

**Application number:** NPS/WR/005499

**Licence number:** TH/039/0016/003

**EA Region:** South East

**Date of Application:** 22 July 2011

**Applicant details:** Abingdon Hydro Community Interest Company, 30 Bury Street, Abingdon, Oxfordshire, OX14 8QX

**Summary of the proposal:** The applicant has applied to install and operate a new hydropower scheme at Abingdon Weir on the River Thames. The scheme will consist of three 4 blade hydrodynamic screw turbines with a new fish pass also being installed at the site. There is also an existing Larinier fish pass at this site, upstream of the weir.

The applicant will create a new cut adjacent to the existing weir to install the three turbines. The turbines will be 3.2 metres in diameter with a rotational speed of 23 revolutions per minute (rpm). The proposed channel will be approximately 29 metres in length and will enter the river downstream of the weir pool. A new footpath, over the turbines will be constructed. The turbines will be covered to ensure the turbines are not obstructed and for safety purposes. The applicant will also install a new fish pass, which will need to be a natural like stream and suitable for all fish species.

A sluice gate will be installed immediately in front of each turbine. These will be automatically operated by a control system that will be linked to a level sensor. The level sensor will be calibrated to the water level at the lock, when the water level drops below the prescribed level the scheme will shut down. The sluice gates will automatically open, in turn, when the water level is sufficient to enable abstraction to take place. There will be two variable speed turbines and one fixed speed turbine, these will be programmed to ensure that pulsing does not occur during times of abstraction.

**Source of Supply:** Inland water (river) known as Abbey Stream at Abingdon Weir, Abingdon, Oxfordshire.

**Points of abstraction and quantities:** Between NGR SU 50530 97204 and SU 50545 97193.

1,382,400 cubic metres per day

504,576,000 cubic metres per year

At an instantaneous rate not exceeding 16,000 litres per second.

**Means of abstraction:** Gravity feed intake structure to three 4 bladed Hydrodynamic screw type turbines controlled by a level sensor and a controller.

**Purpose of abstraction:** Power production: Hydro-electric power generation.

**Abstraction period:** All year.

**Case history:** Pre-application undertaken between November 2010 and January 2011, when we recommended that applicant submit a formal application.

The applicant submitted a formal application on 22 July 2011. The scheme was advertised in the Oxford Herald on 7 September 2011. Since this date the layout of the scheme has changed. The applicant was required to alter the layout of the scheme and the turbine discharge location has now changed. Changes to the proposed fish pass type and location have been made and the final fish and eel pass designs will be assessed under the fish pass approval.

**Justification of quantities:** The applicant has applied to abstract at a rate of 16,000 litres per second. This is lower than the Qmean (provided by the applicant but considered to be suitable by the Environment Agency) value of 26,800 litres per second. The annual quantity applied for is based on 365 days at a daily abstraction rate of 1,382,400 cubic metres. Although the Agency's Hydropower Good Practice Guidelines (GPG) states that the maximum annual abstraction quantity should be based on 220 days at the maximum daily rate, the proposed annual abstraction quantity is considered to be appropriate. This is because the proposed annual abstraction quantity is less than 220 times the Qmean of the river ( $220 \times 26,800 \times 3.6 \times 24 = 509,414,400$  cubic metres).

The power calculations show that the scheme will generate a maximum of 190kW. This is based on the turbines operating at an efficiency of 73.3%, which is considered to be a reasonable estimate of the efficiency rate for this type of turbine.

Therefore, the quantities applied for are considered to be reasonable and fully justified.

**Resource assessment:** The Catchment Abstraction Management Strategy (CAMS) resource assessment status for this area is 'over abstracted'. However, this proposal is for a non-consumptive abstraction. All of the abstracted water is returned to the River Thames approximately 35 metres downstream, so there are no impacts on water resource availability due to this proposal. The abstraction rate is less than Qmean for this river and a Hands off Level (HoL) condition will be placed on the licence to ensure that downstream lawful rights are not impacted.

