



**Cyfoeth  
Naturiol**  
Cymru  
**Natural  
Resources**  
Wales

# **St. Asaph November 2012 Floods**

## Data Report – KS2/3

## Introduction

The data contained within this document is the raw data which was used by NRW to identify and evaluate the risk of flooding during the November 2012 floods in St. Asaph. The data is displayed:

- In the original format so that learners can plot the data themselves – numbers could be rounded to the nearest whole number to help students interpret the data if required.
- As graphs for students to interrogate and interpret. Data from 2013 is included so that pupils can compare and contrast the data.

For further information and data please visit [NRW's River Levels Online webpage](#), where data on Welsh river levels can be obtained along with live flood risk levels around Wales.

## Data collection background

### River Levels

Telling people that a flood may happen or that a flood is about to happen is vital as it gives those concerned time to prepare. To be able to monitor river levels and forecast floods, Natural Resources Wales has two river measuring stations along the Afon Elwy in the River Clwyd catchment.

### Pont y Gwyddel gauging station

**Where?** Pont y Gwyddel near Llanfair Talhaiarn. Gauging station 66006 on National River Flow Archive if you want to search for the gauging station's location on their searchable maps: <http://nrfa.ceh.ac.uk/data/search>

**Purpose?** Data is collected every 15 minutes and the information is sent down the phone line to a computer server so that on duty NRW Officers can analyse the data. The information gathered is also available to the public as it is displayed on NRW's 'River Levels Online' webpage: <https://naturalresources.wales/riverlevels?lang=en>

**Notes:** The Afon Aled, which is managed for water abstractions by Dwr Cymru, joins the Afon Elwy 750 metres upstream of the measuring station. At Pont y Gwyddel the River Elwy has a width of 15 metres.

## St. Asaph gauging station

**Where?** In the river below the A55 dual carriageway in St. Asaph. A kiosk is situated nearby to control the measuring station.

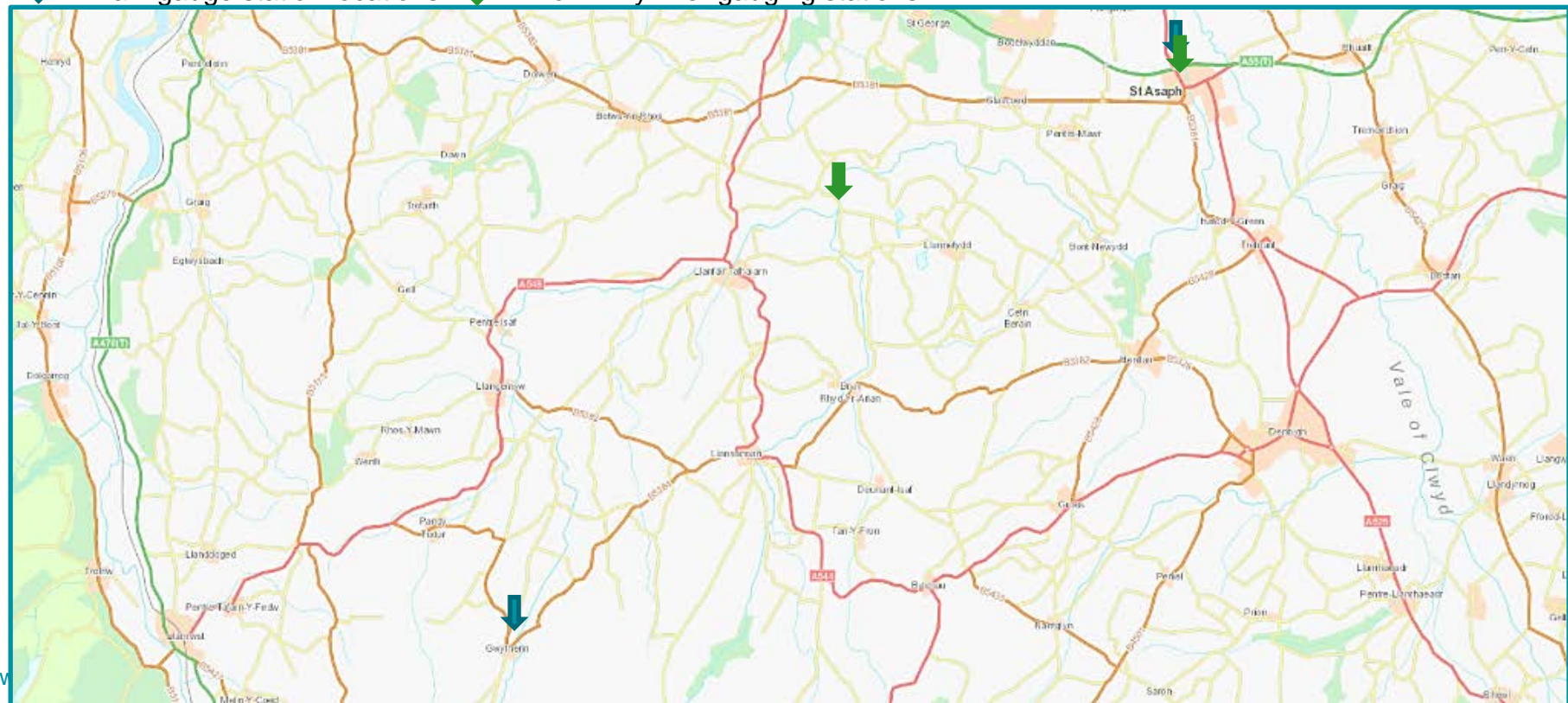
**Purpose?** To monitor river levels at the city in case of flooding in the area. Data is collected every 15 minutes and the information is sent down the phone line to a computer server so that on duty NRW Officers can analyse the data. The information gathered is also available to the public as it is displayed on [NRW's River Levels Online webpage](#).

