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# Earth Science Partnership

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Our Ref: ESP.8599.3920 Rev1

Monday, 08 July 2024

**Salt Consultancy Ltd.**

c/o Jonathan Salt  
Business Development Centre  
Main Avenue  
Treforest Industrial Estate  
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CF37 5UR

**BY EMAIL**

Dear Jonathan,

**PENTWYN LAKE, CARDIFF  
UPDATED REVIEW OF CHANNEL CAPACITY**

Following your recent request to update our previous assessment, we are pleased to provide our revised report letter.

**1. INTRODUCTION****1.1. Background**

Cardiff County Council (hereafter known as the Client) are proposing renovation works to the weir on the Nant Glandulas and associated improvement works to a pipe that supplies the existing Pentwyn Lake, via an overflow inlet feature. The Earth Science Partnership Ltd (ESP), Consulting Engineers, Geologists and Environmental Scientists, were instructed by the Client via Salt Consultancy Ltd. to undertake a series of limited calculations in regard to the wier channel and pipe capacities.

We understand that the improvement works are aimed at improving the flow downstream in the Nant Glandulas, whilst not restricting the existing flow/feed to Pentwyn Lake, provided by an existing supply pipe (see Insert 2). The original scope of works allowed for was presented in our emailed costing, dated 21<sup>st</sup> April and in summary allowed only for:

- Independent calculation of channel before top of weir.
- Independent calculation of overflow pipe capacity.

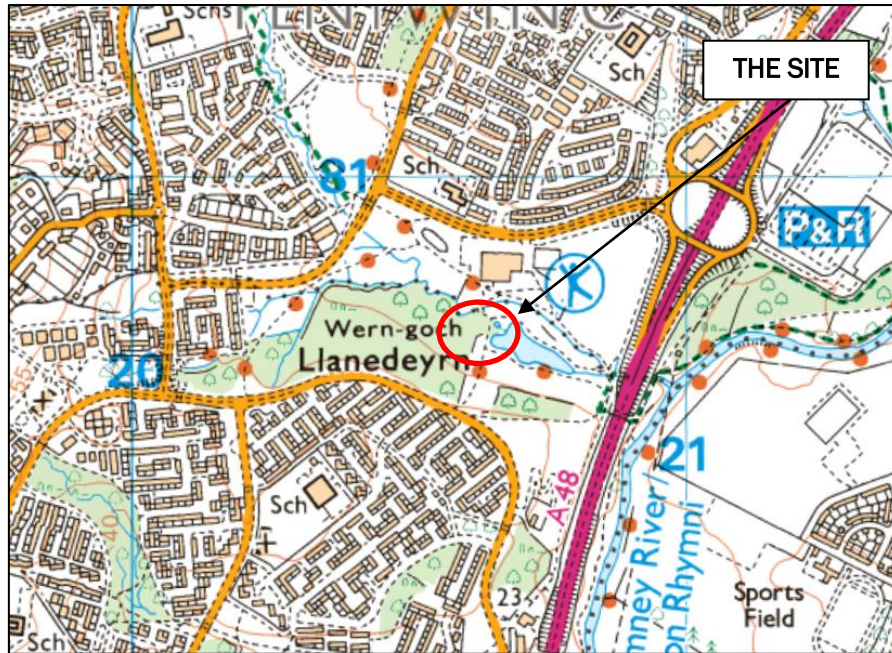
Further to provision of this assessment in June 2023 (Ref: 8599.3920), the Client provided feedback from NRW requesting the re-assessment of potential flows, for varying flow options. This is addressed in this revised report in line with our emailed costing dated 21<sup>st</sup> of June 2024.

**1.2. Site Setting**

The site is located at Pentwyn Lake, to the rear of Pentwyn Leisure Centre, Cardiff. The National Grid Reference of the centre of the site is (ST) 320618, 180766 and the postcode for the adjacent leisure centre is CF23 7EZ. A Site Location Plan is presented as Insert 1 below.

