

WRH Supporting Documentation for  
CRT236 Llantysilio

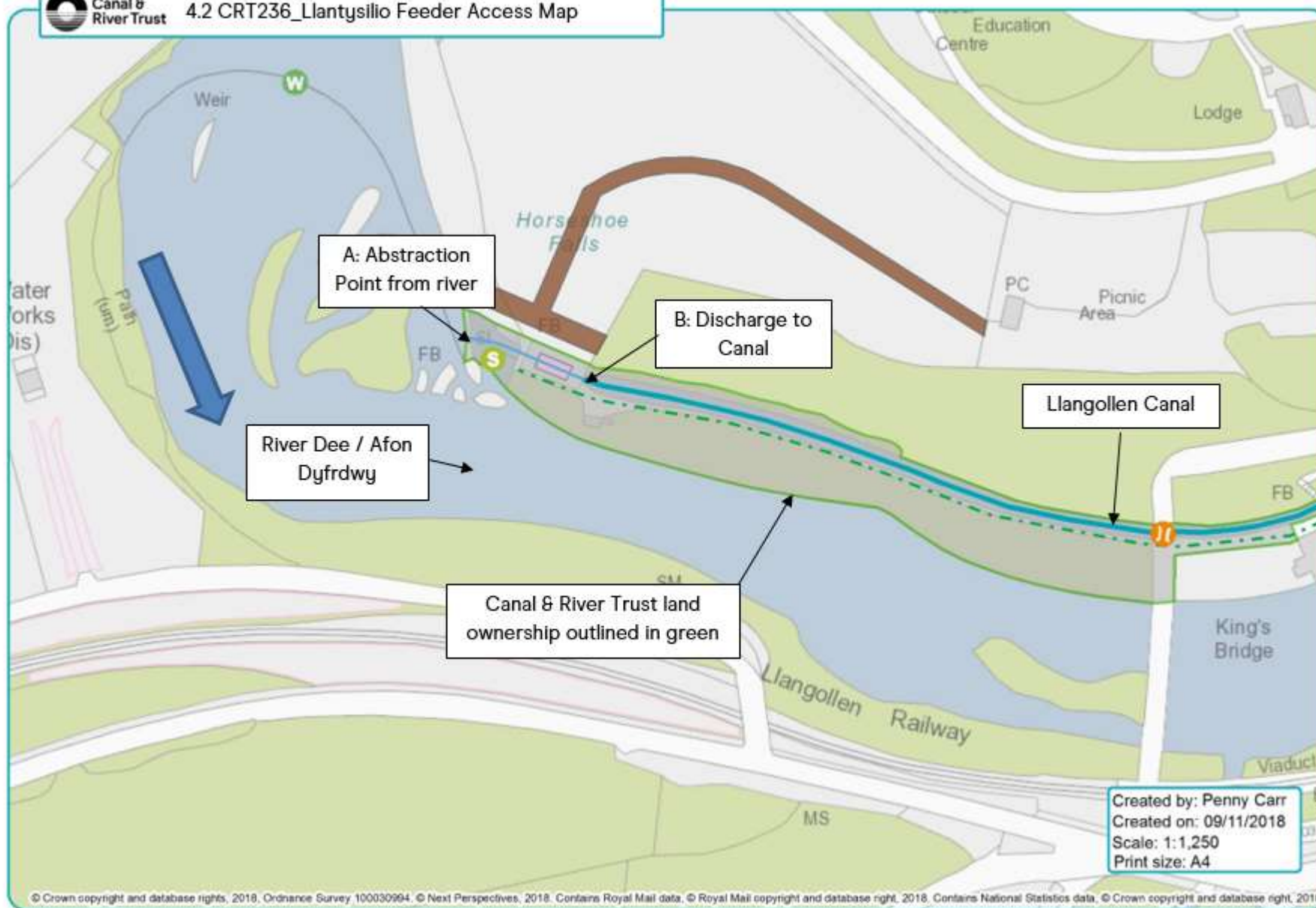
Documents included are:

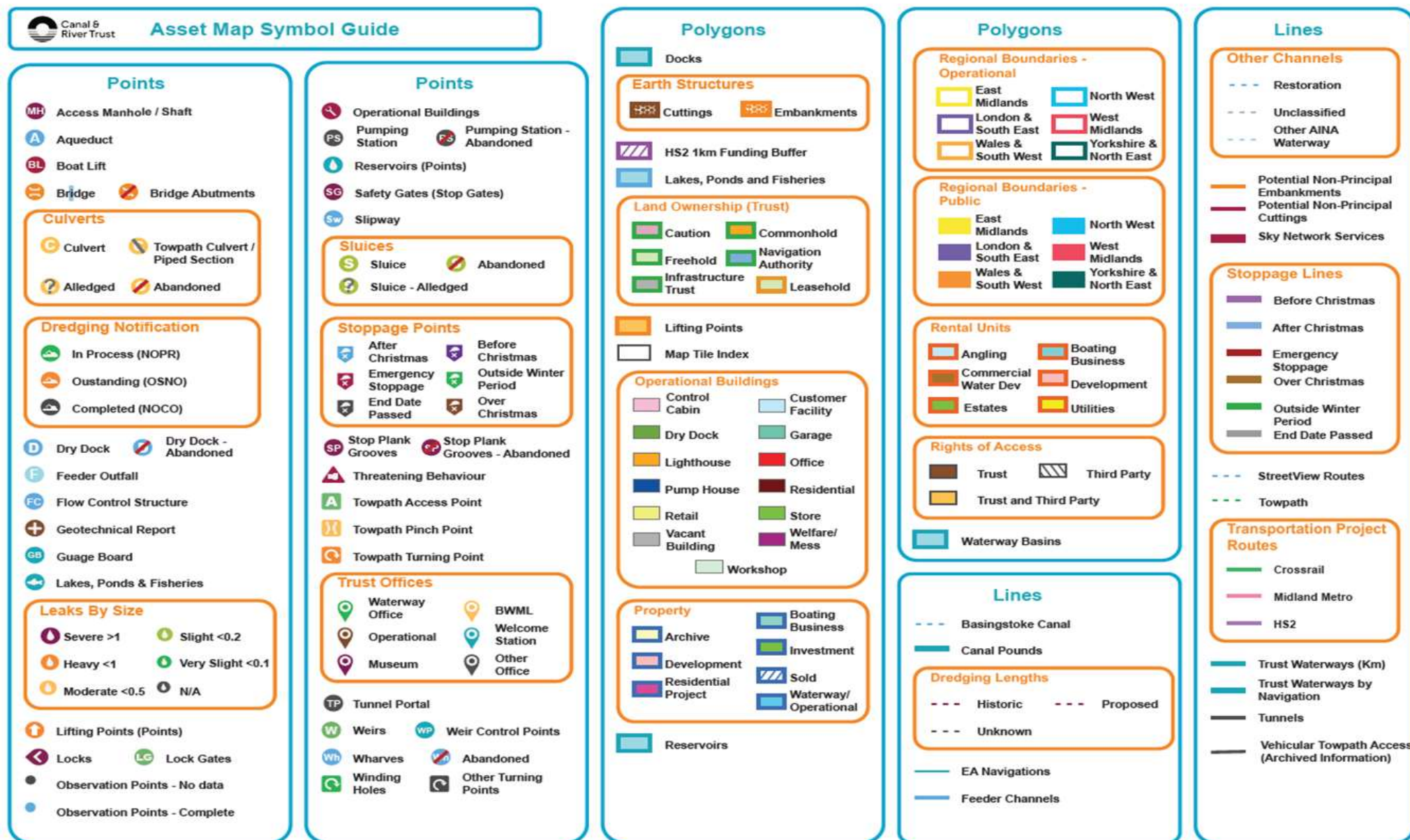
- 4.2 CRT236\_Llantysilio Feeder Access Map
- Canal & River Trust Generic Map Key