## Rain Gauges

Natural Resources Wales has two rain gauges within the Afon Elwy catchment. The first is in the uplands of the river's catchment at Gwytherin and the second is based in St. Asaph. The rain gauges are automated and the data recorded is analysed and recorded to help forecast when flooding is likely to occur.

Figure 1 – Overview map of gauging sites

↓ = Rain gauge station locations   ↓ = Afon Elwy river gauging stations





## Suggested questions/tasks for learners

Figure 2 – OS map of Gwytherin

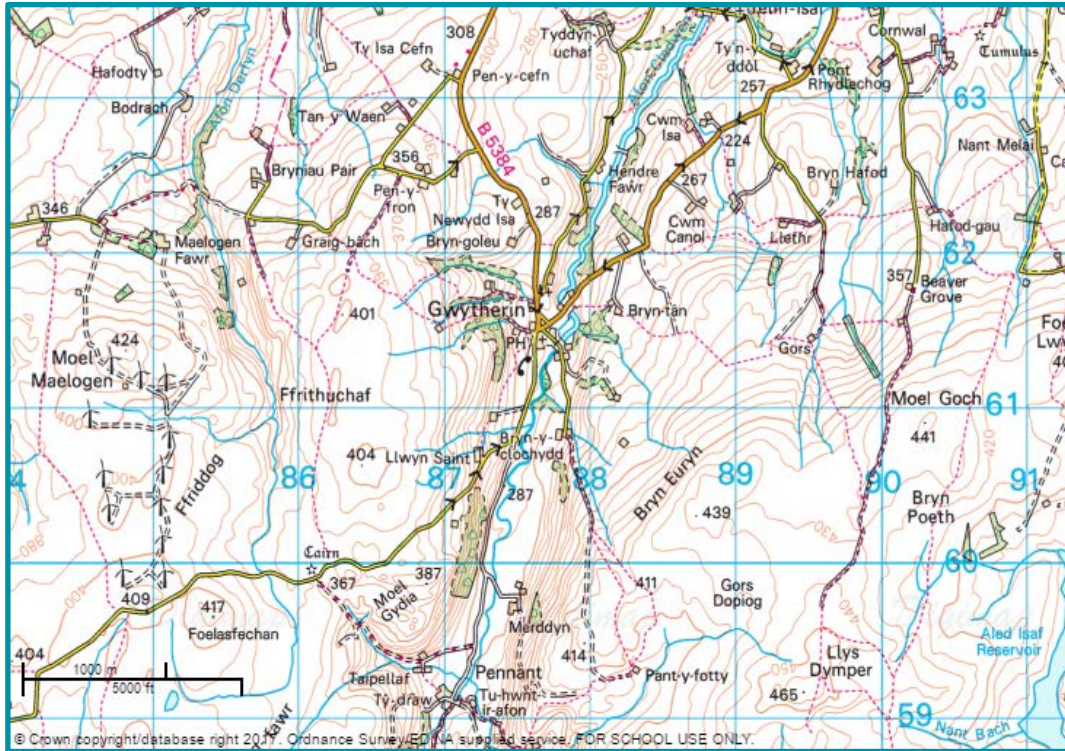
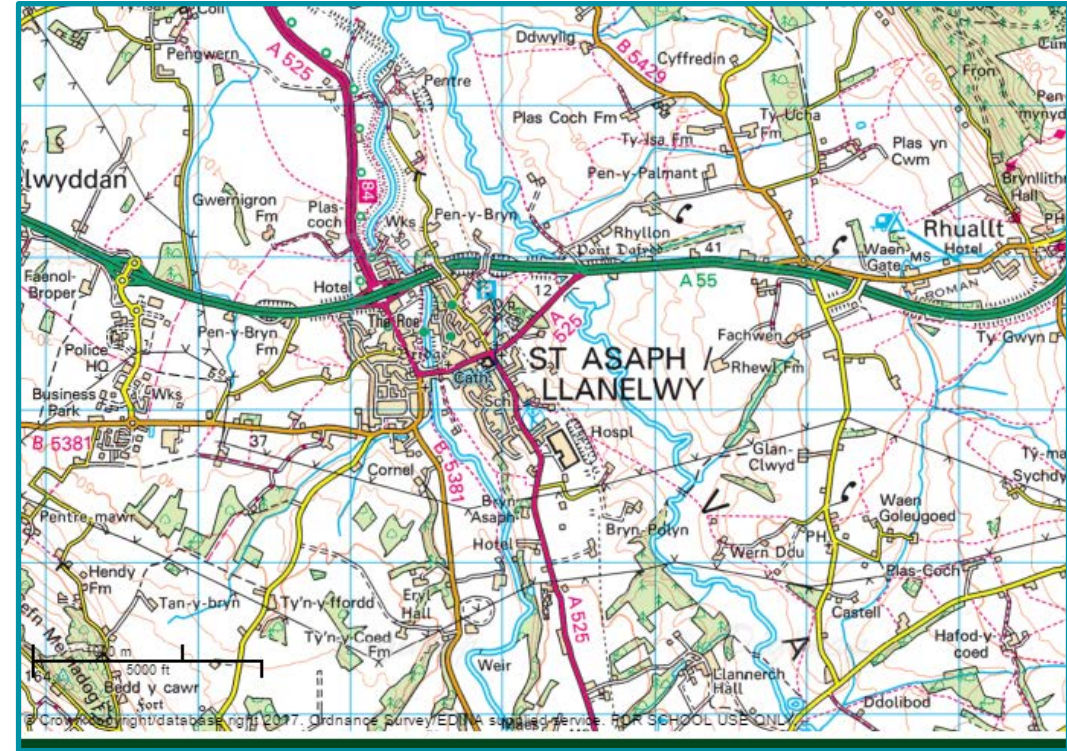


