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Revised 2018-2033
Local Development Plan

Habitats Regulations Assessment
2nd Addendum Report

2nd Deposit Plan
February 2024

Cyngor Sir Gâr
Carmarthenshire
County Council

Mae’r ddogfen yma hefyd ar gael yn Gymraeg

This document is also available in Welsh

Contents

Abbreviations

(r)LDP	(revised) Local Development Plan
AMP	Asset Management Plan
AoS	Area of Search
CBEEMS	Carmarthen Bay and Estuaries European Marine Site
HRA	Habitat Regulations Assessment
LSA(s)	Local Search Area(s)
MoU	Memorandum of Understanding
NRW	Natural Resources Wales
P	Phosphorous
SAC(s)	Special Area(s) of Conservation
SNCB	Statutory Nature Conservation Body
SPA(s)	Special Protection Area(s)
SPG	Supplementary Planning Guidance
SuDS	Sustainable Drainage Systems
WwTW	Wastewater Treatment Works

1 Introduction

1.0.1 Carmarthenshire County Council is preparing a revised Local Development Plan (rLDP). The rLDP is a land-use plan which outlines the location and quantity of development within Carmarthenshire for a 15-year period between 2018 and 2033, and will replace the existing adopted LDP. Over the course of the preparation of the rLDP, which has undergone several iterations, the accompanying Habitats Regulations Assessment (HRA) has been carried out in an iterative and integrated manner as part of the plan making process since 2018.

1.0.2 The scope of the present HRA is to ensure that all allocations for proposed development contained within the 2nd Deposit rLDP[1] have been duly considered in terms of their potential impact upon the National Site Network. This *HRA 2nd Addendum* (October 2023) expands upon the findings and recommendations made by the *HRA Addendum*[2] (February 2023), *HRA Report*[3] (December 2020) and an earlier, informal *HRA Screening Report*[4] of the Preferred Strategy (December 2018), which are required under *The Conservation of Habitats and Species Regulations (as amended) 2017* (hereinafter referred to as the Regulations)[5].

1.0.3 Where appropriate, the present document contains excerpts of, and cross references to, the above-mentioned assessments. Effort has been made to avoid the repetition of supplementary text which is not fundamental to the rationale and conclusions here made. This is to give an accessible and transparent record of the assessment of the rLDP throughout its preparation, under the Regulations. Nevertheless, the present document should not be considered in isolation and signposting to earlier HRA effort has been provided accordingly.

1.0.4 The publication of new guidance, in addition to an emerging evidence base, has resulted in the alteration of previous HRA effort (further noted in text as superseded).

Consultation Response

1.0.5 Natural Resources Wales (NRW), as the Statutory Nature Conservation Body (SNCB), was consulted upon and provided comments on both the rLDP and the HRA[6]. In their response dated 14th April 2023, they advised that additional clarification would be needed to justify the conclusion of the *HRA Addendum* (Feb 2023) (i.e., with appropriate certainty and beyond reasonable scientific doubt) that the rLDP will not have an adverse effect on the integrity of riverine SACs.

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[1] Carmarthenshire County Council / Cyngor Sir Gâr - Second Deposit LDP (oc2.uk)
[2] 2nd Deposit Revised Local Development Plan HRA Addendum. February 2020. As amended Appendix A.
[3] Revised Local Development Plan HRA Report. January 2020. As amended by the HRA Addendum, Appendix A.
[4] rLPD HRA Screening Report of the Preferred Strategy. December 2018.
[5] The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk)
[6] Please find all responses within the Consultation Report. Spring 2024.

1.1 Work Undertaken in Preparation for Submission.

1.1.1 In light of NRW comments and the emerging nature of associated guidance and ongoing works, a summary of evidential developments which have been undertaken since the publication of the *HRA Addendum* is provided below. Additionally, a schedule of proposed Focus Changes made to the *HRA Addendum* is further provided in Appendix A.

1.1.2 A Statement of Common Ground[7] between neighbouring Local Planning Authorities, NRW, and Dŵr Cymru has been prepared to address uncertainties related to cross-catchment collaboration. Regard to the location of future development and its associated mitigation is also made to ensure that no further detriment, whether alone or in-combination, arises from future development. Additionally, the Nutrient Management Board for each respective SAC catchment will provide further certainty regarding the deliverability of cross-border mitigation measures (and benefit sharing thereof). As of November 2023 the terms of reference for the Nutrient Management Boards have been agreed. These shall facilitate the cross-nature partnership, information sharing between the affected Local Planning Authorities, and act as an agreed approach to their respective permissions process. Ultimately, this ensures that further development does not contribute towards a net increase in phosphorous pollution throughout each affected SAC catchment.

1.1.3 As detailed within version 3.1 of advice from NRW[8], there has been an ongoing Review of Permits of existing Wastewater Treatment Works (WwTW)[9] within SAC catchments throughout Wales. A collation of WwTWs that have an environmental permit with a P limit can be found in the Topic Paper[10]. Additionally, it may now be possible to condition the timing of development through Grampian Conditions to correspond with the delivery of improvements to WwTW made by Dŵr Cymru, as scheduled under their appropriate Asset Management Plan (AMP). However, in light of the localised spatial nature of these factors, these will be considered on a case-by-case basis at the project level, and it is anticipated that further details will be presented within Supplementary Planning Guidance (SPG).

1.1.4 A dedicated *Topic Paper* on Phosphorus has been prepared to support the evidence base of the rLDP. It summarises the work undertaken by Carmarthenshire County Council which has informed the development of measures to mitigate the adverse effects associated with development in P sensitive SAC catchments. Additionally, it discusses the implication of evidential changes which have been published since the *HRA Addendum* (e.g. the recent source apportionment report[12] by NRW and Dŵr Cymru which indicates that 83% of the phosphorus pollution within the Afon Tywi SAC originates from the rural land-use sector).

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[7] Supporting Sustainable Development within Carmarthenshire by Safeguarding Phosphorus Sensitive Riverine Special Areas of Conservation (Spring 2024). Statement of Common Ground.
[8] Natural Resources Wales / Advice to planning authorities for planning applications affecting phosphorus sensitive river Special Areas of Conservation.
[9] with a dry weather flow, final effluent discharge of =>20m3/day.
[10] Topic Paper: Phosphorous (October 2023).
[12] SAC Rivers: Source Apportionment Reports | Dŵr Cymru Welsh Water (cymru.com)

1.1.5 Carmarthenshire, Ceredigion, and Pembrokeshire County Councils have worked in collaboration to devise the *West Wales Nutrient Budget Calculator* which has since been adopted across the region[13]. Based on peer-reviewed literature, this tool considers those mitigation measures which may have the capacity to remove all reasonable scientific doubt, in perpetuity, as to the effects of the rLDP allocations on the riverine SACs. Additionally, Welsh Government have published the *Mitigation Measures Menu*[14] which acknowledges the efficacy and reliability of a wide range of measures which have the potential to reduce nutrient input into freshwater environments. This was, in part, formulated on a technical review of nutrient mitigation options commissioned by Carmarthenshire County Council, which, in turn, has been reviewed upon following the publication of the *HRA Addendum*[15].

1.1.6 The development of the *Action Plan*[16] is ongoing to ensure alignment with the best available scientific evidence and guidance. To clarify paragraph 4.2.16 and 4.3.19 of the *HRA Addendum,* this living document will effectively build upon the Interim Action Plan and shall be finalised during the examination of the rLDP. Supplementary to the scope outlined previously, this document will provide further confidence in regard to phasing development in accordance with mitigation delivery; mitigation situation to prevent a net increase in phosphorous pollution associated with the development; quantifying the role which other catchment-based interventions could have in addition to constructed wetlands; the long-term operation of such interventions (in accordance with the lifetime of the development) and the management of captured phosphorous; and any unforeseen modifications to the rLDP recommended by the inspectors report.

1.1.7 Signposting is given to the *Nutrient Management Strategy*[17], developed by Carmarthenshire County Council, which sets out the framework for the Local Authority and its stakeholders to collaboratively restore and/or maintain the Conservation Status of Riverine SACs whilst enabling sustainable growth.

1.1.8 There have been no material changes to the rLDP as a consequence of these works.

[13] West Wales Nutrient Budget Calculator NB: This supersedes previous notation of the Carmarthenshire Calculator.
[14] Mitigation Measure Menu External Version 2. Created by Natural Resource Wales for Welsh Government. River pollution summit action plan | GOV.WALES
[15] Ricardo (commissioned by Carmarthenshire County Council). Nutrient Mitigation Options Technical Review: Guidance on phosphorus mitigation options for use in Carmarthenshire. Phosphorus Mitigation
[16] Previously refer to as the '*Afon Tywi and Afon Teifi Phosphorus Reduction Strategy'* within the HRA Addendum and rLDP.
[17] Carmarthenshire Nutrient Management Strategy. Spring 2024.

2. Screening Stage

2.0.1 This Chapter has been prepared in accordance with the legislative requirements outlined within the *HRA Report* in Sections 1.2, 1.3 and 1.4 (pages 1 to 4) in addition to the methodology set out in Chapter 2 (pages 6 and 7), as amended by the *HRA Addendum*. In principle, it ensures all rLDP Allocations[18] and Other rLDP Proposals are adequately appraised, and that the rLDP is procedurally compliant in line with the Regulations. Again, in the interest of clarity, no changes have been made to the *2nd Deposit rLDP* since its publication for public consultation in February 2023.

2.0.2 According to the Joint Nature Conservation Committee Protected Sites Designations Directory, there has been no further designations (or candidate thereof) added to the National Site Network within a 15km radius of Carmarthenshire since time of writing. Additionally, there has been no further publications relating to the characterisation of designated sites, conservation status, nor changes to the condition of their Qualifying Features since the *HRA Addendum*.

2.0.3 The screening impact pathways featured in Task 2 of the *HRA Report* (subsequently amended in paragraph 3.2.1 of the *HRA Addendum*) have been reviewed and were found to remain appropriate.

2.1 rLDP Allocations

2.1.1 The screening outcome for each of the allocations against the potential effect mechanisms are summarised below in Table 1, as supplemented by site-specific commentary in Appendix B. Those allocations within a Phosphorus Sensitive SAC catchment are additionally screened within Appendix C.

[18] rLDP Allocations hereinafter refers to those proposed development sites listed within Policies *SG1: Regeneration and Mixed Use Sites*, *SG2: Reserve Sites*, *HOM1: Housing Allocations*, *EME3: Employment Proposals*, and *SP10: Gypsy and Traveller Provision*.

Table 1. Summary of HRA screening of *2nd Deposit rLDP* Allocations which are not featured within the *HRA Report* (2020) or *HRA Addendum* (Feb 2023). For site-specific commentary and the explicit identification of the potentially affected National Site Network Sites in question, please refer to Appendix B. Y = Yes, allocation is identified to have a likely significant effect under this impact pathway (highlighted in grey); N = Allocation is NOT likely to cause effects under this impact pathway.

Site Reference	Name	Aquatic	Marine	Coast	Mobile Species	Recreational	Abstraction	Wastewater	Phosphates	Air Pollution	Disturbance	Screening Conclusion
PrC1/MU3	Nant y Caws Regeneration and Mixed-Use Site	N	N	N	N	N	N	N	N	N	N	Out
PrC2/GT1	Land at Penyfan, Trostre, Llanelli	N	N	N	Y	N	N	Y	N	N	Y	In
PrC2/GT2	Penybryn (extension), Bynea, Llanelli	Y	Y	N	Y	N	N	Y	N	N	N	In
PrC2/h20	Harddfan	N	N	N	N	N	N	Y	N	N	N	In
PrC2/MU1	Former Old Castle Works, Llanelli	Y	Y	N	Y	N	N	Y	N	N	N	In
SeC20/MU1	Laugharne Holiday Park	Y	Y	N	N	N	N	N	N	N	Y	In
SeC3/h3	Llys Felin	Y	Y	N	Y	N	N	N	N	N	Y	In
SeC4/MU1	Burry Port Waterfront	Y	Y	N	Y	N	N	Y	N	N	Y	In
SeC6/h2	Land between Clayton Road and East of Bronallt Road	N	N	N	N	N	N	N	N	N	N	Out
SuV1/h1	Adjacent Fron Heulog	N	N	N	N	N	N	N	N	N	N	Out
SuV16/h1	Llwynddewi Road	Y	N	N	Y	N	N	N	Y	N	Y	In
SG2/1	Former Morlais Colliery, Llangennech	Y	Y	N	Y	N	N	N	N	N	Y	In
SG2/2	Land adjacent to Silver Terrace, Burry Port	Y	Y	N	Y	N	N	N	N	N	Y	In
SG2/3	Cross Hands Employment Zone	Y	Y	N	Y	N	N	N	N	N	Y	In
SG2/4	Former Ennis Caravans, Cross Hands	Y	Y	N	Y	N	N	N	N	N	Y	In

Effects of Increased Development: Phosphorous Loading

2.1.2 This subsection must be considered in conjunction with paragraphs 3.2.3 to 3.2.13 of the *HRA Addendum*. In light of an additional site being screened in for phosphates (SuV16/h1), a revised compilation of all rLDP Allocations has been provided (Table 2).

Table 2. Summary of all residential rLDP Allocations screened in for likely significant effects on the integrity of Afon Teifi SAC or Afon Tywi SAC due to phosphates. This table supersedes all previous consolidations (including Table 7 featured within HRA Addendum). * = site is also part commitment; number is exclusive of units with extant permissions.

Phosphate Sensitive Catchment	rLDP Allocation Ref	Name	Units
Afon Teifi SAC	SuV38/h1	Maes y Bryn	6
	SuV37/h3	Land adjacent to Lleinau	10
	SuV37/h2	Land south of Cae Coedmor	20
	SuV39/h1	Adjacent Yr Hendre	7
	SuV33/h1	Land opposite Brogeler	5
	SuV36/h2	Land at Bryndulais	16
	SuV36/h1	Cae Pensarn Helen	6
	SeC13/h1	Adjacent Y Neuadd	10
	SuV43/h1*	Blossom Inn	5*
	SeC12/h1	Trem Y Ddol	17
	SeC12/h3	Land rear of Dolcoed	20
	SeC14/h2	Land adjacent Maescader	24
	SeC14/h1	Blossom Garage	20
	SuV35/h1	Land adjacent Arwynfa	6
Afon Tywi SAC	SuV16/h1*	Llwynddewi Road	2*
	SuV17/h1	Rear of former joinery, Station Road	35
	SuV51/h1	Land opposite Village Hall	8
	SeC16/h1	Llandeilo Northern Quarter	27
	SeC15/h2	Land adjacent to Bryndeilog, Tywi Avenue	8
	SeC17/h1	Land opposite Llangadog C.P School	16
	SeC17/h2	Land off Heol Pendref	8

2.1.3 There is also one mixed use and employment allocation situated within the Tywi SAC P Sensitive Catchment (SeC16/MU1 & SeC16/E1) however, these sites are screened out under this impact pathway in accordance with NRW's advice[19]. Additionally, the rLDP also contains committed development within the respective SAC P Sensitive Catchments (much of which is under construction or has already been built). Full details of screening under this impact pathway can be found within the dedicated Appendix C, with further context contained within the *HRA Addendum* and *Topic Paper*[20].

2.1.4 Reference is made to paragraph 1.4.3 of the *HRA Report* outlining that there is no requirement to effectively reassess commitments under the provisions of the Regulations, particularly where they have previously been found to be acceptable by the competent authority and in consultation with the SNCB. This approach is consistent the Habitats Regulations Assessment Handbook[21], in addition to advice published by NRW specifically concerning those situated within SAC P Sensitive Catchments[22].

Effects Associated with Development: Wastewater (Updated)

2.1.5 This subsection must be considered in conjunction with paragraphs 3.2.70 to 3.2.75 and 3.2.77 to 3.2.79 of the *HRA Report* (as amended by Ref 27 and 28 of the *HRA Addendum*). Paragraphs 3.2.76 and 3.2.80 of the *HRA Report* are superseded in light of the below.

2.1.6 It should be recognised that WwTW capacity is subject to change and, therefore, the rationale originally given within the *HRA Report* for the detailed screening of individual rLDP Allocations must be reflected accordingly. Dŵr Cymru and Carmarthenshire County Council have continued to work together to identify any capacity related concerns associated with the growth proposed by the *2nd Deposit rLDP*.

2.1.7 Recent consultation with Dŵr Cymru has confirmed that the majority of rLDP Allocations can be accommodated by existing consents and that they do not have significant concerns with the deliverability of the rLDP[23]. However, some WwTW catchments may not have the capacity to accommodate the amount of growth proposed in the rLDP. A supplementary Dry Weather Flow assessment has also been undertaken by Dŵr Cymru to establish whether the rLDP Allocations could result in unsatisfactory overflows through the exceedance of associated permits. This has led to the identification of other WwTWs in which certain rLDP Allocations may result in the exceedance of the permitted capacity, meaning that a new or modified permit would likely be required to provide for the increase in demand. As potential operational headroom (or lack thereof) associated with each environmental permit is not known,

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[19] Version 3.1, published in August 2023. Sites contain employment, commercial and retail (i.e., non-residential and, therefore, unlikely to increase the number of overnight stays within the catchment). Natural Resources Wales / Advice to planning authorities for planning applications affecting phosphorus sensitive river Special Areas of Conservation

[20] Topic Paper: Phosphorous (October 2023).

[21] Part C.12. Tyldesley, D., and Chapman, C., (2013) The Habitats Regulations Assessment Handbook, April 2021 Edition. UK: DTA Publications Limited.

[22] Advice for the review of LDPs specifically states "*Allocations*…" (i.e., not commitments) "*for developments that are proposed to be connected to a mains wastewater treatment works and have the potential to increase phosphorus loading, should be assessed*…"

[23] Signposting is given to the Consultation Report which contains reference to their full response.

following a precautionary approach it is assumed that exceedance of the permitted capacity could result in adverse effects upon hydrologically connected National Site Network Sites.

2.1.8 Network concerns associated with Llanelli WwTW have also been identified. These are established within the Burry Inlet Memorandum of Understanding (MoU), and are owing to the combined nature of the sewerage network within the associated service catchment. Dŵr Cymru have expressed that the introduction of additional foul flow may lead to hydraulic overloading of the WwTW, as well as potential increase in the frequency of discharges from combined sewerage overflows, particularly during significant rainfall events. Whilst it is not assumed that further deterioration to the respective waterbody status[24] would strictly amount to adverse effects on the integrity of CBEEMS, following a precautionary approach those rLDP Allocations likely to be connected to the Llanelli WwTW are also screened in under this impact pathway.

2.1.9 On a precautionary basis it is, therefore, concluded that those rLDP Allocations linked to the identified WwTWs of concern could have an adverse effect upon hydrologically connected National Site Network Sites, as summarised within Table 3.

Table 3. WwTWs which could experience an exceedance of permitted capacity as a result of the growth proposed in the *2nd Deposit rLDP*, alongside the resulting designated sites with LSE. This table supersedes Table 10 featured within the *HRA Report,* along with all specific screening summaries and commentary given for the identified rLDP Allocations. [1] = Identified in consultation response by Dŵr Cymru. [2] = Determined through Dry Weather Flow assessment. [3] = Established by the Burry Inlet MoU.

Wastewater Treatment Work	rLDP Allocation Ref	Name	National Site Network potentially affected
Llangennech WwTw	PrC2/h20	Harddfan, Bryn	Burry Inlet SPA and Carmarthen Bay and Estuaries SAC[1]
	SeC7/h3	Golwg Yr Afon	
	SeC7/h4	Gyferbyn Parc Morlais	
St Clears WwTw	SeC18/h3	Tir gerllaw i Cefn Maes	Carmarthen Bay and Estuaries SAC[1]
	SeC18/h4	Tir yn Heol Llaindelyn	
	SeC18/h5	Tir gerllaw i Gwynfa	
	SeC18/h6	Tir y tu cefn i	
Whitland WwTw	SeC19/h1	Tir yn Park View	
Laugharne WwTw	SeC20/h3	Tir oddi ar Clifton Street	Carmarthen Bay and Estuaries SAC[1,2]
Ffairfach WwTw	SeC16/h1	Gogledd Chwarter Llandeilo	Afon Tywi SAC, Carmarthen Bay and Estuaries SAC[1]
	SeC16/MU1	Beechwood	
Alltwalis WwTw	SuV11/h1	Tir ar Ysgol Alltwalis	Carmarthen Bay and Estuaries SAC[1]
Parc y Splotts WwTw	PrC1/MU2	Pibwrlwyd	Carmarthen Bay and Estuaries SAC[2]
	PrC1/h4	Tir gerllaw Parc y Delyn	
	PrC1/h5	Dwyrain o Rhodfa	
	PrC1/h8	Heol Llansteffan	
	PrC1/h10	Brynhyfryd	
	PrC1/h12	Heol Castell Pigyn	

[24] Deterioration under *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.* Waterbody status can be found in Paragraph 3.2 of MoU (now amended by Cycle 3).

Wastewater Treatment Work	rLDP Allocation Ref	Name	National Site Network potentially affected
Pencader WwTw	SeC14/h2	Tir gerllaw Maescader	Afon Teifi, Cardigan Bay Marine Site[2]
Pendine WwTw	SuV61/h1	Tir yn Fferm Nieuport	Carmarthen Bay and Estuaries SAC[2]
Llanelli WwTw	PrC2/GT1	Tir ym Mhenyfan, Trostre	Burry Inlet SPA and Carmarthen Bay and Estuaries SAC (components of CBEEMS)[3]
	PrC2/GT2	Pen-y-bryn (estyniad), Bynea	
	PrC2/h1	Beech Grove, y Pwll	
	PrC2/h10	Tir ger The Dell, Ffwrnes	
	PrC2/MU1	Cyn Safle Gwaith yr Hen Gastell, Llanelli	
	PrC2/MU2	Porth Trostre, Llanelli	
	SeC4/MU1	Glannau Porth Tywyn	

2.1.10 Notation related to the individual appraisal of rLDP Allocations against the '*Effects Associated with Development: Wastewater'* contained within the *HRA Report* is superseded by Table 3 (i.e., Appendix 8 of the *HRA Report* and Appendix G of the *HRA Addendum*). Additionally, the summary of generic level screening under this associated impact pathway (contained in Table 14 within the *HRA Report*) is further amended to reflect effort here presented.

2.2 Other rLDP Proposals

2.2.1 In response to the reasoning given by the SNCB during previous consultation, as a precautionary measure the following proposals contained within rLDP policies have been subject to screening:

- Local Search Areas (LSAs) (Proposed under *CCH1: Renewable Energy within Pre-Assessed Areas and Local Search Areas*);
- Sand and Gravel Area of Search (AoS) (Proposed under *SP 18: Mineral Resources*); and
- Gwili Railway Extension (Proposed under *TRA3: Gwili Railway*).

2.2.2 The policies in which these proposals are contain have already been screened[25], however the following exercise is explicitly focused upon their associated spatial component(s) as proposed on the *2nd rLDP Proposal Map and Insets Maps*[26]. Other mapped proposals such as the Cross Hands Health and Wellbeing Centre (proposed under *PSD6: Community Facilities*), Cross Hands Economic Link Road (proposed under *TRA1: Transport and Highways Infrastructural Improvements*) and the Gwili Railway Station already have extant permissions and are, therefore, considered as commitments in line with paragraph 2.1.4.

2.2.3 The screening conclusions for each of these proposals against the potential effect mechanisms are summarised below in Table 4, as supplemented by commentary in Appendix B.

[25] Please refer to the HRA Report and HRA Addendum.
[26] Second Deposit Revised Local Development Plan (gov.wales)

Table 4. Summary of HRA screening of *2nd Deposit rLDP other proposals*. For proposal specific commentary, please refer to Appendix B. Y = Yes, proposal is identified to have a likely significant effect under this impact pathway (highlighted in grey); N = proposal is NOT likely to cause effects under this impact pathway.

Site Reference	Name	Aquatic	Marine	Coast	Mobile Species	Recreational	Abstraction	Wastewater	Phosphates	Air Pollution	Disturbance	Screening Conclusion
A	North East of Farmers (LSA)	N	N	N	Y	N	N	N	N	N	N	In
B	Mynydd Pencarreg (LSA)	N	N	N	Y	N	N	N	N	N	N	In
C	West of Talley (LSA)	N	N	N	Y	N	N	N	N	N	N	In
Sand and Gravel	Clarbeston Road to Llanfalteg (AoS)	Y	Y	N	Y	N	N	N	N	N	N	In
TRA3/A	Gwili Railway Extension	Y	N	N	Y	N	N	N	N	N	N	In

2.3 In-Combination Effects

2.3.1 As detailed within the *HRA Report* (see page 45), Article 6(3) of the Habitats Directive requires the potential for plans to have a significant effect either individually or in-combination with other plans, programmes, and projects. This Section supplements Task 3 in the *HRA Report* and *HRA Addendum*.

2.3.2 All rLDP Allocations and Other rLDP Proposals hereby screened have been either assigned to a category which allows them to be screened out as they cannot undermine a sites conservation objectives (either alone or in-combination), or are deemed to have likely significant effect (LSE) alone (category I). Therefore, no further consideration of 'in-combination' effects is required.

NB: In-combination effects are further considered within Appendix C in relation to those rLDP Allocations situated in the Afon Teifi P Sensitive SAC Catchment.

2.4 Screening Summary

2.4.1 Additional rLDP Allocations have been screened in line with the requirement of the Regulations. In summary, …

- **Three rLDP Allocations have been screened out the need for further assessment. These are SuV1/h1, SeC6/h2, and PrC1/MU3;**

- **12 rLDP Allocations are determined to have LSE on the integrity of National Site Network sites (as shown in Table 1). Please refer to Appendix B which identifies the affected sites and associated impact pathways for each rLDP Allocation; and**

- In context to rLDP Allocations, only one additional impact pathway and affected SPA supplementary to those determined within previous HRA effort has been identified. This is the **disturbance to bird resting/breeding habitat with LSE on Burry Inlet SPA Bird Assemblages through development proposed by PrC2/GT1, PrC2/GT2, PrC2/MU1, SeC4/MU1, and SG2/2.**

2.4.2 All rLDP Allocations contained with the *2nd Deposit rLDP* have been rescreened against effects associated with the discharge of wastewater in line with the evidential changes informed by Dŵr Cymru. **Please refer to Table 3 which identifies those rLDP Allocations and affected sites determined to have LSE under this impact pathway.**

2.4.3 In respect of Other rLDP Proposals, on a precautionary basis the following is also screened in for Appropriate Assessment:

- **Solar LSAs with LSE on foraging grounds linked to Elenydd-Mallaen SPA Bird Assemblages[27];**

- **Impact on roosting sites and foraging area of Greater and Lesser horseshoe[28] due to mineral operations situated in the AoS, with LSE on Pembrokeshire Bat Sites and Bosherston Lakes SAC;**

- **Surface water contamination as a result of AoS and Gwili Railway Extension with LSE on CBEEMS and Afon Tywi SAC, respectively; and**

- **Disturbance to otter[29] features as a result of the Gwili Railway Extension with LSE on CBEEMS, Afon Tywi SAC and Afon Teifi SAC.**

2.4.4 The above screening conclusion is made alongside those within the *HRA Screening Report, HRA Report* (as amended by Appendix A of the *HRA Addendum*), and *HRA Addendum*.

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[27] *Falco columbarius* (Merlin), *Milvus milvus* (Red Kite), and *Falco peregrinus* (Peregrine Falcon).
[28] *Rhinolophus ferrumequinum* and *Rhinolophus hipposideros*, respectively.
[29] *Lutra lutra*.

3. Appropriate Assessment

3.0.1 This Chapter should be read in conjunction with the appropriate assessment contained within the *HRA Report* (incorporating alterations Ref 41 to 43 set out in the *HRA Addendum*), the *HRA Addendum* (as amended by Appendix A), and Appendix C.

3.0.2 With the exception of the disturbance to bird resting/breeding habitat with LSE on Burry Inlet SPA, it is proposed that the mitigation measures and integrity test originally put forward within the *HRA Report*[30] and the *HRA Addendum* remain applicable (as amended in Appendix A through consultation with the SNCB) to all other LSE arisen from the rLDP Allocations. This is supplemented by the following considerations:

i. The appropriate assessment for wastewater disposal (proposed in Table 18 of the HRA Report) is expanded upon in Table 4 and amended to reflect those WwTWs and affected National Site Network sites identified in Table 3. Mitigation is further considered to be embedded within the *2nd Deposit rLDP* through *CCH4: Water Quality and Protection of Water Resources, INF4: Llanelli Wastewater Treatment Works Catchment Surface Water Removal*[31]*, and SP 14: Maintaining* and *Enhancing the Natural Environment.* Collectively, these can be relied upon to avoid adverse effects to the integrity of the National Site Network because:

- Despite the uncertainty whether developers will fund the works themselves (through planning contributions) or rely upon *Dŵr Cymru* AMP to deliver the necessary upgrades, if funding was not secured the development would be delayed or phased until the upgrades are delivered, or further capacity is made available to accommodate the proposal; and

- With reference to Paragraph 4.3.3 of the *HRA Addendum*, it is a permissible route for development proposed by the *2nd Deposit rLDP* to be conditionally approved subject to the delivery of associated infrastructure.

ii. With regards to the potential adverse effects identified on the Afon Tywi, Afon Teifi, Afonydd Cleddau, and Afon Gwy (Wye) SACs through increased P loading, the summary in Section 1.1 provides additional material clarity to the mitigation measures outlined in the *HRA Addendum*. As supplemented by Appendix C, it can be concluded that the proposed mitigation measures could be relied upon to avoid adverse effects to the integrity of these riverine SACs.

