WRH Supporting Documentation for
CRT484 Ystalyfera

Documents included are:

- 7.1 CRT484_Ystalyfera Feeder Location Map
- Canal & River Trust Generic Map Key
- 8.4 CRT484_Ystalyfera Abstraction Details
- 8.5 CRT484_Ystalyfera Evidence of Abstraction

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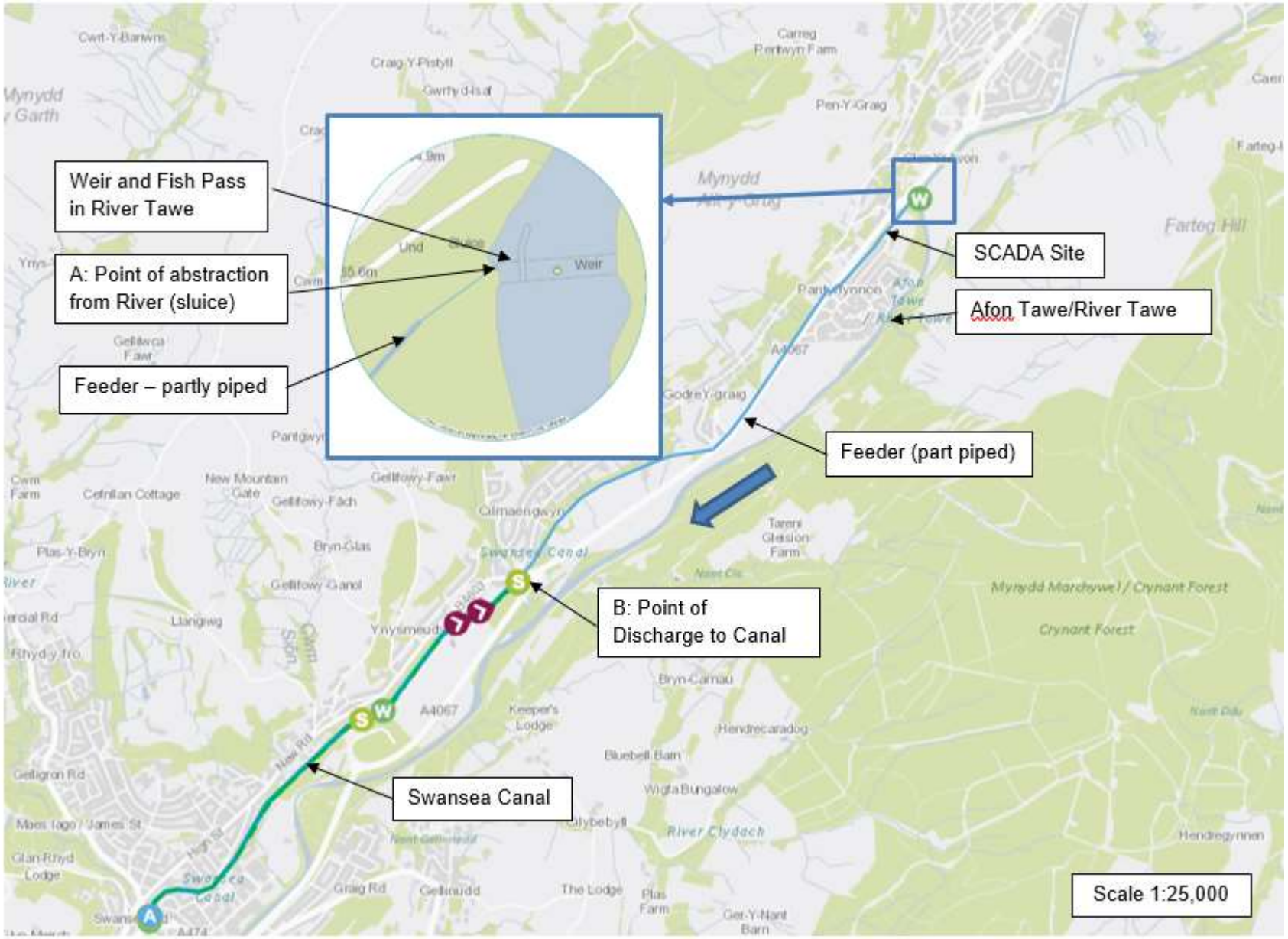
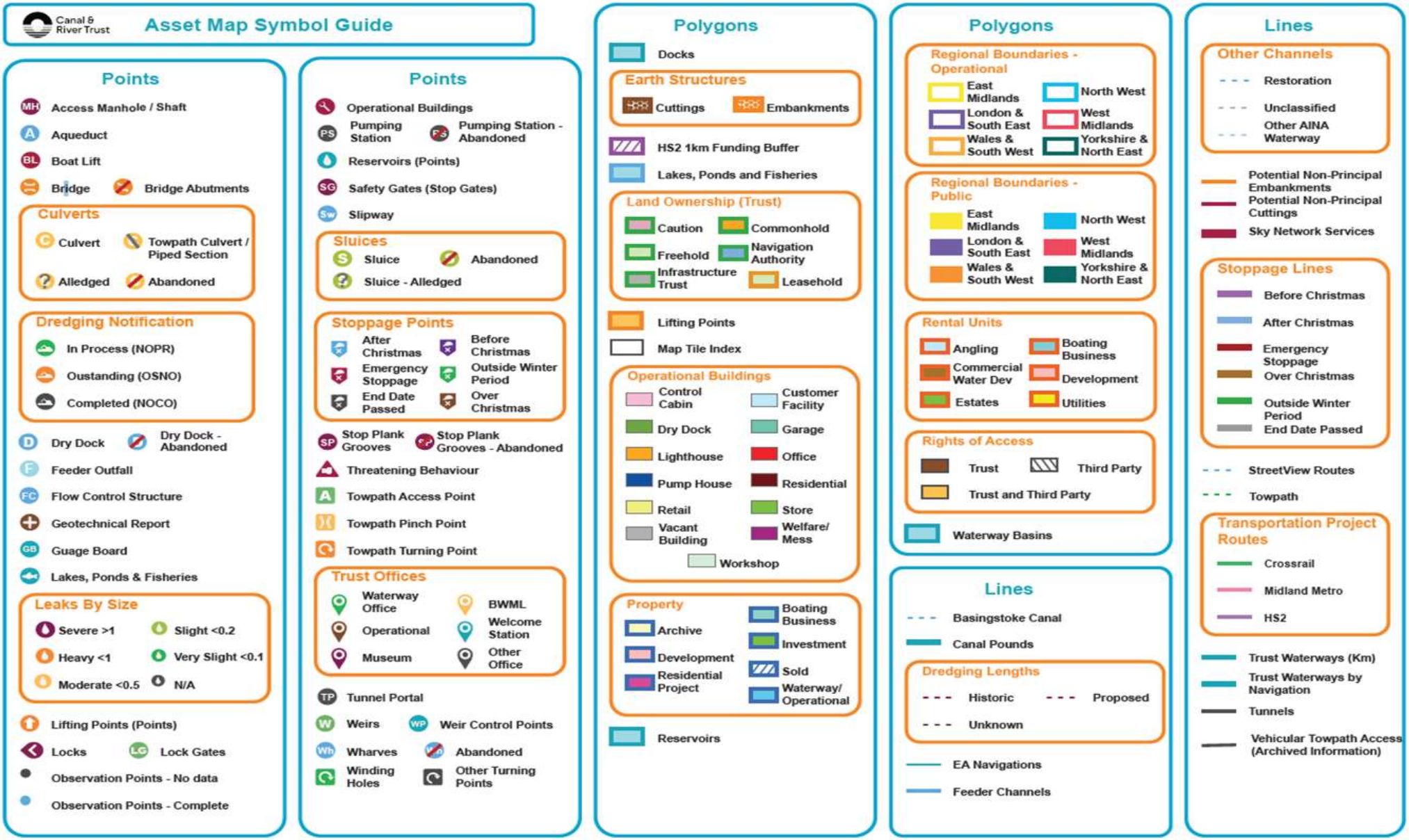
7.1 CRT484_Ystalyfera Feeder Location Map



Canal & River Trust Generic Map Key:

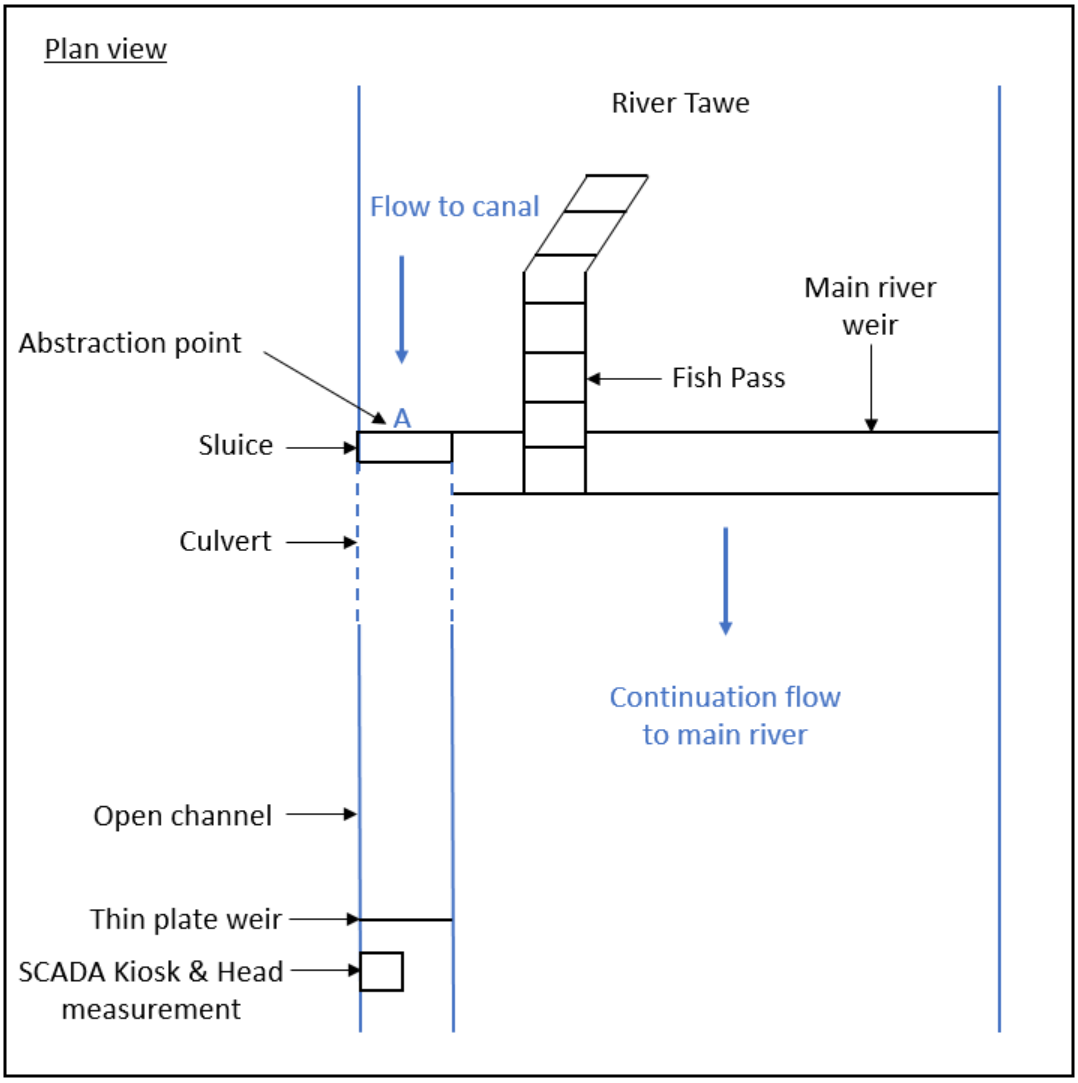


8.4 CRT484_Ystalyfera Abstraction Details

General Description:

Ystalyfera Feeder is a Scenario 2a feeder (as detailed in Navigation Scenario Workbook), with a variable abstraction structure. The abstraction is from the main River Tawe at Pantteg, which is diverted towards the feeder channel via a main river weir. Flow into the feeder is then controlled by a sluice. The abstraction discharges via a culvert immediately downstream of the sluice into an open channel which is then part culverted to the Swansea Canal at Ynysmeudwy approximately 3km downstream. Please see schematic of abstraction arrangement.