Figure 3 – OS map of St. Asaph



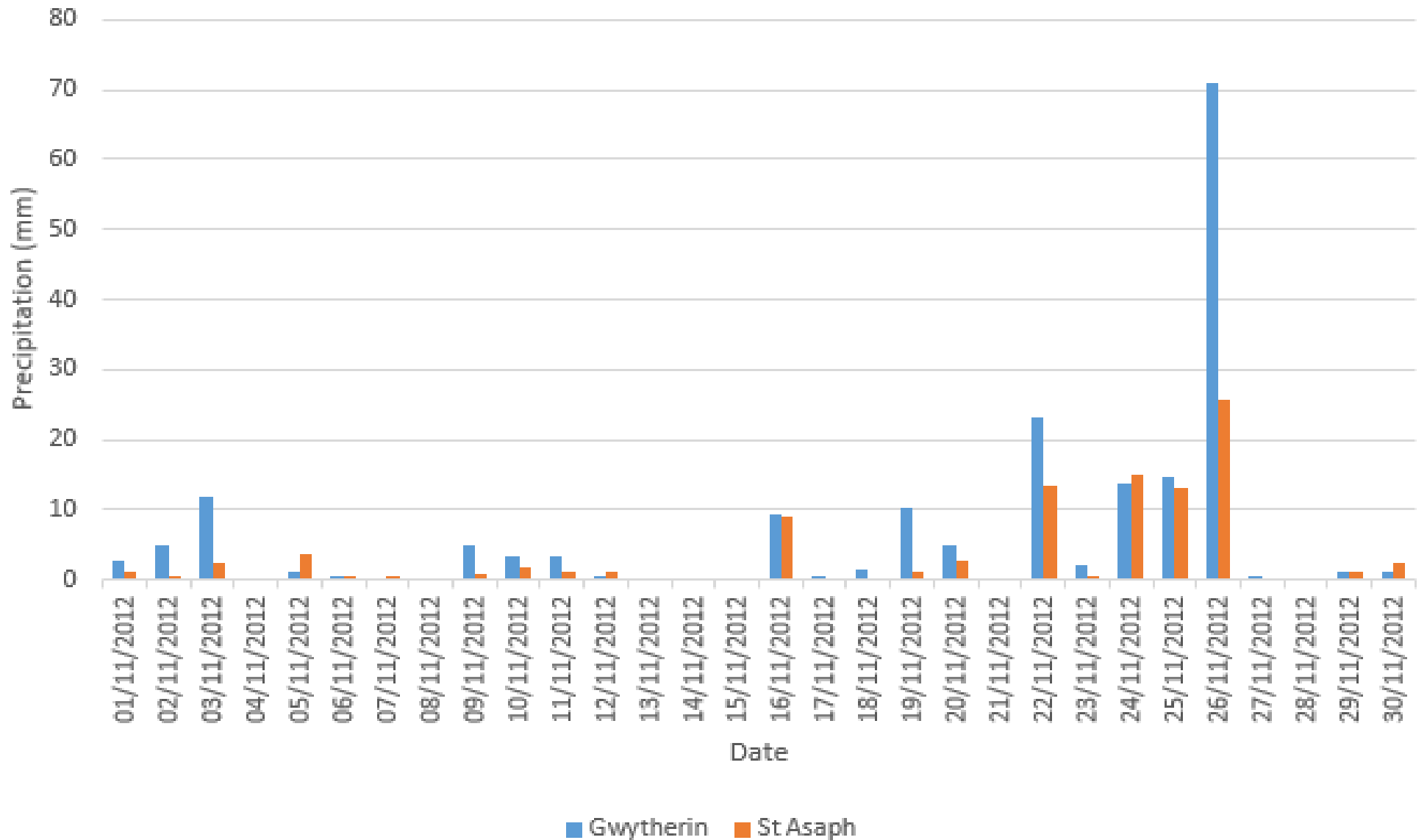
**Task 1** - Compare and contrast the 2 maps. What can you learn about the local areas from the maps?

Please note – the Afon Cledwen is a tributary of the Afon Elwy.