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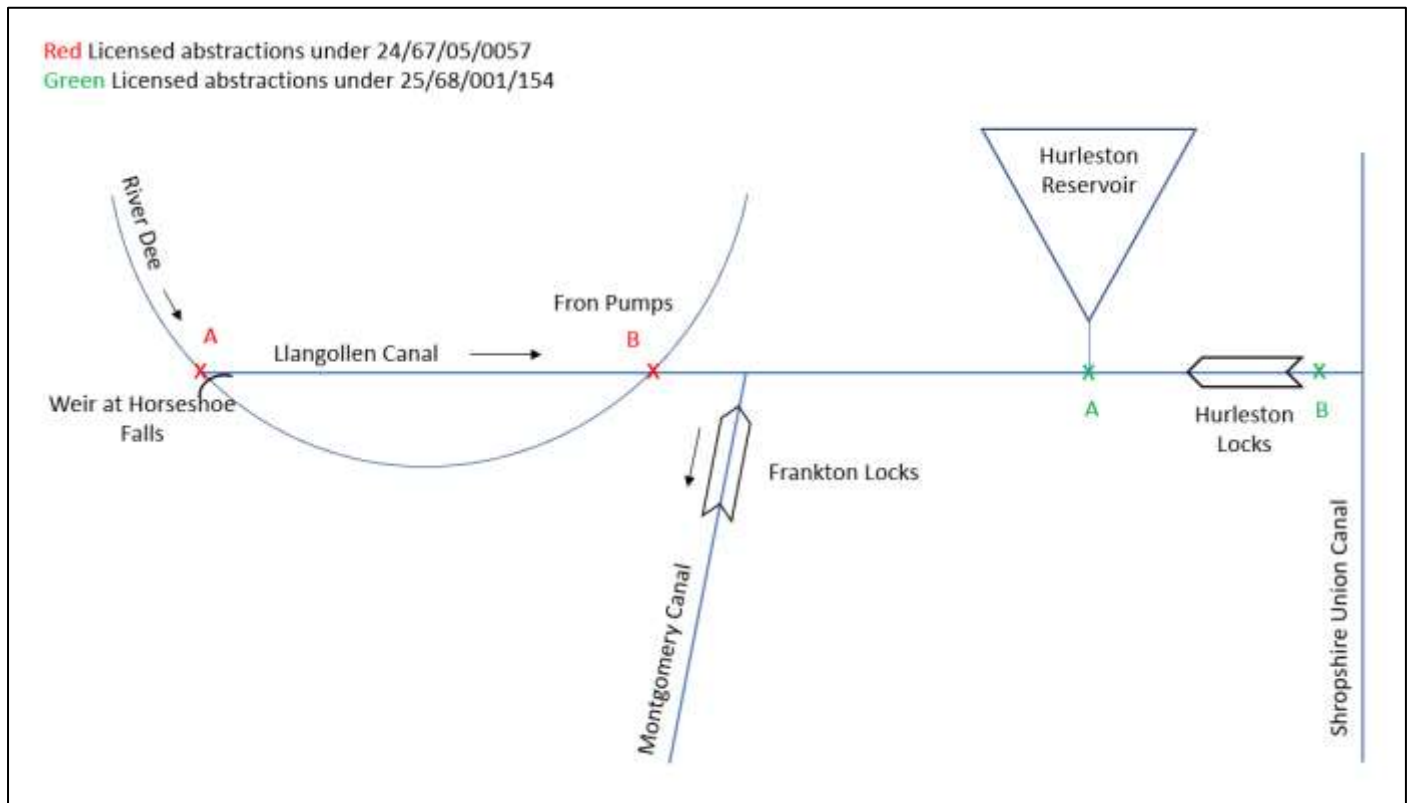