Schematic of Abstraction Arrangement:



Details of the Structures:

Flow is diverted to the canal via a main river weir, Pantteg Weir. Flow then enters the head of the feeder channel through a manually operated 1.3m wide sluice. The abstraction discharges via a culvert immediately downstream of the sluice into an open channel which is then part culverted to the Swansea Canal at Ynysmeudwy approximately 3km downstream.

Please refer to photographic record in section 8.5 CRT484_Llantysilio Evidence of Abstraction below for photographs of the abstraction arrangement.

Means of Measurement/Assessment of Abstraction Quantities Method:

The abstraction is monitored via the Trust's telemetry/SCADA system approximately 0.2km downstream of the abstraction. A thin plate weir is installed in the feeder channel and the head over weir is recorded over the weir crest. The flow is then calculated from the recorded head over weir using the standard weir equation for thin plate weirs as follows:

$$Q = Cd \times b \times (h^{3/2})$$

Where Q is the discharge/flow in m^3/s, Cd is the coefficient of discharge, b is the breadth of the weir in m and h is the recorded head of water over the weir in m.

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.

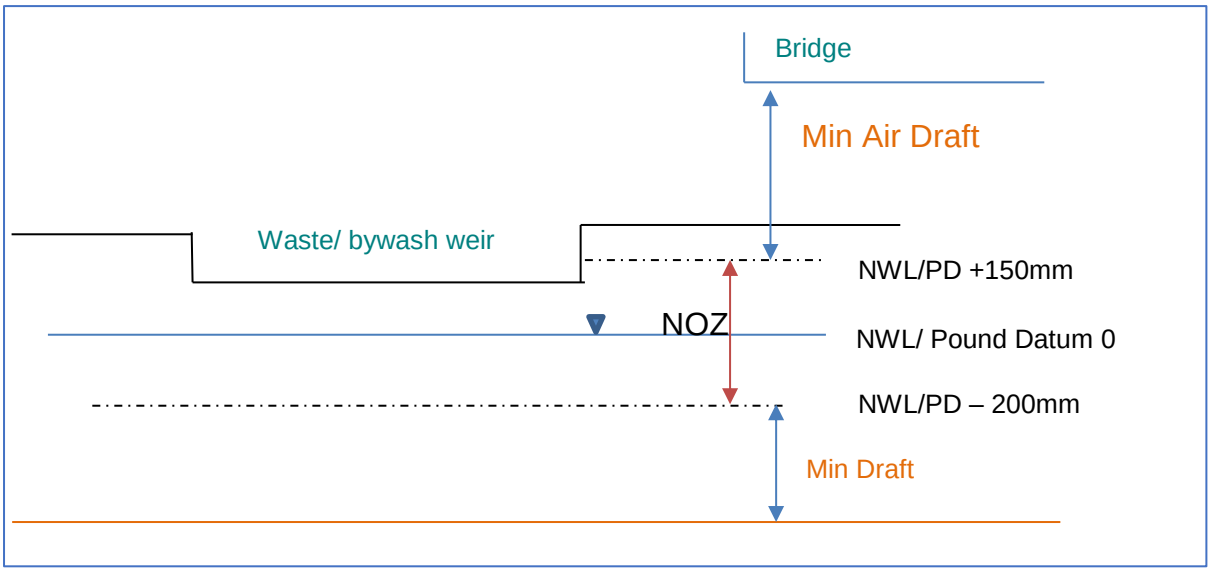


Figure 8.41: Example of Normal Operating Level on Canal & River Trust Navigations

8.5 CRT484_Ystalyfera Evidence of Abstraction

Telemetry/SCADA data:

The abstraction quantities are monitored via the Trust's telemetry/SCADA system. Figure 8.51 below shows the daily mean abstraction quantities for the period 2011-2017 inclusive.

