

<u>Titley Wetland – Cell Design Options</u>

To incorporate the existing Dwr Cymru public sewer pipeline running through the wetland site at Titley, the wetland cells will need to be adjusted. This document summarises the three options presented and considerations to acknowledge.

Please note, the positioning of the Dwr Cymru pipeline is based on a network map received from Gareth Morris at Dwr Cymru, however the precise location of the pipeline will need to be confirmed. A site visit confirmed the location of the manhole within the site boundary (NGR SO 33347 60060) as shown in the plans below. A distance of 3m has been kept between the cell edge and pipeline/manhole. The wetland inlet position will not change.

Considerations for scheme layout changes are summarised below:

Option 1: Reducing wetland size

- Reduce the size of the wetland from 2800m² to 2346m² (Figure 1).
- Based on our current offsetting calculations, using the most recent monitoring data, the change in size only results in a minor impact on the efficacy of the wetland.
 - 2800m² = 31.49kg/yr offset
 - 2346m² = 31.35kg/yr offset
- A reduced wetland size could benefit in terms of reduced construction costs and reduced amount of spoil removal.



Figure 1. Option 1 – Total wetland area of 2346m²



Option 2: Extend the wetland to regain the original size

- There is an opportunity to extend the wetland further south to avoid the pipeline and regain the original wetland area of **2800m²** (Figure 2).
- This would likely involve removing several medium willow trees, which can be replaced to the north of the wetland.
- Based on our current offsetting calculations, using the most recent monitoring data, the offset would be **31.49kg/yr**.



Figure 2. Option 2 – Extending the wetland to the south to regain a wetland size of 2800m². 19m buffer is retained for a veteran tree to the east of the site boundary. This design would involve removing several small to medium willow trees on the southern boundary.

Option 3: Reduce wetland size and increase water depth.

- There is also an opportunity to reduce the wetland size to **2346m**² and slightly increase the water depth. This would extend the hydraulic residence time to regain the minor loss of offset from reducing the wetland size.
- Based on our current offsetting calculations, using the most recent monitoring data, the offset figures are outlined below:
 - \circ 200mm deep 31.35kg/year of offset
 - \circ 220mm deep 31.49kg/year of offset
 - 230mm deep 31.63kg/year of offset
 - 240mm deep 31.93kg/year of offset



- The main consideration with undertaking this option is that more mature wetland plants are likely required to establish in the slightly deeper water which could be associated with higher costs.
- An extra volume of spoil will also need to be excavated, however it is likely this will be more clay which can be transported and utilised at Tarrington. See below:
 - \circ 200mm deep 983m³ topsoil and 1568m³ clay* (Total: 2,551m³)
 - \circ 220mm deep 983m³ topsoil and 1615m³ clay* (Total: 2,598m³)
 - \circ 230mm deep 983m³ topsoil and 1638m³ clay* (Total: 2,621m³)
 - \circ 240mm deep 983m³ topsoil and 1662m³ clay* (Total: 2,645m³)

*Approximately 760m³ of excavated clay will be used on site for the puddled clay liner



Figure 3. Option 3 – Reduced wetland size of 2346m² with an increased water depth.

This table summarises the offset figures issued in June 2022, in comparison to the latest October 2022 updated figures for option 3.

	June 2022	Oct 2022 Option 3	Change
Size	2,800m2	2,346m2	- 464m2
Material excavated	3,044m3	2,551-2,645m3	-399m3 to – 493m3
Predicted load (DCWW)	35.56kg p/a	35.56kg p/a	No change
95% load	24.05kg p/a	33.97kg p/a	+ 9.92kg
Offset	22.55kg p/a	31.49 - 31.93kg p/a	+ 8.94kg to + 9.38kg
Offset %	93.76%	92.69% - 93.99%	

Conclusion

Following internal discussion with the Herefordshire Council wetlands team, it was concluded that option 1 is to be progressed based on the following rational:

- This option would minimise the changes to the wetland design.
- Eliminate the need for further landtake.
- Reduce the risk of additional spoil.
- Reduce the risk of additional costs.
- A minimal reduction in phosphate uptake.