## Daily rainfall level data for November 2012 in the Afon Elwy Catchment

Date	Total precipitation (mm)	
	Gwytherin	St.Asaph
01/11/2012	2.8	1.2
02/11/2012	5	0.6
03/11/2012	11.8	2.4
04/11/2012	0.2	0.2
05/11/2012	1	3.6
06/11/2012	0.6	0.6
07/11/2012	0.2	0.4
08/11/2012	0.2	0
09/11/2012	4.8	0.8
10/11/2012	3.4	1.6
11/11/2012	3.4	1.2
12/11/2012	0.4	1.2
13/11/2012	0	0
14/11/2012	0	0
15/11/2012	0	0
16/11/2012	9.4	9
17/11/2012	0.4	0
18/11/2012	1.4	0.2
19/11/2012	10.4	1.2
20/11/2012	4.8	2.8
21/11/2012	0.2	0
22/11/2012	23.2	13.4
23/11/2012	2.2	0.4
24/11/2012	13.6	15
25/11/2012	14.6	13.2
26/11/2012	71	25.8
27/11/2012	0.6	0
28/11/2012	0	0
29/11/2012	1	1
30/11/2012	1	2.4

## Daily Rainfall during November 2012 in the Afon Elwy Catchment



## Suggested questions/tasks for learners

**Task 2** - Analyse the data provided. On which day did Gwytherin/St. Asaph receive the highest amount of rainfall?

**Task 3** - On which days in November was there no rainfall?

**Task 4** - Which days in November had the lowest amount of rainfall?

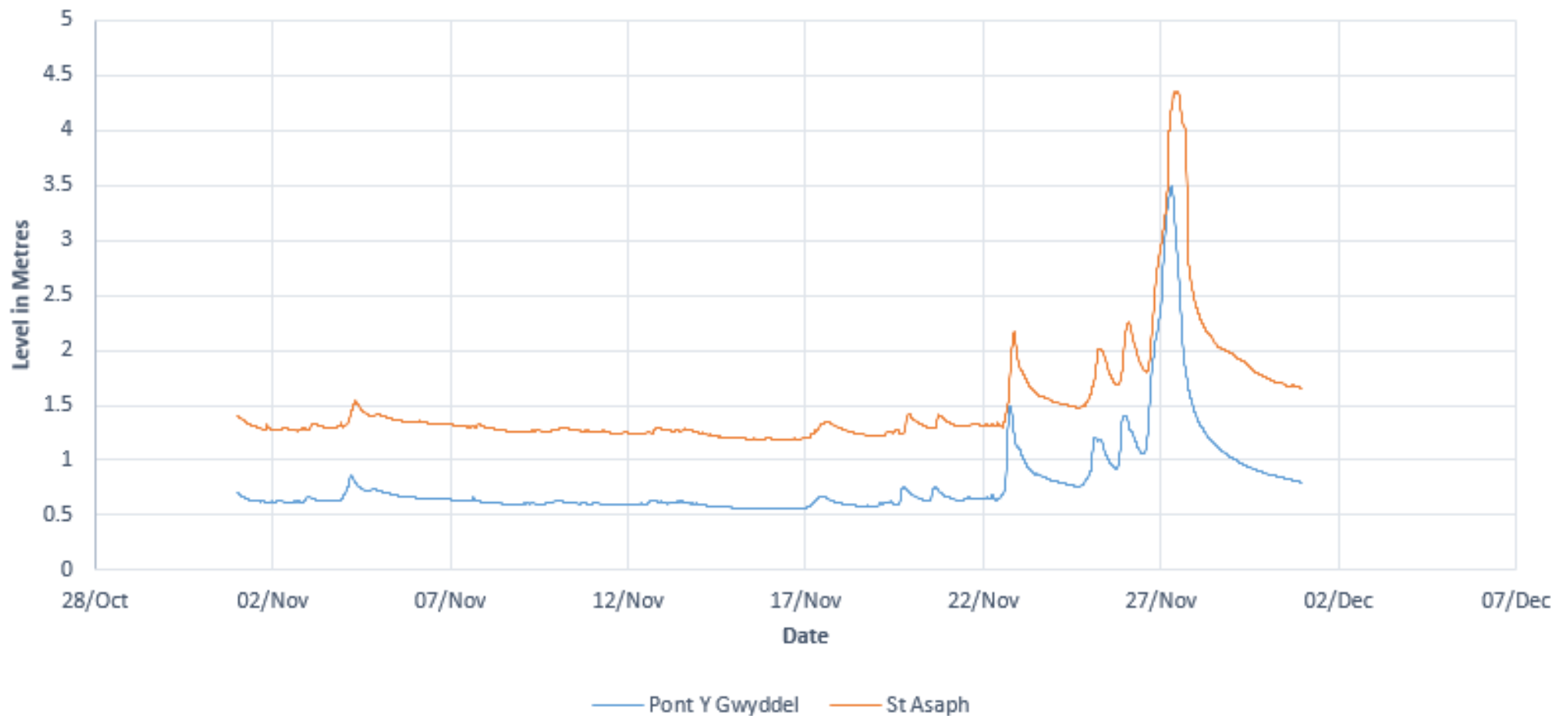
**Task 5** - Using graph paper or using Excel, plot or input the data to create a graph to show the total amount of rainfall received at Gwytherin/St.Asaph during November 2012.