3.0.5 Both surface water contamination as a result of AoS and Gwili Railway Extension with LSE on CBEEMS and Afon Tywi SAC, and disturbance to otter features as a result of the Gwili Railway Extension with LSE on CBEEMS, Afon Tywi SAC and Afon Teifi SAC, are seen to align with the mitigation measures and integrity test originally put forward within the *HRA Report* (see Table 18 and paragraphs 4.3.6 to 4.3.18, respectively). As such, and following a review undertaken, these can be relied upon to avoid adverse effects on the associated National Site Network Sites.

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[30] As amended by the *HRA Addendum.*

[31] Specifically formulated for those rLDP Allocations within the Llanelli WwTW service area. This policy includes a dedicated SPG which sets out a betterment mechanism to prevent additional foul flows from entering the combined sewer system.

3.1 Incorporation of Mitigation Measures

3.1.1 Supplementary to the above, those remaining LSE identified in Section 2.2 for Other rLDP Proposals, in addition to disturbance to bird resting/breeding habitat with LSE on Burry Inlet SPA Bird Assemblages created by rLDP Allocations and effects associated with wastewater disposal, are reviewed below.

3.1.2 Signposting is given to paragraph 4.2.1 and 4.2.2 of the *HRA Report*. Mitigation measures which might be relied upon to avoid adverse effects are considered below (Table 5).

Table 5. Summary of possible mitigation measures for the remaining LSE identified with the present HRA. For the entire compilation of mitigation measures which are relied upon to avoid adverse effects identified by the 2nd Deposit rLDP, reference is made to Table 18 of the *HRA Report* (as amended by Ref 42 of the *HRA Addendum*) and Chapter 4.2 of the *HRA Addendum*.

Effects	Mitigation Measures
Wastewater disposal (expanded) (see Table 3 for potentially affected National Site Network Sites)	These following measures expand upon those put forward, under this particular impact pathway, within the HRA Report (as amended by Ref 42 within HRA Addendum). At the project level, developers may need to fund a Developer Impact Assessment to identify required reinforcement works, particularly when there is no/limited capacity at the servicing WwTW[32]. If improvements are deemed necessary and there are no plans in place for infrastructure improvements in the upcoming AMP investment programme, developers can pay for the necessary infrastructure themselves through the requisition provisions of the Water Industry Act 1991 or via Planning Obligations Agreements under the Town and Country Planning Act 1990. It should be noted that the requisition provision of the Water Industry Act 1991 only applies to sewerage network reinforcement works, not to WwTW schemes. Funding to deliver reinforcement works at a WwTW can be delivered via Section 106 of the Town and Country Planning Act 1990. This standard process is referenced within the supporting text of *CCH4: Water Quality and Protection of Water Resources* (paragraph 11.510). Additionally, this process may be conditioned alongside the timing of development to correspond with the delivery of improvements to WwTW through Grampian Conditions. At the project level, hydrological assessments may be carried out to best determine the potential for hydrological links between the proposed development and designated sites. This is to make certain that potential impact pathways are well understood and ensure that appropriate mitigation measures can be properly situated where potential for adverse effects are latterly confirmed. Secondary measures to prevent additional loading[33] on foul sewer networks could include the incorporation of Sustainable Drainage Systems (SuDS) and other nature-based surface water drainage solutions into scheme designs; in addition to the incorporation of other water quality protection measures which may be secured through a Construction Environmental Management Plan.
Solar LSAs with LSE on foraging	Carmarthenshire County Council supports the principle of developing renewable and low carbon energy to meet our future energy needs. The 2nd Deposit rLDP

[32] Typically determined through consultation with Dŵr Cymru during pre-application and/or the planning application process.
[33] whether volumetric and/or pollutive contaminants.

Effects	Mitigation Measures
grounds linked to Elenydd-Mallaen SPA Bird Assemblages	does not allocate (or contain specific detail related to) solar energy projects however, it does specify LSAs which, in principle, represent areas where this type of application would be permitted (subject to criteria set out in *CCH1: Renewable Energy within Pre-Assessed Areas and Local Search Areas*). As reviewed by Natural England[34], Birdlife Europe[35] found that solar photovoltaic arrays may present particularly high risks for open habitat bird species with the potential for disturbance resulting in reduced opportunities for foraging, in addition to breeding and roosting. The potential for cumulative impacts of multiple solar developments in a concentrated locality is highlighted, which could negatively affect species at the population level. Incidental evidence suggests that the collision risk created by solar panels to birds is low (but not impossible). Additionally, it is likely that infrastructure associated (e.g., powerlines) presents more of a collision risk for birds than the solar arrays themselves. Whilst the specific details of prospective solar proposals (and actual delivery thereof) remain unknown, any proposal put forward on the LSAs will need to consider avoiding disturbance and/or retaining features functionally linked to the foraging grounds if their importance to the SPA Bird Assemblages was latterly confirmed. Measures may include minimising the footprint of the proposals to avoid areas with known foraging grounds and/or ecological linkages deemed important to thereof. Additionally, regard should be had to any known avian foraging bouts and potential mitigation paths. On-site monitoring may be need in terms of operational disturbance combined with behavioural monitoring of the qualifying features. It is proposed that the present inclusion of the following mitigative policies[36] would be sufficient to provide the necessary confidence that the designation of LSA will not adversely impact the integrity of Elenydd-Mallaen SPA and its conservation objectives: • *SP14: Maintaining and Enhancing the Natural Environment;* and • *NE2: Biodiversity*. Whilst not conditional to this conclusion, it is recommended that specific reference is given to *SP14: Maintaining and Enhancing the Natural Environment* and *NE2: Biodiversity* within onward SPG proposed for *CCH1: Renewable Energy within Pre-Assessed Areas and Local Search Areas.* Additionally, this SPG may wish to contain technical mitigative solutions which, whilst not relied upon to avoid adverse effects, may aid the integration of this particular consideration at the conceptual design stage within the planning process. Nevertheless, a project-level HRA would likely be required to assess the specific proposal and extent of any onward application received. As such, permission would not be granted unless it were to accord with *SP14: Maintaining and Enhancing the Natural Environment.* If the project-level HRA cannot rule out adverse effects on site integrity, the project will either have to be withdrawn, or amended and re-assessed, or pass the derogations set out under Article 6(4) of

[34] Evidence review of the impact of solar farms on birds, bats and general ecology 2016 - NEER012 (naturalengland.org.uk), 1st Edition, March 2017.
[35] BirdLife Europe (2011). Meeting Europe's Renewable Energy Targets in Harmony with Nature. Report by BirdLife International. Report for Royal Society for the Protection of Birds (RSPB).
[36] Synonymous with embedded mitigation measures.

Effects	Mitigation Measures
	the Regulations (i.e. no alternative solutions, Imperative Reasons of Overriding Public Interest) and compensatory measures secured.
Impact on roosting sites and foraging area of Greater and Lesser horseshoe due to mineral operations situated in the AoS, with LSE on Pembrokeshire Bat Sites and Bosherston Lakes SAC	The *2nd Deposit rLDP* seeks to positively provide for the workings of mineral resources to meet local needs and also safeguard resources from sterilisation. It does not allocate (or contain specific detail related to) proposed extraction projects however, it does specify one AoS for sand and gravel which, in principle, represents where this type of application would be supported to satisfy broader subregional requirements (subject to criteria set out in *SP18: Mineral Resources*). Whilst outside the 10km 'rule of thumb' set by the National Development Framework[37], the AoS is well beyond the 'core sustenance zone' determined by the Bat Conservation Trust[38] (3km for *R. ferrumequinum*, and 2km for *R. hipposideros*). Research on the impacts of open-pit mining on bat activity found that that loss of potential habitat within the mine site boundary may reduce bat movement because of barrier effects. At the project stage, assessments should be carried out to identify the potential for any disturbance as a result of machinery, and vibration during both construction and operation (e.g., noise, light). Ecological surveying would be necessary to assess the likelihood of these, and indicate the presence of roosting sites and/or suitable foraging area (alongside an assessment whether these support SAC meta-populations). Measures such as lighting regimes and ecological buffer zones may be employed as required. It is proposed that the present inclusion of the following mitigative policies would be sufficient to provide the necessary confidence that the designation of the AoS will not adversely impact the integrity of Pembrokeshire Bat Sites and Bosherston Lakes SAC and its conservation objectives: • *SP14: Maintaining and Enhancing the Natural Environment;* • *NE2: Biodiversity;* • *MR1: Mineral Proposals*; and • *PSD12: Light and Air Pollution.* Nevertheless, a project-level HRA would likely be required to assess the specific proposal and extent of any onward application received. As such, permission would not be granted unless it were to accord with *SP14: Maintaining and Enhancing the Natural Environment* and *MR1: Mineral Proposals*[39].
Disturbance to resting/breeding habitat with LSE on Burry Inlet SPA Bird Assemblages	Whilst the specific details of prospective development proposals (and actual delivery thereof) remain unknown, any proposal put forward on the identified rLDP Allocations will need to consider avoiding disturbance and/or retaining features functionally linked to the resting/breeding habitat if their importance to the SPA Bird Assemblages was latterly confirmed. Where potential displacement/disturbance effects have been identified, measures such as buffer zones, timing works to avoid sensitive times (such as breeding season), noise mitigation, visual screening (natural and artificial), alterations to lighting design to reduce light spill and reducing access to sensitive

[37] Welsh Government NDF. HRA Rules of Thumb. August 2017
[38] Core_Sustenance_Zones_Explained_04.02.16.pdf (bats.org.uk)
[39] Condition f – "*There are no unacceptable adverse impacts upon sites of nature conservation importance and ecological features…"*

Effects	Mitigation Measures
	habitats could be incorporated into scheme designs to avoid such effects. An on-site monitoring plan should consider potential disturbances terms of noise, lighting, etc., and combined with behavioural monitoring of the qualifying feature. Complementary planting and habitat linkages, as well as integration with the existing Green and Blue Infrastructure should be further incorporated into scheme designs to mitigate potential adverse effects. A project-level HRA would likely be required for the identified allocations to assess the specific proposal and extent of any onward application received. This will enable the identification of effects more precisely, and ensures that any development which would result in adverse effects will not be granted. It is proposed that the present inclusion of the following mitigative policies would be sufficient to provide the necessary confidence that the identified allocations will not adversely impact the integrity of the Burry Inlet SPA and its conservation objectives: • *SP14: Maintaining and Enhancing the Natural Environment;* • *NE2: Biodiversity;* and • *PSD12: Light and Air Pollution.*

3.2 Integrity Test

3.2.1 This section specifically concerns those LSE and measures contained within Table 5, in addition to the appropriate assessment for wastewater disposal (proposed in Table 18 of the HRA Report and here supplemented by both paragraph 3.0.2 and Table 5). For those LSE deem covered by previous HRA effort, please refer to the Section 4.3 of the *HRA Report* and *HRA Addendum*, respectively.

Solar LSA: Elenydd-Mallaen SPA Bird Assemblages

3.2.2 Solar proposals on LSAs that may result in a loss of foraging grounds for SPA bird assemblages would require a project level HRA in order to satisfy the embedded mitigation measures contained within the rLDP. A number of mitigation measure could be implemented at the project level when effects can be more precisely established. However, given the uncertainty surrounding the delivery of such, *SP14: Maintaining and Enhancing the Natural Environment* can be relied upon to avoid adverse effects to the integrity of the Burry Inlet SPA under this impact pathway.

AoS: Pembrokeshire Bat Sites & Bosherston Lakes SAC

3.2.3 The incorporation of protective policies within the rLDP are considered sufficient to provide the necessary reassurance that the designation of the AoS will not adversely affect the integrity of Pembrokeshire Bat Sites & Bosherston Lakes SAC. Onward mineral proposals will be required under *MR1: Mineral Proposals* to ensure no adverse impacts upon sites of nature conservation importance.

rLDP Allocations: Burry Inlet SPA Bird Assemblages

3.2.4 All rLDP Allocations that may result in a loss of habitat for SPA bird assemblages would require a project level HRA in order to satisfy the embedded mitigation measures contained within the rLDP. A number of available mitigation measure have been identified which could be implemented at the project level when effects can be more precisely established. Additionally, these are recognised to have the necessary flexibility to enable adverse effects to be avoided. However, given the uncertainty surrounding the delivery of such, *SP14: Maintaining and Enhancing the Natural Environment* can be relied upon to avoid adverse effects to the integrity of the Elenydd-Mallaen SPA under this impact pathway.

rLDP Allocations: Wastewater Disposal

3.2.5 This subsection should be read in conjunction with paragraph 4.3.1, 4.3.2, and 4.3.3 of the *HRA Report*.

3.2.6 It is understood that all rLDP Allocations will likely require SuDS for surface water. Whilst SuDS specifically necessitated by the Flood and Water Management Act 2010 cannot be relied upon to avoid adverse effects, it should be noted that these inventions have the potential to alleviate the risk associated with increased volume entering combined sewage systems.

3.2.7 It is reasonable to assume that those necessary WwTW improvements proposed within the upcoming AMP8 will be delivered. However, there is no absolute certainty in the delivery of other catchment measures that may have been relied upon to free up associated capacity. Although the embedded mitigation measures contained within the rLDP are not yet fully funded, nevertheless, this approach is not incompatible with satisfying the Regulations, as *SP14: Maintaining and Enhancing the Natural Environment* can be relied upon to avoid adverse effects to site integrity as a result of wastewater disposal (i.e. *"Development that would result in unacceptable adverse environmental effects or that does not result in enhancement of biodiversity will not be permitted..."*).

3.2.8 Additionally, while formulated upon the best available scientific evidence and advice, it is beyond the scope of this assessment to accurately predict future mechanisms which may pose potential threats to the integrity of the National Site Network (including those associated with wastewater and surface water disposal). Nevertheless, if further failures other than P are later determined in water quality attributes for SAC rivers (e.g., Ammonia, Dissolved Oxygen, and Trophic Diatom Index), for instance, the encompassing and conditional nature of *SP14: Maintaining and Enhancing the Natural Environment* may foreseeably be relied upon in the deliberation of emerging advice and/or scientific understanding. Continued collaboration amongst Carmarthenshire County Council, Dŵr Cymru, and NRW[40], should help anticipate a procedure that will enable corrective or adaptive measures to be taken in response to such issues.

[40] As set out within the Statement of Common Ground for Supporting Sustainable Development within Carmarthenshire by Safeguarding Phosphorus Sensitive Riverine Special Areas of Conservation (Spring 2024).

4. Conclusion

4.1 All proposals and allocations contained within the 2nd Deposit rLDP have now been subject to screening under the Regulations. No additional impact pathway or affected National Site Network Site supplementary to those determined within previous HRA effort have been identified.

4.2 In respect of those matters hereby screened, and in alignment with the appropriate assessment within the *HRA Report*[41], *HRA Addendum*, Appendix C, and alongside the considerations made within Section 1.1, **the conclusion of the present *2nd HRA Addendum* is that the 2nd Deposit rLDP will have no adverse effect on the integrity of any National Site Network Site.**

4.3 NB: The above conclusion is consistent with that made in Chapter 5 of the *HRA Report* (as amended by Ref 41, HRA Addendum), the *HRA Addendum*, and Appendix C.

[41] As amended by the *HRA Addendum*.

5. Next Steps

5.1 The present *2nd HRA Addendum* will be subject to public consultation. Copies of all HRA documentation are available from the Strategic Policy & Placemaking Section of Carmarthenshire County Council, or they can be viewed on online. The rLDP and associated documents can also be inspected at Customer Service Centres and public libraries during advertised opening hours.

5.2 Your views can be made online via the Consultation Page. Alternatively, response forms are available upon request.

If you wish to send your views in writing, please write to:

Strategic Policy & Placemaking
Place and Infrastructure
3 Spilman Street
Carmarthen
Carmarthenshire
SA31 1LE

Or email: forward.planning@carmarthenshire.gov.uk

Please include 'HRA' within the subject line.

5.3 Representations must be received by the relevant date and time stated upon the Consultation Page. Comments submitted after this date may not be considered.

5.4 To ensure that the requirements of the Regulations are met, it will be necessary to consider all further changes to the rLDP following the examination process. Therefore, additional HRA documentation will be published at this time. Additionally, the compilation of a composite report for legibility will be later explored.

Appendices

Appendix A. Schedule of Focus Changes to HRA Addendum

A schedule of proposed Focus Changes made to the *HRA Addendum* since its publication in February 2023 are presented below (updated text in red). These have either been made in response to the consultations received or are *errata*. Please note that the additional matters screened within this 2nd *HRA Addendum* are not presented below. * = Ref 1 to 53 relates to the *HRA Report* and can be found within the *HRA Addendum*, whereas Ref 54 onwards relates to amending the *HRA Addendum*. Consultation responses (i.e., HRAREP#) can be found within the Consultation Report (as published for submission). Please see Appendix C for those alterations concerning the corresponding Appendix within the *HRA Addendum*.

Ref*	Subject	Description	Reason	Implication
54	3.2.17	Need to explicitly state the policies under which the driver of impacts associated with the preferred growth option is more appropriately assessed under. Paragraph 3.2.17 is amended to include the following: "…through which growth will be implemented (explicitly, rLDP Allocations*)." Insert new footnote = * rLDP Allocations hereinafter refers to those proposed development sites listed within Policies SG1: Regeneration and Mixed Use Sites, SG2: Reserve Sites, HOM1: Housing Allocations, EME3: Employment Proposals, and SP10: Gypsy and Traveller Provision.	Alterations made in response to consultee (see HRAREP1).	None.
55	Appendix E	Reasoning as above. Amended Justification & Conclusion column within Appendix E accordingly: SP1/4/7/10…through which growth will be implemented (explicitly, rLDP Allocations)."	Alterations made in response to consultee (see HRAREP2).	None.
56	Appendix E	Revision of screening justification. SP19: Sustainable Waste Management | B | ~~This policy promotes change, but the wording of the policy includes reference to there being no significant, adverse effects upon the environment.~~ **~~There would be no LSE on European sites because of the implementation of this policy~~** This policy is an overarching policy which set out the general criteria for development relating to the sustainable management of waste. It cannot have any effect on a European Site. **Therefore, there would be no LSE on European sites because of the implementation of this policy.** | Screened Out	Contextual update.	None.
57	3.2.20	Clarification in line with the above. "…further assessment. Please refer to Appendix E which indicates where implications are more clearly assessed under. Therefore, the amendments…"	Alterations made in response to	None.

Ref*	Subject	Description	Reason	Implication
			consultee (see HRAREP2).	
58	Table 5	"…to each SAC catchment (rLDP Allocations).	Alterations made in response to consultee (see HRAREP3).	
59	3.2.28	Correction: Policy HOM1 Housing Allocations identifies 192 ~~allocations~~ sites for the provision of new homes across the County, with 116 of these being provided for under 'commitments' (those with Extant/Full Planning Permission) which have already been subject to assessment under the Regulations at the project stage~~, including consultation with NRW as the SNCB~~. Therefore, unless a site features multiple states of planning (e.g., SuV41/h2 and SuV43/h1), ~~those commitment allocations~~ committed development is ~~are~~ not subject to screening here (reference is made to Regulation 71).	Alterations made in response to consultee (see HRAREP4).	None.
60	3.2.29	Correction: "As outlined in SAR25, there are twenty-nine ~~allocations~~ proposed development sites which have been added since the 1st Deposit, with twenty-five of these being commitments. …"	Factual clarification.	None.
61	4.2.10 4.2.11	Insertion of footnote for paragraph 4.2.10 and 4.2.11 in the interest of clarity. These recommendations are made in the interest of specificity, and are not considered to impact the soundness of the plan whether subsequently heeded (or not). Regard should be had to the emerging nature of this impact pathway, the associated development in scientific understanding, and the subsequent advent of mitigative solutions and relvent guidance – factors which do not align well with the development plan process.	Alterations made in response to consultee (see NRW letter dated 14.04.23 regarding CCH4 and INF5).	None.
62	4.2.16	Factual correction: To facilitate the delivery of development which may be affected by CCH4: Water Quality and Protection of Water Resources, CCC ~~have prepared~~ will prepare the 'Afon Tywi and Afon Teifi Phosphorus Reduction Strategy'. This document will set~~s~~ out the strategic approach for delivering P reductions in these two catchments while also facilitating growth and demonstrating that mitigation can be delivered in practice. It will further summarise the ~~document sets out a~~ range of measures~~,~~ that have ~~which will have~~ been agreed in consultation with NRW. It is a proposed ~~The 'Afon Tywi and Afon Teifi Phosphorus Reduction Strategy' are~~ living document~~s~~ that will develop during the lifetime of the rLDP, and in consultation with NRW.	As above.	None.

Ref*	Subject	Description	Reason	Implication
63	Appendix C	NB: This dedicated assessment has been revised (see Appendix C). This supersedes the draft Appendix C within the *HRA Addendum*.	Alterations made in response to consultee (see HRAREP5/6/7/8).	rLDP is considered to meet the test of soundness in light of SNCB recommendations made on the HRA.
64	See description accordingly.	Non substantive corrections: 3.2.15… 'screened out ~~screened out'~~ 3.3.2… 'unlikely to have ~~a~~ significant effects' 3.3.4… 'With regard to rLDP ~~Site~~ Allocations…' 4.1.3… 'initial HRA Report, and, as a bespoke protective' 4.2.17… '~~there~~ they are important' 4.2.20… 'which can demonstrate not to cause the failure' 4.3.1… 'ready~~y~~ in conjunction' While correctly screened in/out, a number of screening categorises mistakenly do not align with the justification given. For consistence, these should be altered throughout to accurately reflect those originally put forward with the HRA Report. Additionally, overall figures (i.e., X number of allocations) will need updating in line with the content provided with this current 2nd *HRA Addendum*. Furthermore, various linkages and references to supporting documents will also require updating in light of Section 1.1 (e.g., the Nutrient Budget Calculator). Whilst the following terms have been used interchangeably, all reference to 'European sites' is amened to 'National Site Network sites'. With reference to Paragraph 2.1.10 within the present HRA, rLDP Allocation proformas contained within both the *HRA Report* and *HRA Addendum* need to reflect the most up to date screening outcome under '*Effects Associated with Development: Wastewater'*.	Alterations made in response to consultee (see HRAREP18) in addition to officer review, and consequences of screening contained within the present report.	None.

Appendix B. Screening Commentary

rLDP Allocations

Site Ref		SuV1/h1	**Name**	Adjacent Fron Heulog	**Cluster**	1 (Tier 3)
Observations		This site has been allocated 5 residential units, although has a total of 8 units given 3 have extant permissions (as commitment, see W/39955 and W/39856). The proposed development site is approximately 9km from Afon Tywi SAC but is not spatially linked to the site. At such distances localised effects associated with proximity of development are unlikely.				
Overall Screening	**Category**	**No likely significant effects either 'alone' or in combination with other plans and projects**				
	Outcome	**Screen Out**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**G**	None	Screened Out
Effects on marine environment	**G**	None	Screened Out
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**G**	None	Screened Out
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC catchment.	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	None.	Screened Out

Site Ref		SuV16/h1	**Name**	Llwynddewi Road	**Cluster**	1 (Tier 3)
Observations		This site has been allocated 2 residential units, although has a total of 8 units given 6 have been already built (as commitment, see W/38104, W/38620, W/39018, W/39068, and W/39806 for application history). Previous refusal of outline planning permission due to two reasons, one of these includes phosphates (see PL/02162 for details). The proposed development site is approximately 800m from Afon Tywi SAC, and is within the respective P sensitive catchment.				
Overall Screening	**Category**	**May have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**I**	The site is in proximity to a water course which may result in potential effects to Tywi SAC from pollution run-off, particularly during construction phase. Nevertheless, these are thought to be unlikely given the situation and extent of the site.	Screened In
Effects on marine environment	**G**	None	Screened Out
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is ‘adopted’ for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**I**	The site is within the Afon Tywi P Sensitive SAC Catchment	Screened In
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	The site is in proximity to a water course; however it is the other side of a railway from the site and is therefore unlikely to be used as resting/breeding habitat for otter.	Screened In

Site Ref		PrC2/h20	**Name**	Harddfan	**Cluster**	2 (Tier 1)
Observations		This site has been allocated for 6 residential units. The proposed development site is approximately 1.2km from Carmarthen Bay and Estuaries SAC. Given the situation and extent of the site, localised effects associated with proximity of development are unlikely. However, the allocation is hydrological connected to Burry Inlet SPA and Carmarthen Bay and Estuaries SAC, with capacity issues raised within Llangennech WwTw.				
Overall Screening	**Category**	**May have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**G**	None	Screened Out
Effects on marine environment	**G**	None	Screened Out
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**G**	The site is in the vicinity of CBEEMS, however it is separated by existing development and the site is therefore unlikely to be used as resting/breeding habitat for otter.	Screened Out
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is ‘adopted’ for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**I**	Site is within the service catchment for Llangennech WwTw which has capacity issues. Mitigation will be needed to prevent potential breach in permitted capacity with potential adverse effects upon the Burry Inlet SPA and Carmarthen Bay and Estuaries SAC. NB: enhancements are planned within the upcoming AMP8 scheme.	Screened In
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC catchment.	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	None	Screened Out

Site Ref		SeC3/h3	**Name**	Llys Felin	**Cluster**	2 (Tier 2)
Observations		This site has been allocated 15 residential units, although has a total of 24 units given 9 have been built (as commitment, see S/36660 for reserve matters approval, and S/34146 for previous project-level HRA). The proposed development site is approximately 300m from Carmarthen Bay and Estuaries SAC. Given the situation and extent of the site, localised effects associated with proximity of development are unlikely.				
Overall Screening	**Category**	**May have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**I**	The site is in proximity to a water course which may result in potential effects to CBEEMS with including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation. Nevertheless, these are thought to be unlikely as the existing surrounding developments (including rain line) separates the allocation from the water course.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	The site is in proximity to a water course; however it is the other side of a railway from the site and is therefore unlikely to be used as resting/breeding habitat for otter.	Screened In

Site Ref		SeC6/h2	**Name**	Land between Clayton Road and East of Bronallt Road	**Cluster**	2 (Tier 2)
Observations		This site has been allocated 12 residential units, although has a total of 20 units given 8 have been previous built (commitment). The proposed development site is approximately 7km from Caeau Mynydd Mawr SAC and 1.2km from Carmarthen Bay and Estuaries SAC. At such distances localised effects associated with proximity of development are unlikely.				
Overall Screening	**Category**	**No likely significant effects either 'alone' or in combination with other plans and projects**				
	Outcome	**Screen Out**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**G**	None	Screened Out
Effects on marine environment	**G**	None	Screened Out
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**G**	None	Screened Out
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC catchment.	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	None.	Screened Out

Site Ref		PrC2/GT1	**Name**	Land at Penyfan, Trostre, Llanelli	**Cluster**	2
Observations		The Gypsy Traveler Accommodation Needs Assessment outlined the additional pitches needs which, as of 2019, was 19 pitches. By 2024 this is expected to be 23, reaching 31 pitches to the end of the plan period 2033. Whilst a definite pitch allocation has not been given, this is the larger of the two proposed gypsy sites and, therefore, it is assumed that the majority of the additional needs will be met here. The proposed site is located approximately <1km from the nearest boundary of the Carmarthen Bay and Estuaries European Marine Site SAC and Burry Inlet SPA.				
Overall Screening	**Category**	**May have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**G**	None	Screened Out
Effects on marine environment	**G**	None	Screened Out
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	This site may be used as habitat for resting/breeding habitat for SPA bird assemblages or otter (southernmost tip of the site is within 1km of Burry Inlet). Nevertheless, these are thought to be unlikely as existing development encompasses the site, separating it from areas of more suitable habitat.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**I**	Site likely connected to Llanelli WwTw which, as established within the Burry Inlet MoU, has sewerage network issues due it's the combined nature. Mitigation will be needed to prevent hydraulic overloading as well as potential increase in the frequency of discharges from combined sewerage overflows – potential adverse effects upon the Burry Inlet SPA and Carmarthen Bay and Estuaries SAC.	Screened In
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	Whilst considered unlikely, this site has been identified as being used by adjacent SPA bird assemblages and development may result in a loss of habitat.	Screened In

