

South Wales Trunk Road Highways & Structures Framework 2023

A465 Neath Masonry Arch Foundation Investigation & Scour Protection



Method Statements

➤ Core Drilling & Reporting (Rev A)



A465 Neath Masonry Arch Foundation Investigation & Scour Protection



Method Statement

**Coring to piers and abutments
(Rev A)**

T5014 Neath Masonry Arch Coring Investigation

Preliminary methodology

Scope of fieldworks:

- Service clearance of each exploratory location using GPR non-intrusive PAS survey;
- 4no vertical drilled holes at A465 99 Neath Masonry Arch to establish foundation depth, wall material and material beneath the foundations;
- Sampling and in-situ testing of strata beneath foundations;
- Backfilling of core holes with a lime concrete.

Deliverables:

- Laboratory testing of core samples;
- Provision of factual report and photographic records

Proposed site equipment and services:

- 1no multipurpose Commachio drilling rig, with equipment to provide a variety of drilling options for penetrating the existing structure and founding strata (available techniques include concrete coring, rock coring and open hole drilling techniques;
- Compressor;
- Cement mixer;
- Water bowser;
- Personnel vehicle;
- Trailer;
- Temporary fencing around borehole positions;
- Hand tools for removal/reinstatement of hardstanding;
- Suitable PPE

Protection of Works and Surrounding Area

Working areas will be cordoned off using tall Herras fencing with a heavy duty plastic sheeting attached to stop water and dust from being spread from the drilling (see photo below showing the barrier used at Little Haven by Quantum) and suitably signed, ensuring that no plant or materials are left unattended at any time.



High Heras fencing with sheeting use at Little Haven next to a heavily trafficked public footpath.

A drilling marshall will be in attendance at all time to warn the public of the drilling and then to get the drillers to stop work, whilst the pedestrian passes safely.

Whenever possible all equipment will be stowed away overnight in the steel stores within the Main Contractor compound. No hole shall be left open and unsecured at any time.

The herras security fencing will be padlocked at night to prevent entry to the works.

Services have been investigated at each borehole location by the client – as evidenced by the 4 tarmac reinstatement areas. However, as an additional precaution, any live services/ utilities shall once again be suitably demarcated following completion of the PAS survey.

Members of the public will not have access to the working areas. No excavation will be left unattended or open overnight. Any inquisitive members of the public will be directed to our client.

Mobilisation

The works are envisaged to extend for 2 weeks with all plant and equipment mobilised to site on the morning of Day One. All supervision and co-ordination of fieldworks will be undertaken by Quantum in conjunction with the Centregreat and Atkins.

Test Locations

Provisional locations of intended exploratory hole locations are shown on the tender drawing FD04_001-ATK-SBR-SWTRA-DR-CB-0001 (a copy of which would be appended to our RA-MS document). Hole locations shall be marked out by BGCBC/QGL on site as per proposed site location plan, but may be adjusted in consideration of the PAS survey results

Supervision

Supervision of the site works will be undertaken by one of Quantum's fully qualified and experienced Engineering Geologists

Works Duration & Working Hours

The fieldworks duration is provisionally determined to be approximately two weeks on site. Working hours are 08:00 – 17:00 hrs Monday to Friday light permitting. Should a borehole be nearly complete at 17.00 hrs, we will request permission to use temporary lighting to complete the borehole in a timely manner after 17:00hrs.

Personal Protective Equipment (PPE)

Suitable and appropriate Personal Protective Equipment (PPE) will be used throughout the works. Any protective clothing and boots shall be removed at the hygiene facilities prior to leaving site. Good personal hygiene shall be kept in check to prevent any spread of potentially contaminated soils with no food to be consumed onsite where potential contaminated land lies. Hi-visibility clothing will be kept in good order at all times

Re-fuelling

Re-fuelling of machinery will take place on areas of hardstanding where possible. Spill trays and absorbent plant nappies will be used when re-fuelling. Quantum propose to undertake refuelling at the Centregreat site compound, requiring any machinery will have to relocate accordingly. Any contaminated spill kit materials will be double bagged securely sealed and labelled and disposed of at a licensed waste receiving facility by Quantum.