## 6 CRT236 Llantysilio Cross Border Applications

The Trust do not also abstract for a previously exempt activity in England as part of our site operation. However, the abstraction at this location is a conjunctive one, with a proportion being abstracted under an existing abstraction licence held by UU: 24/67/05/0057. This licence is linked to an additional licence held by UU for an abstraction from Hurleston Reservoir in England, under licence 25/68/001/154. See schematic below showing the location of existing abstractions permitted under the two UU licences associated with the current application.

Schematic showing existing licensed UU abstractions associated with this application:



NB: As can be seen from the above schematic, licence 24/67/05/0057 includes an additional abstraction point at Fron. This abstraction is not a conjunctive one and is solely used by UU.

Licence 24/67/05/0057 includes the following statement:

'There remains a link between the volumes authorised for abstraction by this licence and the licence for subsequent abstraction from the canal at Hurleston (licence no 25/68/001/154). Any proposals to vary this licence should be considered against the need to also vary the abstraction licence at Hurleston'.

Licence 25/68/001/154 includes the following statement:

'The volumes authorised for abstraction by this licence are connected with the licence where the water for this abstraction is abstracted from the River Dee and put into Llangollen Canal at Horseshoe Falls, Berwyn and Pont Cysyllte, Froncysyllte (licence number 24/67/05/0057/V001 authorised by NRW). Any proposals to vary this licence should also be considered against licence 24/67/05/0057/V001 (or such other number that may be applied by NRW upon renewal or variation to that licence).





## 7.1 CRT236\_Llantysilio Feeder Location Map

River Dee / Afon Dyfrdwy

Llangollen Canal

River Weir

Horseshoe Falls

Meter House

A: Abstraction point from river

B: Discharge to Canal

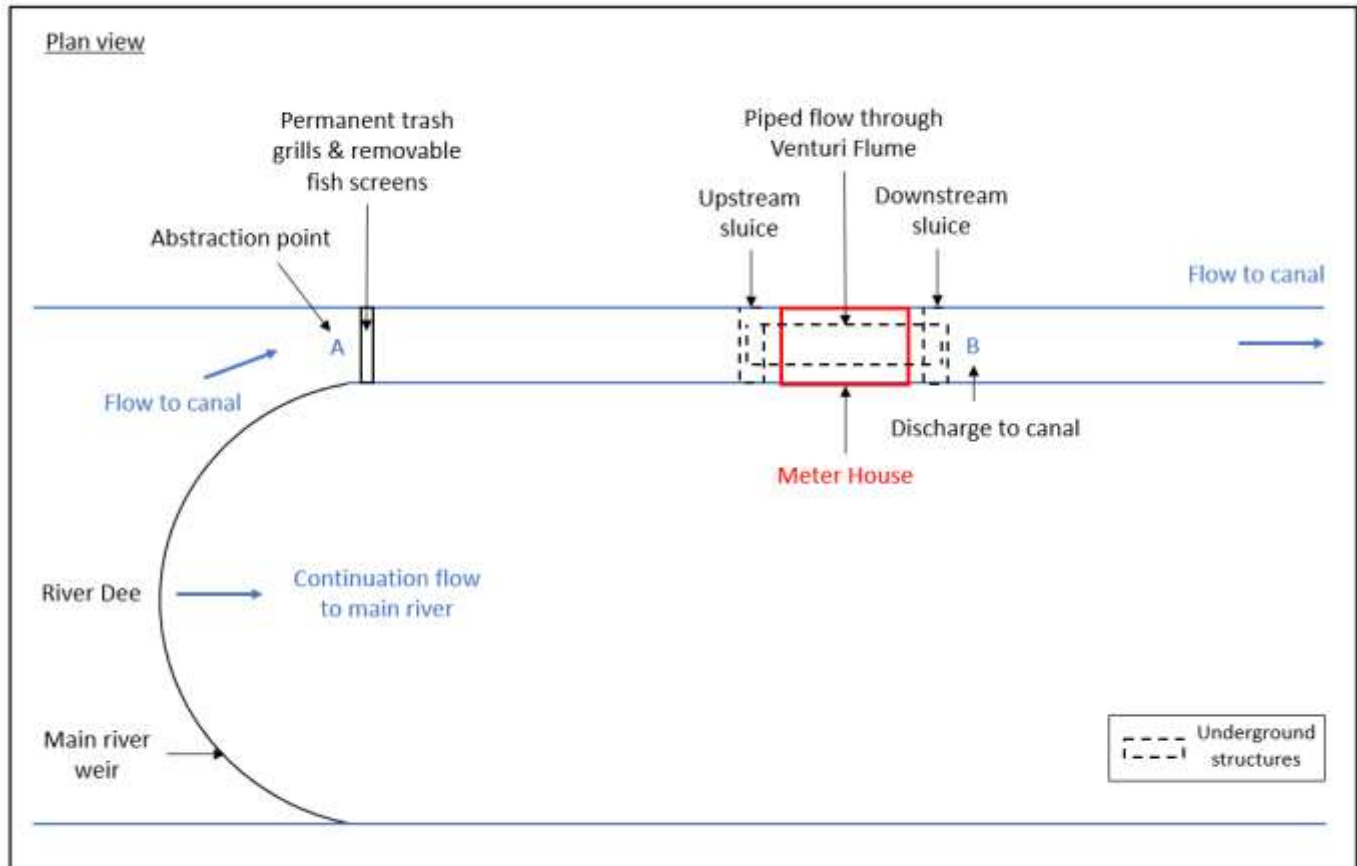
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Created on: 28/03/2019  
Scale: 1:10,000  
Print size: A4