Site Ref		PrC2/GT2	**Name**	Penybryn (extension), Bynea, Llanelli	**Cluster**	2
Observations		The proposed site is located approximately 460m from the nearest boundary of the Carmarthen Bay and Estuaries European Marine Site SAC and Burry Inlet SPA. See observations of PrC2/GT1 regarding pitch numbers.				
Overall Screening	**Category**	**May have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**I**	The site is in proximity to a water course which may result in potential effects CBEEMS including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation. Nevertheless, these are thought to be unlikely as surrounding development (gateway resort and sewage treatment works) separates the allocation from the water course.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance. This site has also been identified as being used by adjacent SPA bird assemblages and development may result in a loss of habitat (as within 1km of Burry Inlet SPA).	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**I**	Site likely connected to Llanelli WwTw which, as established within the Burry Inlet MoU, has sewerage network issues due it's the combined nature. Mitigation will be needed to prevent hydraulic overloading as well as potential increase in the frequency of discharges from combined sewerage overflows – potential adverse effects upon the Burry Inlet SPA and Carmarthen Bay and Estuaries SAC.	Screened In

Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	The site is in close vicinity to a water course; however it is the other side of a road from the site and is therefore unlikely to be used as resting/breeding habitat for otter.	Screened Out

Site Ref		PrC2/MU1	**Name**	Former Old Castle Works, Llanelli	**Cluster**	5
Observations		The proposed site is located approximately 400m from the nearest boundary of the Carmarthen Bay and Estuaries European Marine Site SAC and Burry Inlet SPA.				
Overall Screening	**Category**	**May have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**I**	The site is adjacent to a water course which may result in potential effects to CBEEMS with including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation. Nevertheless, these are thought to be unlikely as the existing surrounding developments (including rain line) separates the allocation from the water course.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance. This site has also been identified as being used by adjacent SPA bird assemblages and development may result in a loss of habitat (as within 1km of Burry Inlet SPA).	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is ‘adopted’ for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**I**	Site likely connected to Llanelli WwTw which, as established within the Burry Inlet MoU, has sewerage network issues due it’s the combined nature. Mitigation will be needed to prevent hydraulic overloading as well as potential increase in the frequency of discharges from combined sewerage overflows – potential adverse effects upon the Burry Inlet SPA and Carmarthen Bay and Estuaries SAC.	Screened In
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out

Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	The site is in close vicinity to a water course; however it is the other side of a road from the site and is therefore unlikely to be used as resting/breeding habitat for otter.	Screened Out

Site Ref		SeC20/MU1	**Name**	Laugharne Holiday Park	**Cluster**	5
Observations		Majority of site is previously developed with holiday chalets (see W/34546), sparing the northern quarter. The site is located approximately 30 meters from the nearest boundary of CBEEMS and is spatially linked to the site by a wooded slope and associated service roads.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**I**	The site is immediately adjacent to CBEEMS with potential effects on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation. Nevertheless, these are thought to be unlikely given the situation of the undeveloped area and the wooden slope separating it directly from the water course.	Screened In
Effects on marine environment	**I**	(see above)	Screened In
Effects on the coast	**G**	Unlikely to have a significant effect on coastal processes	Screened Out
Effects on mobile species	**I**	The site is adjacent to CBEEMS and could potentially be used as resting/breeding habitat for otters.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary	Screened Out
Effects of increased development: Abstraction	**G**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC catchment.	Screened Out
Effects of increased development: Air Pollution	**H**	The majority (approximately 80%) of the proposed site is within 200m of Carmarthen Bay and Estuaries European Marine Site SAC (via River Taf). However, a HRA completed on this site concluded no likely significant effect under this impact pathway (as reviewed in 2017 although with previous ecological assessment dating back to 2011). UK National Atmospheric Emission Inventory indicates that road transport only accounts for 4.5% of Nitrogen deposition on the SAC (2018 data, spatial resolution 5km). Therefore, it is considered that the level of development in this area is low enough that there will be no likely significant effects on air quality.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	The site is adjacent to CBEEMS and could potentially be used as resting/breeding habitat for otters.	Screened In

Site Ref		PrC1/MU3	**Name**	Nant y Caws Regeneration and Mixed-Use Site	**Cluster**	1
Observations		The proposed development site is approximately 10km from Caeau Mynydd Mawr SAC and 8.4km from Cernydd Carmel SAC. At such distances localised effects associated with proximity of development are unlikely.				
Overall Screening	**Category**	**No likely significant effects either 'alone' or in combination with other plans and projects**				
	Outcome	**Screen Out**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**G**	None	Screened Out
Effects on marine environment	**G**	None	Screened Out
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**G**	None	Screened Out
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC catchment.	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	None.	Screened Out

Site Ref		SeC4/MU1	**Name**	Burry Port Waterfront	**Cluster**	2
Observations		The site is approximately 350m from the nearest boundary of the Carmarthen Bay and Estuaries European Marine Site.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**I**	The site is adjacent to a water course which may result in potential effects to CBEEMS with including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance. This site has also been identified as being used by adjacent SPA bird assemblages and development may result in a loss of habitat (as within 1km of Burry Inlet SPA).	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**I**	Site likely connected to Llanelli WwTw which, as established within the Burry Inlet MoU, has sewerage network issues due it's the combined nature. Mitigation will be needed to prevent hydraulic overloading as well as potential increase in the frequency of discharges from combined sewerage overflows – potential adverse effects upon the Burry Inlet SPA and Carmarthen Bay and Estuaries SAC.	Screened In
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**H**	The majority of the site and accompanying road infrastructure do not run within 200m of a European Site. A small (approximately 10m) of the south most tip of the site is within the boundary, however it is considered that the level of development in this area is low enough that there will be no likely significant effects on air quality.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	This site has been identified as being used by adjacent SPA bird assemblages (within 1km of Burry Inlet SPA) and other, development may result in a loss of habitat.	Screened In

Site Ref		SG2/1	**Name**	Former Morlais Colliery, Llangennech	**Cluster**	2
Observations		Previously Developed Land. The site is located approximately 90m from the nearest boundary of the Carmarthen Bay and Estuaries European Marine Site.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**I**	The site is immediately adjacent to CBEEMS (via River Loughor) with potential effects on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation.	Screened In
Effects on marine environment	**I**	(see above)	Screened In
Effects on the coast	**G**	Unlikely to have a significant effect on coastal processes	Screened Out
Effects on mobile species	**I**	The site is adjacent to CBEEMS and could potentially be used as resting/breeding habitat for otters.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary	Screened Out
Effects of increased development: Abstraction	**G**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC catchment.	Screened Out
Effects of increased development: Air Pollution	**H**	Approximately 5% of the proposed site is within 200m of Carmarthen Bay and Estuaries European Marine Site SAC (via Afon Loughor). However, a HRA completed on this site concluded no likely significant effect under this impact pathway (as reviewed in 2017 although with previous ecological assessment dating back S/34071). UK National Atmospheric Emission Inventory indicates that road transport only accounts for 6.7% of Nitrogen deposition on the SAC (2018 data, spatial resolution 5km). Therefore, it is considered that the level of development in this area is low enough that there will be no likely significant effects on air quality.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	The site is adjacent to CBEEMS and could potentially be used as resting/breeding habitat for otters.	Screened In

Site Ref		SG2/2	**Name**	Land adjacent to Silver Terrace, Burry Port	**Cluster**	2
Observations		The site is approximately 350m from the nearest boundary of the Carmarthen Bay and Estuaries European Marine Site.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**I**	The site is adjacent to a water course which may result in potential effects to CBEEMS with including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance. This site has also been identified as being used by adjacent SPA bird assemblages and development may result in a loss of habitat (as within 1km of Burry Inlet SPA).	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	This site has been identified as being used by adjacent SPA bird assemblages (within 1km of Burry Inlet SPA) and otter, development may result in a loss of habitat.	Screened In

Site Ref		SG2/3	**Name**	Cross Hands Employment Zone	**Cluster**	3
Observations		The proposed development site is approximately 900m from Caeau Mynydd Mawr SAC.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**I**	The site is adjacent to a water course which may result in potential effects to CBEEMS with including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is within an area that contains suitable habitat for the Caeau Mynydd Mawr Marsh Fritillary metapopulation. The proximity of the site to a water course may present risks to otter that may be in the area.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is ‘adopted’ for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	The proximity of the site to a water course may present risks to otter that may be in the area.	Screened In

Site Ref		SG2/4	**Name**	Former Ennis Caravans, Cross Hands	**Cluster**	3
Observations		Previously Developed Land. The proposed development site is approximately 1.5km from Caeau Mynydd Mawr SAC and 2km from Cernydd Carmel SAC.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**I**	The site is adjacent to a water course which may result in potential effects to CBEEMS with including those on water quality from pollution run-off during the construction phase and contamination impacts on water quality during operation.	Screened In
Effects on marine environment	**I**	(same as above)	Screened In
Effects on the coast	**G**	None	Screened Out
Effects on mobile species	**I**	The site is within an area that contains suitable habitat for the Caeau Mynydd Mawr Marsh Fritillary metapopulation. The proximity of the site to a water course may present risks to otter that may be in the area.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	(same as above)	Screened Out
Effects of increased development: Wastewater	**J**	None	Screened Out
Effects of increased development: Phosphorous	**G**	The site is outside P Sensitive SAC Catchment	Screened Out
Effects of increased development: Air Pollution	**G**	Site or accompanying road infrastructure do not run within 200m of a European Site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**I**	The proximity of the site to a water course may present risks to otter that may be in the area.	Screened In

Other rLDP Proposals

Proposal Ref		LSA/A	**Name**	North East of Farmers (Local Search Area)	**Area**	3.31 km^2
Observations		The proposed LSA is located approximately 1.2km from the nearest boundary of Elenydd-Mallean SPA. Potential installed capacity 72.9 (MW).				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on marine environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on the coast	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on mobile species	**I**	Proposal is within 5km from Elenydd-Mallean SPA and, therefore, could pose a risk to Merlin, Red Kite, and Peregrine.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Wastewater	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Phosphorous	**G**	Proposal is within the Tywi SAC P Sensitive Catchment, however it does not have any conceivable effect.	Screened Out
Effects of increased development: Air Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out

Proposal Ref		LSA/B	**Name**	Mynydd Pencarreg (Local Search Area)	**Area**	0.9 km^2
Observations		The proposed LSA is located approximately 11.5km from the nearest boundary of Elenydd-Mallean SPA. Potential installed capacity 23.8 (MW).				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on marine environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on the coast	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on mobile species	**I**	Proposal is within 18km from Elenydd-Mallean SPA and, therefore, could pose a risk to Peregrine.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Wastewater	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Phosphorous	**G**	Proposal straddles both the Teifi and Tywi SAC P Sensitive Catchment, however it does not have any conceivable effect.	Screened Out
Effects of increased development: Air Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out

Proposal Ref		LSA/C	**Name**	West of Talley (Local Search Area)	**Area**	0.99 km^2
Observations		The proposed LSA is located approximately 12.5km from the nearest boundary of Elenydd-Mallean SPA. Local Search Area. Potential installed capacity 30.3 (MW).				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results			
Potential Effect	**Screening Category**	**Justification & Conclusion**	**Screening Outcome**
Effects on aquatic environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on marine environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on the coast	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on mobile species	**I**	Proposal is within 18km from Elenydd-Mallean SPA and, therefore, could pose a risk to Peregrine. The proximity of the proposal to a water course may present risks to otter that may be in the area (supplemented by nearby records of associated breeding sites and structures).	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Wastewater	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Phosphorous	**G**	Proposal is within the Tywi SAC P Sensitive Catchment, however it does not have any conceivable effect.	Screened Out
Effects of increased development: Air Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out

Proposal Ref		Area of Search – Sand and Gravel	**Name**	Heol Clarbeston i Llanfalteg / Clarbeston Road to Llanfalteg	**Area**	803.75 ha
Observations		Proposal is located approximately 12km from the nearest boundary of Pembrokeshire Bat Sites and Bosherston Lakes SAC. In immediate proximity to Afon Rhydybennau, Daulan and Taf which are connected to Carmarthen Bay and Estuaries SAC.				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**I**	The site is in proximity to a water course which may result in potential effects to Carmarthen Bay and Estuaries SAC from pollution run-off, particularly during construction phase. Nevertheless, these are thought to be unlikely given the situation and extent of the site.	Screened In
Effects on marine environment	**I**	As above.	Screened In
Effects on the coast	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on mobile species	**I**	Proposal is within 16km of Pembrokeshire Bat Sites and Bosherston Lakes SAC.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Wastewater	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Phosphorous	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Air Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out

Proposal Ref		TRA3/A	**Name**	Gwili Railway Extension (northwards to Llanpumsaint)	**Length**	**6.43km (approx. 4-miles)**
Observations		Proposal is approximately 30m away from historical otter breeding structure record that may support Afon Tywi SAC populations. For clarity, the provision of a new station at Glangwili (TRA3/B) has already been built (see W/19935). Length is the combined figure for the individual proposals – 5.29km and 1.14km).				
Overall Screening	**Category**	**Proposal may have a significant effect on a site alone**				
	Outcome	**Screen In**				

Detailed Screening Results

Potential Effect	Screening Category	Justification & Conclusion	Screening Outcome
Effects on aquatic environment	**I**	The site is in proximity to a water course which may result in potential effects to Afon Gwili (tributary of the Afon Tywi SAC) from pollution run-off, particularly during construction phase. Nevertheless, these are thought to be unlikely given the situation and extent of the site.	Screened In
Effects on marine environment	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on the coast	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects on mobile species	**I**	The site is adjacent to suitable otter habitat and therefore development may have potential impacts on otters from lighting, noise, and disturbance. This is supplemented by nearby records of associated breeding sites and structures.	Screened In
Recreational effects	**H**	Screened out at Preferred Strategy stage and conclusion is 'adopted' for the purpose of this HRA, where no additional material has emerged to the contrary.	Screened Out
Effects of increased development: Abstraction	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Wastewater	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Phosphorous	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Air Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out
Effects of increased development: Disturbance, Noise and Light Pollution	**G**	Proposal that could not have any conceivable effect on a site.	Screened Out

Appendix C. Phosphate Assessment

NB: The following Appendix supersedes the previous draft version within the *HRA Addendum*.

Habitats Regulations Assessment to inform the assessment of the Carmarthenshire Local Development Plan

Phosphate Assessment Appendix to the rLDP HRA Addendum

JANUARY 2024

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Habitats Regulations Assessment to inform the assessment of the Carmarthenshire Local Development Plan

Phosphate Assessment Appendix to the rLDP HRA Addendum

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1 Introduction

1.1 Background

This Habitats Regulations Assessment (HRA) Phosphate Assessment Appendix has been prepared by Arcadis Consulting (UK) Limited (Arcadis) on behalf of Carmarthenshire County Council (CCC) as part of their review of the Carmarthenshire revised Local Development Plan 2018-2033 (hereafter referred to as the 'rLDP'). The rLDP is a land-use plan which outlines the location and quantity of development within Carmarthenshire for a 15-year period between 2018 and 2033, and will replace the existing adopted LDP. This HRA Appendix, alongside the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033, are required to address the new Natural Resources Wales (NRW) policies with regards to phosphorus standards and associated planning advice. Issues concerning water quality in terms of phosphate reduction have been addressed separately to other Substantive Amendment References (SARs) due to their potential significance. Aspects beyond phosphate reduction are addressed in the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033.

In January 2021, following a review of tighter water quality standards set by the Joint Nature Conservation Committee (JNCC)[1], Natural Resources Wales (NRW) published evidence[2] which showed that over 60% of riverine Special Areas of Conservations (SACs) were failing against revised phosphorus standards. Excess phosphorus can cause increased growth of algae and large aquatic plants, which can result in decreased levels of dissolved oxygen, a process called eutrophication. High levels of phosphorus can also lead to algae blooms that produce algal toxins which can be harmful to human and animal health. This process also results in an overall reduction in biodiversity. As a result of these failures, NRW subsequently issued planning advice[3] to avoid further deterioration. There is therefore a need to demonstrate environmental capacity where new development may affect phosphorus sensitive riverine SACs in compliance with the Habitats and Species Regulations 2017, as amended (Habitats Regulations). Therefore, this NRW 'advice' relates to all riverine SACs whose drainage catchments extends into Carmarthenshire, namely, the Afon Teifi, Afon Tywi, Afon Cleddau, River Wye and River Usk.

CCC, as the Local Planning Authority (LPA) is required to have regard to this advice given by NRW when making planning decisions on individual developments and Local Development Plans (LDPs). As a result, this new advice from NRW with respect to phosphorus within Welsh riverine SACs effectively paused the progression of CCC's revised LDP (rLDP) to its adoption stage.

As a result, this Appendix, rescreens the rLDP, with regards to the potential for their Site Allocations (SAs) to impact upon SACs, and sets out the proposed avoidance mitigation to prevent any additional input into SACs. This also considers the potential in-combination effects of the LDP of bordering counties.

1.2 Previous LDP HRA

For the original LDP HRA submitted in November 2019[4] seven SACs were initially scoped in for further screening with regards to water quality, presented in Table 1.

[1] Joint Nature Conservation Committee (2016) Common Standards Monitoring Guidance for Rivers Version September 2016 Updated from (January 2014) [Accessed 19/01/2024]
[2] Natural Resources Wales (2021) Tighter phosphate targets change our view of the state of Welsh rivers [Accessed 19/01/2024]
[3] Natural Resources Wales (2023) Advice to planning authorities for planning applications affecting phosphorus sensitive river Special Areas of Conservation. [Accessed 19/01/2024]
[4] Carmarthenshire Revised Local Development Plan (LDP) (2019) Habitats Regulations Assessment (HRA) of the Deposit LDP [Accessed 19/01/2024]

Table 1 - Original LDP SAC screening justification

SAC	Justification	Source
Afon Teifi	Various flora and fauna are at risk from high phosphate loads, such as the Atlantic Salmon: "Among toxic pollutants, sheep dip and silage effluent present a particular threat to aquatic animals in this predominantly rural area. Contamination by synthetic pyrethroid sheep dips, which are extremely toxic to aquatic invertebrates, has a devastating impact on invertebrate populations and can deprive fish populations of food over large stretches of river. These impacts can arise if recently dipped sheep are allowed access to a stream or hard standing area, which drains into a watercourse. Pollution from organophosphate sheep dips and silage effluent can be very damaging locally. Pollution from slurry and other agricultural and industrial chemicals, including fuels, can kill all forms of aquatic life." "NRW water quality monitoring (2004 data, quoted in Burgess et al.) has indicated elevated phosphate levels in Llyn Teifi and Llyn Egnant, but only a marginal increase in Llyn Hir. Significantly elevated phosphate levels may have a negative impact on the *Littorelletea* feature, and contribute to the absence of some macrophyte species, particularly those that are sensitive to nutrient enrichment; for example, this may have contributed to the absence of water lobelia from Llyn Egnant (Burgess et al.). Possible reasons for these elevated nutrient levels include enrichment from livestock dung (sheep) and sediment inputs from stock-mediated soil erosion exacerbated by sheep trampling around the shores."	Core Management Plan including Conservation Objectives for Afon Teifi/River Teifi SAC[5]
Afon Tywi	"Discharges put pressure on water quality during a drought as lower than normal river flows mean that there is less water available to dilute discharges such as final effluent from WwTW. A drought option may exacerbate these low flows and contribute to a reduction in water quality, with potentially detrimental impacts on sensitive features in the impacted reach. Discharges impacting the oxygen balance and ammonia concentration (to support fish and macroinvertebrates, where these are identified as sensitive features) and soluble reactive phosphorus (SRP) concentration (to support macrophytes and algae, where these are identified as sensitive features) in the river have been reviewed."	Dŵr Cymru Welsh Water Environmental Assessment of Afon Tywi Drought Order (8201-3)[6]
Cleddau Rivers	"Among toxic pollutants, sheep dip and silage effluent present a particular threat to aquatic animals in this predominantly rural area, especially in the head waters of the Eastern Cleddau. Contamination by synthetic pyrethroid sheep dips, which are extremely toxic to aquatic invertebrates, has a devastating impact on crayfish populations and can deprive fish populations of food over large stretches of river.	Core Management Plan including Conservation Objectives for Afonydd

[5] NRW (2022) Core Management Plan including Conservation Objectives for Afon Teifi/River Teifi SAC [Accessed 19/01/2024]
[6] DCWW (2019) Environmental Assessment of Afon Tywi Drought Order (8201-3) Final [Accessed 19/01/2024]

SAC	Justification	Source
	These impacts can arise if recently dipped sheep are allowed access to a stream or hard standing area, which drains into a watercourse. Pollution from organophosphate sheep dips and silage effluent can be very damaging locally." "Pollution from slurry and other agricultural and industrial chemicals, including fuels, can kill all forms of aquatic life. All sheep dips and silage, fuel and chemical storage areas should be sited away from watercourses or bunded to contain leakage." "Agricultural sources may be one source for increased levels of nitrates and phosphates within the rivers, and may also increase the levels of sediment within the river system. Pesticides and herbicides that leach into the river can also cause pollution problems."	Cleddau/Cleddau Rivers SAC (Special Areas of Conservation)[7]
Cardigan Bay	"The limited marine monitoring undertaken in Cardigan Bay has found the water quality to be good however sediment analysis has found significant levels of contaminants at several locations in the bay." "The majority of the consented discharges to the SAC are of domestic sewage effluent with a few being from an industrial source. However, diffuse run off and effluent from agricultural land and the continuing impact from historic mining activity (metals) provide the major landward inputs in central Cardigan Bay. The scale and significance of contaminant input from outside the site, via the movement of marine waters and sediments or the movement of marine organisms (e.g. dolphin prey), is not known."	Cardigan Bay European Marine Site: Advice provided by the Countryside Council for Wales in Fulfilment of Regulation 33 of the Conservation (Natural Habitats, &c.) Regulations 1994[8]
Carmarthen Bay and Estuaries	"Available nitrogen and phosphorus levels are in excess of the criterion indicating hyper-nutrification in the upper estuary which has been linked to high numbers of algal cells and chlorophyll a concentrations. In addition, there have been inputs of heavy metals from industry and redundant coalmines in the estuaries. Inputs of fine sediments from rivers into all of the estuaries are small, compared to other sources of material (inward migration from the sea). This is reflected in the character of the estuaries and the habitats within them."	Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd European Marine Site: Advice provided by the Countryside Council for Wales in Fulfilment of Regulation 33 of the Conservation (Natural Habitats, &c.) Regulations 1994[9]

[7] Countryside Council for Wales (2012) Afonydd Cleddau/Cleddau Rivers SAC (Special Areas of Conservation) [Accessed 19/01/2024]
[8] Countryside Council for Wales (2009) Cardigan Bay European Marine Site: Advice provided by the Countryside Council for Wales in Fulfilment of Regulation 33 of the Conservation (Natural Habitats, &c.) Regulations 1994 [Accessed 19/01/2024]
[9] Countryside Council for Wales (2009) Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd European Marine Site: Advice provided by the Countryside Council for Wales in Fulfilment of Regulation 33 of the Conservation (Natural Habitats, &c.) Regulations 1994 [Accessed 19/01/2024]

SAC	Justification	Source
Cernydd Carmel	For various flora, fauna and areas of bog, nutrient loading was highlighted as potentially having a negative impact: “Good water quality is essential to the ecological integrity of the turlough. Increased nutrient levels in particular could be detrimental to the characteristic flora and fauna of the turlough.” Similarly for species in raised bogs: “Key species (notably peat-forming Sphagna) are highly susceptible to increases in nutrient levels, either from run-off from the surrounding agricultural land or through atmospheric deposition”.	Core Management Plan including Conservation Objectives for Cernydd Carmel SAC (Special Area of Conservation)[10]
Pembrokeshire Marine	In the Pembrokeshire Marine Action Plan, in order to ensure that maintenance procedures consider and reduce the impacts of SAC features, one of the action plans includes: “Where cleaning agents are necessary, consider only using non-chlorinated products without phosphate.” This is in addition to noting how the importance of changes to grazing may impact nutrient loading, including organophosphate.	Pembrokeshire Marine Special Area of Conservation Management Scheme[11]

[10] Countryside Council for Wales (2011) Core Management Plan including Conservation Objectives for Cernydd Carmel SAC (Special Area of Conservation) [Accessed 19/01/2024]
[11] Burton, S. (2008) Pembrokeshire Marine Special Area of Conservation Management Scheme [Accessed 19/01/2024]

However, these original assessments, with regards to water quality, were pending further information from NRW. Under Regulation 63 of the Habitats Regulations, NRW are responsible for ensuring that potential effects from treated wastewater on European Designated sites are considered as part of a Review of all existing Consents (RoC). Under the RoC, discharge consents and water abstraction licences are required to have been considered to ensure that there were no detrimental impacts on the conservation interests in designated sites a result of these consents.

In the original HRA it was determined that "*The final HRA of the LDP deposit plan will need to seek clarification from both NRW and Dŵr Cymru Welsh Water's (DCWW) over the potential capacity within the current post RoC discharge consent limits for further growth. Where allocations can be accommodated within the post-RoC discharge consent limits, it can be considered that there will be no likely significant effects on European Designated sites. If the allocated development might exceed available permitted capacity, then a new or modified permit is likely to be required at the waste water treatment works in question to provide for the increased demand, and the HRA would need to consider whether it would be feasible for such additional capacity to be provided without any adverse effects on the integrity of any European Sites.*"

1.3 NRW Phosphorus Compliance Exercise

Subsequently the reliance on the above approach was infeasible for two reasons. Firstly, not all consents included Total Phosphorus (TP) limits. Secondly, in January 2021, NRW published evidence following a review of tighter water quality standards set by the Joint Nature Conservation Committee (JNCC)[1]. NRW undertook a Phosphorus compliance exercise for Special Areas of Conservation (SACs)[12]. Phosphorus concentration data were extracted from the NRW water quality database for a three-year period from January 2017 to December 2019 for all sample points within water bodies in the nine SACs designated for one or more river features. These were:

- Afon Eden – Cors Goch Trawsfynydd
- Afon Gwyrfai a Llyn Cwellyn
- Afon Teifi
- Afon Tywi
- Afonydd Cleddau
- Meirionnydd Oakwoods and Bat Sites (the Afon Glaslyn)
- River Dee & Bala Lake
- River Usk
- River Wye

The monitoring data published in 2021 showed that over 60% of riverine SAC water bodies in Wales failed against revised phosphorus standards. Due to these failures, NRW has issued planning advice[13] to prevent further deterioration in environmental capacity where new developments can impact riverine SACs in terms of phosphorus and thus demonstrate the compliance with the Conservation of Habitats and Species Regulations 2017, as amended (known as the Habs Regs).

This planning advice included the re-screening of all developments and LDPs with regards to water quality and phosphates.

1.4 Revised Local Development Plan

The emerging revised LDP (rLDP) is a land-use plan that sets out the planning requirements for achieving sustainable development in the Carmarthenshire County over the period 2018-2033. The Plan identifies where and how much new development will take place, as well as which areas need to be protected for their environmental qualities.

[12] Hatton-Ellis, T.W., Jones, T.G. (2021) Compliance Assessment of Welsh River SACs Against Phosphorus Targets [Accessed 19/01/2024]
[13] NRW (2023) Advice to planning authorities for planning applications affecting phosphorus sensitive river Special Areas of Conservation [Accessed 19/01/2024]

The Carmarthenshire rLDP (2018-2033) is currently under examination due to the outstanding issue of phosphorus levels in the SACs within Carmarthenshire. The staged progression of the rLDP has been informed by the Carmarthenshire Nutrient Neutrality Interim Action Plan[14] which progressed into the final AP)[15] that sets out in detail the nutrient assessments that have informed this assessment.

Arcadis have been involved in delivering the AP and HRA addendum to support Key Stage 4 – Second Deposit rLDP for the CCC LDP (2018-2033), which was published for consultation on 17th February 2023 to the 14th April 2023[16]. The current indicative timeline for rLDP progression is presented in Table 2.

1.5 Interim and Final Nutrient Neutrality Action Plan

An Interim Action Plan (IAP) was produced as part of the ongoing assessment of the potential nutrient budget for the rLDP site allocations and its subsequent mitigation. This IAP detailed the initial nutrient budgeting required to offset the total phosphate (TP) calculated with the first list of Site Allocations and prior to DCWW confirming the TP backstops for the WwTWs (i.e. the maximum concentrations of phosphate being discharged from the WwTWs). The potential mitigation to be implemented within Carmarthenshire for the rLDP SAs was also discussed in this report, which introduced the use of nature-based solutions (NbS) as phosphorus mitigation. This included the application of constructed wetlands to remove phosphorus and the preliminary calculations of how much TP could be offset for the identified constructed wetland locations at the time.

This document has further evolved into the final AP in line with the updated Site Allocation list and the finalised TP backstop of 5mg/l (unless otherwise stated by DCWW based upon their monitoring results).