**Task 6** - Calculate the difference in rainfall totals between Gwytherin and St.Asaph on the 26<sup>th</sup> November 2012. Can you think of any reasons why one location received more rainfall than the other?

**Task 7** - Using the data provided, work out the total mean rainfall (mm) for the month of November 2012 for Gwytherin/St.Asaph.

**Task 8** - By looking at the data/graph, calculate how much total rainfall (mm) Gwytherin and St. Asaph received on the 26<sup>th</sup> November 2012.

## Afon Elwy Level for Pont Y Gwyddel and St. Asaph Sites in November 2012





## Suggested questions/tasks for learners

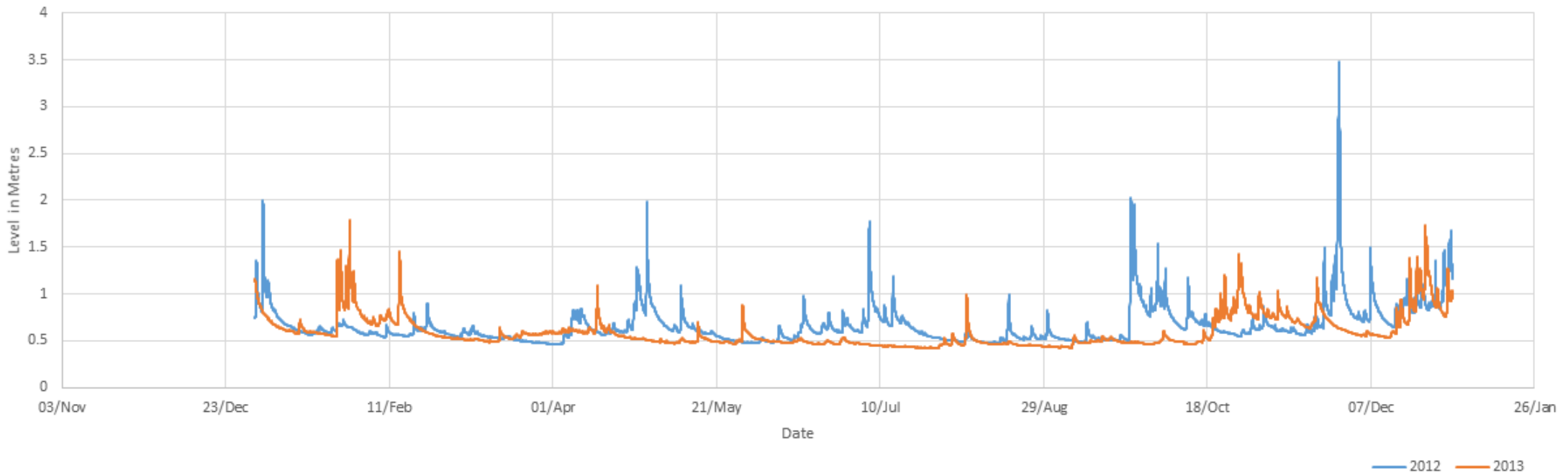
### Afon Elwy level graph for Pont y Gwyddel (Llanfair Talhaiarn) and St.Asaph sites in November 2012

**Task 9** - From looking at the graph, on which day was the highest river level recorded at Pont y Gwyddel/St.Asaph?

**Task 10** - From looking at the graph, you will see that the river reached it's peak level in Gwytherin before St.Asaph. Can you explain why this happened?