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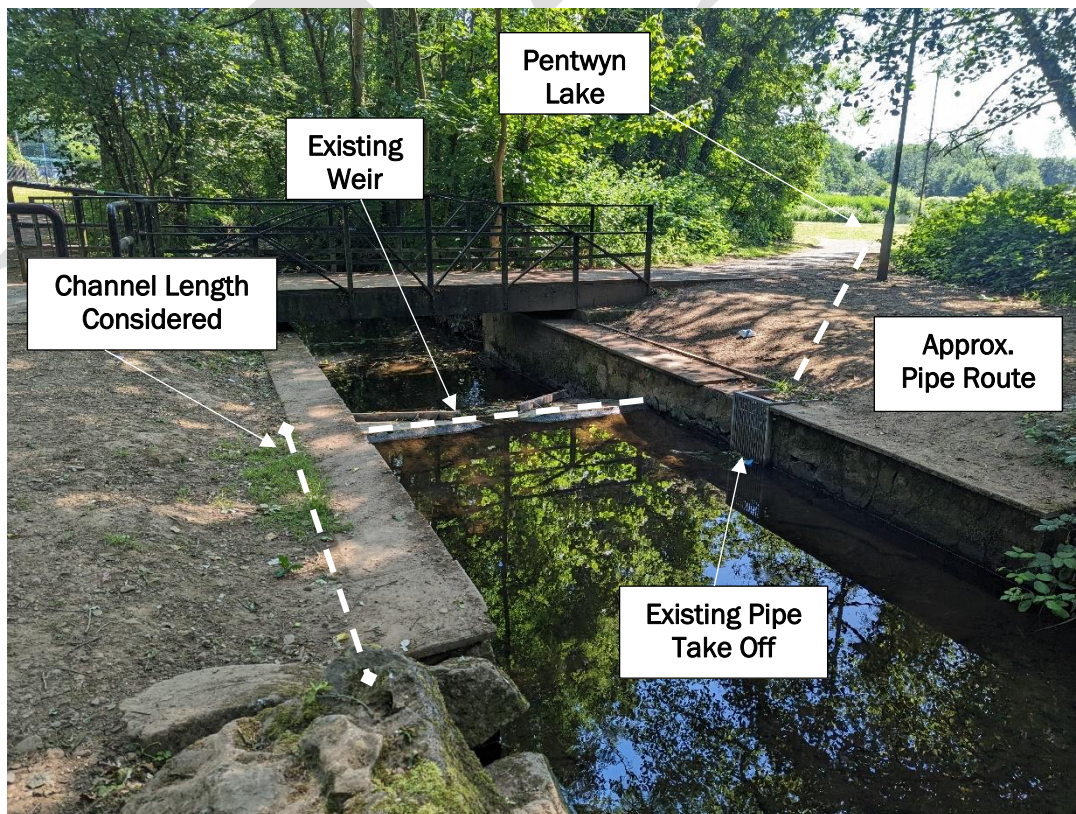




Insert 1: Site location Plan 1:25,000 (Ordnance Survey License No.:AL100015788)

The area of assessment is shown on Insert 2 below, with the main features annotated, comprising:

- The weir.
- Constructed pipe take off (300mm diameter x 500mm length followed by 150mm diameter to lake).
- The approximate (assumed) pipe route – no confirmation of this has been provided.
- Pentwyn Lake in the background.



Insert 2: General View Looking East (downstream) Along the Nant Glandulas

## 2. SITE WALKOVER

The photograph presented as Insert 2, the description of the site, and our understanding of the scheme is based on a site walkover and discussion with Jonathan Salt of Salt Consultancy on the 22<sup>nd</sup> May 2023.

An important point of note, is that ESP are only required to address the portion of the channel that is concrete lined and immediately upstream of the existing weir, measuring approximately 4m in length (see Insert 2).

## 3. CALCULATIONS

ESP have been instructed to provide calculations for different scenarios, which are summarised below and presented in Table 1.

The values presented are associated with maximum discharge capacities based on the geometry information provided to us and may not be representative of all potential events. The three scenarios considered comprise:

- The capacity of the existing channel before the weir.
- The capacity of the same channel should a 200mm width restriction be put in place.
- The capacity of the newly installed 300mm diameter pipe (500mm length) followed by 150mm diameter pipe currently supplying Pentwyn Lake and retained.
- The potential water levels flowing into the pipe have been assessed, by raising/lowering the points at which the 300mm section “ties in” with the existing and retained 150mm section.

**Table 1:** Summary of ESP Calculations Revised

Scenario	Maximum Discharge Capacity	Comment
Existing Channel	9.09m <sup>3</sup> /sec	-
Channel with 200mm width reductions	8.40 m <sup>3</sup> /sec	Approximately equivalent to a 7.5% reduction in capacity.
Capacity of original (pre works) pipe at current (pre works) level	0.022 m <sup>3</sup> /sec	-
Capacity of pipe with water level at 0.095m	0.0528 m <sup>3</sup> /sec	Assumes centre point of new 300mm diameter section is same level as centre point of 150mm section.
Capacity of pipe with water level at 0.02m	0.0022 m <sup>3</sup> /sec	Assumes base of new 300mm diameter section is same level as base of 150mm section.
Capacity of pipe with water level at 0.17m	0.1492 m <sup>3</sup> /sec	Assumes top of new 300mm diameter section is same level as top of 150mm section.
Notes: 1. Calculations assume an initial 300mm diameter section from weir to manhole (500mm length) followed by 150mm diameter section from manhole to lake.		

Should any further calculations/iterations be required, we would happy to discuss further and/or provide.

We trust that the above and attached is clear and provides sufficient information for your present requirements. However, should you have any queries, or require further clarification, please do not hesitate to contact us.

Yours sincerely,



**Danilo Bettosi**

Enc.      Appendix A – ESP Calculations Revised  
            Appendix B – Information Provided by Client Team Revised  
            General Notes

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