

Object to Proposal

Application number: I4/3732/FUL

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Comment: Objection to I4/372/FUL

28th October 2014.

Development and Planning Control Office
London Borough of Richmond upon Thames
Civic Centre
York Street Twickenham TW1 3BZ

Dear Sir/Madam,

Please register my strong objections to planning application I4/3732/FUL

I write with particular technical expertise of over 50 other Hydro projects including this site (2009). I am qualified by virtue of my 35 year career as an engineer and from living, working and navigating the River Thames for 25 years. I have consulted with my peers and other hydro power experts in this field and make references to publicly available records.

After reviewing the evidence of recent installations (Romney et al), ongoing projects (Molesey Weir) and future schemes (Thames Flood Relief schemes) and other similar projects in the UK, this application fails to achieve the minimum expected standard of accuracy, diligence and conflict management necessary for successful implementation of a hydro power scheme.

The planning application, as submitted, does not accurately assess the impacts of the proposed development or put forward appropriate mitigation. I do not therefore see how planning permission could be granted.

Summary of key concerns

The most significant concerns raised within this objection may be summarised as follows:

- During the summer, the full bulk of the generating plant will be visible above the water line. It will be revealed as a large engineered structure, extending 30m either side of the existing weir.
- The acoustic data is based on different technology, at a different site, located away from the bankside. The proposals include screws over two times longer than those at Romney, where the data originated. The approach of relying on noise figures from this alternative site is therefore completely inappropriate.
- Using EA guidelines, between 5 and 10 tonnes of debris is likely to accumulate. This has not been mentioned in the application. The storage and arrangements for removal of this waste must be fully considered, before the planning application can be determined. Until this is done, the impacts of the proposals, including visual, cannot be fully assessed.
- Cofferdams, such as the one proposed, are vulnerable to flood events. This was observed during the 2014 floods at the Molesey Weir improvement works, where the cofferdam increased localised flooding of Ash Island by up to 450mm. No mitigation has been put forward, to address this unacceptable impact.
- Even with its omissions and shortcomings, the flood risk report states that there would be a slight increase in flood risk as a result of the proposals. This is not permitted under a wide range of legislation and must be addressed.
- It is widely recognized that certain designs of Archimedean screw are problematic, leading to issues such as bearing failures. The application fails to refer to the impacts of this, for example in relation to flood risk and noise.

- It is not permitted within the electricity regulations or the electricity supply acts to clip a cable along the sea wall from the weir to the local substation. This indicates that one of the most significant aspects of the project has yet to be designed. The impacts of such infrastructure, in terms of visual appearance, heritage impacts, ecological impacts and impacts on trees are therefore unknown.

It seems clear from these summary points alone that the proposals should be refused planning permission.

Detail of Objections

1) Issues with the position of the plant

The generating plant has bulk and mass over and above that of any other part of the weir and, being adjacent to the bank; its scale is oppressive to the adjacent landowners.

The existing landscapes at this site are not considered by this application. On the one hand, at low tide during the summer, the bulk and massing of the generating plant will be fully exposed. It will be revealed as a large, engineered structure extending 30m either side of the existing weir structure. Whilst during high tides and higher winter water levels it will still present blocked in and blocked out views of the river above the water line, not in keeping with the rest of the landscape and engineered structures of the weir which are typified by slender structures with through views.

The generating plant is located at the riverbank within a large mass of concrete. This structure has a profile that is an impediment to high flows. As such there are increased flood risks due to bow wave, afflux and hydraulic jump to consider.

Please refer to EA publication Hydraulic principles. During the 2014 flood at Molesey Weir works, a rise in the local flood water level was observed around all structures by 150mm to 300mm, specifically around the cofferdam water levels rose by 450mm. The water levels (afflux) were 25mm higher at the bank side 50m away. Also observed at Molesey Weir was an asymmetric bow wave forming around the bank side works. This local effect is also predicted for this application, increasing flood risk to the adjacent land owners during high flows.