**Task 11** - On what day was the River Elwy at its lowest level in Pont y Gwyddel/St.Asaph? What was the level recorded?

Afon Elwy Level during 2012 - 2013 at the Pont Y Gwyddel Hydrometric Site



## Suggested questions/tasks for learners

### Afon Elwy levels graph during 2012 – 2013 at the Pont y Gwyddel (Llanfair Talhaiarn) Hydrometric Site

**Task 12** - From looking at the graph, during which year was the highest river level recorded?

**Task 13** - During which month in 2012/13 was the lowest river level recorded?

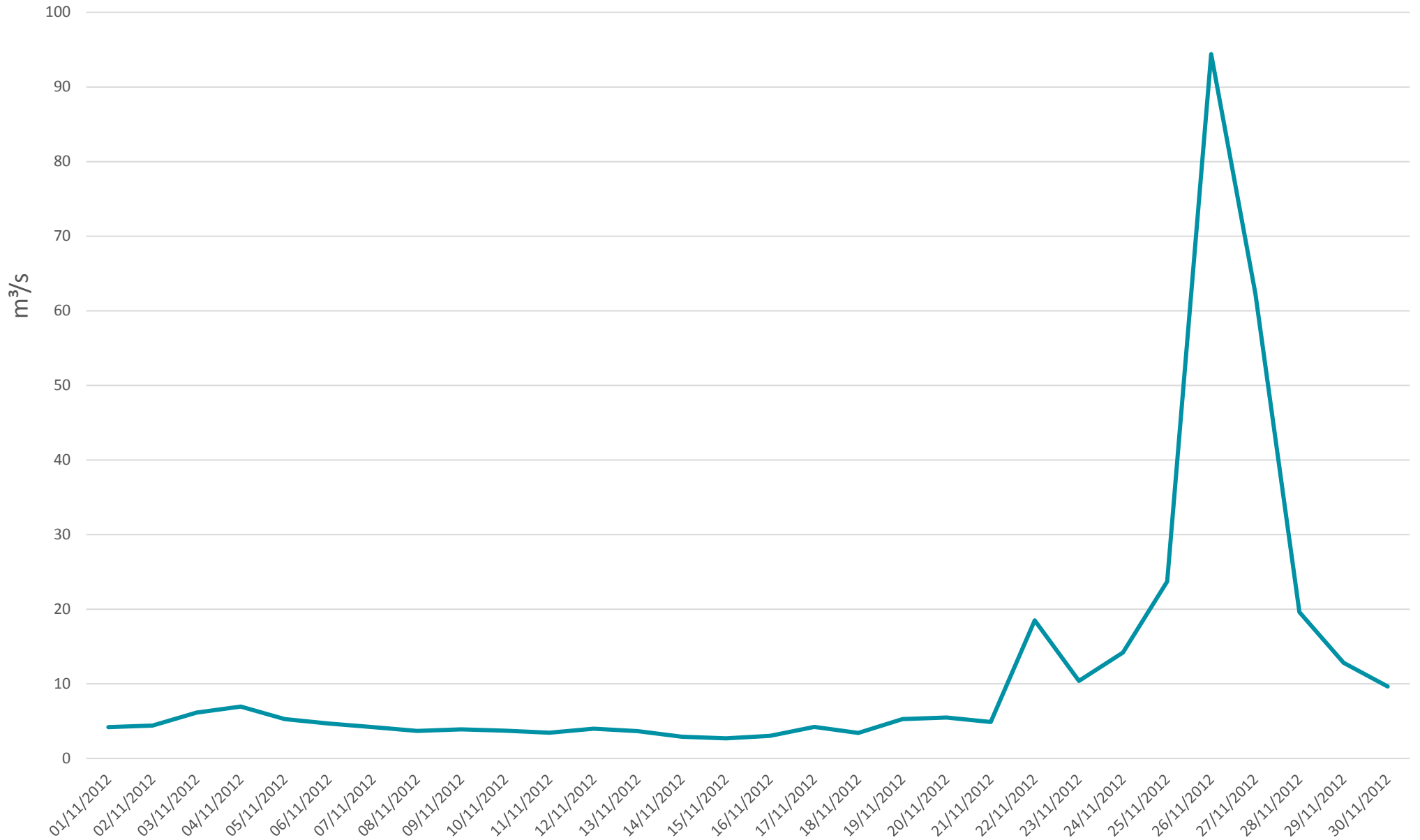
**Task 14** - What was the lowest river level recorded at Pont y Gwyddel in 2012/2013?