## 8.4 CRT236 Llantysilio Abstraction Details

### General Description:

Llantysilio Feeder is a Scenario 2a feeder (as detailed in Navigation Scenario Workbook), with variable structures. The abstraction is from the main River Dee at Horseshoe Falls, which is diverted into the feeder channel via a main river weir. Flow into the feeder is then controlled by two sluices, one upstream and one downstream of a Venturi flume, located in the Meter House (please see 7.1 CRT236\_Llantysilio Feeder Location above). The abstraction is generally controlled by raising and lowering the downstream sluice, with the upstream sluice remaining fully open. Please see schematic of abstraction arrangement.

### Schematic of Abstraction Arrangement:



As noted above, the abstraction at this location is a conjunctive one. As per agreement with Natural Resources Wales and UU, (meeting held on 29.01.19) this application is submitted solely for the Trust's proportion of the abstraction. Please see below for further details of means of measurement/assessment of abstraction quantities method.

### Details of the Structures:

Flow is diverted to the canal via a main river weir. Flow then enters the head of the feeder channel, via a floating log boom and permanent trash grills. Removable fish screens can also be installed at this location. This is a Habitats Directive requirement included in the conditions of the existing United Utilities' Abstraction Licence 24/67/05/0057 for this abstraction point. For the period 1 March to 12 April each year, six x 4mm mesh screens are installed to prevent the entrapment, entrainment or impingement of lamprey at the point of abstraction. For the period 13 April to 31 August each year, six x 10mm mesh screens are installed to prevent the entrapment, entrainment or impingement of salmon at the point of abstraction.

Flow then continues to the upstream sluice which is generally kept open, and then into the Venturi Flume, used to measure the abstraction. These data are recorded via the Trust's telemetry/SCADA (Supervisory Control and Data Acquisition) system at this location. Please see below for further details of means of measurement/assessment of abstraction quantities method. The downstream sluice is then used to control flow to the canal, by raising and lowering as required.

Please refer to photographic record in section 8.5 CRT236\_Llantysilio Evidence of Abstraction below for photographs of the abstraction arrangement.

## Means of Measurement/Assessment of Abstraction Quantities Method:

The existing combined abstraction is measured using a Venturi Flume and recorded via the Trust's telemetry/SCADA system. The Trust's abstraction quantities in this application have been estimated from these data.

UU's abstraction licence 24/67/05/0057 includes the following statement in the Important Notes section of the licence:

'There is only one meter located at Point A which measures the water abstracted under this licence and also the water abstracted by the Canal and River Trust under rights conferred by the London Midland Scottish Railway Act 1944. Therefore it is not possible to solely measure the volume of water abstracted at Point A under this licence. For the purpose of monitoring compliance the assumption will be that the Licence Holder is abstracting on a continuous basis at the maximum daily rate of 50.006 megalitres per day. The balance will be attributed to the abstraction by Canal and River Trust on their behalf.'

The Trust's daily mean flows have therefore been estimated by subtracting the existing daily licensed maximum quantity i.e. 50,006m<sup>3</sup> from the combined flow recorded. The maximum quantities abstracted, required as part of the application, have then been estimated as follows:

- 1) Yearly max – the sum of the Trust's estimated daily mean flows in each year;
- 2) Daily max – the maximum estimated daily quantity;
- 3) Hourly max – the maximum hourly recorded (combined) quantity minus the existing hourly licenced quantity i.e. 2,605m<sup>3</sup>;
- 4) Peak instantaneous – there is no peak instantaneous maximum quantity on the existing licence at this location. The Trust's peak instantaneous maximum has therefore been estimated *pro rata*, based on the approximate proportion of the combined total daily quantity that is being abstracted by the Trust per day i.e. 40%

## General principles of maintaining a level on Canal & River Trust Navigations:

The purpose of water control at the Canal & River Trust (the Trust) is to keep the water level within a Normal Operating Zone (NOZ) to minimise business risks. The business risks associated with high water levels include overtopping, which could lead to canal infrastructure damage ranging from towpath surfacing to catastrophic embankment failure or breach. Low levels can lead to damage to canal lining and in cases of rapid drawdown collapse of canal bank, in addition to insufficient navigable depth which can lead to disruption and inconvenience to our customers, damage to reputation, loss of income and/or environmental/ ecological damage such as algal blooms, fish distress, kills etc. and/or impact on water sales (hands off flows, commercial agreements, intake structures exposed).