The current position of the generating plant replaces the most recently constructed part of the weir (1992) and functional fish passes. This location has no known defects. The EA have identified defects and asset replacement works to the rest of the Weir.

Please refer to EA drawings of the weir, EA structural inspections, and EA asset replacement works Condition Assessment Manual (Environment Agency 2006) Teddington Weir.

The effects of the local microclimate and the effects of this bank side location on the river have not been assessed by the applicant.

Debris and materials will be drawn towards the intakes to accumulate around the trash screens, the river bed and the river bank. Other schemes report becoming blocked with debris and gravel and no reference is made by the applicant to estimate the volume and type of debris in accordance with EA requirements.

Placing the generating plant at the bank side significantly increases the conflict and nuisance to the adjacent land owners.

The period of operation is not stated by the applicant. It currently appears that 2 cycles of opening sluices, starting turbines, closing sluices, stopping turbines will occur at any time of day or night, to follow the tide. This is characterised as an intermittent and out of hours nuisance.

The acoustic data is based on different technology at a different site away from the bank side. The applicant's proposal includes screws over two times longer than those at Romney where the noise data originated.

No acoustic analysis has been undertaken during start up and shut down cycles when the background noise of the weir overflow changes.

The build-up of debris and likelihood of blocked intakes, along with the health risks of any materials, is a nuisance to the adjacent land owner. Using EA guidelines, between 5 and 10 tonnes or 20m³ of debris is likely to accumulate. This may require a waste disposal license.

There is no information relating to the numbers and frequency of visitors likely to be permitted access to the generating plant. The plant and viewing platform overlooks adjacent properties, a swimming pool, secure training facilities and areas for private functions.

The bank side location will require cofferdam construction adjacent to low lying land and a bank already susceptible to overtopping.

It is an EA requirement to consider dual probability events when assessing risks during construction and operation. Cofferdams are vulnerable to flood events, as observed during the 2014 flood event at the Molesey Weir improvement works, where the cofferdam increased localised flooding of Ash Island by up to 450mm.

The bank side location of intakes and sluices will increase the flow towards the bank. There has been no condition survey relating to the existing bank to ensure that no undermining of the bank or its trees will occur.

Reference to EA publications: Deposition and Scour report?. The typical change in the depth of the river is <0.5m when last undertaken in 2008 / 2010. The most recent EA 2014 Bathymetric Survey data is not yet available.

Reference also to EA living on the edge the responsibilities of riparian owners and EA statements regarding biannual surveys of the river bank.

The original intention, published by the EA, was not to locate hydro power adjacent to the opposite bank from the access road and lock but within the existing weir complex. The basis of the decision to change the placement of the turbines to the bank side are not visible from T21, TRBMP or TLS or meeting minutes which are attended by the EA and LBRUT.

Closer inspection of flows across the weir, and the condition of the weir itself, indicate that the existing smaller zig zag gates, away from the bank side, exhibit the potential for higher energy production, which would then receive a higher tariff and would cost less to construct. A reduction in scale to a total installed capacity of less than 100 kW and centralising the turbines would manage many of the conflicts and represent better value for money.

Issues with the analysis of flood risk.

The planning application includes a flood risk assessment that is incomplete and not independent, as it was revised and prepared by the applicant. There are significant shortcomings in the analysis and the following items are omitted.

Any relevant information subsequent to recent flood events (no reference to EA reports and actions, EA Bathymetric survey, lessons from other hydro power schemes and in river works.)

Any study of changes in the use of the Thames Barrier (DEFRA / EA Use of the Thames Barrier prioritised for increase in tidal not fluvial flood events).

Calculations confirm that any fluvial flows over 200m³/s would represent a flood risk to adjacent properties upstream and downstream at high tides without the barrier in operation. Over the last 120 years there have been 26 events at Teddington where the flow rate exceeded 400m³/s.

