

FABER MAUNSELL  Marlborough House Saint Albans AL1 3UT	Project  <b>Buxton Crescent and Spa</b>				<b>Briefing Sheet 9</b>
	<b>Groundwater survey</b>				Job Ref <b>37900 ESC</b>
	Prep. by PS	Date Nov 2004	Chck'd	Date	Page 1 of 4

Location:

The Crescent, Buxton, , Derbyshire, SK17 6BQ

Client:

Trevor Osborne Property Group

Project

It is proposed restore the grade 1 listed Crescent in Buxton, and the grade 2 listed Natural Baths alongside, as the first new Spa Hotel in the country for over a hundred years. Whilst ownership of the two halves of the project will remain with the two current owners, Derbyshire County Council and High Peaks Borough Council, the procurement of the project has been assigned to the two Councils in partnership with a specialist developer, the Trevor Osborne Property Group.

Client

For the purposes of the contract the Client is the Trevor Osborne Property Group and all directions to Faber Maunsell are to be channelled through them.

The Client's contact details are:

Managing Director: Trevor Osborne  
Construction Director: Peter Ingram  
Address: 70 Conduit Street, London, W1S 2GF  
Telephone: Tel: 020 7851 2500  
Email: [property@topgroup.co.uk](mailto:property@topgroup.co.uk)

Correspondence for the Trevor Osborne Group is to be addressed to Peter Ingram. Day to day correspondence within the design team is not to be copied to the Trevor Osborne Group.

Layout

The Crescent and Natural Baths are situated in the middle of Buxton between a steep limestone hill to the south and a similarly steep Millstone Grit hill to the north. Behind the outside curve of the Crescent lies the River Wye, flowing from west to east. Before the Crescent was constructed in 1780 the Wye flowed as an open stream in the narrow valley between the two opposing hills. After the end of the construction of the Crescent it is reported that the Wye, local to the Crescent, was then roofed over to form a culvert. It was also reported at the time that the architect, John Carr, had the invert of the culvert smoothed so as to better provide for the unhindered flushing of foul effluent from the drains coming from the Crescent.

Buxton Water

The project is complicated because the Natural Baths and, to a lesser degree the Crescent, lie either directly above, or just to the side of, the springs for which Buxton is famous. High Peak Borough Council has contracted some time ago with Buxton Mineral Water Company for a significant quantity of this spring water, drawn off right below the western part of the project, to be pumped direct from the source to their nearby bottling plant. At the plant the water is bottled as a "natural mineral water" and sold across the country as "Buxton Water". It is a condition of the development that this supply is maintained as an uninterrupted flow up to the level set in the contract between High Peaks Borough Council and Buxton Mineral Water.

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### Copy Information

Copies of all correspondence are required to be sent to Erica Gardner, the Project Architect for the Lead Architect: Edmund Kirby in Manchester.

### Layout

FM are new members of the design team, replacing the then incumbent structural engineer after an OJEC interview. The original design team had, over a period of some years, built up a design for the Spa Hotel. This design, drawn by DA Architects, was presented to the post OJEC Design Team as the assumed basis for working up the Planning and then the Working Drawings. At present the assumptions behind this DA set are being scrutinised before proceeding to the Planning Drawings Stage.

### Parallel activities

- (a) A plan showing the desired development of the insides of the Crescent and the Spa has been prepared by DA Architects
- (b) A contract is being let to enable the culverted River Wye, with the side soughs, to be surveyed.
- (c) A contract is being let to enable geophysical surveys to be run over the current ground and basement surfaces.
- (d) A flood risk assessment is being undertaken for the Crescent area.
- (e) A hydrogeotechnical assessment is being made of the relationship between spring water and ground water in the Crescent area.
- (f) A schedule of test pits required has been prepared by Faber Maunsell. The number listed will increase as the early structural details for the Crescent and Spa are developed. No digging of these pits will be permitted until authorisation has been received for the Hydrogeologists.