Additional Remarks

Quantum will carry out Site Inductions for any site visitors and workers. Regular site meetings and toolbox talks with Quantum personnel prior to commencement of shifts will be undertaken to ensure that all site personnel are refreshed of the hazards and risks posed on site

Daily and weekly plant maintenance checks will be carried out by competent persons for all plant and machinery. Any incidents / accidents on site shall be reported to the Quantum Project Manager as soon as practicable and recorded on Quantum's intranet database incident/accident reporting system. Throughout works, Quantum will maintain a safe and tidy site and the correct PPE will be worn within defined working areas

All Quantum site personnel will actively aid Centregreat and Atkins throughout the scheme particularly with landowner liaison and public inquisitiveness

Methods of Work

Rotary Drilling: Methodology

Prior to drilling, each borehole location shall be set out in agreement with the Client whilst taking due consideration of any site-specific considerations and existing land use. Hand excavated service inspection pits to 1.2mbgl will be dug at each location to check for the presence of any buried services / utilities. Each borehole will only be undertaken once a permit to break ground has been issued and understood. All borehole working areas are to be securely fenced off and signed to prevent public interface with the works

The proposed drill rig to undertake the boreholes would be the Commachio MC305. The drill rig is metal track mounted and has a diesel engine and is powered with the drive being transmitted through hydraulic or clutch gearing to the swivel head that provides rotation to the rods and core barrel. Prior to drilling the drill rig will be set up that includes stabilising the rig by extending outriggers. Air/Mist flush medium will be utilized during the drilling process provided by a 400cfm/170psi compressor.

A drilling marshall will be in attendance at all time to warn the public of the drilling and then to get the drillers to stop work, whilst the pedestrian passes safely.

The boreholes shall be progressed depending on conditions encountered within the existing structures.

Open hole rotary drilling methods is an option if the construction material is loose or fractured, where the ODEX drilling system will be used to progress the drilling through the structure whilst maintaining the structural integrity of the boreholes. The ODEX drill bit, guide and hammer along with the lead casing length are drilled into the ground then the process repeated with additional drill rods and lengths of casing added to progress the borehole. Upon encountering rock head, ODEX casing will cease progression. Air mist will be used to progress drilling through the superficial soil deposits and switched to water flush when rock is encountered.

If the construction material within the structure is unreinforced mass concrete (as anticipated) where the bore will remain open and stable, the borehole will be progressed using concrete coring techniques.

Upon encountering rockhead, a core barrel is lowered to the base of the borehole through the addition of drill rods and progresses through the rock through rotary action. The cores are recovered in 1.5m lengths (nominally 76mm diameter), which once drilled is recovered from the borehole by the removal of the drill rods. This process is repeated to progress the borehole to the required depth.

Core bits will be governed by the specific rock type encountered and the coring rate achievable. In typical medium strength sandstones and siltstones, surface diamond and tungsten carbide bits will be most appropriate. The core recovered is placed immediately in sound wooden core boxes in a specific manner, to enable examination and for safe storage.

On completion, the borehole will be backfilled with a heritage lime concrete mix (1part NHL5 lime to 3 parts graded aggregate of 10mm gravel down). The water to lime and ratio shall be the minimum required to create a low slump mix, so as not to flow too far from the borehole.

A portable cement mixer will be used to mix the concrete on site.

The lime will be stored in a watertight container in the Contractors Compound area and brought to the works only when needed. The aggregate and sand will be supplied in 1t builders bags.

Clean potable water (not river water) shall be used to mix the concrete at surface, which will then poured under gravity (no pressure) into the open bore. For this site, a Fosroc Cebex 653 additive will be added to the mix to minimise potential concrete flow into open cracks surrounding the bore.

The outside faces of the bridge shall be continuously monitored by Centregreat during concrete injection to

detect any leaks through the bridge outside face. If leaks are spotted, the concrete injection shall stop immediately and timber wedges driven into the concrete leaks (likely to be an open joint) to prevent concrete loss into the river.

In the event concrete does seep through cracks on the outside face of the bridge, the concreting will be terminated and recommence when the concrete has set

A set of 4 number 150mm x 150mm x 150mm concrete cubes shall be taken from each borehole. The cubes shall be stored in a water bath at 20°C and then transported to a local laboratory (to avoid damage during transit) after 7 days, and then tested for compressive strength at 28 days. The cube results shall be reported to the Site Supervisor within 1 day of crushing.

All associated rotary drilling plant and materials shall be kept onsite, including a 400cfm compressor and drill string equipment. Air/mist flush will be used during the coring process, unless water flush is required to improve recovery rates. Recirculation system may also be used when coring where necessary to reduce any water arisings from the borehole/ where source of water for drilling use is limited

The drilling crew and Quantum Site Manager will remain vigilant to ensure detailed logs are undertaken, particularly relating to voids or open spaces encountered or loss of air/water flush. In addition, they will also continuously monitor the immediate area to ensure no ground movement, masonry cracking or disruption is occurring due to the drilling process

All soil and rock samples obtained from the various investigation shall be logged in accordance with BS 5930 +A2: 2010. Photography of core and of trial pits shall be in accordance with the specification. All logging Engineers shall be versed and shall follow the methods outlined in the Specification

All samples handled carefully and managed with utmost due care and attention to minimise any disruption of the sample to ensure that Class 1A samples remain as Class 1A samples until the samples are tested within the dedicated Laboratories. Detailed logging of samples shall take place on site