**Impact assessment of proposal:** With the conditions applied to the abstraction licence the scheme is not expected to adversely impact on downstream water resources, water quality, conservation, ecology, fisheries or recreation/amenity.

Discharge point: The local Fisheries Officer raised concerns that the location of the discharge from the turbines would impact upon important habitat at the river bank, downstream of the weir. During the determination the applicant agreed to a new discharge location and has changed the layout of the scheme. This change will ensure that the habitat at the river bank is not impacted.

New fish and eel pass: The original proposed fish pass was considered to be insufficient to ensure suitable fish passage for all fish species. The applicant will install a natural, meandering fish pass as part of the scheme. The fish pass will require approval from the local Fisheries Officer prior to construction; this will be conditioned on the licence. The installation of this fish pass will ensure the safe passage of all fish species over the migration barrier caused by the weir. The licence will also state a minimum attraction flow of 500 litres per second through the fish pass at all times that abstraction takes place.

Existing fish pass: The applicant will be required to ensure that the flow reserved for the existing fish pass is not impacted. The licence shall be conditioned to ensure this and will require a flow of at least 300 litres per second at all times that abstraction takes place.

The applicant will also be required to maintain a prescribed water level, enforced by HoL condition. Maintaining this level will ensure sufficient flow within the Abbey Stream and over the weir. This level will also ensure that navigation interests are not impacted. The scheme will immediately cease abstraction if the level drops below the prescribed value and if the control systems fail.

**Statutory Consultation:** No concerns were raised by any of the external bodies consulted as part of the determination of this application.

**External Representations:**

48 letters of representation were received with regard to this application. The following concerns were raised.

Main points raised during representations	How was this point taken into account?
<b>Amenity</b>	
The Abbey Stream is of historical interest as it was used for mill grinding in the 10 <sup>th</sup> Century.	The flows in the Abbey Stream will be protected by means of the HoL being maintained. The Licence Holder will be required to ensure a prescribed level is always maintained within the Abbey Stream; when they are abstracting.
The aesthetics of the site would be changed.	This area is not regarded as having a high amenity value. There are public footpaths in the nearby area, so it is understood that members of the public will see the installation on a regular basis. However, it is considered that the installation of this scheme could become a feature of the local landscape. Therefore, in conclusion it is thought that although the installation of the scheme will change the aesthetics of the site, it will be a positive impact rather than a negative one.
<b>Recreation</b>	
This scheme will result in a loss of a facility used by canoeists and kayakers.	The Licence Holder has discussed the scheme with local canoe clubs. The Licence Holder will require an agreement to be in place before abstraction can take place, this will be conditioned on the licence document.

