Attachment 1 – Scheme Description

1. Installation

The boreholes will be drilled and installed in four locations shown indicatively on Figure BHA2 and the associated works will take place within the red line boundaries shown on the same figure at land off Springs Road, Misson (see Figure BHA1). Where this application refers to the 'Site' this relates to the area within the blue line (land within the control of the applicant) as shown on Figure BHA2.

At each location up to three groundwater monitoring boreholes will be installed - a single deep borehole to target the bedrock Nottingham Castle Sandstone Formation and up to two shallow borehole to target a superficial sand and gravel horizon or isolated shallow bedrock sandstone/weathered sandstone horizon. The shallow boreholes will only be installed if an additional distinct water body is encountered which is isolated by marl or clay.

2. Design

The type of installation will be the same as that commonly used to install groundwater abstraction boreholes on farms and in the curtilages of residential properties etc. The design for the groundwater boreholes and headworks has been the subject of consultation with the Environment Agency and is shown on Drawing 47070055-GW-802-004.

3. Drilling and Installation

A rotary water well drilling rig (with a tricone drilling bit or a down the hole hammer capable of drilling a minimum 9" diameter (229 mm) hole) will be used to drill the deep groundwater monitoring boreholes to a depth of 30 m below ground level (bgl). The drilling will use either; air, air-foam or water as a drilling fluid. As the boreholes will be installed into a Principal Aquifer other drilling fluids will not be used. Water will be supplied from a bowser filled from the mains water supply at the adjacent existing commercial premises. The drilling equipment used to construct the deep monitoring boreholes is likely to be mounted on a heavy duty commercial 4x4 truck. An example of a commercially available rig with a 5.5 m working mast height is shown in the photograph below.

Figure 1: Example Rig

In addition, staff welfare facilities e.g. a small portakabin and portaloo (of the type shown in the attached welfare accommodation brochure) will be positioned within one of the areas shown edged in red on Figure BHA2 i.e. to the east of the buildings which form part of the existing commercial premises. Any shallow boreholes to be installed in the superficial deposits or to target perched water bodies will be up to 3 m deep and may use different methods e.g. a cable percussion rig.

As the boreholes are drilled, solid casing, a screen, a filter pack and grouting will be installed. These are illustrated in the design drawing 47070055-GW-802-004. These are important elements to ensure that the monitoring instrument only monitors the target strata and does not act as a vertical pathway that could link the surface to the aquifers or link different water bodies. The boreholes will be completed above ground level to minimise the risks of a pollution pathway to the groundwater via a sub-surface chamber (see Attachment 4 – Contaminated Land Review).

4. Preparation and Testing

Once each borehole is installed it will be prepared to make sure it is both responsive to changes in groundwater level in the target aquifer and that the water quality of samples obtained from the structure is representative of that in the groundwater body. Such preparatory work will be undertaken by a combination of:

- circulating potable water to remove all drill cuttings;
- airlift pumping; and
- pumping using a submersible pump.

The groundwater monitoring boreholes will be tested to measure the hydraulic properties of the aquifer. This would comprise variable head permeability tests for the shallow boreholes and short pumping tests of up to 8 hours duration for the deep boreholes.

5. Waste Management

The cuttings from the drilling of the boreholes will be collected in a skip for disposal at a suitably licensed offsite facility by a licensed waste contractor.

Water pumped from the borehole during preparation and testing will similarly be collected for disposal at a suitably licensed offsite facility by a licensed waste contractor.

6. Duration

The boreholes will be drilled and installed over a period of up to two weeks in each location – meaning that the overall duration will not exceed 8 weeks in total.

The rig will be operated during a typical working day i.e. between 07:00 and 19:00 and not during weekends or on Bank Holidays.

Monitoring of the boreholes will take place for at least 12 months and may be required for a longer period - depending on the outcome of development which is to be the subject of a forthcoming application for planning permission.

7. Traffic

Access will be via the existing entrance from Springs Road as shown on Figure BHA2.

The rig will be parked overnight throughout the drilling operation – meaning that the number of rig movements associated with the proposed development will be just two – one at the beginning of the operation when the rig is brought to Site and one to remove the rig when the operation is finished. In addition there will be occasional HGV movements (associated with the delivery of materials and the removal of cuttings and water) and occasional staff movements by car or van.

8. Completion

When no longer required, the headworks and the uppermost 0.5 m of casing will be removed from each borehole and the boreholes themselves will be backfilled – all in accordance with Environment Agency guidelines. In addition the surrounding areas affected by the works (four areas each not exceeding 2,250 m^2) will be reinstated to their original condition.