At this flow rate, very high damaging flood levels upstream would be;

6.8 AOD at Trowlock Island

6.6 AOD at Thames Ditton Island

7.4 AOD at Ash Island

Upstream flood relief schemes are in progress or have been completed for the Jubilee River and Molesey Weir, increasing conveyance to Teddington

Historical records and recent rainfall and flow data confirm that within the last 120 years there have been three events where flow exceeded 700m³/s at Teddington. None of the flood risk reports have modelled this data. It is believed that the capacity of the weir is around 600m³/s without the hydro power scheme.

Future confirmed upstream flood relief schemes include dredging Lord Desborough's Cut and further weir improvement works planned for over the next 5 years, increasing conveyance to Teddington.

Further flood relief schemes are planned with new channels to Wraysbury and Walton, also increasing conveyance to Teddington.

There is no analysis of the effects of other significant events increasing flood risk at the location.

For example, debris calculations use a factor of three to increase scour and deposition and screen blockage rates. There have been at least three barges and 12 small boats trapped against the weir at this location. EA requirements include dual event probability (worst case). Future flow and catchment area analysis suggests that the winter increases in flow will be in the +25% range for short periods.

Even with the omissions, the flood risk report states that there will be a slight increase in flood risk as a result of the generating plant being installed. This is not permitted under a wide range of legislation. The EA ISIS TUFLOW

model predicts higher levels upstream by up to 0.1 m (this is not negligible).

None of the cumulative effects of these schemes have been included in the flood risk assessment process.

The downstream boundary used by the applicant's model uses 2.6m at Southend but according to Hydrographic Office and navigation charts, MWHS is 5.7m at Southend.

The report acknowledges that any obstruction of the weir could promote new flooding and new flow routes across adjacent land.

The flood risk does not consider a 14.8m by 3m obstruction represented by a closed or blocked structure.

The authors of the flood risk report acknowledge that there are contradictions and instability with the model results, including greater than negligible flood risks.

The flood risk does not correctly model the pier structures across the weir or the ancillary building or the open sluice gates. There is no identification of when over-topping the bank level occurs.

Issues with safety

The planning application includes an assessment of risks using very low likelihoods, impacts and risks. The assessment does not appear to reflect the high risks of drowning and concludes that it is the responsibility of the other river users to manage the risks.

Reference the ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS (RoSPA), 2004, online information on statistics associated with drowning.

National Water Safety Forum.

Available from: <http://www.nationalwatersafety.org.uk/inlandwatersafety/facts.htm>

There are no risk assessments or mitigations for operatives when the generating plant is in operation. There are significant risks associated with the manual raking and clearing of intake screens.

Reference the EA guide Trash and Security Screen Guide. Designers must avoid compromising the functioning of the screen by not making proper provision for access for routine maintenance and emergency cleaning operations?

The frequency of debris clearance operations along with debris storage and consideration of the various blocked intake scenarios has not been offered.

Other hydro schemes (Settle and Dart) experience peaks of debris clearance operations. Observations of the annual debris likely at this location are between 5 and 10 tonnes.

It is normal industry practice for all rotating machinery to be fitted with an emergency stop button. The application does not reference the normal practice.

Other hydro schemes provide accessible shut down buttons for canoeists and in case of emergency (Abingdon).

The analysis has not identified many of the concerns of river users, for example, being drawn into the screws via a lanyard or attachment and having no means of escape.

The risk assessment provided by the applicant allocates a very low likelihood and risk contrary to the 15 deaths and 344 rescues that occurred in the River Thames during 2013.

The applicant's proposals do not comply with the electrical regulations and have been poorly designed. It is not permitted to run the generator when there is no grid connection. It is not permitted to run a cable along the protected sea wall.

The proposed turbine is two times as long and has many more blades and flights than that previously submitted. There are additional risks associated with this change which are not addressed by the applicant.