<p>This scheme will make the area unsafe for recreational users.</p> <p>The Environment Agency has a duty to encourage the recreational use of water.</p> <p>This site is regarded as a unique site for canoe and kayak users.</p> <p>There are limited sites with similar recreational opportunities nearby.</p> <p>A suitable Hands off Flow should be maintained to ensure there is no impact upon recreational users.</p>	<p>The agreement will ensure that suitable opportunities for recreational water users are available during times of abstraction. The details of the agreement are for the applicant and the local canoe clubs to arrange; there is no requirement for the Environment Agency to be involved in these discussions.</p> <p>The licence conditions will require the applicant to maintain a HoL. This level has been set to ensure that the downstream interests within the Abbey Stream and over the weir at Abingdon are not impacted. This level will also ensure that navigation interests are not impacted. The scheme must immediately cease abstraction if the level drops below the prescribed level and if the control systems fail.</p>
<p>The scheme reduces the public right of way at this site.</p>	<p>There will be no impact on the public right of way following the installation of this scheme as the applicant will be installing a new public footpath over the hydropower turbines.</p>
<p>The scheme will impact upon portage for recreational users.</p>	<p>The scheme is not considered to impact upon any existing portage or access sites for this watercourse. The applicant is working with local canoe clubs to ensure that there is no impact upon the recreational use of this site.</p>
<p>General</p>	
<p>There will not be enough water available for this scheme to work.</p>	<p>The abstraction rate applied for is lower than the Qmean for the River Thames at this location. The quantity of water applied for is considered to be a reasonable estimate of the quantity required for this scheme to generate renewable energy at an efficient rate. However, the issue of an abstraction licence does not guarantee that the quantity or quality of water required will be available.</p>
<p>The proposed scheme is not financially viable.</p>	<p>The scheme has been assessed as applied for. The financial viability of a scheme is not considered by the Environment Agency, this is the responsibility of the applicant. A self destruct time limit will be applied to ensure that, in the event the scheme is not completed, the water resources associated with this scheme are not unnecessarily tied up.</p>
<p>The applicant has not consulted with members of the public prior to submitting an application.</p>	<p>There is no legal obligation for any applicant to consult with the public prior to submitting an abstraction licence application. However, the applicant has provided evidence that some public consultation was undertaken prior to the application being applied for.</p>
<p>Applications for 4-blade turbines are not currently being authorised by the Environment Agency.</p>	<p>At the time the application was submitted the Environment Agency was considering the approval for schemes using 4-blade turbines. The policy at the time was to entertain the application, but that no decision would be made until approval had been granted.</p> <p>The Environment Agency now accepts that 4-blade turbines are suitable for hydropower schemes. This scheme will require a compressible silicone rubber extrusion to be installed on the leading edge of each turbine. This scheme meets the requirements to ensure</p>

	that no additional screening is required.
The scheme will pollute the river.	There are no water quality impacts expected due to this proposal. The applicant will require a Flood Defence Consent prior to commencement of construction. The Flood Defence Consent will outline the methods of best practice and ensure that pollution during construction does not occur.
Hydropower is not an effective method of generating energy.	Hydropower schemes harness the energy from flowing water to generate electricity. This method of power generation is a renewable source and will contribute towards the Government's target for the UK to achieve 15% of its energy consumption from renewable sources.
The installation of this scheme will impact upon the social and economical well-being of the local community.	This proposal has been put forward by a local community group. No impacts upon the social and economical well-being of the local community are anticipated due to the installation of this scheme. It is often the case that the installation of such a scheme encourages other local community members to investigate methods of renewable energy for their personal/business use.
The scheme will help to meet Governments renewable energy targets.	This scheme (if constructed) will help towards achieve the renewable energy target set by the Government.
The scheme will provide the local community with an educational and attractive feature.	<p>The installation of this scheme may prove to be a way of educating the local community about sources of renewable energy. It is often the case that the installation of a hydropower scheme encourages others to investigate renewable energy sources.</p> <p>It is considered that the installation of the scheme will change the aesthetics of the site; it will be a positive impact rather than a negative one.</p>
Archimedean screw turbines are a 'fish friendly' form of hydropower.	Investigations, carried out by a third party organisation for the Environment Agency, have shown Archimedean screw type turbines to be less harmful to fish than many other types of turbine used for hydropower. This has been considered through the GPG, hence a less restrictive requirement with regards to fish screening for Archimedean screw type turbines. Modifications to Archimedean screw type turbines are often still required to help reduce the impingement, entrapment and entrainment of fish during times of abstraction.
<b>Fisheries</b>	
<p>The installation of this scheme will result in a loss of spawning sites in the area.</p> <p>Native species to this river are in decline. The installation of this scheme will make the situation worse.</p> <p>A full fish survey should be requested.</p>	<p>During the determination of this application the applicant has altered the layout of the turbines (following discussions with the Environment Agency's Area Fisheries Officers). The applicant was requested to alter the layout, in particular the discharge point, to ensure that the important habitat at the river bank would not be impacted.</p> <p>The applicant has also been informed that they will have to provide a natural, meandering fish and eel pass as part of the scheme. This will ensure that all fish species can safely pass the barrier caused by the weir.</p>

