contamination is within the land or the surrounding area, such as former landfills.
2. Demand - determine if borehole equipment duties, capital, and operating costs are viable considering the probable request and intended use.
3. Geology – the type of strata, potential yield and depth. Guidance from other boreholes in the vicinity is a valuable source of information, as are British Geological Survey records.
4. Regulations – water extracted for private use in England and Wales is subject to Private Water Supplies Regulations 2016, as amended in 2018

The fundamental problem with ii) above is that once a borehole is sunk, neither the presence of water nor the quality or yield can be determined. For this, it is usual to enlist geology and hydrology expertise from specialists.

In addition to the proposed location, details of the purpose and requirement and compliance with appropriate regulations and standards are necessary when seeking consent.

In the United Kingdom, any borehole drilled beyond 15 metres for water extraction must be reported to the British Geological Survey (BGS).

2:00 Licence to Extract Water

Private Water Supply Regulations 2016, as amended 2018, govern the extraction of water for private use in England and Wales. If the dwelling is less than 10 m³, Regulation 8 applies. If there is more than 10 m³, Regulation 10 applies, and if there is more than 10 m³, Regulation 9 applies. It is important to note that these regulations are subject to amendment, so always use the latest edition.

To extract more than 20m³/d different licensing regulations apply.

In Scotland, a licence is required for any extraction of water.

It is unlikely that a license will be needed for such applications in England and Wales since a private dwelling rarely consumes more than 1.0 m³ per day (1,000 litres per day).



3:00 Private Water Supplies Regulations 2009

Water from wells, boreholes, or springs not supplied by a water utility company is covered by these regulations, which have been amended several times. The latest amendment (at the time of writing) was made in 2018.

In particular, they apply to water used for domestic purposes, such as drinking, food preparation, cooking, and bathing.

4:00 Borehole Drilling

When assessing capital costs, it is essential to consider that boreholes are long-term investments requiring sound construction and long-lasting components.

Regarding drilling equipment deployment, access to the drill site is a crucial consideration.

A contractor with experience is best suited to sink a borehole because of the specialised skills and equipment required.

Consult those who have local knowledge, experience, and recommendations.

5:00 Water Sampling

As an essential guide, the following should be the initial test parameters:

- Conductivity
- Enterococci
- Escherichia coli (E.coli)
- pH
- Turbidity

For further assessment, the following parameters may be considered:

Microbiological testing of water:

- Legionella bacteria
- Coliforms
- Total Viable Counts (TVCs,s)
- Pseudomonas aeruginosa and other Pseudomonas species
- Staphylococcus aureus



Chemical parameters:

- Scale
- Corrosion
- Dissolved oxygen
- Hardness
- Alkalinity
- Redox potential
- Chlorine
- Total dissolved solids (TDS)
- Metals
- Heavy metals

Physical parameters:

- Biological Oxygen Demand (BOD5)
- Chemical Oxygen Demand (COD)
- Total suspended solids (TSS)
- Silt Density Index (SDI)

6:00 Operation

Water supplies should be based on the Demand for private dwellings. To draw water, open the tap or faucet, flush the toilet, or turn on an appliance.

Private water supplies require some form of treatment before use, usually bacterial, sedimentary, ionic, or reaction-based. The analysis of extracted water can guide treatment and equipment selection.

It is crucial to maintain and operate any equipment installed correctly for maximum efficiency.



7:00 Demand

Demands and usage patterns are the same for residential, commercial, and industrial users. Careful consideration is required to optimise capital and operating expenditure.

A smaller unit operating for several hours per day is best suited for private use. Continental Europe is a bit higher in some regions, exceeding 230 lpd.

According to British tradition, the average family's water demands during breakfast and dinner are 200 litres per person per day. In contrast, the peak demand of 220 litres per person per day is possible twice a day, depending on the bathroom use.

Typically, a bath draws 180 litres of blended water, with 60:40% and 70:30% hot and cold, while the average adult displaces 70 to 80 litres. Thus, a bath requires approximately 110 litres of water. The Demand for showers is roughly the same, but it is influenced more by the duration.

Apart from direct hot water heating systems (combi boilers), residential accommodation has indirect hot water storage via header or diaphragm tanks. Indirect methods, however, store sufficient hot water to serve bathing and other requirements, reducing the Demand for cold water systems at any given time.

Using a diaphragm cold water storage tank meets peak flow demands with a smaller, more compact, and more economical treatment system than a larger unit that would often remain idle.

Choosing such equipment often overlooks the frequency of motor starts or short cycles that prevent motors from stabilising or starting loads from dissipating.

8:00 Water Regulations



In the United Kingdom water supplies for potable use whether from utility companies or private sources are governed by statute which are at the time of writing are:

England and Wales - Statutory Instrument 1999 No. 1148

[S.I.1999 No. 1148 – The Water Supply \(Water Fittings\) Regulations 1999](#)

[S.I.1999 No.1506 – The Water Supply \(Water Fittings\) \(Amendment\) Regulations 1999](#)

[S.I.2005 No. 2035 – The Water Act 2003 \(Consequential and Supplementary Provisions\) Regulations 2005](#)

[S.I.2013 No.1387 – The Construction Products Regulations 2013](#)

Scotland

[The Water Supply \(Water Fittings\) \(Scotland\) Byelaws 2014](#)

Northern Ireland – Statutory Rules 2009 No.255

[S.R. 2009 No.255 - The Water Supply \(Water Fittings\) Regulations \(Northern Ireland\) 2009](#)

There is a common misunderstanding particularly amongst specifiers that WRAS (Water Regulations Approval Scheme) is required for equipment and systems intended for potable water use.

WRAS is a wholly owned subsidiary of Water Regs UK Ltd, a private company.

It is not a mandatory requirement of the above regulations.