Table 2 - Indicative timetable for Key Stages of the rLDP[17]

Stage in Plan Preparation	Regulation Number	Timescale
Definitive		
Key Stage 1 – Delivery Agreement	5-10	Initial DA – February 2018 to July 2018 First Revised DA – publication following WG approval, November 2020 Second Revised DA – publication following WG approval, August 2022
Key Stage 2 – Pre-Deposit – Preparation and Participation	14	February 2018 – February 2020
Key Stage 3 – Pre-Deposit – Public Consultation	15,16, 16A	May 2018 – May 2019
Key Stage 4 – First Deposit Revised LDP	17-21	January 2019 – January 2021
Key Stage 4 – Second Deposit Revised LDP	17-21	March 2022 – March 2024
Indicative		
Key Stage 5- Submission of LDP to WG for Examination	22	March 2024
Key Stage 6 – Independent Examination	23	March 2024 – January 2025
Key Stage 7 – Publication of Inspector's Report	24	March 2025
Key Stage 8 – Adoption	25, 25A	May – June 2025
Key Stage 9 – Monitoring and Review	37	Continued following adoption

[14] Interim Action Plan (IAP) (February 2023) [Unpublished issued]
[15] Carmarthenshire Nutrient Neutrality Action Plan (AP) (April 2024)
[16] Carmarthenshire County Council. (Feb 2023). Second Deposit Revised Local Development Plan [Accessed 19/01/2024]
[17] Revised Delivery Agreement. (2024) Revised Carmarthenshire Local Development Plan 2018 – 2033

2 HRA Approach

2.1 Introduction

In addition to the rescreening of all SACs with regards to potential impacts from phosphorus (from the original LDP), this HRA Appendix includes the screening of Substantive Amendment References (SARs) of note introduced into the rLDP that are relevant to the impacts of phosphates on water quality. The SARs that are included in this report refer to changes to wording of relevant policies that include phosphates, as well as updates to the site allocation screening process for areas that may contribute to the TP for the affected SACs. The full list of SARs is assessed in the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033.

2.2 HRA Stages

2.2.1 Stages in HRA

All lower-tier plans and projects that have the potential to impact upon National Site Network Sites and/or/Ramsar sites, previously known as Natura 2000 and/or European Designated Sites (regardless of their proximity to these sites) are required to comply with the Habitats Regulations[18]. These requirements of the comprise four distinct stages:

1. **Stage 1: Screening** is the process which initially identifies the likely impacts upon a National Site Network Site of a project or plan, either alone or in-combination with other projects or plans and considers whether these impacts may have a significant effect on the integrity of the site's qualifying habitats and/or species. It is important to note that the burden of evidence is to show, on the basis of objective information, that there will be no significant effect; if the effect may be significant, or is not known, that would trigger the need for an Appropriate Assessment. There is European Court of Justice case law to the effect that unless the likelihood of a significant effect can be ruled out on the basis of objective information, and adopting the precautionary principle, then an Appropriate Assessment must be made. The April 2018 CJEU judgement determined that mitigation to avoid or reduce harmful effects of the plan or project on a National Site Network Site cannot be taken into account at the screening stage (Stage 1). Where such measures are required, a plan or project will require Appropriate Assessment to be undertaken (Stage 2).
2. **Stage 2: Appropriate Assessment** is the detailed consideration of the impact on the integrity of the National Site Network Site of the project or plan, either alone or in-combination with other projects or plans, with respect to the site's conservation objectives and its structure and function. This is to determine whether or not there will be adverse effects on the integrity of the site. This stage also includes the development of mitigation measures to avoid or reduce any possible impacts.
3. **Stage 3: Assessment of alternative solutions** is the process which examines alternative ways of achieving the objectives of the project or plan that would avoid adverse impacts on the integrity of the National Site Network Site, should avoidance or mitigation measures be unable to cancel out adverse effects.
4. **Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain.** At Stage 4, an assessment is made with regard to whether or not the development is necessary for imperative reasons of overriding public interest (IROPI). If it is, this stage also involves detailed assessment of the compensatory measures needed to protect and maintain the overall coherence of the National Site Network Site.

Development should be refused where there are adverse impacts on the features for which a site has been designated. International and national responsibilities and obligations for conservation should be fully met,

[18] UK Gov (2017) The Conservation of Habitats and Species Regulations 2017 [Accessed 15/01/2024]

and, consistent with the objectives of the designation, statutorily designated sites protected from damage and deterioration, with their important features conserved and enhanced by appropriate management. Further information on Habitats Regulations Assessment is contained in TAN 5: Nature Conservation and Planning.'[19] It is nevertheless important that this HRA identifies the types of potential impacts which could arise from policy implementation, and how these could be avoided/mitigated at a later stage (i.e. 'flagging up' potential issues at an early stage), as well as providing the high-level policy reassurance that future National Transport Delivery Plans, LDPs and developers will follow the necessary process to identify and assess potential implications for National Site Network Sites/Ramsar sites when allocating land for development. The subsequent LDP-level, or even project-level HRAs will need to take into consideration the potential impacts identified in this HRA to guide their policy development and ensure that mitigation measures can be delivered, where potential for adverse effects are identified. It is important to note that this is how the iterative HRA process ensures that plans and projects cannot be consented or implemented without first ensuring that they would not have an adverse effect upon the integrity of the National Site Network Sites and Ramsar sites.

2.2.2 In-combination Effects

It is necessary for HRA to consider in-combination effects with other projects or plans.

Where an aspect of a project could have some effect on the qualifying feature(s) of a National Site Network Site, but the effects of that aspect of the project alone would not be significant, the effects will need to be checked in-combination, firstly with other effects of the same project, and then with the effects of any other plans and projects.

If the prospect of cumulative effects cannot be eliminated, it is necessary to consider how the addition of effects from other projects or plans may produce a combined adverse effect on a National Site Network Site that would be significant. Taking the effects which would not be likely to be significant alone, it is necessary to make a judgement as to whether these effects would be made more likely or more significant if the effects of other projects or plans are added to them. Most cumulative effects can be identified by way of the following characteristics. Could additional effects be cumulative because they would:

- Increase the effects on the qualifying features in an additive, or synergistic way?
- Increase the sensitivity or vulnerability of the qualifying features of the site affected by the project proposals?
- Be felt more intensely by the same qualifying features over the same area (a layering effect), or by the same qualifying feature over a greater (larger) area (a spreading effect), or by affecting new areas of the same qualifying feature (a scattering effect)?

In accordance with David Tyldesley Associates (DTA) Publications Limited, *The Habitats Regulations Assessment Handbook* (DTA Publications Limited, 2021)[20], it will be necessary to look for projects and plans at the following stages:

a. Applications lodged but not yet determined.

Projects subject to periodic review e.g. annual licences, during the time that their renewal is under consideration.

Refusals subject to appeal procedures and not yet determined.

Projects authorised but not yet started.

b. Projects started but not yet completed.

c. Known projects that do not require external authorisation.

d. Proposals in adopted plans.

[19] Technical advice note (TAN) 5: nature conservation and planning (2009)

[20] DTA Publications Limited, (2021) *The Habitats Regulations Assessment Handbook*, DTA Publications Limited.

e. Proposals in finalised draft plans formally published or submitted for final consultation, examination or adoption.

Plans under consideration may range from neighbouring authorities' planning documents down to sector-specific strategic plans on such topics as flood risk.

A review has been undertaken of projects and plans with the potential for an in-combination effect with the proposed development.

2.2.3 Definition of Significant Effects

A critical part of the HRA screening process is determining whether or not the proposals are likely to have a significant effect on National Site Network Sites and, therefore, if they will require an Appropriate Assessment. Judgements regarding significance should be made in relation to the qualifying interests for which the site is of European importance and also its conservation objectives. A useful definition of 'likely' significant effects is as follows:

> '*…likely means readily foreseeable not merely a fanciful possibility; significant means not trivial or inconsequential but an effect that is potentially relevant to the site's conservation objectives'* (Welsh Assembly Government, 2006).

In considering whether the project is likely to have a significant effect on a National Site Network Site, a precautionary approach must be adopted, particularly where features are assessed as being in unfavourable condition and critical loads are being exceeded.

- The project should be considered 'likely' to have such an effect if the applicant is unable (on the basis of objective information) to exclude the possibility that the project could have significant effects on any National Site Network Site, either alone or in-combination with other plans or projects.
- An effect will be 'significant' in this context if it could undermine the site's conservation objectives. The assessment of that risk must be made in the light of factors such as the characteristics and specific environmental conditions of the National Site Network Site in question.

2.2.4 Approach to the HRA Report

This HRA Report takes into account the requirements of the Habitats Regulations and relevant guidance produced by DTA Publications Limited, 2021.

This report is an Appendix to the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033 which was made available for public consultation from 17th February 2023 to 14th April 2023, which was prepared to consider the impacts of the Carmarthenshire revised Local Development Plan 2018-2033 on National Site Network Sites, as required under the Conservation of Habitats and Species Regulations 2017, as amended (known as the Habs Regs)[18].

The purpose of this assessment is to:

1. Ensure that all Substantive Amendment References (SARs) which have occurred since the First Deposit rLDP are considered in terms of their implications upon the HRA process with regards to phosphate impacts on water quality. All potential effects of the rLDP alone and in-combination were screened out in the previous iteration of the HRA published in 2019; and
2. Take account of the NRW policy position on phosphates in rivers (May 2021), and subsequent advice to planning authorities[13]. This includes potential impacts from Carmarthenshire Site allocations and any other developments within the Zone of Influence.

This Appendix should be read and interpreted alongside the Submission HRA document, the rLDP, and the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033 which also considers the effects of the SARs on the rLDP.

The complete list of SARs in terms of policy screening are assessed in the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033, which screen in or out each strategic and specific plan policy. However, this report will consider the changes related to phosphate only.

2.3 Substantive Amendment References

2.3.1 Substantive Amendment References

Substantive Amendment References (SARs) are the main changes to the rLDP. Where potential HRA implications were identified they were screened for their potential to affect water quality with regards to phosphates. They comprise changes of varying substance which relate to policy wordings, explanatory text and proposals maps which the Council considers necessary to demonstrate the soundness of the LDP.

The majority of the SARs are minor editing changes which do not affect the meaning or implementation of a policy and sets out amendments to the rLDP to take into account Planning Policy Wales – Edition 11. The SARs in this report are centred upon phosphates only. The full list of SARs are available in the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033 which concerns changes beyond those that impact phosphates. SARs that have been screened out with regards to phosphate, have not been considered further within this report.

2.3.2 Policy SARs

For this HRA Appendix, the only policy that was relevant to potential phosphate impacts was CCH4: Water Quality and Protection of Water Resources. These changes were implemented to ensure clarity in relation to NRW's phosphate guidance. Additionally, the policy amendments included a change in policy number from CCH3: Water Quality and Protection of Water Resources to its current name CCH4: Water Quality and Protection of Water Resources.

2.3.3 Site Allocation SARs

The Site Allocation SARs as presented in the rLDP have been through an initial screening to remove those allocations with the largest potential impact with regards to phosphate. Therefore, the SARs screening has been undertaken in two stages:

1. Screening of Site Allocations from the LDP to remove those with the potential for the greatest impact with regards to phosphate to remove these from the rLDP; and
2. Screening of the remaining Site Allocations, with differing potential phosphate input parameters, to confirm the requirement for the preparation of information for Appropriate Assessment.

3 Water Quality with Regards to Phosphorus

3.1 SAC Phosphate Compliance Failures

The riverine SACs whose catchments extend into the zone of influence of Carmarthenshire, are the Afon Teifi, Afon Tywi, Afon Cleddau, River Wye, and River Usk. Of these five water bodies, only the Afon Teifi and Afon Tywi have been identified as containing site allocations with potential to impact the SAC.

Out of these two SAC water bodies, only the Afon Teifi (See Image 1) is currently failing to meet the new targets. For the water bodies within Carmarthenshire, the failures are mostly in the “low” category, which is less than 10ug/l in exceedance of their targets, which largely range from 20 to 30 ug/l P[12].

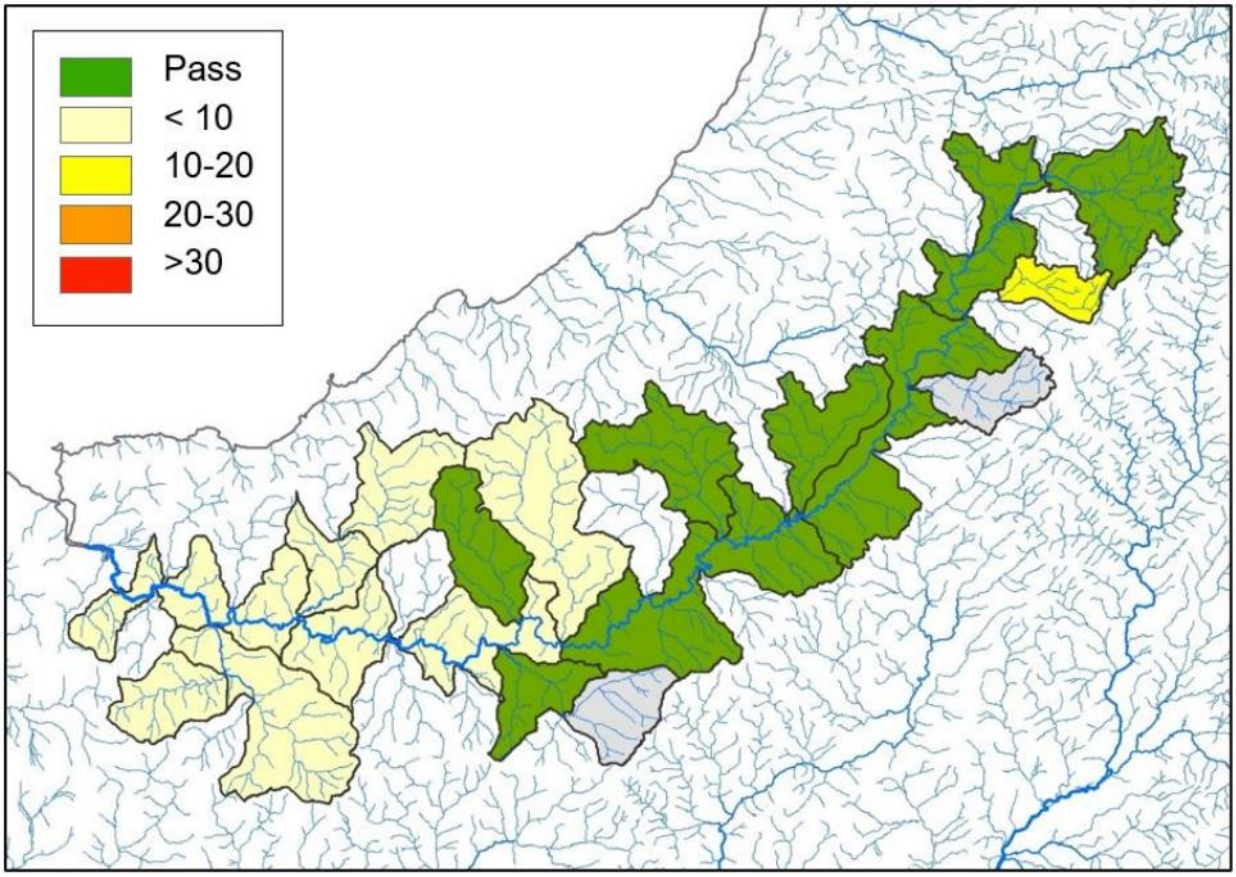


Image 1 - Map of phosphorus compliance for the Afon Teifi SAC.

***Note**: Water bodies shaded green pass their target. Other colours fail the target with different colours representing the magnitude of failures in µg l-1 expressed as the larger of annual means and growing season means. Greyed out water bodies could not be assessed due to lack of data.*

According to the NRW review of Welsh riverine SACs, the Tywi is currently passing its phosphorus targets (See Image 2) with some level of environmental headroom available[12] (i.e. the difference between the current water quality and the water quality targets, therefore additional phosphate could be added without having an adverse effect on the SAC). This is separate to a permit headroom at a WwTW, where the concentration limits permitted are higher than the monitored concentration of the WwTW discharge. In permit headroom instances there is capacity for the WwTW to increase the concentration of its discharge up to the permit limits without the need for a change to the environmental permit.

Based on the NRW Compliance Assessment of Welsh River SACs Against Phosphorus Targets, the upper, middle and lower catchments in the Afon Tywi are all comfortably passing their targets. In all instances the mean P concentration is below half of its target and is therefore not at a high risk of phosphorous.

How this affects the HRA assessment is discussed in section 3.3.5.

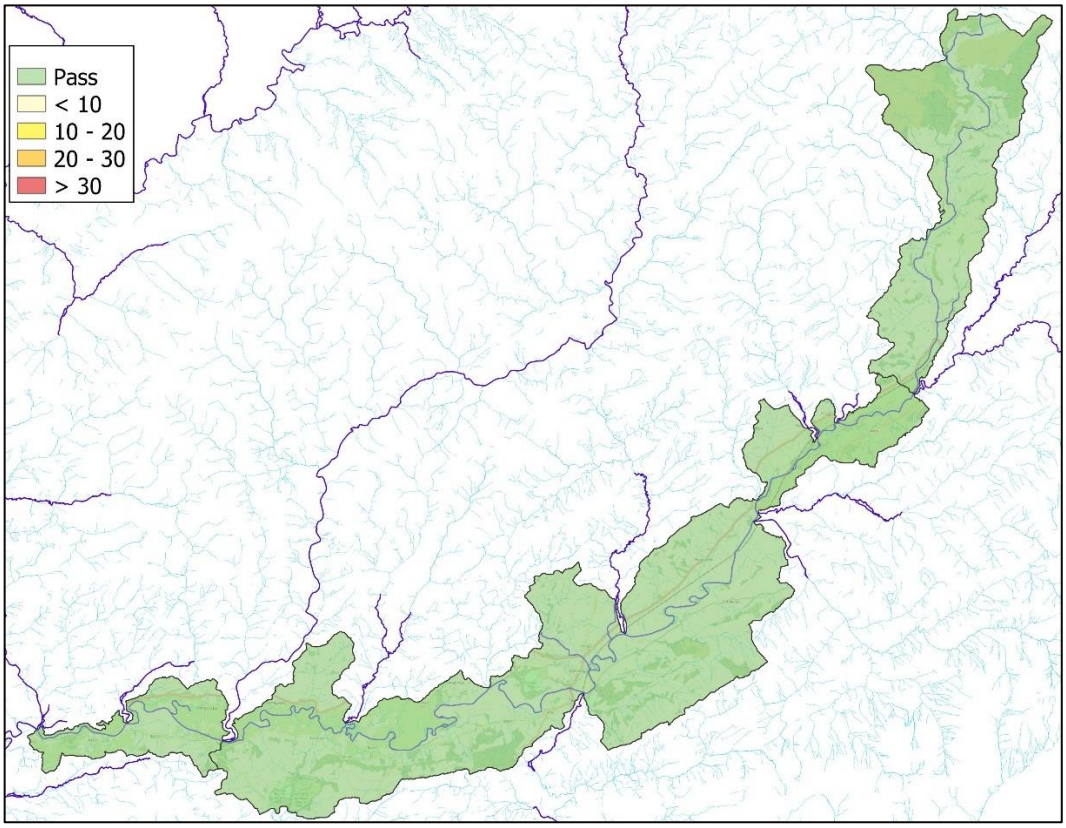


Image 2 - Map of phosphorus compliance for Afon Tywi SAC.

***Note:** Water bodies shaded green pass their target. Other colours fail the target with different colours representing the magnitude of failures in µg l-1, expressed as the larger of annual means and growing season means.*

Image 2 has been created using data presented in the original compliance assessment reports[12] and subsequent data provided by NRW in their consultation response to CCC on the HRA Approach for the Non-failing Tywi SAC, see section 3.3.5 for detail / reference.

3.2 Potentially Affected SACs

3.2.1 Afon Teifi

The Afon Teifi in west Wales is a large river flowing over hard rock, with some spectacular gorges in the lower section. It is mainly mesotrophic but also has oligotrophic sections in the upper reaches and represents an outstanding example of a sub-type 3 river with water-crowfoot *Ranunculus* vegetation in western Britain. It is designated as a SAC for the following features:

- Annex I habitats that are a primary reason for selection of this site 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
- Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea

- Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
- Annex II species that are a primary reason for selection of this site:
    - 1096 Brook lamprey *Lampetra planeri* The Teifi is a predominantly mesotrophic river in west Wales supporting a large population of brook lamprey *Lampetra planeri*. A mixture of habitat and substrate types provides the combination of spawning gravels adjacent to silt beds that are favoured by this and other lamprey species. A large number of tributaries have been included in the SAC; these are thought to be important for lampreys in the Teifi because the main channel is prone to severe floods that may result in washout of smaller ammocoetes.
    - 1099 River lamprey *Lampetra fluviatilis* The Teifi is a large catchment of high conservation value in west Wales. It contains a healthy population of river lamprey *Lampetra fluviatilis*. The semi-natural channel containing a mixture of substrates and in-stream features provides excellent habitat for juvenile lampreys.
    - 1106 Atlantic salmon *Salmo salar* The Teifi is a medium-sized mesotrophic river system in west Wales. In 1999 the salmon *Salmo salar* rod catch in the Teifi was the third-largest in Wales, and the system has not experienced the steep decline in stock numbers seen in many other rivers in the area. This is likely to reflect the high quality of the catchment, with a semi-natural channel largely unaffected by poor water quality or artificial barriers to migration. However, in common with many other Welsh rivers, acidification in the upper reaches is a cause for concern. In common with many other rivers in west Wales, grilse are the main stock component. There is a small traditional coracle fishery that exploits the salmon and sea trout *Salmo trutta trutta*.
    - 1163 Bullhead *Cottus gobio* The Teifi represents bullhead *Cottus gobio* in west Wales. Water quality is generally good, and the diversity of semi-natural habitat and predominance of stony substrates provides excellent bullhead habitat throughout much of the catchment. Environment Agency electrofishing data shows this species to be widespread throughout the system. Bullheads show marked differences in growth and longevity between upland and lowland streams, and the Teifi includes sections representing both types of habitat.
    - 1355 Otter *Lutra lutra* The Teifi in west Wales holds otter *Lutra lutra* throughout much of its catchment. The river has suitable resting and breeding sites along its length. Evidence from surveys and sightings suggest the tidal reach is being increasingly used by otters.
    - 1831 Floating water-plantain *Luronium natans* The Teifi is a mixed habitat supporting floating water-plantain *Luronium natans* at the western margins of its range in the UK. This species has been recorded in the nutrient-poor standing waters of the Teifi pools in the headwaters of the river. It has also been recorded in a moderately nutrient-rich stretch of the river immediately downstream of Cors Caron.
- Annex II species present as a qualifying feature, but not a primary reason for site selection
    - 1095 Sea lamprey *Petromyzon marinu*

Prevention of diffuse pollution from one of the principal sources, that is agriculture (the first being WwTW in the Teifi) is one of the conservation objectives of the SAC[5].

3.2.2 Afon Tywi

The Afon Tywi is one of the longest rivers flowing entirely within Wales. Its total length is 120km. It weaves its way from its source in the Cambrian Mountains above Llyn Brianne reservoir to the sea at Carmarthen Bay. It has been designated for the following features:

- Annex II species that are a primary reason for selection of this site:
    - 1103 Twaite shad *Alosa fallax* A large spawning population of twaite shad *Alosa fallax* occurs in the Tywi, south Wales, and is considered to be self-sustaining. Spawning sites occur throughout the

lower reaches of the river between Carmarthen and Llangadog, with most spawning occurring downstream of Llandeilo. Water quality and quantity are considered adequate to maintain this internationally vulnerable species, and there are no impassable obstructions along the migration route, though one weir at Manorafon may be an obstacle during low flow conditions. The presence of Llyn Brianne reservoir at the headwaters provides the potential to manipulate river flows to aid shad migration.

    - 1355 Otter *Lutra lutra* The Afon Tywi is one of the best rivers in Wales for otters *Lutra lutra*. There are abundant signs of otter and they are regularly seen on the river. The water quality is generally good and there is an ample supply of food. There are suitable lying-up areas along the riverbank, but there few known breeding sites on the main river, although cubs have been seen.

- Annex II species present as a qualifying feature, but not a primary reason for site selection:
    - 1095 Sea lamprey *Petromyzon marinus*
    - 1096 Brook lamprey *Lampetra planeri*
    - 1099 River lamprey *Lampetra fluviatilis*
    - 1102 Allis shad *Alosa alosa*
    - 1163 Bullhead *Cottus gobio*

3.3 Consultation

Key consultees NRW and DCWW have been contacted with regards to our phosphate nutrient budgeting approach for use within the HRA. The following presents the relevant publicly available advice for LDPs for HRAs, in addition to the key consultation between NRW, DCWW and Arcadis with regards to P limits.

3.3.1 NRW Advice for the Review of LDPs[13]

"All LDPs should be screened to determine whether any policies are likely to have a significant effect on a river SAC.

Policies can be screened out as not likely to have a significant effect in relation to increased phosphorus loading if the associated developments or activities are not a source of phosphorus or there are no pathways for additional phosphorus to enter the river environment.

Any LDP polices relating to schemes for private sewage treatment systems should ensure no adverse effects on the integrity of any river SACs where:

- *discharges are direct to surface waters; or*
- *discharges are to ground and do not meet the screening criteria set out in this document.*

Allocations for development that are proposed to be connected to a mains wastewater treatment works and have the potential to increase phosphorus loading, should be assessed in accordance with advice set out earlier in this document."

Allocations where there is no capacity for additional wastewater:

"Where a development is proposed with connection to a public sewer but the associated wastewater treatment works has insufficient capacity to accommodate additional phosphorus from new connections or no improvements to increase treatment capacity of phosphorus is planned within the Asset Management Plan programme, the Planning Authority should undertake an Appropriate Assessment of the proposals. The Appropriate Assessment should consider any other mitigation, nutrient neutrality, or avoidance measures."

3.3.2 NRW HRA-Phosphorus Specific Advice

Under the Habitats Regulations, Planning Authorities have to take into consideration the effect of phosphorus from the proposed developments on water quality within SACs. For catchments that do not meet the phosphorus targets:

"…it is possible that new developments can be authorised if it can be demonstrated they will not lead to further deterioration of water quality in the SAC water bodies failing to meet water quality targets and will not undermine the ability for the SAC to meet its conservation objectives."

"This may be achieved if:

- *developments are not a source of phosphorus or*
- *developments are a source of phosphorus but there is no pathway for it to enter the SAC river environment or*
- *measures associated with a given development are put in place so that nutrient neutrality can be achieved and that development does not lead to a net increase in phosphorus entering the SAC river environment."*

"In SAC catchments meeting phosphorus targets, it is possible that new developments can be authorised if it can be demonstrated they will not lead to an adverse effect on site integrity (i.e. will not undermine the ability for the SAC to meet its conservation objectives)."

3.3.3 NRW's Phosphate Backstop Requirements

NRW's advice concerning discharge to SAC water bodies, requires a 5mg/l backstop (i.e. the maximum amount of total phosphorus that is permitted to be discharged into a SAC or a water body draining to a SAC) for WwTWs[21]:

"*The environmental regulators will require a 5mg/l TP permit limit to be applied to wastewater treatment works over a certain population threshold, discharging to a Special Area of Conservation. This will be actioned in Asset Management Period 8 (2025-2030). The new permit limits give greater certainty to prevent deterioration and the statutory requirement to sample and report Wastewater Treatment Works' final effluent for phosphorus. The backstop limit will also give greater certainty to water quality modelling where the new limit will replace estimated TP values in previous versions.*"

3.3.4 DCWW Phosphate Permitting

In February 2023, DCWW published an open letter to its stakeholders outlining progress made on the issue of phosphorus in Welsh SACs[22]. Alongside this letter, details of the Review of Permits (RoP) was published. Whilst the RoP is still progressing, many permits have already been issued including for WwTW within the Tywi catchment. NRWs public register for environmental permits or licenses hosts the ultimate decision documents supporting the RoP, of particularly importance is PAN-018673, a decision document supporting the RoP project, which states:

"We have decided to review and where appropriate issue variations for Environmental Permitting Regulations water discharge activity permits from an agreed list of Dŵr Cymru Welsh Water Waste Water Treatment Works...

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided"

[21] DCWW Our work in Special Areas of Conservation water bodies [Accessed 19/01/2024]
[22] DCWW (2023) Phosphorus Programme Cover Letter. [Accessed 19/01/2024]

In other words, where a permit has been reviewed and issued, taking into consideration its effective date (which can vary from immediate to March 2030), it can be assumed that the environmental impact of this new limit has been considered according to NRWs duty under Article 6(2) of the Habitats Directive. As such, so long as a site allocation is discharging to a WwTW with a reviewed permit that is effective before its planned occupation, it can be assumed that there would be no likely adverse impact on the SAC resulting from an increased discharge of phosphorus.