A greater proportion of the turbine, its shaft and blades will be exposed and submerged in the river. Longer flights introduce greater entrapment risks and are noisier than shorter flights. A longer shaft introduces higher torsion and turning moment forces to the supporting structure and bearings. The turbines proposed do not have published performance data; they are non-standard items that exceed the scale of the manufacturer's normal products.

Issues with navigation

Planning policy requires that there be no negative impacts to existing established users of the River Thames as it is a major navigation, recreation and tourism attraction. There has been no study, or consultation of the impacts on the peak commercial or public navigational use during summer.

There are negative impacts and conflicts associated with permitting the applicant the rights to abstract water at this location, due to its primary function being to hold back water for low flow and low tide navigation.

It is of great concern to navigation interests, that there are no studies or consideration of the prima facie function of the weir. Providing sufficient draught and a navigable channel, water for locking leakage, drinking water abstraction, habitat and migrations protections have precedence over consumptive hydropower flows (fresh water to sea water body). LBRUT and the EA have existing established duties to protect, preserve and maintain the navigation over and above hydro power at this location. Reference is made to the recent very low flow year of 2011 described within the application. This confirms that flow in the river was below the level permitted for abstraction (10.8 m³/s) for over 7 months. The applicant's proposals would only have been able to operate for 5 months of the year at best. During these low water flows, navigation and abstraction must take precedence.

There is no recent bathymetric survey data in the application and the profile of the river bed is still unknown. Given that most of the structure is below the water line, the 2011 Flood Risk Assessment is incomplete and should not be considered sufficient for the planning application. Observation concludes that the new large concrete apron and foundations for the intakes are, in fact, impediments to flow.

The proposals indicate an intake set 2.5m below the zero level of the weir. The navigable channel of the river is typically 2.5m from this zero level. There is grave concern that under failure scenarios of the plant or when the applicant exceeds their draw, that vessels may ground out.

Structural Issues

There is no discussion relating to the structural integrity of the existing weir or narrative, from the EA, relating to asset replacement works, planned and required, to the whole of the weir complex.

Reference the EA Thames Asset management report and works required at Teddington. Government policy, DEFRA and DECC indicate that the EA, as conservators, must give precedence to this over and above granting specific rights to a private development generating electricity. An EA integrated design scheme and co-ordinated construction, that is more future proof, could remove this conflict and represent the best value for money.

Closer inspection of the drawings reveal there are significant catastrophic and structural failure risks due to the length of the turbines being proposed. Blade loss, tube and bearing collapse, failure of bearings and structural fixings all will have significant risks to all river stakeholders. There is no mitigation and no assessment of these issues.

References have been made to a number of failures and critical repairs for the applicants design of the turbines. Insurance claims include The Settle Hydro site's failures of two bearings, the latest of which resulted in 6 months outage (May 2014). The EA also recognise that certain designs of Archimedean screw are problematic.

Observation records there are already defects with some of the existing central weir structures. The EA originally identified that new hydro power would be located in the central part of the weir, as this section requires repairs and works. No defects have been observed at the newest part of the structure where the existing fully functional fish passes and structures are now being intended to be removed and placed concurrently with new turbines.

Issues with diligence and completeness of the application.

It is not permitted within the electricity regulations or the Electricity Supply acts to, clip a cable along the sea wall from the weir to the local substation?. This indicates that one of the most significant aspects of the project has yet to be designed and that there remains a significant risk that the lack of suitable electricity connection could prevent the application.

It is normal practice for all hydro projects to maintain insurance cover during the design, construction and operational phases. The poor design skills, lack of understanding and lack of experience by the applicant are compounded with a reliance on a single manufacturer. These are significant risks that all require insurance cover that is not in place.

The applicant wrongly asserts they will receive a feed in tariff (FIT) before the generators are fully commissioned. The applicant also wrongly asserts that the total installed capacity of the plant is less than 500 kW. It is also a requirement of the FIT orders that projects declare all income derived from public funds as part of the Ofgem registration process.