Generally, canals operate within the NOZ (Figure 8.41 below), which is a zone of tolerance around a Normal Water Level (NWL); NWL is usually determined by refining a given level based on unobstructed passage for navigation and efficient use of available resources (water and manpower).

Across the Trust's canal network, NWL may or may not be the same as 'level', 'pound datum' or 'zero' and slight variations between NWL and 'level' exist across the network i.e. in some areas NWL is equivalent to 'level', whereas in other areas 'level' maybe the bywash cill and NWL is 25 to 50mm above this to maintain a flow and level throughout the lower pounds in the canal.

The lower limit of the NOZ is generally governed by the minimal navigable depth of the section of canal in question, below NWL. Assuming pound datum and NWL are the same, then typical values of the lower limit of NOZ are in the region of - 200mm from pound datum. Depending on location, this can vary between -450mm and -100mm.

The upper limit of the NOZ is generally governed by the available freeboard of the section of canal and then subtracting a 'margin' from this. The freeboard enables the canal to have a degree of passive control, by the waste and bywash weirs (and in some areas the top beam of the lock gates), before requiring active intervention/flood control activities to avoid overtopping of the canal. In some locations on the network, the upper limits of NOZ is governed by the air draft under a bridge, i.e. the point below NWL beyond which navigational issues occur due to restricted head room.

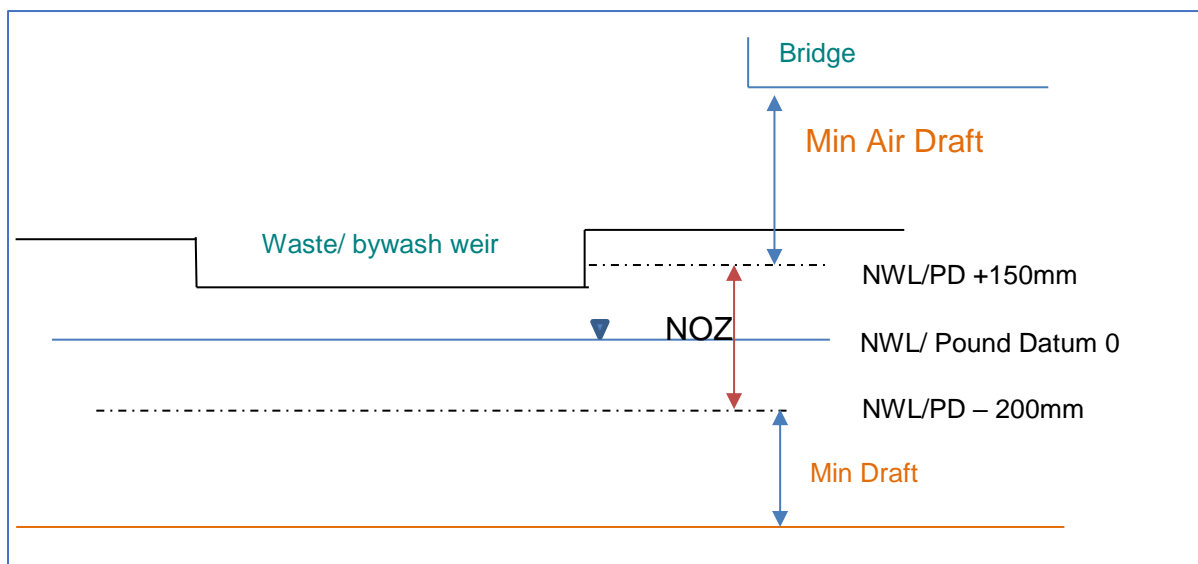


Figure 8.41: Example of Normal Operating Level on Canal & River Trust Navigations



## 8.5 CRT236 Llantysilio Evidence of Abstraction

### Telemetry/SCADA data:

The combined total abstraction is measured using a Venturi Flume and recorded via the Trust's telemetry/SCADA system. The Trust's abstraction quantities in this application have therefore been estimated from these data. Figure 8.51 below shows the estimated daily mean abstraction quantities for the period 2011-2017 inclusive.