To understand DCWW's contribution to the phosphorus load to the rivers, and to assess any improvements DCWW would need to make to their WwTW discharges, DCWW have updated and re-calibrated their water quality models using the regulator and industry standard tool known as SAGIS (Source Apportionment Geographical Information System).

SAGIS has been used to identify and quantify the main sources of phosphorus within each water body within each of the SAC catchments. DCWW have produced their indictive Phosphorus Reduction Programme, detailing WwTWs likely to require a new phosphorus permit limit, to address DCWW's regulatory compliance needs.

SAGIS modelling has been used to identify where DCWW must remove additional phosphorus in order to meet their 'fair share' of the improvements needed. DCWW's programme states that all WwTWs discharging over 20m^3/day to a SAC or discharging to a non-designated water body draining to a SAC (i.e., where there is no TP limit currently in place), will meet a backstop phosphorus permit limit of 5 mg/l by the end of the investment programme (2032)[22].

It should be noted that all WwTWs assessed in this report (i.e., those connected to a site allocation in the rLDP) qualify under these conditions. This means that all WwTWs in this assessment discharge over 20m3/day without (an environmental permit with) a P limit and will be at subject to at least a backstop P limit of 5 mg/l by the end of DCWW's planned investment programme (2032). However, in many cases, agreements will be in place to meet this backstop limit or better, well before 2032, Table 3 provides further detail.

DCWW have released key documents[23] relating to their SAGIS modelling and planned phosphorus reduction investment strategy under the emerging programme. This will support collaborative efforts with their key stakeholders to restore the SACs to favourable conservation status whilst supporting the economic development of Wales. The expected completion of this programme is the end of 2032, delivered over multiple 5 yearly AMP investment periods that will require prior agreement with the Water Services Regulation Authority (OFWAT).

Table 3 - Summary of DCWW Phosphorus Reduction Scheme by WwTW for Carmarthenshire rLDP

SAC	WWTW	RoP Status	P limit mg/l	Date Implemented	Permit No.
Afon Teifi	Capel Iwan	Accepted	1.8	2030	BN0054901
	Pencader	Proposed	3.5	2032	BG0007801
	Llanybydder	Accepted	2.5	2025	BJ0091401
	Lampeter	Accepted	0.5	2025	BP0045001
	Tregaron	Accepted	2	2030	BH0057801
	Pontrhydfendigaid	Accepted	1.8	2032	BN0040202
	Drefach/Velindre	Accepted	5	Effective Dec '23	BH0060601
	Adpar	Accepted	5	Effective Dec '23	BN0112801
	Llandysul	Accepted	5	Effective Dec '23	BG0010201

[23] DCWW (2023) Understanding the sources of phosphorus in our rivers [Accessed 19/01/2024]

SAC	WWTW	RoP Status	P limit mg/l	Date Implemented	Permit No.
	Llanfihangel-ar-arth*	Proposed	5	2032	BN0020802
Afon Tywi	Cwm Ifor	Proposed	5	2030	BN0103601
	Ffairfach	Proposed	5	2030	BH0065401
	Llandovery	Accepted	5	Effective Aug '23	BN0202701
	Llangadog	Accepted	5	Effective Jul '23	BG0040001
	Pont-ar-Gothi & Nantgaredig	Accepted	5	Effective Jul '23	BN0002601

**Llanfihangel-ar-arth WwTW currently does not have a proposed date for its new permit. Therefore, the end of the DCWW investment programme has been assumed.*

3.3.5 NRW Consultation on the HRA Approach for the Non-failing Tywi SAC

On 8th December 2022, NRW provided a response to CCC following their consultation dated 21st October 2022, which sought to establish a common understanding of the nutrient neutrality compliance requirements in non-failing SACs[24]. The scope of the CCC consultation and NRW response was wide ranging, but with specific reference to the application of an environmental headroom approach in non-failing SACs, the following key points are highlighted:

1. CCC and NRW were in agreement that phosphorus concentrations within the Afon Tywi catchment were significantly less than their targets, indicating that "*phosphorus is not likely to be a significant concern in these stretches*".
2. NRW reiterated their advice that "*for developments leading to increases in phosphorus discharges into catchments of non-failing riverine SACs. As set out in our planning advice, new developments can be authorised if it can be demonstrated they will not lead to an adverse effect on site integrity (i.e. will not undermine the ability for the SAC to meet its conservation objectives by causing a phosphorus target failure alone or in combination with other plans or projects).* ***There is no requirement for nutrient neutrality…"***
3. NRW recognised that developments not requiring nutrient neutrality are likely to reduce "*river headroom*", which without consideration could lead to water bodies in the Afon Tywi failing to meet their phosphorus targets.
4. NRW highlighted several considerations that may help the local planning authority to consider the requirement to apply a nutrient neutrality approach including the rate and pace of development coming forward and the application of decision thresholds based on phosphorus export potential.
5. NRW noted their work with DCWW to review phosphorus impacts of discharges from WwTW in SAC catchments. The work will inform a Review of Permits for WwTW and will provide clarity on the capacity of WwTWs to receive connections from new development, aiding both the water company and planning authorities as part of the decision-making process for planning applications.

[24] NRW (2022) "Compliance requirements of non-failing riverine SACs" (2022) Letter to CCC, 8th December.

4 Water Quality Phosphates Screening

Policies and allocations previously screened out due to their lack of construction pathway or due to their likely scale and distance from the Afon Teifi and Afon Tywi SACs, have been screened in for further consideration where this includes occupation that could contribute to phosphates entering into the sewage system. NRW provided detailed advice as to the nature of that screening process detailed in the sections below.

4.1 Policy Screening

With regard to Policies, NRW advised that "*Policies can be screened out as not likely to have a significant effect in relation to increased phosphorus loading if there are no pathways for increased phosphorus impacts.*" This resulted in only one policy being screened in that was firstly, relevant to phosphates, and secondly, had undergone SARs.

The rLDP Policy CCH4 was identified as the only policy that was directly relevant to phosphates and their impact upon water quality, hence any changes that were made to the policy are explored in Section 5.2. Changes to the policy's wording are presented in Table 9. Any revisions made to other policies are addressed in the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033.

Policy CCH4 has had its name altered from CCH3: Water Quality and Protection of Water Resources due to what was previously policy CCH1 being split into two individual policies. It has also had its policy wording amended in order to improve its clarity and its response in terms of NRW's phosphate guidance. As a result, the supporting text of CCH4 has also been amended to account for the recent update with regard to phosphates and will be discussed further in Section 5.2.

4.2 Site Allocation Screening

4.2.1 Nutrient budgeting

To determine the amount of phosphate exported to the SACs due to the rLDP, a nutrient budget was calculated. The four stages of the Nutrient Budget Calculator, as shown in Image 3, were followed in order to calculate the TP budget that would require mitigation from each of the sites identified as impacting an SAC.

The nutrient budget calculations are completed as per the following four key stages:

- **Stage 1 -** Calculate the increase in TP loading that comes from a development's wastewater.
- **Stage 2 -** Calculate the pre-existing TP load from current land use at the development site.
- **Stage 3 -** Calculate the future TP load from land use at the site post-development.
- **Stage 4 -** Calculate the net change in TP loading from the development to the SAC with the addition of a 20% precautionary buffer; this is hereby referred to as the TP budget.

Image 3 - Diagram showing the overall equation used to calculate the nutrient budget

Of the four stages outlined above, Stage 1 was found to present the largest contribution of TP loading. This stage relies upon an understanding of the permit limit at the WwTW a given development is due to connect to. During development of the IAP, the RoP process was still in its infancy, and as such, there was uncertainty around selection of a reasonable P limit value for WwTWs where no such P limit existed. This led to a conservative estimate of nutrient budgets being produced, which assumed a P limit of 8mg/l at any WwTW without a permit.

As documented in Section 3.3.4, significant progress has since been made with the RoP process, and there is now a commitment to achieve a backstop limit of 5mg/l at all WwTW draining to SACs above a dry weather flow (DWF) of 20m^3/day (this covers all WwTW of importance to this assessment).

However, there are circumstances where the actual permitted value will be lower than 5mg/l due to existing and proposed WwTWs enhancements. For six WwTW locations within the Afon Teifi SAC, implementation of a tighter TP limit has already been confirmed, and in two instances (Lampeter and Llanybydder) the works will be complete by 2025 (presented in Table 3). Where improvements are confirmed within AMP7 (by 2025) the accepted P limit values have been applied to calculations. In all other instances, the 5mg/l backstop limit is applied, except in the case of Package Treatment Plants where default values are used as per the calculation guidelines.

The finalised list of Site Allocations proposed to be brought forward as part of the rLDP was provided by CCC in October 2023. This list was different from the previous allocations provided by the Council in Stage 1, hence the nutrient budget and subsequent calculations have been amended accordingly. The complete list of the final Site Allocations for the rLDP are outlined in Table 6.

4.2.2 Stage 1 rLDP Site Allocation Screening Results

Arcadis found that within the drainage catchments of the Afon Teifi and Afon Tywi, 42 Site Allocations were identified as having a potential effect on these SACs:

- 28 in the Afon Teifi; and
- 14 in the Afon Tywi

No Site Allocations were identified as affecting the Afon Cleddau River Usk or River Wye SACs. [14]

Following this assessment and other strategic considerations, the council planning officers reviewed each individual site within the rLDP with a view to “screening out” sites which were deemed unlikely to come forward under the rLDP. The Council provided Arcadis with a refined number of sites to be taken forward:

- For the Afon Teifi, the number of Site Allocations reduced from 28 sites (417 units) down to 15 (189 units). The Site Allocations screened in are presented in Table 4
- For the Afon Tywi, the number of Site Allocations reduced from 14 sites (175 units) down to 6 (104 units). The sites screened in are presented in Table 5

The impact of the first reduction in the number of Site Allocations within the rLDP decreased the TP budget by:

- 49% (486.11 TP Kg/yr to 236.28 TP Kg/yr) for Afon Teifi
- 43% (191.17 TP Kg/yr to 109.77 TP Kg/yr) for Afon Tywi

Table 4 - Stage 1 rLDP Site Allocations removed/added for the Afon Teifi SAC as provided by CCC

Allocations	Description (No. of units)	Potential Impact pathway	rLDP in/out
SeC12/h1	17	Drains into phosphorus sensitive catchment - Teifi	In
SeC12/h2	14	Drains into phosphorus sensitive catchment - Teifi	Out
SeC12/h3	20	Drains into phosphorus sensitive catchment - Teifi	In
SeC13/h1	10	Drains into phosphorus sensitive catchment - Teifi	In
SeC13/h2	30	Drains into phosphorus sensitive catchment - Teifi	Out
SeC13/h3	23	Drains into phosphorus sensitive catchment - Teifi	Out
Sec13/h4 (New Site W39176)	9	Drains into phosphorus sensitive catchment - Teifi	Out
SeC14/h1	20	Drains into phosphorus sensitive catchment - Teifi	In
SeC14/h2	24	Drains into phosphorus sensitive catchment - Teifi	In
SeC14/h3	28	Drains into phosphorus sensitive catchment - Teifi	Out
SeC14/h4	7	Drains into phosphorus sensitive catchment - Teifi	Out
SuV31/h1	12	Drains into phosphorus sensitive catchment - Teifi	Out
SuV31/h2	10	Drains into phosphorus sensitive catchment - Teifi	Out
SuV32/h1	6	Drains into phosphorus sensitive catchment - Teifi	Out
SuV33/h1	5	Drains into phosphorus sensitive catchment - Teifi	In
SuV34/h1	14	Drains into phosphorus sensitive catchment - Teifi	Out
SuV35/h1	6	Drains into phosphorus sensitive catchment - Teifi	In
SuV36/h1	6	Drains into phosphorus sensitive catchment - Teifi	In
SuV36/h2	16	Drains into phosphorus sensitive catchment - Teifi	In
SuV37/h1	20	Drains into phosphorus sensitive catchment - Teifi	Out
SuV37/h2	20	Drains into phosphorus sensitive catchment - Teifi	In
SuV37/h3	10	Drains into phosphorus sensitive catchment - Teifi	In
SuV38/h1	6	Drains into phosphorus sensitive catchment - Teifi	In
SuV38/h2	5	Drains into phosphorus sensitive catchment - Teifi	Out
SuV39/h1	7	Drains into phosphorus sensitive catchment - Teifi	In
SuV41/h1	19	Drains into phosphorus sensitive catchment - Teifi	Out
SuV41/h2 (New Site W40639)	14	Drains into phosphorus sensitive catchment - Teifi	In
SuV43/h1	8	Drains into phosphorus sensitive catchment - Teifi	In

Table 5 - Stage 1 rLDP Site Allocations removed/added for the Afon Tywi SAC as provided by CCC

Allocations	Description (No. of units)	Potential Impact pathway	rLDP in/out
SuV15/h1	10	Drains into phosphorus sensitive catchment - Tywi	Out
SuV16/h1	8	Drains into phosphorus sensitive catchment - Tywi	Out
SuV17/h1	35	Drains into phosphorus sensitive catchment - Tywi	In
SuV18/h1	15	Drains into phosphorus sensitive catchment - Tywi	Out
SeC15/h1	12	Drains into phosphorus sensitive catchment - Tywi	Out
SeC15/h2	8	Drains into phosphorus sensitive catchment - Tywi	In
SeC16/h1	27	Drains into phosphorus sensitive catchment - Tywi	In
SeC16/h2	5	Drains into phosphorus sensitive catchment - Tywi	Out
SeC16/h3	5	Drains into phosphorus sensitive catchment - Tywi	Out
SeC17/h1	16	Drains into phosphorus sensitive catchment - Tywi	In
SeC17/h2	8	Drains into phosphorus sensitive catchment - Tywi	In
SuV47/h1	7	Drains into phosphorus sensitive catchment - Tywi	Out
SuV48/h1	18	Drains into phosphorus sensitive catchment - Tywi	Out
SuV51/h1	8	Drains into phosphorus sensitive catchment - Tywi	In

4.2.3 Stage 2 rLDP Site Allocation Screening Results

As of October 2023, the Council responded to the previous iteration of this HRA Addendum Appendix with a finalised list of Site Allocations, which will be taken forward as part of the rLDP. In comparison to the list of screened in Site Allocations in the previous iteration of this report, one site allocation (SuV43/h2) was removed from the Afon Teifi SAC and one new site allocation (SuV16/h1) for the Afon Tywi SAC was included after initially being screened out. A revision of the SA units was also undertaken, for example, SuV43/h1 which previously contained 8 units, was reduced to 5 units as three homes had already been built and were not required to be included in the nutrient budget. For Afon Tywi, there are currently 7 Site Allocations with a total of 104 units. For the Afon Teifi, there are currently 14 Site Allocations with a total of 172 units.

This resulted in a final list of site allocations for the rLDP (Table 6) as follows:

*Table 6 - Sites screened in for the final Site Allocations as provided by CCC. * = site is also part commitment; number is exclusive of units with extant permissions.*

SAC	Site Reference	Name	No. of Units
Afon Teifi	SuV38/h1	Maes y Bryn	6
Afon Teifi	SuV37/h3	Land adjacent to Lleinau	10
Afon Teifi	SuV37/h2	Land south of Cae Coedmor	20
Afon Teifi	SuV39/h1	Adjacent Yr Hendre	7
Afon Teifi	SuV33/h1	Land opposite Brogeler	5
Afon Teifi	SuV36/h2	Land at Bryndulais	16
Afon Teifi	SuV36/h1	Cae Pensarn Helen	6
Afon Teifi	SeC13/h1	Adjacent Y Neuadd	10
Afon Teifi	SuV43/h1*	Blossom Inn	5*
Afon Teifi	SeC12/h1	Trem Y Ddol	17
Afon Teifi	SeC12/h3	Land rear of Dolcoed	20
Afon Teifi	SeC14/h2	Land adjacent Maescader	24
Afon Teifi	SeC14/h1	Blossom Garage	20
Afon Teifi	SuV35/h1	Land adjacent Arwynfa	6
Afon Tywi	SuV16/h1*	Llwynddewi Road	2*
Afon Tywi	SuV17/h1	Rear of former joinery, Station Road	35
Afon Tywi	SuV51/h1	Land opposite Village Hall	8
Afon Tywi	SeC16/h1	Llandeilo Northern Quarter	27
Afon Tywi	SeC15/h2	Land adjacent to Bryndeilog, Tywi Avenue	8
Afon Tywi	SeC17/h1	Land opposite Llangadog C.P School	16
Afon Tywi	SeC17/h2	Land off Heol Pendref	8
TOTAL			**276**

4.2.4 Carmarthenshire rLDP Nutrient budget calculations

Based on the methodology set out in section 4.2.1 and the sites screened in for the final rLDP (as per Table 6), the final TP budget for the Afon Tywi is **75.69 TP Kg/year**, and for the Afon Teifi **126.45 TP Kg/year** as illustrated in Table 7. A full breakdown of the nutrient budget calculations can be found in the AP. Nutrient budgets per allocation are also presented in this document when exploring potential mitigation options, see Section 5.4.

Table 7 - Summary of the reduction in units and nutrient budgets based on the revised list of Site Allocations for a 5mg/l TP backstop

SAC	Previous No. of Units	Current No. of Units	Previous TP Nutrient Budget (Kg/year)	Current TP Nutrient Budget (Kg/year)	TP reduction required to mitigate
Tywi	175	104	191.17	75.69	60.41%
Teifi	417	172	486.11	126.45	73.99%
Total	**592**	**276**	**677.28**	**202.14**	**70.15%**

4.3 In-combination effects screening

4.3.1 Phosphorus sources

4.3.1.1 Phosphorous sources for the Afon Teifi SAC

To understand the potential for in-combination effects it is important to understand where the greatest sources of phosphate are in both of the SACs. For the Afon Teifi, which is currently failing in terms of NRW's P targets, the latest model results from the Phosphorus Source Apportionment Summary suggest that 45 kg of phosphorus is discharged from the catchment daily[25]. It was found that the predominant source of phosphorus in the Afon Teifi is WwTW; which accounts for 66% of the average daily load (kg/d). Rural land use contributes 30% of the daily phosphorus load, storm overflows (intermittents) contribute 3% and a further 1% from other sources such as septic tanks and urban run-off.

This confirms that the P load in the Afon Teifi is largely driven by WwTW discharge. Image 4 gives an overview of the source apportionment loads for the Afon Teifi riverine SAC catchment. The Afon Teifi Phosphorus Load Overview, which shows a breakdown of the phosphorus load and a breakdown of the sources of pollution within each water body has been published by DCWW[26].

[25] Phosphorus Source Apportionment Summary: Updating the SAGIS River Teifi Model (Dec2022) [Accessed 19/01/2024]
[26] Afon Teifi Phosphorus Load Overview. [Accessed 19/01/2024]

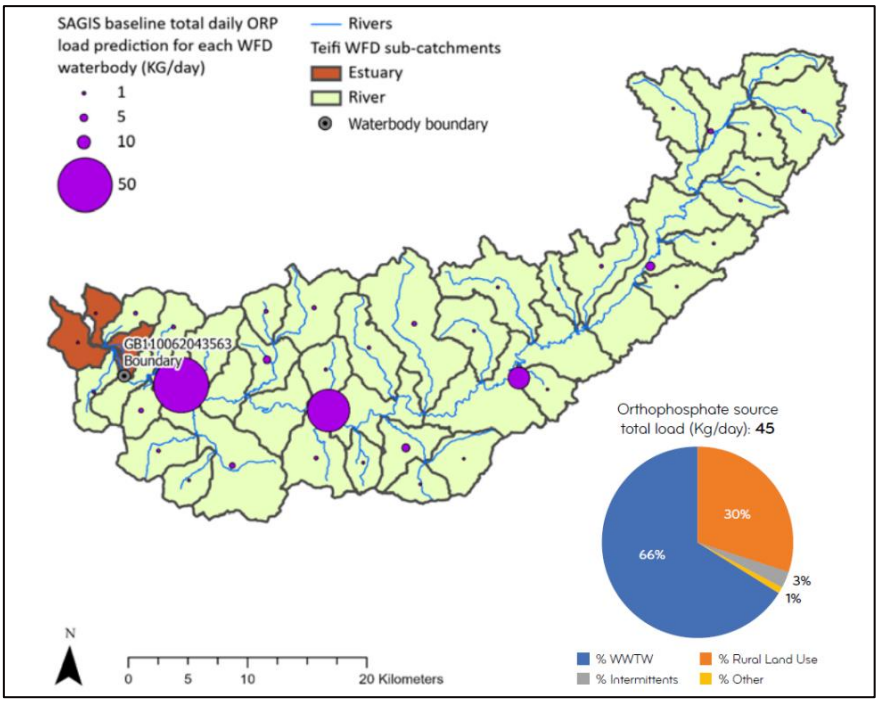


Image 4 - Phosphorus apportionment by source for the Afon Teifi[26]

Note: *The source apportionment represents that of the boundary of the furthest downstream WFD water body in the Afon Teifi catchment (GB110062043563). Load prediction points are plotted at the centre of each WFD water body.*

4.3.1.2 Phosphorous sources for the Afon Tywi SAC

For the Afon Tywi, which is not currently failing its phosphate targets, the Phosphorus Source Apportionment Summary model results show that approximately 60Kg of phosphorus is discharged from the catchment daily[27]. It was found that the predominant source of phosphorus in the Afon Tywi is rural land use; which accounts for 86% of the average daily phosphorus load (Kg/d). WwTW contribute 11% and a further 3% from other sources such as septic tanks and urban run-off. This confirms that phosphorus load in the Afon Tywi is largely driven by rural land use. Image 4 gives an overview of the source apportionment loads for the Afon Tywi riverine SAC catchment. The Afon Tywi Phosphorus Load Overview has recently been published by DCWW[28].

[27] Phosphorus Source Apportionment Draft Summary: River Tywi (May 2023) [Accessed 19/01/2024]
[28] Afon Tywi Phosphorus Load Overview. [Accessed 19/01/2024]

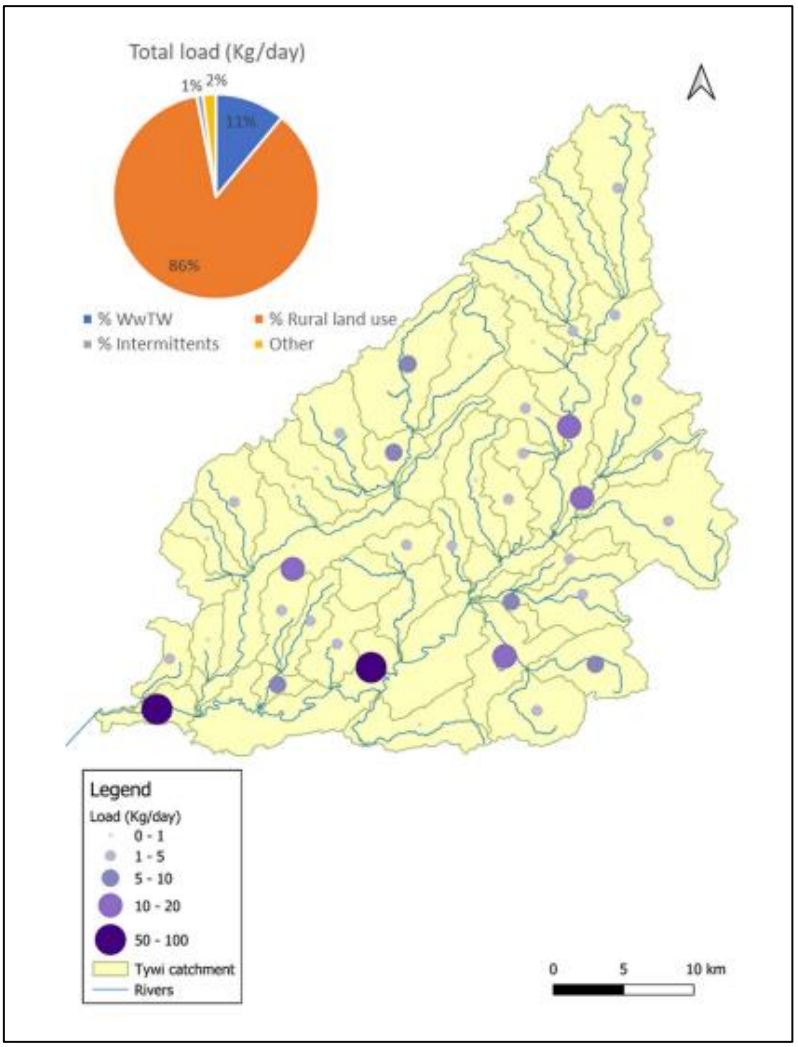


Image 5 - Phosphorus apportionment by source at the furthest downstream point on the River Tywi.

4.3.2 Neighbouring LDPs Site Allocations and Status

A review was undertaken of neighbouring Councils' LDPs for the potential for their Site Allocations to affect the Afon Teifi and Afon Tywi SACs. The only LDPs Site Allocations with the potential to affect any of these SAC catchments were those in CeCC and Pembrokeshire County Council (PCC) and with respect to the Teifi SAC.

The western reaches of the Brecon Beacons National Park (BBNP) are located within Carmarthenshire's boarders, although the assessed rLDP is not applicable to this area (~230 km^2) as it is under the responsibility of another LPA. While preparation works were started in 2017, the BBNP Authority had to pause the production of its revised LDP as a result of the phosphate constraint[29]. At the time of publication, no updated delivery agreement is available and the current LDP remains in force. From the information available online (adopted Local Plan, proposals, inset maps and supporting documents), there are no proposed allocations which would be within the boundary of the County nor within the shared Tywi P sensitive SAC catchment and, therefore, an in-combination assessment is not required.

[29] Bannau Brycheiniog Local Development Plan 2 [Accessed 19/01/2024]

4.3.3 Ceredigion Local Development Plan

The Afon Teifi flows through large areas of Ceredigion (its river catchment area includes 44.6% of Ceredigion) and the new planning guidance issued by NRW in relation to dealing with phosphate levels in Afon Teifi SAC would significantly impact how these communities would develop during the next LDP period 2018-2033 (i.e., LDP2).

Based on the latest NRW planning guidance and evidence base, there is significant risk of the LDP2 being considered 'unsound' through the public examination process and not fit for purpose, due to the phosphate issue being unaddressed. Therefore, at a Full Council held virtually on 21 October 2021, Ceredigion County Councillors agreed a pragmatic decision needed to be reached and agreed to a temporary but as yet unspecified length pause for the replacement LDP, to allow essential evidence and data to be gathered and mitigation options to be devised. In the meantime, CeCC is working with NRW, DCWW, Welsh Government (WG) and neighbouring Local Authorities to find both national and local solutions to the issue.

Although the current adopted LDPs plan period ends in 2022, it will continue to be the Development Plan for Ceredigion until a Replacement Plan is adopted. Therefore, those currently allocated LDP sites that are yet to be fully developed have been included in the nutrient budgets undertaken by Arcadis in this Phosphate Assessment Appendix to the Carmarthenshire rLDP HRA to quantify the in combination impacts on the river Teifi SAC.

4.3.4 Pembrokeshire Local Development Plan

The Afon Teifi flows through a part of Pembrokeshire and therefore would be impacted by the new NRW planning guidance for dealing with phosphate levels, as with Carmarthenshire and Ceredigion.

This has implications on the location and sites which can be included as allocations in PCC Local Development Plan Review (LDP 2). PCC will not be in a position to know which sites can be retained in LDP2 until further information is received and additional research is undertaken. Further time is therefore required to allow essential evidence and data to be gathered and mitigation options on the phosphates issue to be devised.

In addition to any changes required as a consequence of the phosphates issue, PCC is likely to wish to make a range of other changes to the Deposit Plan of 2020 (covering the period 2017- 33) in response to consultation feedback and as a result of updated evidence / changes to national policy and context, including those required as a consequence of Covid-19.

Therefore, at a Full Council, held virtually on 9th December 2021, Pembrokeshire County Councillors agreed to note delays to the LDP2 timetable and approved a recommendation to allow an amended Delivery Agreement to be prepared, which includes a return to the Deposit Plan stage. This means that a second Deposit Plan will be published for public consultation in the future. The timetable for this is still uncertain as it is dependent on the release of information and outcomes of research. Specific dates for this are therefore not yet identified. A new Delivery Agreement and preparation of a second Deposit Plan will allow for essential evidence and data to be gathered and mitigation options to be devised. In the meantime, PCC is working with NRW, DCWW, WG, neighbouring Local Authorities and other organisations such as the Pembrokeshire Coastal Forum to find both national and local solutions to the issue.

The current adopted LDP's plan end date of 2021 has been disregarded, so that it will continue to be the Development Plan for Pembrokeshire until a Replacement Plan is adopted. Therefore, those Site Allocations that were considered in the Deposit Plan of 2020 have been included in the nutrient budgets undertaken by Arcadis in this HRA to quantify the in combination impacts on the Afon Teifi SAC.