**Task 15** - What was the highest river level recorded at Pont y Gwyddel in 2012/2013?

## Afon Elwy mean flow recorded at Pont y Gwyddel hydrometric site November 2012

Date	Mean daily m <sup>3</sup> /s
01/11/2012	4.2
02/11/2012	4.4
03/11/2012	6.13
04/11/2012	6.95
05/11/2012	5.26
06/11/2012	4.67
07/11/2012	4.2
08/11/2012	3.67
09/11/2012	3.9
10/11/2012	3.71
11/11/2012	3.45
12/11/2012	3.99
13/11/2012	3.65
14/11/2012	2.91
15/11/2012	2.69
16/11/2012	3.04
17/11/2012	4.22
18/11/2012	3.4
19/11/2012	5.26
20/11/2012	5.48
21/11/2012	4.89
22/11/2012	18.5
23/11/2012	10.4
24/11/2012	14.2
25/11/2012	23.7
26/11/2012	94.4
27/11/2012	62.3
28/11/2012	19.6
29/11/2012	12.8
30/11/2012	9.63

Afon Elwy mean flow (m<sup>3</sup>/s) at Pont y Gwyddel during November 2012

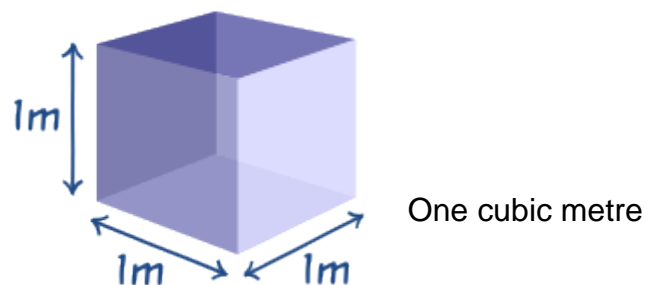




## Suggested questions/tasks for learners

### Afon Elwy mean velocity recorded at Pont y Gwyddel hydrometric site November 2012

**Task 16** - The flow of rivers is measured in  $\text{m}^3/\text{s}$  (metres cubed per second) e.g. how many cubic metres are passing a given place per second. Use metre ruler sticks, bamboo sticks or anything else you can lay your hands on to make a metre square.



**Task 17** - Using graph paper or using Excel, plot or input the data to create a graph to show the mean flow of the Afon Elwy recorded at Pont y Gwyddel during November 2012.

**Task 18** - What was the lowest mean flow in November? On what day was this recorded?

**Task 19** - What was the highest mean flow in November? On what day was this recorded, imagine that number of your metres squared passing your front door per second.

**Task 20** - Use the data provided to calculate the mean flow of the river at Pont y Gwyddel during November 2012.

## Acknowledgements

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For a full explanation of what happened during the St.Asaph floods of 2012 and what NRW has done to establish a Flood Risk Management scheme you may wish to look at the St. Asaph 'Task and Problem' and 'Solution' documents which can be found on the Education, Learning and Skills pages of NRW's website.

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