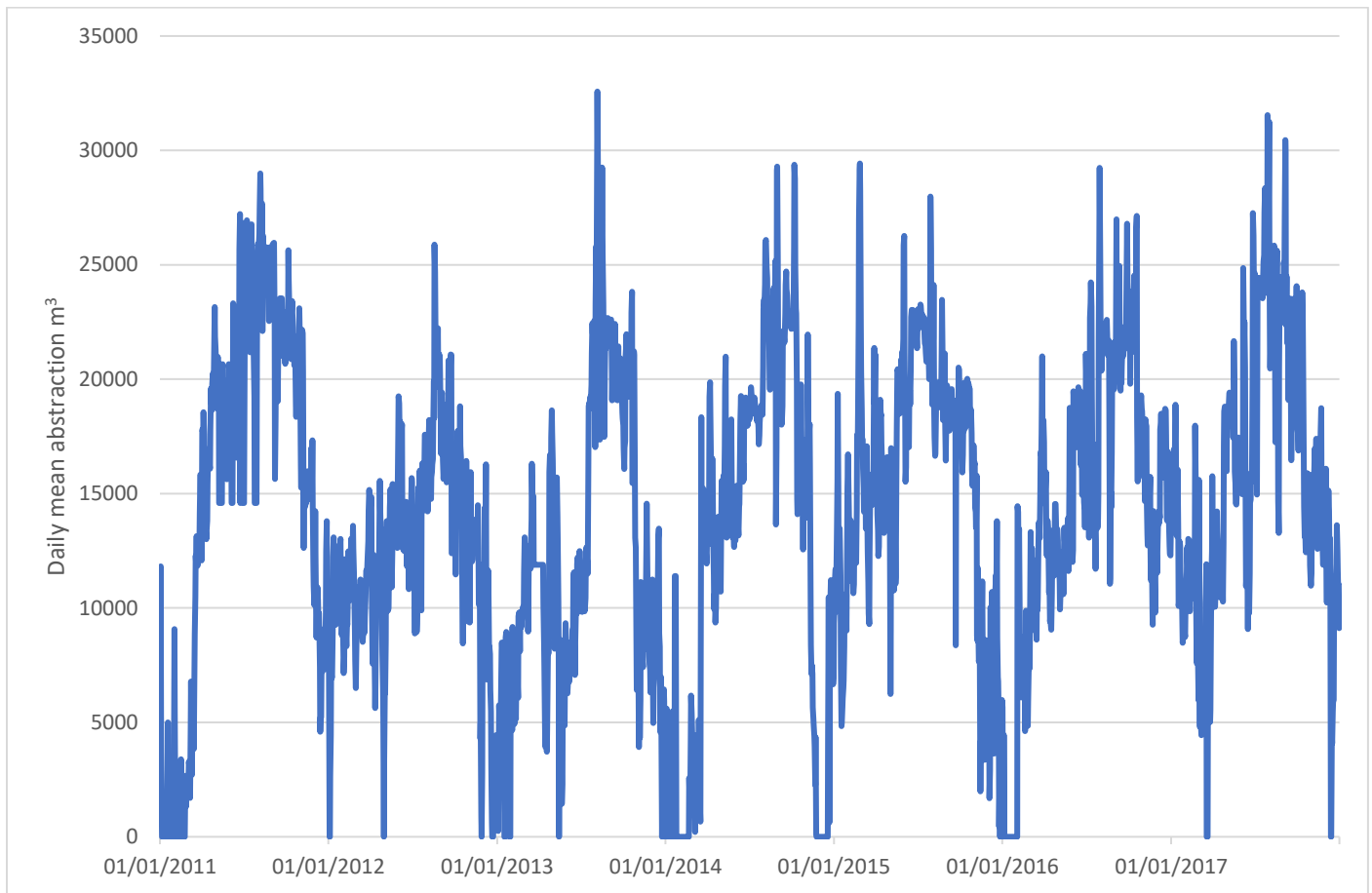


Figure 8.51 Daily mean abstraction 2011-2017

## Photographic Record:

Photo 1: Horseshoe Falls – Main River Weir & the Trust's Offtake

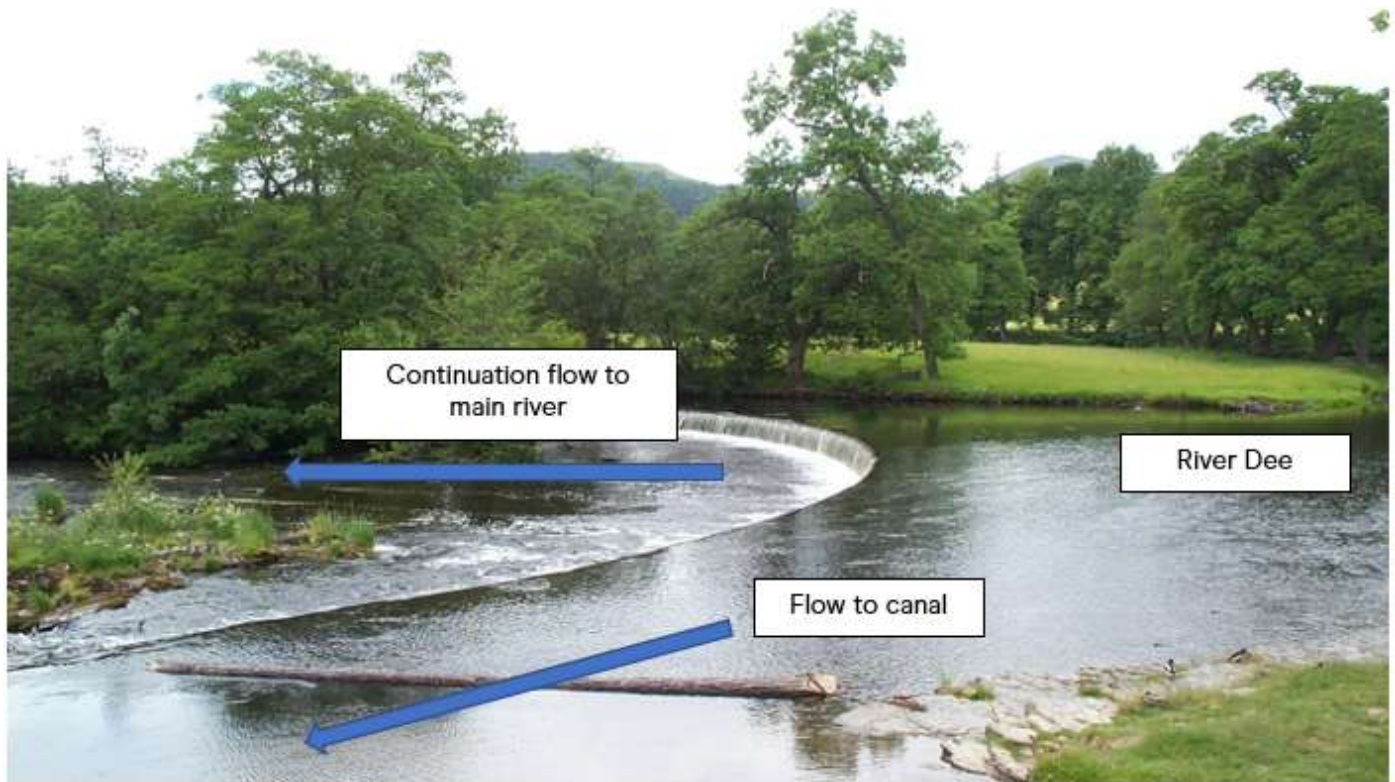


Photo 2: Horseshoe Falls with intake grilles & fish screens 29.01.19





Photo 3: Abstraction at Llantysilio Feeder – intake grilles and fish screens 02.08.13



Photo 4: Flow to the canal downstream of grilles & fish screens and Meter House 29.01.19



Photo 5: Upstream sluice controls inside Meter House 29.01.19



Photo 6: Downstream sluice controls inside Meter House 29.01.19



Photo 7: Discharge to the canal downstream of the Meter House 29.01.19