4.3.5 In-combination Nutrient Budget

Planned developments that discharge to the Afon Teifi SAC from the CeCC and PCC have the potential to impacts the overall nutrient budget of the SAC and the scale of mitigation required to ensure there are no adverse impacts to the SAC as a result of potential future development within CCC, CeCC and PCC.

In consistency with the Carmarthenshire rLDP nutrient budget calculations (Section 4.2.4), the 5mg TP/l backstop has been used in calculations (with the exception of sites connecting to Lampeter WwTW where a tighter environmental permit limit has been committed to within AMP7).

The additional wastewater from these units generates an annual TP load (Stage 4) of 316.62 kg TP/year and 40.13 kg TP/year in Ceredigion and Pembrokeshire respectively.

These values present the TP that is required for avoidance mitigation to ensure that the rLDP does not alone, or in combination with other developments, adversely affect the Afon Teifi SAC Table 8. Full details are provided in the AP.

Table 8 - Summary of cumulative nutrient budget

LDP	SAC	No. of Units	Nutrient Budget TP (Kg/year)
Carmarthenshire	Tywi	104	75.69
Carmarthenshire	Teifi	172	126.45
Ceredigion	Teifi	592	316.62
Pembrokeshire	Teifi	61	40.13
Total (Cumulative)		**929**	**558.89**

As discussed in Section 4.3.3, the CeCC LDP (LDP2) 2018 – 2033 and PCC LDP (LDP 2) have been on hold following the advice issued by NRW. Ceredigion, the replacement LDP has been on hold since 2020. As this LDP develops in the future, there is the potential that some of the Site Allocations in this assessment are screened out, or new developments are screened in. This exercise would influence the nutrient budget and mitigation requirements in the Teifi SAC catchment. Similarly for PCC, the LDP review (LDP2) has developed with a return to the Deposit Stage anticipated, which is yet to be confirmed. The timetable is not yet finalised as it is dependent on the release of information and outcomes of research. Specific dates for this are therefore not yet identified[30].

Therefore, the cumulative budget is based on the latest information and could be subject to change as the respective LDPs are developed for examination and adoption. Should the development of the respective LDPs impact the current TP budget and mitigation requirements along the Afon Teifi, CeCC and PCC would need to explore any additional mitigation required.

4.4 HRA Screening Stage 1 conclusion

4.4.1 Screening Conclusion for rLDP

From initial nutrient budgeting and Site Allocation (SA) screening selected sites were removed from the rLDP to minimize potential phosphate loads on the Afon Teifi and Afo Tywi SACs. This reduced the number of proposed SA units from 417 to 172 for the Teifi and from 175 to 104 for the Tywi.

Liaison and consultation with NRW produced an agreed maximum backstop requirement which has resulted in a maximum of 5mg/l for WwTW discharging to the SACs. DCWW liaison and consultation has resulted in

[30] Pembrokeshire County Council Local Development Plan Review (LDP 2) Delay to LDP2 Timetable and return to 2nd Deposit Plan stage. [Accessed 19/01/2024]

knowledge of actual and proposed WwTW discharge rates in these catchments and dates for proposed compliance. Some WwTW discharge rates are considerably lower than the 5mg/l maximum backstop.

Using these SA unit numbers, and the discharge rates, nutrient budget calculations confirmed the amount of TP in Kg/year from the SAs. That is, 126.45 Kg/year for the Teifi and 75.69 Kg/year for the Tywi.

The Tywi is not currently failing its phosphorus targets. The additional TP from the rLDP SAs is very low (75.69 Kg/year) compared to its current receiving values (22,150 Kg/year) which equates to a yearly increase in phosphate loading of 0.35%. Given that CCC and NRW have agreed that "*phosphorus is not likely to be a significant concern in these stretches*", it is reasonable to screen out the rLDP SA allocations from requirement for information for Appropriate Assessment.

The environmental headroom approach will be applied, this headroom will be monitored to ensure that this is not being eroded and if required nutrient neutrality can be applied on developments on a project-by-project basis in the future.

The Teifi is however failing its targets and is therefore screened in for rLDP SAs.

4.4.2 Screening Conclusion for In-combination Effects

While the CeCC LDP is not yet adopted, there are proposed SAs that have the potential to add TP to the Afon Teifi catchment. Similarly, the Pembrokeshire LDP while not yet adopted could also contribute future TP to the Afon Teifi catchment.

CeCC contribute the largest potential increase, 316.62 Kg/year of TP from 592 units and Pembrokeshire a much smaller 40.13 Kg/year from 61 units. This is in addition to the 126.45 Kg/year from the Carmarthenshire rLDPs. In a catchment that is already failing its phosphate targets this is a considerable addition and must be considered for avoidance mitigation.

While the Afon Tywi is not currently failing its phosphate targets, and no neighbouring LDPs drain to the catchment, there is potential for phosphate inputs from agricultural sources to erode the current environmental headroom, without consideration these could lead to water bodies in the Afon Tywi failing to meet their phosphorus targets in the future. Therefore, the Afon Tywi is screened in for in-combination effects.

5 Appropriate Assessment

5.1 Approach rLDP Avoidance measures

5.1.1 Overview

In order to deliver the rLDP with confidence, that alone and in-combination with other plans, ideally there would be no increase in the amount of P entering the Afon Teifi and the nutrient status of the Afon Tywi should be monitored and the current environmental headroom maintained.

To summarise, the screening process for this report is as follows:

- Policy CCH4 has been screened in for further assessment.
- The rLDP Site Allocations for the Afon Teifi that have been brought forward and require mitigation are presented in Table 4 of this report.
- The in-combination sites screened in which require mitigation has been presented in Section 4.3, with the cumulative budget summarised in Section 4.3.5.

There are potential solutions with traditional WwTW, associated with water utilities upgrades which have been presented in Table 3, however these may not be available in time to permit the adoption and approval of the rLDP. Therefore, the use of NbS has been explored as mitigation measures.

5.1.2 Case Law

Case law has established some important principles in respect of the reliance on mitigation measures as part of the HRA of a plan (as opposed to a HRA of a project). In the case of a project, it is necessary to have the details of proposed mitigation measures clearly established before being able to rely on them to conclude that a project will have no likely significant effect, or no adverse effect on integrity. However, in line with the strategic nature of a plan, it is necessary to outline an overall framework within which later projects can be successfully delivered without requiring abnormal derogations from compliance with existing legislation.

As set out in section C.5.1. of the HRA Handbook[20], as a general principle for both plans and projects:

"all 'mitigation measures' should be effective, reliable, timely, guaranteed to be delivered and as long-term as they need to be to achieve their objectives. Any doubt about the effective, reliability, timing, delivery or duration of mitigation measures, should be addressed by the competent authority before relying on such measures during the appropriate assessment and integrity test stages".

The effect of the Dutch nitrogen case (Case C293/17 and C 294) ruling[31] provides that the expected benefits of mitigation measures should be certain at the time of assessment. However, this ruling should be considered in conjunction with the standards of certainty established by earlier Waddenzee ruling[32], when ascertaining 'no adverse effect on the integrity' of a site. In particular, whilst the 'expected benefits' of mitigation measures should be certain 'at the time of the assessment', taken together with what is known of the impacts, overall, the standard that remains to be met is that there remains no reasonable scientific doubt as to adverse effects on the integrity of the site.

With specific reference to the HRA of a plan, case law has established that it is acceptable in principle to include policies within a Local Plan which are **conditional** upon certain **conditions** being met. In the case of Feeney v Oxford City Council[33], in respect of the assessment of land use plans under the Habitats

[31] Joined Cases C-293/17 and C-294/17 [Accessed 19/01/2024]
[32] Case C-127/02 [Accessed 19/01/2024]
[33] Feeney v Oxford Council decision [Accessed 21/01/2024]

Regulations, the use of a '**safeguard**' relating specifically to a particular policy within the Core Strategy was subject to considerable scrutiny. The High Court ruled that:

"There is nothing wrong in approving something in principle which may not happen in the future, if the condition is not satisfied (para 96)…

The conditional approval is a permissible and lawful course of action (para 99)"

In support of this premise, an approach which potentially relies upon matters being finalised after the adoption of the plan was specifically endorsed by the High Court in the case of Abbotskerswell v Teignbridge (2014)[34]. In this case, the Inspector:

"did not consider that safeguards proposed in the plan – the strategic mitigation strategy, settlement and site mitigation plans – had to be in place in advance of adoption of the Local Plan".

The Court ruled in para 84 that *"the Inspector was entitled to conclude that the Local Plan met the statutory requirements and was sound".*

In addition, a nutrient neutrality approach has been subject to scrutiny in the High court in the case of Wyatt v Fareham BC[35].

The Wyatt case also explored the issue of certainty and ruled that the presence of uncertainty can be addressed by ruling out the possibility of relevant harm to a high standard, thereby removing any reasonable scientific doubt. Paragraph 105 states:

'By requiring the competent authority effectively to rule out, to a very high standard, the possibility of relevant harm, the requirement under both articles 6(2) and (3) of the Habitats Directive is fully satisfied.'

In the Wyatt case this was achieved by including a sufficient level of precaution (namely underestimating the effectiveness of mitigation measures) to counterbalance the uncertainties, and this approach was endorsed by the ruling. It is important to note that the uncertainty in this case did not concern uncertainty about whether proposed measures would be effective, rather uncertainty in how otherwise robust mitigation measures might be quantified and applied in a strategic manner.

This case is discussed further in Section 5.6.1.

Finally, in the case of NANT v Suffolk Coastal District Council (2015)[36], the Court of Appeal ruled that:

"the important question in a case such as this is not whether mitigation measures were considered at the stage of CS [Core Strategy] *in as much detail as the available information permitted, but whether there was sufficient information at that stage to enable the Council to be duly satisfied that the proposed mitigation measures could be achieved in practice".*

Therefore, when considering mitigation measures to inform a plan HRA, the key question is whether there is sufficient information to determine that the proposed mitigation measures **could** be relied upon to prevent an adverse effect to the integrity of National Site Network Sites.

5.1.3 Potential Policy Amendments and Mitigation

The HRA Handbook states that '*Further mitigation measures that may be introduced during or after the 'appropriate assessment stage may be case specific policy restrictions or policy caveats*.

[34] Available at: https://www.bailii.org/ew/cases/EWHC/Admin/2014/4166.html [Accessed 19/01/2024]
[35] Available at: https://www.townlegal.com/wp-content/uploads/2021-EWHC-1434-Admin-28-May-2021.pdf [Accessed 19/01/2024]
[36] Available at: https://www.eastsuffolk.gov.uk/assets/Planning/Suffolk-Coastal-Local-Plan/Core-Strategy-and-DMP/No-Adastral-New-Town-Ltd-v-SCDC.pdf [Accessed 19/01/2024]

To be an appropriate restriction or caveat […], enabling the plan-making body to ascertain no adverse effect on the integrity of a European site, the restriction must be –

- *case-specific;*
- *explicit; and*
- *added to the policy and not merely added to the explanatory text or commentary, or not merely inserted into the implementation or monitoring chapters.'*

Therefore, a combination of strengthened embedded policy and a clear mitigation strategy could be sufficient to demonstrate no adverse effect.

5.2 Policy CCH3 Revision to CCH4

In order for the provisions of CCH3 to continue to serve as mitigation measures for the screened in Site Allocations and other policies, a revision to the wording was necessary to provide for a strategic approach to the delivery of phosphorus reduction measures.

Policy CCH4 has been amended (Table 9) to provide greater clarity of the wording of the policy in regard to National Site Network Sites. The requirement for development not to lead to the potential for adverse effects on the integrity of National Site Network Sites has been made explicit and the requirement for approval of any avoidance mitigation must be agreed with CCC and NRW in advance of any acceptance.

With these changes, CCH4 will act as both a policy caveat and a policy restriction which can be relied upon to avoid adverse effects to site integrity.

Table 9 - Policies screened in for further consideration

CCH3 LDP	CCH4 rLDP
"Proposals for development will be permitted where they do not compromise or lead to a deterioration in either the water resource or the quality of controlled waters. Proposals will, where appropriate, be expected to contribute towards improvements to water quality." "Watercourses will be safeguarded through ecological buffer zones or corridors to protect aspects such as riparian habitats and species, water quality, and provide for flood plain capacity. Proposals will be permitted where they do not have an adverse impact on nature conservation, fisheries, public access, or water related recreation use of the rivers in the County." "Development proposals must make efficient use of water resources and where appropriate, contribute towards improvements to water quality. SuDS must be implemented where appropriate with approval required through the Sustainable Drainage Approval Body (SAB)."	"Development proposals must make efficient use of water resources and, where appropriate, contribute towards improvements in water quality. **Proposals will be permitted where they do not have an adverse effect upon water resources, water quality, fisheries, nature conservation, public access, or water related recreation use in the County."** "Where appropriate, nature-based SuDS must be implemented with approval required through the Sustainable Drainage Approval Body (SAB)." "Proposals will be supported if they promote the safeguarding of watercourses through ecological buffer zones or corridors, protecting aspects such as riparian habitats and species, water quality, and providing for flood plain capacity." "Development will only be permitted if **it can be demonstrated that there is no adverse effect on the integrity of phosphorus sensitive riverine Special Areas of Conservation (SACs). In the hydrological catchment area designated for riverine SACs, development creating wastewater discharges will be required to demonstrate there is no increase in phosphorus levels in the SAC. This can be achieved through implementation of mitigation measures and associated supplementary planning guidance. Where evidence demonstrates that adverse effects on the integrity of river SAC can be avoided or offset using mitigation, these must be agreed with the Council on a case-by-case basis, in consultation with NRW."**

5.3 Avoidance Mitigation for rLDP

5.3.1 Avoidance mitigation approach

This section sets out the potential solutions for phosphorus mitigation within Carmarthenshire whilst the rLDP is brought forward for adoption.

A range of NbS that are technically feasible and can reasonably be delivered in relation to the policies and allocations within the rLDP have been presented in addition to the type and quanta of mitigation.

Two categories of measures have been presented.

- Category 1 measures – those which allow compliance with the Habitats Regulations and avoid adverse effects from the developments arising from the rLDP allocations.
- Category 2 measures – those that will deliver wider phosphorus reductions across the catchment to increase certainty of success, increase and/or maintain the environmental headroom and that could be utilised by developers on a project basis should this be required.

These solutions are supported by NRW and DCWW and are discussed in the following sections. The Nutrient Neutrality Action Plan provides further details.

5.3.2 NRW Support for Avoidance Mitigation Measures

NRW have expressed their position on what intervention measures they will and will not support for phosphorus mitigation. These include measures ranging from, Constructed Wetlands (CWs), Sustainable Drainage Solutions (SuDS) and Integrated Buffer Zones (IBZs) of trees and grasslands protecting watercourses. Further information on the interventions considered for the rLDP and for this HRA are presented in 0 and are described in full in the AP[15].

NRW published their final Policy on Constructed Wetlands[37] in October 2023. Additionally, NRW have recently shared their 'live' mitigation menu[38] produced with the WG and the Nutrient Management Boards (NMBs). The document outlines various nutrient mitigation measures and the evidence underpinning their ability to remove nutrients. A full list of mitigation measures including those from the Mitigation Measures Menu can be found in 0, with some examples below:

- Vertical Flow Wetlands
- Algae Treatment
- Reed Beds
- Private Treatment Systems
- River Restoration
- Terrestrial Sediment Traps
- Drainage Ditch Blocking
- Water Stabilisation Ponds

5.3.3 DCWW Support for Avoidance Mitigation Measures

DCWW[23] have expressed their position on what intervention measures they will and will not support for phosphorus mitigation. For DCWW, wetlands developed alongside their WwTW sites must meet certain criteria:

- Treatment works must have a Population Equivalent (PE) of less than 2000 to minimise wetland surface area footprint.
- Have high enough permit limit to warrant wetland construction.
- Ensuring whether the trade effluent contains damaging chemicals to wetlands.

[37] Natural Resources Wales Policy on Constructed Wetlands
[38] Mitigation Measures Menu. Created by Natural Resource Wales for Welsh Government.

These requirements are documented in DCWW's guidance document on 'Collaboration on Phosphorus Reduction Schemes'[39]. The guidance sets out 5 collaboration categories (A, B1, B2, C & D) and for each outlines the opportunity to collaborate, potential funding routes, and roles and responsibilities when co-delivering. Headline summaries for each category are provided (taken directly from the guidance), for full details refer to the guidance directly.

While categories may be subject to change, the preliminary desktop screening aims to provide a starting point for focused and well directed Constructed Wetland feasibility studies. These categories are summarised in Table 10.

Table 10 - DCWW Collaboration on Phosphorus Reduction Schemes (headline explainer)

Category	Headline Explanation
A	DCWW WwTW has/will have P limit. No further reduction possible. **No collaboration possible**
B1	DCWW WwTW will have P limit, but potential for further reduction. **Collaboration opportunity.**
B2	DCCW WwTW will have non-P driver (Water quality or population growth), potential for joint benefit solution. **Collaboration Opportunity.**
C	DCWW has AMP8 driver (non-P related). DCWW will have 'on-site' conventional solution. further P reduction available. **Separate solutions.**
D	DCWW WwTW has no NEP investment scheduled. **Collaboration opportunity.**

5.3.4 Welsh Government Mitigation Measures

The WG Relieving pressures on SAC river catchments to support delivery of affordable housing Action Plan (2022)[40] sets out clear actions, timescales, and responsibilities to tackle pollution in SAC river catchments and address planning constraints. Whilst the action plan mainly focuses on the issue of unlocking development across Wales, certain themes could be applicable to returning the SAC rivers to favourable conditions, and delivering wider benefits, via the NRW Mitigation Measures Menu. The purpose of the mitigation menu is to acknowledge measures which have been identified through available evidence as having the potential to reduce nutrient input into freshwater environments.

The All-Wales Nutrient Calculator is soon to be released in due course and will be a unified nutrient calculator to directly aid planning decisions on nutrient neutrality and will have the ability to take account of catchment-level data, local features and needs. It should be noted that the All-Wales Nutrient Calculator builds on the Carmarthenshire Nutrient Budget Calculator and subsequent West Wales Nutrient Budget Calculator, both developed by the Council and therefore the TP budgets documented throughout this report are final to support the rLDP.

A Task and Finish (T&F) nutrient credit trading group has been established to look at the structures and evidence base that would be required to enable nutrient offsetting in SAC river catchments. The T&F Group will also look at possible mechanisms for nutrient trading in the future.

As discussed previously, each WwTW has been allocated a 'collaboration category' by DCWW. Where CWs are possible, NRW have published a Policy on constructed wetlands[41] which clarifies NRW's position on what CWs NRW will support. This policy assists in making an informed decision on the use of CWs for various purposes. The Policy covers CWs, wetlands designed and created for a specific purpose. Naturally occurring

[39] DCWW (2023) Collaboration on Phosphorus Reduction Schemes Guidance Document
[40] Welsh Government (2023) Relieving pressures on Special Areas of Conservation (SAC) river catchments to support delivery of affordable housing: action plan Accessed 09/01/2024]
[41] NRW (2023) Constructed wetlands for improving water quality [Accessed 09/01/2024]

wetland habitats (including bogs, marshes, fens, ponds, lakes and rivers) are excluded from this Policy. It should also be noted that NRW endorse the use of Natural England's (NE) Framework Approach for Responding to Wetland Mitigation Proposals[42], which provides a detailed guide on undertaking feasibility studies for CW, designing and implementing the CW.

5.4 Avoidance Mitigation – Category 1 Measures

Identification of constructed wetland mitigation opportunities has been ongoing since 2022 with the development of the IAP for phosphate mitigation in Carmarthenshire. As this workstream has developed, new guidance has emerged including NRWs policy on constructed wetlands[41]. With this, the IAP has naturally adapted the initial wetland locations, identified new opportunities and developed proposals to a level of maturity not typically expected of a HRA compliance assessment.

This section will set out the quantum of mitigation required / available including specific strategic locations. It will provide context for how sites have been identified and present a summary of the calculations. Whilst not essential reading, the Action Plan sets out in greater detail the technical calculations that underpin these numbers (including detailed modelling of removal rates using industry standard models) and detail pertaining to feasibility studies that have substantially progressed the maturity of these identified solutions. In brief, substantial progress has been made in taking strategic measures forward, which is to the credit of Carmarthenshire County Council.

5.4.1 Afon Teifi Category 1 Measures

When selecting CW locations, one consideration in the identification of wetland opportunities has been the DCWW collaboration opportunities as discussed in Section 5.3.3. A map highlighting these collaboration opportunities is included in Appendix A Figure A1. Within the Afon Teifi catchment, eight WwTWs are listed as Category B (i.e. where a wetland opportunity could be explored with DCWW support). In the Afon Tywi catchment, five WwTWs are listed as Category B. In theory, any one of these WwTW could be progressed in support of a constructed wetland, which emphasises the available opportunity within the catchment.

It is worth noting that the Llanybydder and Lampeter WwTW, highlighted as Category A, are due to implement improvements by 2025, as documented in Section 3.3.4, (Table 3). These improvements have been reviewed and approved by NRW and DCWW and can be relied upon to mitigate the potential impacts of increased phosphorus loading associated with sites SeC13/h1 (discharges to Llanybydder) and SuV37/h3 and SuV37/h2 (which discharge to Lampeter).

A second consideration has been the location of site allocations within the catchment. Appendix A, Figure A1 again outlines the geographical context of the site allocations, relative to nearby WwTWs. When selecting wetland locations, care has been taken to position mitigation either upstream of proposed development such that an environmental headroom is created, or immediately downstream of development such that the impact can be addressed close to the source.

A final consideration has been the feasibility of the constructed wetland, taking into account aspects such as flood risk, soils, ecological constraints etc. High-level assessments of feasibility have been carried out in all instances and are further discussed in the AP.

Taking these considerations into account, three wetland locations have been proposed to mitigate the nutrient budget associated with Carmarthenshire's rLDP site allocations. Appendix A, Figure A2 highlights the wetland opportunities within the Teifi catchment; these are located at Adpar, Llandysul and Tregaron working from

[42] Natural England (2022) Framework Approach for Responding to Wetland Mitigation Proposals. The Rivers Trust and Constructed Wetland Association

downstream to upstream. These are strategically placed along the Afon Teifi so that they mitigate for the rLDP in the upper, middle and lower portion of the Afon Teifi SAC

The nutrient removal associated with each wetland solution has been calculated using detailed modelling, taking into consideration the influent quality, desired effluent quality (assumed in all cases to be 1mg/l) and the required retention time amongst other technical / design constraints and assumptions, which can be viewed in the AP. A summary of the Category 1 measures identified for the Afon Teifi catchment are included in Table 11.

As Table 11 shows, Site Allocations where a constructed wetland has been proposed can be comfortably mitigated, often securing a significant contingency whereby the **TP removed is in excess of the Nutrient Budget required to demonstrate nutrient neutrality.**

This contingency can be expressed both as a **TP removed and no. of units released**. The calculations show that an excess of **418.63** Kg/year will be removed from the catchment which equates to 853 units.

Table 11 - rLDP mitigation requirements for Category 1 measures for the Afon Teifi

Group	Site Allocation	No. units	TP Nutrient Budget (Kg/yr)	Proposed Mitigation	Wetland Area (ha)	TP Mitigation (Kg/yr removed)	No. units released
1	SuV37/h3	10	1.03	Enhanced WwTW (Lampeter)	N/A	N/A	30
	SuV37/h2	20	2.42				
	Sub-total	**30**	**3.45**		*Contingency*	**N/A**	**N/A**
2	SeC13/h1	10	4.58	Enhanced WwTW (Llanybydder)	N/A	N/A	10
	Sub-total	**10**	**4.58**		*Contingency*	**N/A**	**N/A**
3	SuV33/h1	5	4.15	Constructed Wetlands (Llandysul)	2.50	124.54	167
	SuV43/h1*	5	5.55				
	SeC14/h2	24	17.02				
	SeC14/h1	20	13.68				
	SuV35/h1	6	10.88				
	Sub-total	**60**	**51.28**		*Contingency*	**73.26**	**107**
4	SuV38/h1	6	5.46	Constructed Wetlands (Adpar)	1.25	114.81	148
	SeC12/h1	17	12.57				
	SeC12/h3	20	15.15				
	Sub-total	**43**	**33.18**		*Contingency*	**81.63**	**105**
5	SuV39/h1	7	4.98	Constructed Wetlands (Tregaron)	1.88	297.69	670
	SuV36/h2	16	20.77				
	SuV36/h1	6	8.20				
	Sub-total	**29**	**33.95**		*Contingency*	**263.74**	**641**
	Grand Total	**172**	**126.45**		**Total Contingency**	**418.63**	**853**

5.4.2 Afon Teifi Development Phasing

Table 13 presents the timeline of when the projected number of housing units per annum from the rLDP will be brought forward. The housing trajectory regularly changes and has been informed in line with possible mitigation.

Additionally, conditions may be tied to permissions to ensure habitation is concurrent with the delivery of mitigation, so planning conditions will be in place alongside mitigation. Therefore, the phasing of the creation of wetlands should be aligned with the timing of housing units brought forward. **Any occupancy date will be subject to planning permission and/or Grampian Conditions (restricting other development until terms of a Section 106 are met).**

5.4.3 Afon Tywi Category 1 Measures

As discussed in Section 3.1, the Afon Tywi is currently passing its phosphorus targets. Considering the passing status of the Afon Tywi SAC, the suggested use of available environmental headroom in combination with additional capacity to deliver nutrient neutrality, where applicable, creates confidence in this approach for the delivery of the rLDP allocations.

While detailed modelling has not yet been undertaken on the Afon Tywi, suitable wetland areas are available across the SAC (Appendix A Figure A3). These could be brought forward to support the environmental headroom approach which will be monitored to ensure that the phosphate targets are not breached and to ensure the integrity of the SAC.

Category 2 measures could also be used to remove wider Phosphate pressures (discussed further in Section 5.6.1).

As a high-level assessment, Llandovery WwTW is situated in the upper Tywi catchment and therefore a wetland situated here would mitigate all the rLDP site allocations within the Afon Tywi catchment (Table 12).

Table 12 – Afon Tywi constructed wetland opportunities

Ref	Wetland Area Available (ha)*
Llandovery_CW1	1
Llandovery_CW2	0.3
Total	**1.3**

Therefore, it is important to note that for the Afon Tywi, there is excess of opportunity to remove phosphate from the catchment to deliver nutrient neutrality for the rLDP should this be required. This emphasises the viability of sufficient potential nutrient mitigation for the Afon Tywi SAC, to maintain and even improve upon the current environmental headroom.

The TP budgeted will also be phased over many years. That is, not all of the developments will be operational at once. Therefore, there is confidence in mitigation delivery to preserve and/or enhance environmental headroom if required confirming the viability of the headroom approach for the rLDP and the Afon Tywi.

Table 13 - Timeline of projected housing units from the rLDP to be constructed annually on the Afon Teifi

Group	Site Allocation	Name	No. units	TP Nutrient Budget (Kg/yr)	Proposed Mitigation	Comment	TP Mitigation (Kg/yr removed)	Housing Trajectory (units delivered per year)									
								2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1	SuV37/h3	Land adjacent to Lleinau	10	1.03	Enhanced WwTW	Lampeter WwTW RoP Accepted new P limit of 0.5mg/l by 2025	N/A				5	5						
	SuV37/h2	Land south of Cae Coedmor	20	2.42							5	5	5	5				
		Sub-total	**30**	**3.45**		*Contingency*	**N/A**											
2	SeC13/h1	Adjacent Y Neuadd	10	4.58	Enhanced WwTW	Llanybydder WwTW RoP accepted new P limit of 2.5mg/l by 2025	N/A				2	2	2	2	2			
		Sub-total	**10**	**4.58**		*Contingency*	**N/A**											
3	SuV33/h1	Land opposite Brogeler	5	4.15	Constructed Wetlands	2.50ha Constructed Wetland @ Llandysul WwTW (Collaboration Category B1) proposed	124.54					2	2	1				
	SuV43/h1*	Blossom Inn	5	5.55							2	3						
	SeC14/h2	Land adjacent Maescader	24	17.02								6	6	6	6			
	SeC14/h1	Blossom Garage	20	13.68								5	5	5	5			
	SuV35/h1	Land adjacent Arwynfa	6	10.88							5	1						
		Sub-total	**60**	**51.28**		*Contingency*	**73.26**											
4	SuV38/h1	Maes y Bryn	6	5.46	Constructed Wetlands	1.25ha Constructed Wetland @ Adpar WwTW (Collaboration Category B1) proposed	114.81				2	2	2					
	SeC12/h1	Trem Y Ddol	17	12.57								3	4	4	4	2		
	SeC12/h3	Land rear of Dolcoed	20	15.15							4	4	4	4	4			
		Sub-total	**43**	**33.18**		*Contingency*	**81.63**											
5	SuV39/h1	Adjacent Yr Hendre	7	4.98	Constructed Wetlands	1.88ha Constructed Wetland @ Tregaron WwTW (Collaboration Category A) proposed	297.69					2	2	2	1			
	SuV36/h2	Land at Bryndulais	16	20.77							5	5	6					
	SuV36/h1	Cae Pensarn Helen	6	8.20							2	2	2					
		Sub-total	**29**	**33.95**		*Contingency*	**263.74**											
		Grand Total	**172**	**126.45**		**Total Contingency**	**418.63**											

Mitigation measure committed to by third party.

