Archimedean Screw
Hydropower installation at
Bullhouse Mill

CONSTRUCTION METHOD STATEMENT

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Lead consultant: Stuart Moore

Mann Power Consulting Ltd.
Manor Farm
Kirkham
YORK
YO60 7JS
01653 619968
info@mannpower-hydro.co.uk
www.mannpower-hydro.co.uk

Mann Power Consulting Limited Registered in England: Registration No. 5014120 VAT No. 836353519
Registered Address: Equinox House, Clifton Park Avenue, Shipton Road, York YO30 5PA

Construction method

It is proposed to clear the former intake and the initial part of the silted mill lade, excavate a new channel from this through the adjacent ridge at the riverbank, and excavate/build a mounting position for the Archimedean screw turbine which will descend back to the river.

An area will need to be de-watered to enable the works to take place. This will proceed only at low water in the summer seasonal window agreed acceptable for works in river and subject to the grant of relevant Environment Agency consents for the dates in question.

The contractors appointed to undertake the construction will be required to provide a detailed method statement which must adhere to licence conditions regarding pollution prevention, safeguarding the surrounding soil and vegetation from unnecessary damage, and the removal of invasive species. Prior to construction work, an ecological assessment of the site will be carried out.

Vehicular access to the site lies across improved grassland in the ownership of the client. Some upgrading of the track may be required if construction takes place when the ground is wet.

A summary of the proposed method is provided below.

Part of the works will take place outside the river, and can be scheduled independently of the dewatering operations. The new channel will be excavated from where it deviates from the path of the historic lade. Where the new channel approaches the screw location, over falling ground, shuttering will be erected and concrete poured to form side walls and base to the channel. The area for the upper base of the screw will be excavated, and a hardcore foundation prepared, before laying a reinforced concrete base. Shuttering will be erected to form the side walls and the supporting structure for the upper end of the Archimedean screw will be formed from reinforced concrete designed to carry the calculated loads. The intake chamber will also be formed together with slots for the sluice gate and coarse screens to be fitted. The sluice gate and screen will be fitted. A control shed and a fenced wooden access platform will be built.

To allow the in-river excavation areas to be de-watered and prevent any pollutants from entering the river during construction, a coffer dam will be formed around the proposed intake and outflow points. Two rows of 1 tonne ‘dumpy’ bags filled with sand or gravel will be used to achieve this, with the space between filled with sand to seal the gaps. A submersible pump will be used to remove the water, which will discharge continuously through a silt trap formed from straw bales back into the river below.

Within the upper cofferdam, the existing intake opening will be restored to the desired dimensions and made good, and silt will be removed from the historic channel up to the point where the new channel will deviate. Stop logs will be introduced at the intake.

Within the lower cofferdam, shuttering will be erected and concrete poured to form the lower mounting point for the screw. The screw will be lowered into position using a crane, and installed according to the detailed instructions referenced above. Watertight joints will be grouted.

The cofferdammed areas will be tidied and the cofferdams removed, then stop logs removed to allow the channel to fill. Electrical connection will be made and the system will be tested and commissioned. The site will be tidied and unused materials removed.

When the system is running, it will be possible to draw down the water flowing over the weir at times of low flow. This will then enable repairs to be carried out to the weir crest, including the reinstatement of boards, and the installation of a fish pass of the agreed design down the face of the weir.

Please refer to the scheme design drawings appended below and the Detailed Installation Instructions for the Archimedean screw for more details.

Risk Prevention/Mitigation Measures

- All operatives will be made aware of the need to protect the watercourse from contamination.
- If possible, the construction will be carried out during the dry summer months.
- The works will be carried out in accordance with the principles within the EA's Guidelines on Above Ground Oil Storage Tanks, Working in Watercourses and Construction and Demolition Sites (PPG2, PPG5 and PPG6).
- Fuel storage tanks will be stored at least 10m from watercourses and away from areas where collision with vehicles is likely. Areas where deliveries are proposed will be protected with impermeable surfaces and isolated from surface water drainage.
- Fuel will be stored in steel tanks including secondary containment complying with relevant standards.
- The checklist in PPG2 will be used to ensure protection measures are in place.
- Chemicals and oils will be kept in a locked steel container.
- Pollution spill kits will be kept on site. In the event of an incident these will be used. In the event of a spill a temporary bund will be put in place.
- Any soils contaminated will be removed immediately to a suitable landfill site
- Bins will be provided for debris.
- Geotextile materials silt fences will be installed below excavations to filter suspended solids from runoff.
- When/if pumping, care will be taken in pump sizing. Water will be discharged away from the watercourse and via a straw bale/geotextile filter to prevent entry of silt into the watercourse.
- Bank restoration will be carried out operating from the bank rather than the watercourse.
- Cementitious material will not be placed in the water.
- Cleaning of tools and shuttering will be carried out in water not draining directly to the watercourse.
- In any event of expected heavy rain concrete will not be poured. Therefore we do not expect to have any surface run off from wet concrete sections.
- Any cement stored on site will be properly packaged, and any part used bags will be removed at the end of the working day.