The ROOFIT orders are administered by Ofgem. There are dispensations for community projects of less than 250 kW particularly for PV installations. But for this scheme there is no tariff guarantee, rather a 12 month period in

which to commission the project. Otherwise the tariff that applies is that in force for the later of when it is commissioned or when it is applied for. The total installed capacity or TIC is the nameplate rating of the generator before losses are applied. The manufacturers generators have a nameplate of 168 kW not 164 kW and for the three turbines this exceeds 500kW TIC. The de minimis rules apply to the applicant due to their reliance on public funds (GLA, LBRUT, ETC) to date. The feed in tariff is also state aid.

The applicants have not considered any scenarios likely to impact the adjacent land owners or other third parties.

The acoustic information submitted by the applicant does not match the application drawings or the site or type of machinery proposed. This is due to a lack of data available from the manufacturer for the turbine being proposed, which also suggests that other information (such as resilience and performance) has not been subject to scrutiny either.

The application drawings indicate no acoustic attenuation to any of the rotating machinery, the gearbox or the generator itself. Furthermore the operation of the sluice motors and the sluices dropping along with the noise of trapped debris and the trash cleaning operations has not been assessed. It is highly unlikely that in its current form the application will comply with noise or nuisance standards. This will likely lead to restrictions on operations (ref Ribble Valley).

Issues with wildlife

The application fails to comply with the Water Framework Directive, the Thames River Basin Management Plan, the Thames 21 or DEFRA guidelines. The convergence of legislation is to improve river quality and reduce impediments to flow.

The following examples apply;

The decommissioning and removal of functional existing fish passes

The construction and operational impacts is still the subject of study at the Romney Scheme which although similar, is not tidal.

It is accepted that there is insufficient knowledge of existing species behavior across this site despite long running efforts to support fish transit and migration.

The applicant's fish report refers to a completely different waterway with over 100 times less flow than the Thames.

The applicant's fish report highlights the increased probability of harm to fish over a certain length. The most vulnerable species to this technology are Eels (females laden with eggs) with males travelling upstream. The next vulnerable species are those able to pass through the screens that are over 300mm in length this includes Salmon, Sea Trout, Pike, Lamprey, Chubb and Barbel.

The existing fish trials at the Romney Hydro scheme have not yet been made available. It is acknowledged that the understanding of all fish movements in this part of the River is poor. The applicants have not shown any sensitivity to construction during spawning or operations during the known migratory patterns of fish species.

Salmon/Sea Trout Adults May to June upstream.

Dec to Feb downstream, Mar to Apr downstream juvenile Trout Oct to Feb upstream and downstream

Coarse Mar to July upstream and downstream

Sea Lamprey Adults Feb to Jun upstream, Jan to Mar downstream juv Sea Lamprey Elvers Sept to Mar Upstream

Eels Sept to Nov downstream

Elvers Mar to May full moon upstream

There are existing local roosting habitats for resident aquatic species, bats, and birds on the adjacent bank likely to be displaced and disturbed by the application for a number of years. There is no habitat creation or mitigation.

The mature protected trees on the nearby adjacent land appear will be impacted by both the construction phase of the project and the operational phases and lifetime of the project.

Any increases in bank erosion or water levels or an increase in bank over topping will jeopardise the integrity of mature tree species and their root systems in the banks adjacent or upstream. The applicant has not considered or identified these effects at this site. The LBRUT registers the existing trees under TPOs. The most mature specimens exceed 200 years old and 20m high.

This site is unique and not representative of any other. It has a high number of stakeholders and is a shared critical resource. Upon closer inspection this application does not manage the conflicts and avoids following existing best practice which is necessary to protect the area or to make a hydro power installation successful at this site.

Should you require any further detail or assistance on the points raised above do not hesitate to contact me.

Yours Faithfully