Strategic Nature Based Solution, delivered by CCC.

5.5 Avoidance Mitigation for other LDPs – In Combination Effects

5.5.1 Ceredigion and Pembrokeshire LDP Status

No neighbouring LDP proposals drain to the Afon Tywi and this has been screened out of neighbouring LDP in combination effects.

Arcadis and CCC have considered the sub-set of the Afon Teifi SAC catchment that is situated within Ceredigion and Pembrokeshire with regards to potential sites for wetland creation and therefore P mitigation. This is in relation to the impacts of planned new developments that discharge into the Afon Teifi SAC from both of these counties. Both of these counties have their own LDPs which have not yet been approved and adopted due to the changes in policy / guidance regarding nutrient neutrality. These LDPs will not be able to come forward until the LPAs have demonstrated their own nutrient mitigation for the Afon Teifi SAC.

The replacement Ceredigion LDP (LDP2) had been on pause due to COVID-19 since April 2020 on the advice of WG. This was followed by a temporary pause agreed by CeCC in October 2021 to allow for additional time for researching phosphate reduction in the Afon Teifi SAC. Further work on the issue of phosphates, potential mitigations and general nutrient management is now required to demonstrate that proposed development in the Afon Teifi catchment is phosphate neutral. Therefore, the Ceredigion LDP2 has not been included at this stage.

Similarly, the PCC LDP 2 was delayed allowing time for further evidence and data to be gathered and mitigation options explored on the issue of phosphates. The Delivery Agreement was revised in May 2023 and sets out indicative timings for the LDP Replacement Plan. Consultation is expected to commence in January 2024. The PCC LDP Review has not been included at this stage, as changes to the spatially specific policies and sites within the Deposit Plan are likely between the time of writing, and the time of publication.

5.5.2 Ceredigion and Pembrokeshire Avoidance Mitigation Development

5.5.2.1 Phosphate Reduction and Mitigation Project (PRAM Project)

In 2021, CeCC were successful in their application for Heritage Lottery Funding (HLF) in support of a Phosphate Reduction and Mitigation Project (PRAM Project) for the Afon Teifi SAC Catchment. Part of this funding has been allocated for progressing two CWs to planning. This will demonstrate the nutrient mitigation required for the lower portion of the Teifi SAC which accounts for all of the Site Allocations within PCC and some of the Site Allocations within CeCC (Namely developments associated with Cenarth, Abercych and Cilgerran). Therefore, this would provide avoidance mitigation to allow for the PCC and CeCC Site Allocations in this section of the Afon Teifi SAC to be adopted within their LDPs.

The overall objective of the PRAM project is to progress two planning applications for CWs within the Teifi Catchment. The primary objective of these wetlands is to reverse the decline in nature by improving water quality and ecology through phosphate reduction. Demonstrating nutrient neutrality is an additional benefit to support new developments in the local plans. Alternative measures such as wet woodlands were also considered to meet this objective, all in line with the recent Mitigation Measures Menu published by WG (created by NRW) which provides a list of potential options for phosphorus reduction measures using the best available evidence[38].

The PRAM project has identified two sites for constructed wetlands, deemed to have the greatest feasibility due to a combination of effective phosphate removal, fewer environmental constraints and the potential for wider environmental benefits. These are Cenarth (in CeCC) and Cilgerran (in PCC). Both wetland options

have been considered in detail, including site visits, feasibility studies and detailed modelling to calculate TP removal.

5.5.2.2 Excess Phosphate Mitigation opportunities identified by CCC

As Table 11 shows, CCC Site Allocations where a constructed wetland has been proposed can be comfortably mitigated, often securing a significant contingency whereby the **TP removed is in excess of the Nutrient Budget required to demonstrate nutrient neutrality.**

This contingency can be expressed both as a **TP removed and no. of units released**. The calculations show that an excess of **418.63** Kg/year will be removed from the catchment which equates to 853 units.

5.5.2.3 Cross catchment collaboration

On the 15th December 2022, a meeting was held between Arcadis, CCC and CeCC, wherein CeCC confirmed their interest in supporting wetland creation in their county to help offset TP impacts for the entire catchment. PCC while not present at this meeting, confirmed their interest in supporting the creation of these additional wetlands was confirmed[43]. A Statement of Common Ground (SoCG) (see Section 5.5.3) has been produced by multiple stakeholders, including CCC, PCC and CeCC, with an involvement in the future developments within the Afon Teifi and Afon Tywi SACs.

Using a combination of Category 1 catchment measures, Table 14 sets out the mitigation proposed within the Afon Teifi catchment relative to the SAs from PCC and CeCC (as per latest understanding). It includes the contingency presented in Table 11 for measures proposed by CCC where applicable (i.e., considering the need for mitigation to be placed upstream or directly downstream of development) and also includes the two wetland options identified as part of the PRAM project (noting that these would need to be further developed and eventually delivered by CeCC and PCC respectively).

In Table 14, SAs that begin with a “H” (e.g., H0501) are attached to CeCC and SAs that begin with a “HSG” are attached to PCC. In addition, the group number is linked with the mitigation proposed in Table 11 e.g., the wetland at Llandysul is in Group 3 and has potential to provide mitigation for 5 sites in CCC and 1 site in CeCC.

As illustrated by Table 14, the DCWW planned improvement to Lampeter by 2025 (Group 1) will provide the mitigation required for 5 sites within the current CeCC LDP. The wetland proposed a Llandysul (Group 3) as part of the CCC rLDP provides contingency to offset nearly all TP calculated for SA H0601 releasing an additional 107 units. This leaves 14.52 TP Kg/yr to offset to achieve Nutrient neutrality. However, as discussed in 5.5.1 the CeCC LDP2 is subject to change and therefore the nutrient budget and mitigation requirements could change. Considering this, no further action has been taken to refine the mitigation requirements, noting that further work in collaboration with CeCC could provide the additional mitigation required should the full SA be expected once the LDP2 has been updated.

Wetlands at Adpar (group 4) and Tregaron (group 5) provide sufficient contingency to offset the full nutrient budgets for associated SAs within CeCC, once again providing contingency over and above the requirement for neutrality.

The wetlands identified under PRAM, Cenarth (Group 6) and Cilgerran (Group 7) are capable of offsetting the full nutrient budgets for associated SAs within CeCC/PCC, with contingency provided. These wetlands could therefore also support future developments in relation to the Afon Teifi SAC. Furthermore, this is before additional mitigation such as tree planting, SuDS or IBZs, as discussed in 5.6.1, are considered.

[43] Statement of Common Ground (SoCG) (January 2024)

Table 14 - In Combination Nutrient Budgets vs. Proposed Mitigation within catchment

Group	SA	No. units	TP Nutrient Budget (Kg/yr)	Proposed Mitigation	Comment/ Contingency	Wetland Area (ha)	TP Mitigation (Kg/yr removed)	units released
1	H0501	12	0.73	Enhanced WwTW	Lampeter WwTW RoP accepted new P limit of 0.5mg/l by 2025	N/A	N/A	236
	H0502	20	3.11					
	H0503	9	2.17					
	H0504	90	16.53					
	H0505	105	16.18					
	Sub-total	**236**	**38.73**			*Contingency*	**N/A**	**N/A**
3	H0601	126	87.78	Constructed Wetlands (Llandysul)	Wetland at Llandysul provides a contingency of 73.26 TP Kg/yr or 107 units (see Table 11)	2.50	73.26	107
	Sub-total	**126**	**87.78**			*Contingency*	**-14.52**	**-19**
4	H0401	35	27.33	Constructed Wetlands (Adpar)	Wetland at Adpar provides a contingency of 81.63 TP Kg/yr or 105 units (see Table 11)	1.25	81.63	105
	Sub-total	**35**	**27.33**			*Contingency*	**54.30**	**70**
5	H0701	36	26.28	Constructed Wetlands (Tregaron)	Wetland at Tregaron provides a contingency of 263.74 TP Kg/yr or 641 units (See Table 11). In addition, the two WwTW serving these SAs, Tregaron and Pontrhydfendigaid accepted new P limits of 2mg/l and 1.8mg/l respectively under the RoP by 2030.	1.88	263.77	641
	H0702	38	26.67					
	H2001	44	27.64					
	H2002	19	13.35					
	M0701	20	43.47					
	Sub-total	**157**	**137.41**			*Contingency*	**126.36**	**484**
6	H1101	7	4.25	Constructed Wetlands (Cenarth)	Wetland at Cenarth (CeCC scheme under PRAM)	0.70	149.56	226
	H1102	17	11.59					
	H1103	14	9.53					
	HSG/001/LDP2/01	11	7.68					
	Sub-total	**49**	**33.06**			*Contingency*	**116.50**	**177**
7	HSG/020/LDP2/1	50	32.45	Constructed Wetlands (Cilgerran)	Wetland at Cilgerran (CeCC scheme under PRAM)	0.60	88.7	137
	Sub-total	**50**	**32.45**			*Contingency*	**56.25**	**87**
	Grand Total	**603**	**356.75**			**Total Contingency**	**338.90**	**799**

5.5.3 Statement of Common Ground

Collaboration is required between the LPAs with potential Site Allocations connected to the Afon Teifi.

To support this collaboration a SoCG has been created to agree the collaborative approach required for the delivery of CCC's rLDP across various stakeholders and local authorities, including, CeCC, PCC, and Powys County Council. The SoCG informs the inspectors of the agreed position of LPAs, NRW, and DCWW responsible for SAC catchments draining through the whole of Carmarthenshire, that is the Afon Tywi, Afon Teifi and Afonydd Cleddau SAC.

The partners are:

- Carmarthenshire County Council
- Cyngor Sir Penfro (Pembrokeshire County Council)
- Pembrokeshire Coast National Park Authority (PCNP)
- Cyngor Sir Ceredigion (Ceredigion County Council)
- Powys County Council
- Bannau Brycheiniog National Park Authority (BBNP)
- NRW
- DCWW

Although not a legal document, the SoCG clearly sets out the combined approach to addressing water quality issues being taken by the parties for the inspectors. This includes outlining the partner organisations' responsibilities and commitments regarding nutrient neutrality mitigation and HRA compliance. The SoCG provides further confidence in the successful delivery of the proposed constructed wetlands and that they will have the required effect for achieving nutrient neutrality in the Afon Teifi SAC. Ultimately, the SoCG supports the delivery of CCC's rLDP and future growth aspirations.

5.6 Avoidance Mitigation for Phosphates from Other Sources – Category 2 measures

5.6.1 Avoidance Mitigation – Category 2 measures

The new development process cannot be held accountable for achieving the wider phosphate targets for which diffuse pollution from agriculture and overflows from WwTW contribute. However, it is necessary to ensure that the delivery of mitigation measures which serve to create capacity for new development does not prevent or hinder the delivery of wider measures to achieve the phosphate targets for the SAC.

A nutrient neutrality approach has been subject to scrutiny in the High court in the case of Wyatt v Fareham Borough Council[35]. The Court accepted the principles of a nutrient neutral approach to inform decision-making under Article 6(3), paragraph 42 concludes that:

'The authorisation of an individual project which is no more than environmentally neutral is not inimical to the language and intendment of the Habitats Directive and/or the Habitats Regulations'.

However, when addressing a complaint that this might hinder the delivery of wider duties under Article 6(2), the endorsement by the Court of a neutrality approach was provided on the assumption that other steps to avoid deterioration were being taken by relevant statutory bodies. The implicit support for a neutrality approach at paragraph 42 was reached on the grounds that Mr Justice Jay had[44];

[44] Available at: https://www.bailii.org/ew/cases/EWHC/Admin/2021/1434.html [Accessed 19/01/2024]

'No doubt Natural England and other statutory bodies are taking other steps to avoid further deterioration for the purposes of article 6(2), all of which are outside the scope of this application for judicial review.'

It is therefore considered that in order to rely on a nutrient neutrality approach (through delivery of Category 1 measures) the Council will need to be satisfied that other steps are being taken to avoid deterioration for the purposes of Article 6(2). Hence the recommendation that certainty is provided by considering the inclusion within the AP of both Category 1 and Category 2 measures thus delivering a surplus of mitigation measures, thereby providing the level of 'certainty' required to conclude no adverse effects on site integrity.

Category 1 measures will be sufficient to achieve nutrient neutrality and avoid adverse effects to site integrity from the rLDP. Responsibility for securing the delivery of Category 1 measures therefore lies with the Council. The delivery of wider Category 2 measures will provide the necessary assurances that the delivery of development provided for within the rLDP will not undermine or hinder the achievement of the conservation objectives for the SAC. Delivery of wider Category 2 measures is a shared responsibility across statutory bodies. Ultimate responsibility rests with the WG but NRW Wales have specific powers associated with improving water quality and their role will be central.

Within the AP, the level of mitigation required has been identified along with the range of existing and potentially new opportunities that could deliver P reductions. This includes a wide range of existing grants and funding options and the existing and proposed strategies of organisations such as those listed in Box 4.2. Further details of potential funding sources can be found in the AP[15].

Agriculture is a major contributor to phosphate for both the Teifi and the Tywi. Category 2 measures will provide additional support to the confidence that Category 1 measures will be effective in an environment with excess P and will not undermine the achievement of the conservation objectives and corresponding duties under Article 6(1) and 6(2). They also provide opportunities for developers to implement in advance of Category 1 measures should their timeframes for occupancy require additional mitigation.

Category 2 measures potentially available to support phosphate reduction in the Teifi and Tywi catchments are described below.

5.6.1.1 Tree and Woodland Planting

The NRW Welsh Information for Nature-based Solutions (WINS)[45] has produced a dataset showing opportunities for woodland planting across Wales. This informs discussion on the best way to realise WG's ambition for new woodland creation of 2,000 hectares of new woodland per annum from 2020, rising to 4,000 hectares per annum as rapidly as possible. The dataset showed that South West Wales could provide ~6000 ha of woodland, with over half being located within Carmarthenshire.

5.6.1.2 IBZ

IBZs or Vegetated Filter Strips have been found to be effective in removing phosphorus from agricultural runoff. A study by Zreig et al 2003[46] found that filter length/width had the highest and most significant effect on P removal while inflow rate, vegetation type, and density of vegetative coverage had secondary influences. The P trapping efficiencies of the 2-, 5-, 10-, and 15-m-long filters were 32, 54, 67, and 79%, respectively. While short filters (5 m) are quite effective for removal of sediment, they are not very effective for P removal. For sediment trapping, increasing filter length beyond 15 m is not at all effective in increasing sediment removal but it is expected to further increase P removal. These findings were largely confirmed by the EA evidence base for 3D buffer strips[47] in association with the Forestry Commission. The Mitigation Menu also concludes that the nutrient removal rate of TP for riparian buffers is between 31-99% depending on the width.

[45] NRW. Welsh Information for Nature-based Solutions' (WINS)
[46] Abu-Zreig, M., Rudra, R.P., Whiteley, H.R., Lalonde, M.N. and Kaushik, N.K., 2003. Phosphorus removal in vegetated filter strips. Journal of environmental quality, 32(2), pp.613-619.
[47] Environment Agency (2020) 3D buffer strips: designed to deliver more for the environment.

There are of course other environmental benefits such as greater passive cooling and carbon sequestration associated with woodland IBZs.

Nutrient loss risk modelling and mapping in Pembrokeshire, Ceredigion and Carmarthenshire[48] provides spatial information regarding preventative and mitigative action on nutrient loss and nutrient enrichment throughout the counties. In Carmarthenshire, opportunities for buffer strips have been identified downstream of areas with high nutrient loss rates. Along the Afon Tywi, over 23,000ha of buffer strips have been identified, with 5000ha along the Afon Teifi.

Box 5.1 shows an example of buffer strip opportunities within council owned farms along the Afon Tywi and similar work could be implemented to the Afon Teifi catchments.

5.6.1.3 SuDS

Schedule 3 of the Flood and Water Management Act 2010 for Wales[49], which came into effect 7th January 2019, outlines the mandatory SuDS standards and requirements developers need to meet before gaining approval from the SuDS Approving Body (SAB). Early consideration of the potential multiple benefits and opportunities[50] will help deliver cost effective SuDS schemes with the best results. Therefore, in tandem with the NRW mitigation menu, urban SuDS schemes could provide additional nutrient removal.

There are a number of policies plans and partners that may be able to support these measures. The AP outlines these potential solutions, for example the Taclo'r Tywi project[51] run by NRW with a host of delivery partners. The project aims to make improvements to water quality and biodiversity. Working with partners, the aim is to manage all aspects of the environment in a more sustainable way, so the Tywi can continue to support agriculture, forestry, biodiversity, tourism and recreation now and in the future.

[48] Environment Systems Ltd (April 2022) Modelling and Mapping Nutrient Loss Risk in Pembrokeshire, Ceredigion and Carmarthenshire.
[49] Schedule 3 of the Flood and Water Management Act 2010.
[50] Benefits of SuDS (susdrain.org)
[51] Natural Resources Wales / Taclo'r Tywi - About the project

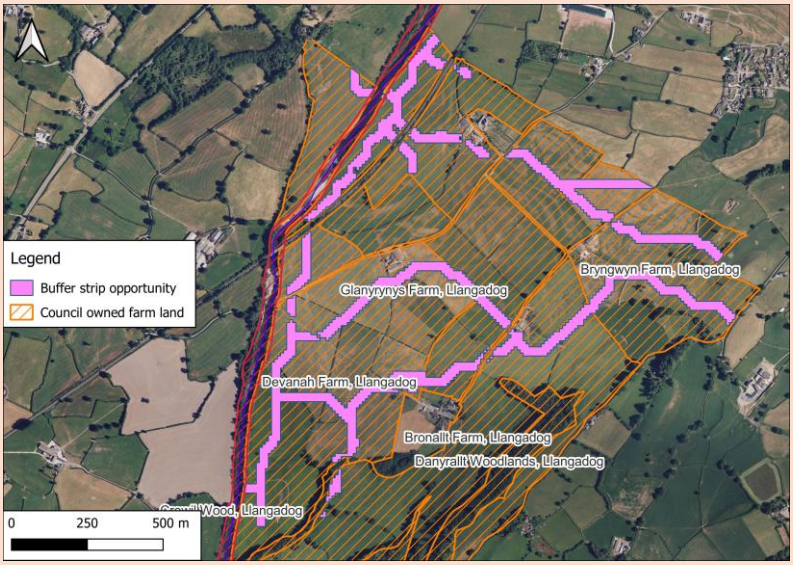
Box 5.1: Category 2 measures on Council Owned Farms – Riparian Buffer Strips.

Agriculture is the main source of nutrient enrichment within the Afon Tywi. Once mobilised from a point source, nutrients can be transported far down the catchment, leading to far-reaching downstream impacts. Pembrokeshire Coastal Forum (PCF) have undertaken modelling to analyse the risk of nutrient runoff/loss from land across Carmarthenshire, Ceredigion and Pembrokeshire as well as generate potential areas for riparian buffer strips to mitigate nutrient loss and nutrient enrichment.

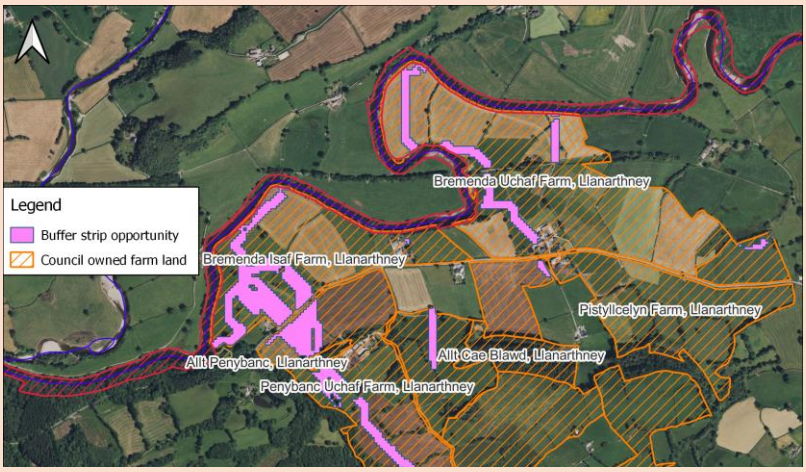
The modelling first explored the interplay between soil type and slope in determining erosion risk, which can be used as a proxy for nutrient loss. The hydrological channel network was extracted from the DTM and buffered by 10m to identify areas where buffer strips could be located alongside channels, for effective mitigation against nutrient loss. Existing wooded areas, in addition to urban areas and waterbodies, were then masked out of the buffer zones to produce the final extent of the buffer opportunities.

The figures below show the potential riparian buffer strip opportunities within council owned farms along the Afon Tywi.

Bryngwyn Farm and Devanah Farm, Llangadog = 21 ha of riparian buffer strip opportunities.



Bremenda Isaf Farm, Penybanc Uchaf Farm & Pistyllcelyn Farm, Llanarthney = 15 ha of riparian buffer strip opportunities.



5.6.2 Carmarthenshire Nutrient Management Strategy

To support the removal of wider phosphates and to deliver other environmental benefits CCC commissioned Arcadis to produce its Carmarthenshire Nutrient Management Strategy in September 2023[52]. This involved additional assessment as to the Category 2 mitigation opportunities available for nutrient management and the holistic benefits that could be attained through the application of NbS for this. Demonstrating how NbS can be utilised to address multiple targets for differing strategies as a result of their multifaceted benefits. Potential delivery partners, funding and stakeholders were also considered as part of this strategy. Example of available funding are presented in Box 5.2, additional information is available in the Strategy.

The Strategy will feed into how CCC approaches their nutrient management and will serve as important guidance for an integrated response to the challenges of delivering nutrient neutrality. The Intervention Measures Matrix produced as part of the strategy is appended to this HRA Addendum (Appendix B).

Box 5.2: Examples of Funded Organisations Working to Improve Water Quality

Natural Resources Wales:

- **Welsh Government Grant In Aid;** this funding is available to deliver measures in Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SAC) in order to move the designated species and habitats closer to 'favourable' status. In 2021, this funding was an annual Biodiversity & Ecosystem Fund and from 2022 will become a 'multiyear' fund.
- **Welsh Government Strategic Allocated Funding;** provides funding for a five-year plan for the improvement of fish and fish habitat in Wales. This fund is known to be being used in other Welsh catchments to undertake catchment measures which reduce nutrient input to watercourses.
- **European Sustainable Fisheries Funding;** this is available for annual ad-hoc bids for specific projects and includes catchment measures to reduce nutrient input to watercourses.
- **Welsh Government Water Quality Capital Fund;** this is used to fund improvements in water quality such as reducing nutrients for Water Framework Directive (WFD) targets and in 2021, £1.8m was available for such work.

Dwr Cymru / Welsh Water:

- DCWW receive funding via their customer bills through a five-year program called Asset Management Plan. This multi-million-pound funding includes improvements to sewage treatment works and storm overflows resulting in a reduced amount of phosphorus entering the watercourses. The drivers for this can include WFD and Habitats Directive (SAC) targets.
- DCWW have made available the Environment Fund which aims to provide financial support to projects that will benefit and enhance biodiversity at or near DCWW sites. DCWW are also enabling third party funded wetlands whereby effluent at DCWW sewage treatment works is directed to a wetland to garner additional polishing for P removal. Note – this is currently in England only.

[52] Carmarthenshire Nutrient Management Strategy (April 2024)

6 Implementation and Delivery

This section sets out the steps required to implement and deliver the mitigation measures outlined in this document such that development within the rLDP can commence alongside the necessary reductions in phosphorus. Full details are provided in the AP.

6.1 The Role of Nutrient Management Boards and Nutrient Management Plans

NRW and WG provide a clear direction on the role and function of the Nutrient Management Board (NMBs), as well as work together to provide sufficient levels of funding for 2023-24 and 2024-25 and then to explore future funding options.

The NMB is responsible for identifying and delivering actions that achieve the phosphorus favourable conservation target of a river that is deemed a SAC, whilst also meeting socio economic needs of its surrounding communities. Three NMBs have been formed in West Wales; the Afon Tywi NMB, the Afon Cleddau NMB and the Afon Teifi NMB.

They are the responsible bodies for ensuring the delivery of the Conservation Objectives for the SACs and will provide oversight and direction to all involved in delivering the Nutrient Management Plan (NMP).

To date, the WG have made available almost £1.5 million of funding to enable the NMBs to produce Nutrient Management Plans. These plans, and their implementation, provide the mechanism by which NMBs progress action to improve water quality in order to restore and conserve favourable condition status on SAC rivers, whilst also allowing development to continue within these catchments without increasing the phosphorus loading. This will address the pressing need to enable the construction of more affordable housing now, while at the same time, making progress on improving river health and achieving favourable conservation status.

The NMP identifies sources of nutrients that are entering the river and steps that can be taken to manage them.

The NMP comprises of three parts:

- evidence base (finalised)
- options appraisal (finalised)
- action plan (first iteration)

These NMP's will also consolidate the efforts being undertaken within the SACs as there is already significant work underway throughout the Teifi catchment to improve water quality. For example, in November 2023, NRW launched a new multi-year initiative - the 'Teifi Demonstrator Catchment' project[53]. This is a cross-sectoral collaboration project supported by WG and aimed at improving water management in the Teifi catchment. The launch of the project was marked by a stakeholder engagement event convened by NRW Chair Sir David Henshaw and attended by key partners including the Rivers Trusts, Dŵr Cymru Welsh Water, the Farming Unions and Local Authorities.

It will complement and support the good work already happening in the catchment, building on existing ambitious river restoration projects like our Four Rivers for LIFE project[54] and the work of the Teifi Nutrient Management Board.

This project is about thinking differently and using innovative solutions to make things happen, with focus on how value and additionality can be demonstrated. It is hoped that the work in the Teifi catchment will be used

[53] Natural Resources Wales / Tackling the Teifi – landowners, industries and regulators join forces for pilot 'demonstrator catchment' project
[54] Four Rivers for LIFE project

to develop a ‘best practice’ model which can subsequently be replicated across all of Wales’ catchments. This project will form part of the wider holistic approach being taken to improve water quality and riverine ecology.

Nutrient Management Plans have been commissioned for all three SACs within Carmarthenshire and will be delivered in 2024.

6.2 Developer Contribution Scheme (DCS)

6.2.1 What is a DCS?

A potential mechanism that could help to deliver the mitigation required to facilitate the rLDP is a Developer Contribution Scheme (DCS). A DCS would be applicable to all residential development predicted to lead to a net increase in phosphorus load discharged to either the Afon Teifi or Afon Tywi SACs where nutrient neutrality is required.

A developer contribution is made by a landowner or developer to ensure that, where planning permission is granted for new development, any impact on the environment is in accordance with appropriate regulatory obligation and the infrastructure necessary to support the development is provided. By securing these contributions, planning authorities can help to improve the quality and sustainability of individual development schemes and their acceptability to local communities.

A DCS would provide a strategic approach to mitigation that facilitates the delivery of new development within the catchments. Under a DCS, phosphorus mitigation costs are matched proportionally to each development based on the additional phosphorus generated. A DCS would need to be developed alongside rLDP adoption with supplementary guidance if appropriate.

It is recommended that a DCS is prepared with key stakeholders, as one of the measures within the Afon Teifi SAC, with this approach to be confirmed on the Afon Tywi should nutrient neutrality be required.

It should be delivered alongside other wider measures within the remit of the recently appointed NMB. It is recommended that any DCS is prepared as a “living” document, i.e., one that evolves iteratively as the evidence base changes or if the costs associated with mitigation measures changes.

Further to the above, it is important to recognise that a DCS is not the only means of securing funding for mitigation. As set out in the Intervention Measures Matrix in Appendix B, there are multiple funding streams available for phosphorus mitigation within the catchments, particularly when considering the multiple benefits afforded by certain nature-based solutions, such as constructed wetlands. Here, the DCS must again be flexible to ensure that as funding is secured by other means, the costs apportioned to development are appropriately adjusted.

Finally, the DCS should be not seen as the only option available to developers when bringing sites forward through the rLDP. When making an application, a developer could ask the authority to assess their application separately from the DCS. The council would therefore remain open to considering any bespoke mitigation proposals brought forward on a case-by-case basis. Consequently, the DCS would not be publicly consulted on, instead it would represent an agreed way forward, but not the only option available to developers in securing the phosphorus mitigation required for their development.

An alternative option to enable developers to make a financial contribution to P reduction is through setting up a phosphate credit scheme. Where a separate offsite council led P mitigation scheme is constructed, developers can make a financial contribution by purchasing credits from the associated council scheme to offset any additional P loading from their development. Such phosphate credit schemes have been utilised in

Somerset and also in Herefordshire where the Council priced credits at £14,000 (+VAT) per kilogram of offset required per year to meet neutrality in the River Lugg SAC[55].