<p>The installation of this scheme will reduce the effectiveness of the existing fish pass.</p>	<p>A full fish survey is not required as the fish pass that will be required, as part of this scheme, will be suitable for all fish species. The applicant will be required to gain approval from the local fisheries team prior to abstraction taking place.</p> <p>While installation of this scheme is likely to impact the effectiveness of the existing fish pass at this weir, however a flow will be maintained through it which will be a condition of the licence meaning the existing fish pass will still be suitable for passing fish.</p>
<p><b>Ecology</b></p>	
<p>The ecology of the local water environment will be impacted due to the installation of this scheme.</p> <p>The reed beds and important habitat will be impacted due to the installation of this scheme.</p> <p>The morphology of the water environment will be impacted due to the installation of this scheme.</p>	<p>There are no ecological impacts expected due to the installation of this scheme. This is because any licence issued will contain appropriate conditions to ensure that the flow within the Abbey Stream and over the weir will remain at a suitable level. This will be managed by means of a HoL condition that will require the applicant to immediately cease abstraction if the water level falls below the prescribed level. A prescribed flow will also ensure that flows are maintained in the existing fish pass and new fish and eel pass. Navigation interests are also maintained to a suitable level, due to the HoL.</p> <p>The water levels are managed at this site by the lock keeper. Any licence issued will require the applicant to comply with instructions given by the lock keeper during times when additional water is required for navigation purposes or maintenance purposes.</p> <p>The applicant was required to alter the layout of the scheme. The purpose of this was to protect the habitat at the river bank and to direct more water to the foot of the weir. This will help to retain the weirpool and morphology of the river at this site.</p>

**Protected Rights:** The applicant will be required to reach an agreement with local canoe clubs before abstraction can take place. This is because the installation of this scheme is likely to reduce the time available for recreational uses at Abingdon Weir. The agreement will be between the applicant and local canoe clubs to ensure that the turbines operate at a reduced rate, or shut down completely, to allow recreational users to use the water and features of the weir and will be a condition of the licence.

Lawful uses of water have been considered and appropriate measures to safeguard them have been taken.

**Conservation Issues:** No designated sites were identified nearby. All sites designated under the Habitats Directive and the Countryside Rights of Way Act (CRoW) 2000 are more than 6 km from the point of abstraction and will not be impacted due to this abstraction taking place.

**Costs/ Benefits:**

The inclusion of level conditions will ensure there is enough water for the environment. The proposal accords with local water resources policy and is sustainable.

The proposal is not considered to have an adverse effect on other licensed abstraction or other lawful interests.

The proposal includes the installation of a new fish pass, this will ensure that this barrier remains passable by all fish species.

**Biodiversity and sustainable development:** There are no expected impacts toward the biodiversity or ecology at this site. This is because the applicant has followed advice from the Environment Agency to alter the discharge location of the turbines and because the scheme is considered to be non-consumptive. The applicant will be required to maintain a suitable water level as to ensure the flow in the Abbey Stream remains at an appropriate level. As mentioned above, this method of water level management will also retain sufficient water over the weir and for navigation purposes.

**Social and Economic welfare of rural communities:** No adverse effects upon the social and economic well being of local communities in the rural area are perceived as a result of this proposal and the imposed licence conditions.

The scheme may encourage others to produce electricity using renewable sources.

This site is frequently used for by canoeists and kayakers for recreational purposes. The agreement with local canoe clubs condition placed on the licence is sufficient and appropriate to ensure that the site can continue as a recreational facility.

**Conclusion and recommendation:** The Environment Agency's decision is to grant the licence with conditions. The principles of sustainable development are embodied in the conditions attached to the licence. Full and due consideration has been given to any representations made, and due regard has been taken of protected rights and other lawful interests.

The conditions incorporated on the licence are considered to be necessary and reasonable in the light of the available and presented evidence. The conditions are also considered to be consistent with appropriate standards for enforcement by the Environment Agency.

**Contact the Environment Agency team responsible for this decision:** [psc-waterresources@environment-agency.gov.uk](mailto:psc-waterresources@environment-agency.gov.uk)