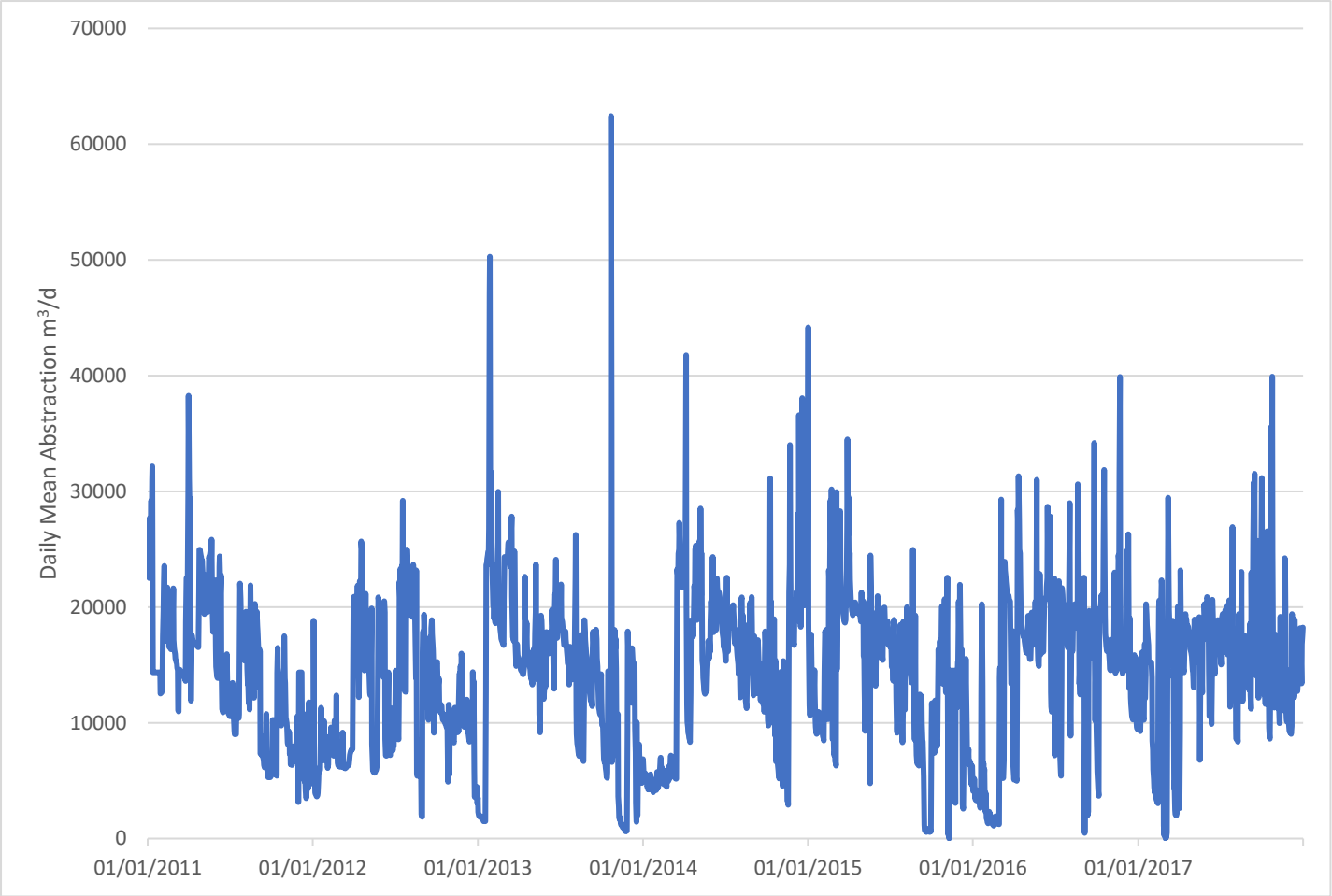


Figure 8.51 Daily mean abstraction 2011-2017

Photographic Record:

Photo 1: River Tawe upstream of main river weir with fish pass 13.11.18

Photo 2: Main river weir with fish pass and downstream continuation flow 13.11.18

Photo 3: Abstraction point A/Manually operated sluice 13.11.18