### **Buxton Spa – Specification for ground investigation**

#### **BACKGROUND**

The geology of the site, based on interpretation of the BGS geological maps, comprises Namurian shales and mudstones possibly with gritstone bands and the Carboniferous Limestone, overlain by alluvial deposits. The junction between the two rock types runs across the study site. The thickness of the alluvial deposits overlying the bedrock is not known, though considered unlikely to exceed 5m.

#### **PROPOSED WORK**

##### **Item 1**

The work involves the drilling, using either a hand-held or mechanical window sampling technique, of probeholes around the Crescent building and on land surrounding the site. Approximately 35 probeholes shall be drilled to an approximate maximum depth of 5m. Up to five of the probeholes shall be drilled in basements or cellars with very limited access. A method statement for gaining access to these locations shall be provided.

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In addition, there is a small risk that certain of the probeholes may prove overflowing artesian groundwater conditions. A method statement shall be provided which outlines the contingency measures which will be adopted to control artesian conditions and to install monitoring facilities without allowing uncontrolled flow of the confined groundwater into the overlying deposits.

Approximately 20 of the probeholes shall be equipped for groundwater and gas monitoring with the installation of 35mm diameter PVC lining – the details of which will be determined for each probehole by the site engineer. The lining shall be completed with a water-tight cap. Each monitoring probehole shall be completed at ground level beneath a lockable, steel stop-tap cover, cemented in place. The remaining probeholes shall be backfilled with bentonite cement.

## Item 2

**NOTE: This item of work will be carried out following completion of the probeholes (Item 1) but may not follow immediately after completion of Item 1.**

This item of work involves the drilling of up to eight boreholes using a rotary drilling technique to estimated depths of up to 10m.

At three locations, two boreholes will be drilled. One borehole will be drilled using a rotary coring technique to produce a core of nominal diameter 50mm through the Namurian strata and approximately 5m into the underlying Carboniferous Limestone. The second borehole will be drilled using a rotary open-hole technique to a depth approximately 1m above the base of the Namurian strata. At the two other locations, the boreholes will be drilled through the limestone using a rotary coring technique to a depth of approximately 10m.

Each borehole shall be lined with 50mm diameter PVC, or similar, lining – the details of which will be determined for each borehole by the site engineer. The borehole lining shall be completed with a water-tight cap. Each borehole shall be completed at ground level beneath a lockable, steel top-tap cover, cemented in place. A Waterra sampling valve and tubing shall be placed in each borehole.

It is likely that the groundwater in the Carboniferous Limestone is confined by the overlying Namurian strata and the alluvial deposits and there is a risk that overflowing artesian groundwater conditions may be encountered. A method statement shall be provided which outlines the contingency measures which will be adopted to control artesian conditions and to install monitoring facilities without allowing uncontrolled flow of the confined groundwater into the overlying deposits.

A Bill of Quantities for the two items of work is attached for completion. The Conditions of Contract for the work will be The Institution of Civil Engineers, Conditions of Contract for Minor Works.

## SUPERVISION

The works will be supervised by a representative of FaberMaunsell Limited, who will be present throughout the investigation. The representative from FaberMaunsell Limited will collect soil samples from the probeholes for subsequent laboratory contamination testing.

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### **LABORATORY TESTING (for information only)**

Samples recovered from the probeholes will be submitted to a suitably accredited, independent laboratory for geochemical testing together with samples of any groundwater present in the probeholes and boreholes. Soil and groundwater samples will be analysed for the suite of parameters listed in Tables 1 and 2 respectively. The analytical suites may be modified based on the nature of materials proved in the probeholes.

**Table 1 – Soil analytical suite**

pH, arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc, boron, cyanide (total, free, and complex), sulphide, sulphur, sulphate, PAH, phenols, TPH, VOCs, SVOCs. Asbestos screen if any visible evidence is identified.

**Table 2 – Groundwater analytical suite**

As soils, plus electrical conductivity, COD, ammoniacal nitrogen (as N), chloride, sodium, potassium, calcium, magnesium, alkalinity, nitrate.

### **MONITORING AND REPORTING (for information only)**

Monitoring visits at monthly intervals subsequently will be carried out to monitor the groundwater level in each probehole and borehole. If water is present in the monitoring holes, a groundwater sample will be collected from a number of the monitoring points at quarterly intervals.