Details of calculations to inform the contributions for each development are presented in the AP.

6.2.2 DCS Roles and Responsibilities

The responsibility for the DCS would lie with the LPA. NRW would be consulted in preparing the DCS in their role as an appropriate nature conservation body advising on Habitats Regulations. Advice from NRW should be sought on specific technical aspects of the DCS e.g., developing guidance around calculating phosphorus savings from mitigation measures.

6.2.3 DCS Policy Drivers

The 2nd Deposit rLDP (2018-2033) went to public consultation in February 2023. Strategic policy "SP9: Infrastructure" will be a key policy driver. This overarching strategic policy supports the principals of planning obligations in considering the need for development proposals to demonstrate that there is sufficient capacity in the existing infrastructure to deliver and support the proposed development. Where this cannot be achieved, the proposals will need to demonstrate that suitable arrangements are in place to provide the infrastructure capacity considered necessary to deliver and support the development.

Within this policy, utility services are given specific mention, as well as biodiversity and environmental protection. Under these elements, phosphorus mitigation could be considered and a DCS could provide the mechanism for developers to assess their level of contribution needed towards specific mitigation measures.

Strategic Policy "SP12: Placemaking, Sustainability Places" also offers a useful mechanism to ensure developments contribute positively to nutrient management within the Teifi and Tywi SACs. Within this policy, protection of or enhancement of biodiversity is required. This would necessitate developments to consider the additional phosphorus generated by their development and deliver measures to mitigate accordingly. Furthermore, this would ensure developers consider on-site mitigation measures such as SuDS as standard.

On SuDS, further understanding is required as to their likely contribution to phosphorus reduction. This should be considered in line with new guidance (see Section 7.1 within the Nutrient Neutrality AP[15]) and in the event that more certainty is placed on the potential for SuDS to remove phosphorus and this is accepted by NRW, a developer could put forward plans for on-site mitigation that reduces their requirement for off-site mitigation. As discussed previously, any DCS put forward must be flexible to these proposals such that costs are proportional and offer developers options to bring forward their own mitigation to safeguard the natural environment.

Strategic Policy "CCH4: Water Quality and Protection of Water Resources" also places requirement on developments that are in line with the AP for phosphorus mitigation.

In this regard, the policy mechanisms to ensure delivery of the appropriate phosphorus mitigation required already exist and are clear in their remit. This HRA confirms this and planning obligations will then be actionable. A DCS would then act as a mechanism by which developers would bring forward their sites whilst contributing towards the necessary mitigation.

6.2.4 DCS Planning Obligations

Developer contributions are normally secured through a "planning obligation". This is a legal commitment by the developer to secure a contribution (in cash or in kind) to address community, infrastructure or environmental improvement needs associated with development. It may be a bilateral agreement between the LPA and the developer, or simply a unilateral undertaking by the developer to provide the same. These are a

[55] Herefordshire Council (2023) Phosphate Credit FAQs (herefordshire.gov.uk) [Accessed 19/01/2024]

proper and recognised part of the planning system and are normally entered into under Section 106 of the Town and Country Planning Act 1990 (as amended).

Planning obligations can be used to secure benefits on the development site itself or on other suitable sites close to the proposed development (as long as they are directly related to the development). Developers may be requested to make a payment of money to the relevant LPA, to be spent on agreed benefits or for the maintenance of them.

Historically, planning obligations have tended to be used to secure infrastructure improvements only from a limited number of sites. However, in respect of the impacts on the Afon Tywi and Afon Teifi, the DCS provides a strategic approach to offsetting the negative effects of development and includes a mechanism for gaining contributions from all new development which connects to mains drainage, and non-mains development where it is considered to be appropriate.

Developer contributions can reasonably be secured in respect of:

- Actual implementation of measures (i.e., costs to actually do the work);
- Staff resource to oversee and co-ordinate implementation;
- Compensation to landowners where measures involve a change of use;
- The long-term (in perpetuity) maintenance and management of mitigation; and
- Monitoring the effectiveness of mitigation measures.

In principle, planning obligations could be used to fund improvements of WwTWs, particularly if development came forward before planned upgrades to WwTWs. Further discussions are needed with the statutory water undertaker, DCWW and NRW as regulator before any commitment was made to this effect.

Regulation 123 of the Community Infrastructure Levy (CIL) Regulation prevents the imposition of planning obligations for “infrastructure”, if five or more separate planning obligations which provide for the funding or provision of that type of infrastructure have been entered into on or after 6th April 2010. However, the measures to be funded through the DCS are “environmental protection measures” and fall outside the definition of infrastructure (S 216 (1) Planning Act 2008) so are not subject to pooling restrictions.

6.2.5 DCS Monitoring and Phasing

It will be necessary to manage and monitor phosphorus budgets during the course of the adopted LDP to confirm that there is sufficient mitigation. For many reasons additional phosphorus budgeting could be required e.g., permissions are allocated a budget, but permissions are not commenced/completed, or housing delivery exceeds LDP delivery schedule. Monitoring will give advance notice if there is a need to release additional mitigation measures. It might be appropriate to manage mitigation in development ‘windows’ matching the LDP delivery schedule, this is a matter to be determined in preparing a DCS.

No new developments will be granted permission unless the required mitigation measures have been demonstrated via a project level HRA undertaken to the appropriate level.

There are a range of options in addition to NbS that could provide short term mitigation in advance of longer-term solutions, if required see the Intervention Measures Matrix in Appendix B.

Planning obligation funding will be pooled to deliver any of the mitigations within the DCS range of measures. The LPA will allocate funding to the measures in order to ensure sites can be delivered in phase with the occupation of the proposals.

6.1 Grampian Conditions

Grampian Conditions provide a means by which mitigation can be secured. A Grampian Condition prohibits development authorised by the planning permission or other aspects linked to the planning permission (in the case of residential use, occupation of the development) until a specified action has been taken (in this case

the provision of an avoidance and mitigation package). Such conditions should not be used where there are no prospects at all of the action in question being performed within the time-limit imposed by the permission, which is not envisaged in this case.

6.2 Additional Sources of Funding

When dealing with wider diffuse phosphate inputs, there are a number of other funding mechanisms available. The Intervention Measures Matrix in Appendix B identifies potential sources of funding available for each intervention. The key funding streams that should be considered are set out below:

6.2.1 Welsh Government

- WG are providing funding to support the work of nutrient management boards, with up to £415k being made available in 2022-23 and additional provision in 2023-24 and 2024-25; in addition to £40m of funding over the next three years to address water quality problems across Wales.
- WG provide small grants for landscape and pollinators supporting the rural economy and transition to the Sustainable Farming Scheme
- WG continues to provide multi million pounds of funding to farmers in Wales to deliver positive environmental outcomes, including reducing nutrients entering watercourses. Funding is also provided to Farming Connect who provide advice and guidance to farmers on reducing nutrient run-off.
- WG fund the NRW Dairy Project across Wales which employs officers to visits dairy farms to give advice and guidance on ways of minimising agricultural pollution.
- WG provide funding for a Nature Network Fund and this has provided NRW resource in other SAC catchments to carry out investigations and visits to reduce nutrient inputs into the watercourses

6.2.2 NRW and the Welsh Government

- Welsh Government Grant In Aid; this funding is available to deliver measures in SSSI and SAC in order to move the designated species and habitats closer to 'favourable' status. In 2021, this funding was an annual Biodiversity & Ecosystem Fund and from 2022 will become a 'multiyear' fund.
- NRW offer grants for planting trees and woodland[56]
- Welsh Government Strategic Allocated Funding; provides funding for a five-year plan for the improvement of fish and fish habitat in Wales. This fund is known to be being used in other Welsh catchments to undertake catchment measures which reduce nutrient input to watercourses.
- European Sustainable Fisheries Funding; this is available for annual ad-hoc bids for specific projects and includes catchment measures to reduce nutrient input to watercourses.
- Welsh Government Water Quality Capital Fund; this is used to fund improvements in water quality such as reducing nutrients for WFD targets and in 2021, £1.8m was available for such work.

6.2.3 Dwr Cymru / Welsh Water

- In July 2022, DCWW announced plans to improve their WwTWs across Wales in line with their Phosphorus Permitting Programming, declaring a spend of £100m on improving river water quality, £60m of which will be for removing phosphorus from WwTW on SAC rivers such as the Teifi (Lampeter and Llanybydder).
- DCWW receive funding via their customer bills through a five-year program called an Asset Management Plan (AMP). This multi-million-pound funding includes improvements to sewage treatment works and storm

[56] Natural Resources Wales / Grants for planting trees and creating woodlands

overflows resulting in a reduced amount of phosphorus entering the watercourses. The drivers for this can include WFD and Habitats Directive (SAC) targets.

- DCWW have made available the Environment Fund which aims to provide financial support to projects that will benefit and enhance biodiversity at or near DCWW sites. DCWW are also enabling third party funded wetlands whereby effluent at DCWW sewage treatment works is directed to a wetland to garner additional polishing for P removal. Note – this is currently in England only.

6.2.4 Ofwat PR24

- The 2024 Price Review (PR24) is in the process of being created by Ofwat, with their final decisions being announced in December 2024[57]. This will set the levels of service and bills from water and sewerage companies for 2025 to 2030.
- Some of the key themes that Ofwat aims to address in the PR24 include both an increased focus on the long-term impacts and to deliver greater environmental and social value. Ofwat emphasised the use of NbS in accounting for these aims in addition to how they can help the Welsh and UK governments to achieve net zero emissions by 2050.
- For instance, they highlight funding services that are the 'best whole life' solution that considers the long-term beyond the 2020-2025 period, rather than funding the cheapest option.
- Ofwat also highlighted the opportunity to gain funding outside of the Price Review where reputational pressures are strong and where improvements do not require funding beyond that provided by DCWW base cost allowance.
- Ofwat are keen to develop the previous PR19 approach for funding capital maintenance and maintaining asset health at PR24. For the PR19, Resilience was a key theme and £13 billion of funding was provided by Ofwat in this area for companies to maintain base services and for enhancements where they were well evidenced. Considering the NbS approaches proposed in the AP and their potential long-term benefits, the PR24 provides the opportunity to gain significant additional funding for the Category 2 measures to further support P reduction in the wider catchment.

It is recommended that the NMB explores these additional sources of funding at an early stage and looks to begin applications for funding as more detailed plans emerge for the mitigation opportunities outlined in this report.

6.3 Managing and Monitoring

Effective mitigation and compliance with the Habs Regs can be ensured by the DCS through the following ways:

- Relevant experts and officers ensuring that there is implementation of sufficient mitigation to deliver the reductions required for the LDP;
- Ongoing monitoring of measures to best assess the actual reductions achieved upon implementation; and
- Monitoring of the SACs to ensure that in-combination effects from other LDPs and/or diffuse pollution sources are not exceeding targets.

This can be driven by the DCS and the Nutrient Management Plans developed between the relevant stakeholders by the NMB to ensure the long-term health of the riverine SACs in Carmarthenshire.

6.4 Pathway to Achieve Targets

[57] Ofwat (2021) PR24 and beyond: Creating tomorrow, Together (May 2021)

There are various mechanisms for implementing the identified phosphorus reduction opportunities ranging from:

- Securing funding through DCS and other opportunities as discussed within this report and the AP;
- Providing advice on funding sources, best practice, and effective solutions which is provided within the Carmarthenshire Nutrient Management Strategy[52];
- Promoting co-delivery mechanisms to maximise wider opportunities and benefits through collaboration and building stakeholder trust and confidence which will be achieved via the Nutrient Management Boards;
- Exercising regulatory tools that are within the power of OFWAT, NRW, the LPAs and the WG; and
- Managing and monitoring phasing and success

Table 15 below outlines indicative milestones in line with current Arcadis understanding. It is recommended that this be reviewed with the council at a workshop to populate and confirm these milestones and outline means of ensuring they are kept to.

Table 15 - Indicative Milestones

Milestone	Commentary	Completion Date
Action Plan Publication	Publish the AP allowing stakeholders to understand strategic mitigation planned in line with the rLDP. The AP will provide detailed information around delivery, costs, monitoring & maintenance allowing the council to progress strategic measures.	Mar 2024
Review housing trajectory	The next review of the housing trajectory for CCC's rLDP is estimated to be in June 2024. This may move delivery of development further into the future, which could shift the required dates for mitigation. This should be reviewed and accounted for in the AP to ensure delivery of mitigation focusses on releasing developments due soonest.	Est. Jun 2024
Consider DCS impacts	Once housing trajectory is confirmed, it will be possible to assign a cost to each mitigation measure per Kg / year of TP removed, allowing CCC to estimate the value of nutrient credits should this be the chosen funding approach.	Jul 2024
Lampeter and Llanybydder upgrades	Upgrades to Lampeter and Llanybydder WwTW will be effective from 31st December 2025, allowing development for SAs connecting to these works.	Dec 2025
1st development window	Upgrades at Lampeter and Llanybydder will allow the development/occupation of 40 units associated with 3 SAs within the rLDP.	Jan 2026 - 2030
Delivery of strategic wetlands	Based on the current housing trajectory (TBC in June 2024), strategic wetlands at three locations will need to be delivered by end of 2026 to allow for remaining development in the CCC rLDP.	Dec 2026
2nd Development Window	The remaining 132 units associated with 11 SA within the rLDP can be developed / occupied.	Dec 2026 - 2031

7 Overall Conclusion

This Addendum sets out to address the new NRW policies with regards to phosphorus standards and associated planning advice.

Any SARs relating to phosphate impacts upon water quality with regards to phosphorus were explored in this assessment. All other SARs not relating to water quality with regards to phosphate levels in the rLDP were screened out. These are discussed in HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033. This report is to be used in conjunction with the HRA Addendum Report: Deposit Revised Local Development Plan 2018–2033.

The changes to the Site Allocation screening process and the changes made to policy CCH4 were examined, in order to demonstrate that all amendments which have occurred since the First Deposit rLDP are considered in terms of their implications upon the HRA process. The screening of the nine SACs within the catchment highlighted that the proposed Site Allocations had a potential negative impact pathway upon the Afon Teifi and Afon Tywi only. The total Site Allocations with the potential to release TP into the catchments have been reduced to 21 sites. The Afon Tywi now has 7 Site Allocations and the Afon Teifi now has 14 Site Allocations.

The changes made to policy CCH4, previously known as policy CCH3, has sufficiently strengthened the policy wording with regards to the need to demonstrate no adverse effect on SACs with regards to Phosphorus and the need to agree mitigation on a case-by-case basis between CCC and NRW.

Nutrient budgeting of the revised Site Allocations (using the revised P limit of 5 mg/l, or lower, where appropriate) within the CCC rLDP concluded that there was no potential for the rLDP to have an adverse effect on the integrity of the Afon Tywi either alone or in-combination with other plans or projects (as none of the neighbouring LDPs, CeCC and Pembrokeshire, drain into the Tywi.

This is due to the SAC not currently failing against its phosphate compliance targets and the additional amount of TP entering the SAC from the additional developments failing to exceed the current target. In fact, only a 0.35% increase in TP is estimated to be contributed by new rLDP developments. Therefore, an environmental headroom approach to development can be undertaken. However, as the greatest source of P in the Tywi is from agricultural sources recommendations have been provided to monitor environmental headroom and apply a nutrient neutrality approach where needed. It has also been demonstrated that there is sufficient suitable land available to deliver mitigation that would implement nutrient neutrality in the Tywi if required.

Nutrient budgeting assessed the possibility for the CCC rLDP to have a negative impact upon the Afon Teifi alone and in combination with other plans (namely CeCC and Pembrokeshire's LDPs).

Wetland creation as a Category 1 measure was explored as a viable avoidance measure to offset the potential P added into the catchment by the proposed CCC rLDP developments. When considering the potential suitable land available within Carmarthenshire there is more than sufficient land identified to be used for nutrient mitigation using constructed wetlands to offset the additional P discharged from the developments.

Table 16 summarises the information in Table 13 which demonstrates that there is excess mitigation available in suitable locations and with implementable phasing to deliver nutrient neutrality in the Teifi.

Table 16 - Summary of Category 1 Measures in support of CCC rLDP

Group	# SAs covered	Unit No.	TP Nutrient Budget (Kg/yr)	Proposed Mitigation	TP Mitigation (Kg/yr removed)	TP Contingency (Kg/yr excess removed)
1	2	30	3.45	Enhanced WwTW (Lampeter)	N/A	N/A
2	1	10	4.58	Enhanced WwTW (Llanybydder)	N/A	N/A
3	5	60	51.28	Constructed Wetland (Llandysul)	124.54	73.26
4	3	43	33.18	Constructed Wetland (Adpar)	114.81	81.63
5	3	29	33.95	Constructed Wetland (Tregaron)	297.69	263.74
Total	*14*	*172*	*126.45*	*-*	*537.04*	*410.59*

Additional phasing of development increases the confidence in delivery of these measures, along with the evolution of the Carmarthenshire Nutrient Neutrality AP.

There is the potential for wider in-combination effects, to the Teifi only, from other LDPs in the catchment. However, these LDPs will be required to demonstrate that they have no adverse effect on the integrity of the Teifi via their own HRAs prior to being adopted. To that end, work has been undertaken by Arcadis to demonstrate that there is potential land available across these counties combined with the over delivery of TP removal by the CCC opportunities to ensures that should their sites come forward that there would be no significant effect on the integrity of the Teifi SAC (demonstrated in Table 14).

A SoCG has been created for stakeholders in relation to the water quality with regards to phosphorus of the Afon Teifi SAC**,** which outlines a clear approach as to how these stakeholders will address water quality through nutrient mitigation and their individual roles and responsibilities.

There are also a range of Category 2 measures that can be used to supplement Category 1 measures, provide advance mitigation prior to Category 1 implementation, if required, remove wider phosphorus from diffuse sources to increase environmental headroom, and to provide multifunctional benefits to the overall health of the SACs. Table 17 presents the type and quanta of Category 2 measures available to support the rLDP.

Table 17 - Summary of Category 2 measures available in support of CCC rLDP

Category 2 Measure	Tywi	Teifi	Potential Removal Rates (%)	Comment
Tree & Woodland Planting	Approx. 30,000ha in CCC		11-95%	Can include forestry buffers or wet woodlands each depending on design with excellent capacity for nutrient removal.
IBZs	23,000ha	5,000ha	31-99%	Can include riparian buffers with excellent potential for nutrient removal, several areas of council owned land within Tywi present opportunities
SuDS	14 SAs	7 SAs	20-99%	Should be implemented at each SA meaning every application on a case-by-case basis will bring forward SuDS with some potential to remove Phosphorus.

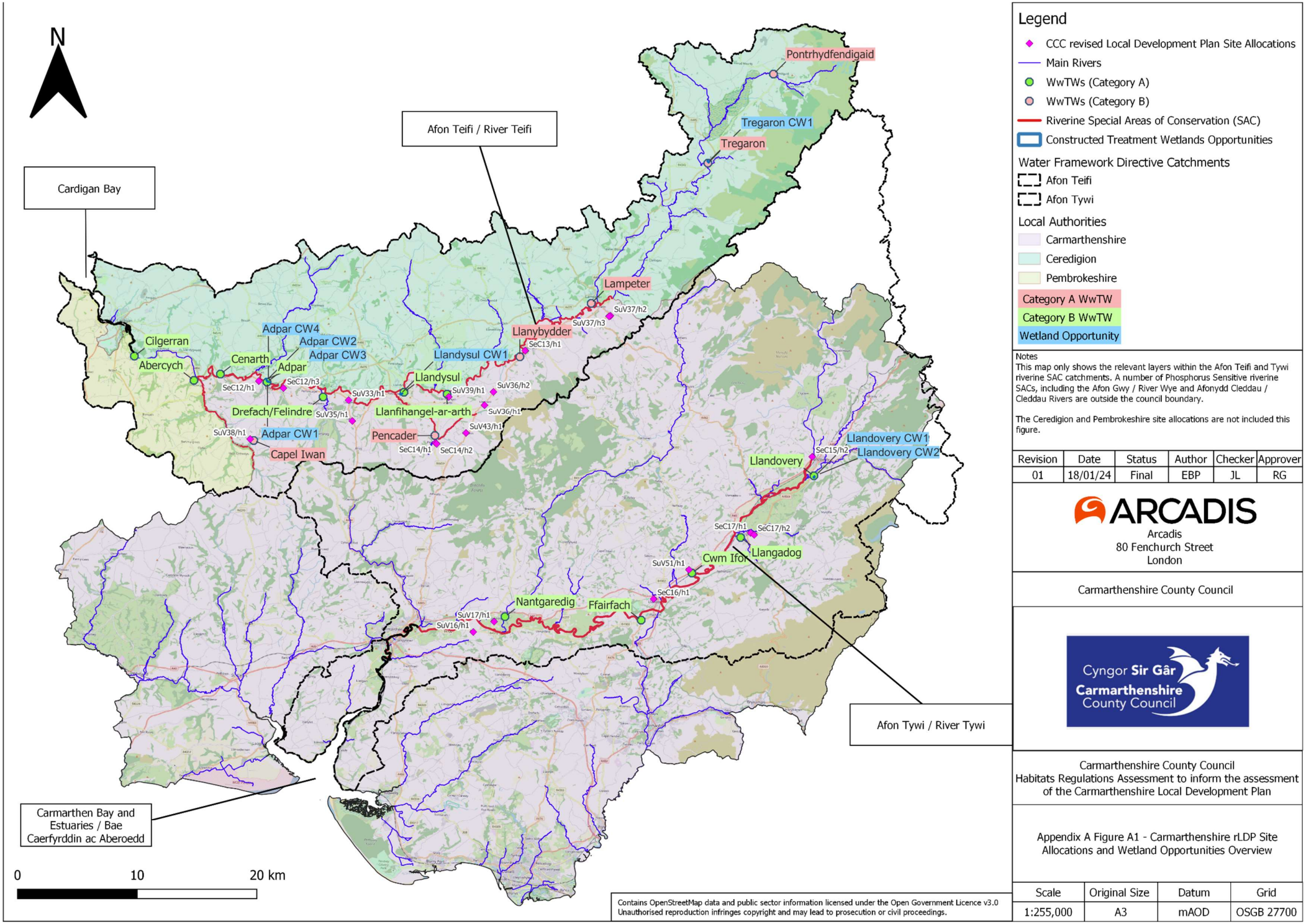
The implementation of these Category 1 measures will be funded via DCS and other P removal will be supported by the funding and roles of the regulatory authorities. Mitigation will be phased with development

and monitored in terms of their implementation and efficiency via the Teifi and Tywi NMBs and via NMPs to be produced in 2024. The AP provides further evidence as to the feasibility of these mitigations.

In respect of the potential effects from discharge of wastewater on the Afon Tywi and Afon Teifi SACs, following production of information for Appropriate Assessment, and taking account of the changes to policy CCH4, changes to Site Allocations, and the total availability of land for wetland construction in the wider catchment, it can be concluded that the CCC rLDP will have no adverse effect on the integrity of either the Teifi or the Tywi SAC either alone or in combination with any projects and/or plans. In fact, there is potential for improvement of the current P status.

Appendix A

Afon Teifi SAC and Afon Tywi SAC opportunities overview



Legend

- CCC revised Local Development Plan Site Allocations
- Main Rivers
- WwTWs (Category A)
- WwTWs (Category B)
- Riverine Special Areas of Conservation (SAC)
- Constructed Treatment Wetlands Opportunities

Water Framework Directive Catchments

- Afon Teifi
- Afon Tywi

Local Authorities

- Carmarthenshire
- Ceredigion
- Pembrokeshire

- Category A WwTW
- Category B WwTW
- Wetland Opportunity

Notes
This map only shows the relevant layers within the Afon Teifi and Tywi riverine SAC catchments. A number of Phosphorus Sensitive riverine SACs, including the Afon Gwy / River Wye and Afonydd Cleddau / Cleddau Rivers are outside the council boundary.

The Ceredigion and Pembrokeshire site allocations are not included this figure.

Revision	Date	Status	Author	Checker	Approver
01	18/01/24	Final	EBP	JL	RG

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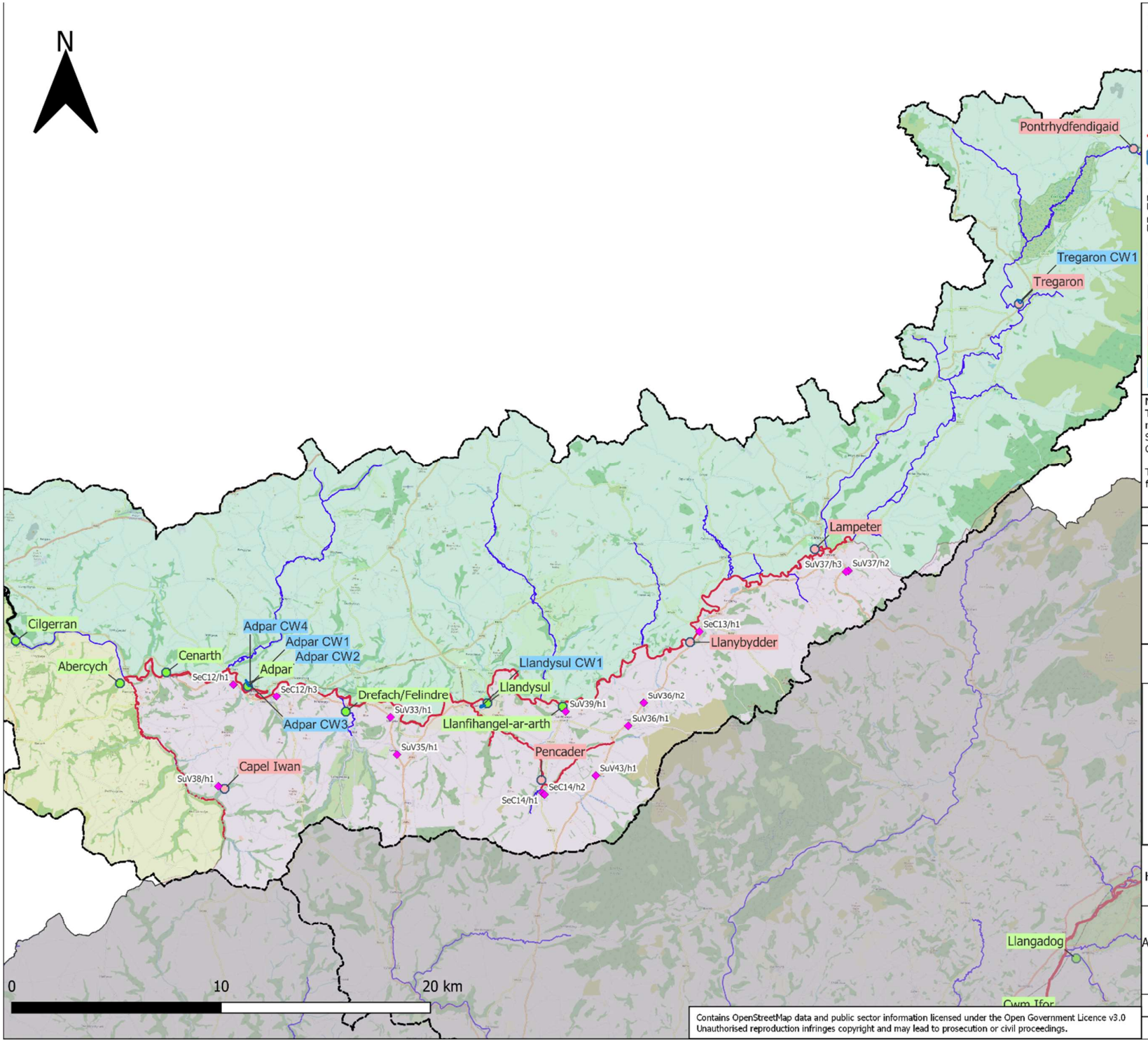
Appendix A Figure A1 - Carmarthenshire rLDP Site Allocations and Wetland Opportunities Overview

Scale	Original Size	Datum	Grid
1:255,000	A3	mAOD	OSGB 27700



Legend

- CCC revised Local Development Plan Site Allocations
- Main Rivers
- WwTWs (Category A)
- WwTWs (Category B)
- Riverine Special Areas of Conservation (SAC)
- Constructed Treatment Wetlands Opportunities

Water Framework Directive Catchments

- Afon Teifi
- Afon Tywi

Local Authorities

- Carmarthenshire
- Ceredigion
- Pembrokeshire

- Category A WwTW
- Category B WwTW
- Wetland Opportunity

Notes

This map only shows the relevant layers within the Afon Teifi and Tywi riverine SAC catchments. A number of Phosphorus Sensitive riverine SACs, including the Afon Gwy / River Wye and Afonydd Cleddau / Cleddau Rivers are outside the council boundary.

The Ceredigion and Pembrokeshire site allocations are not shown in this figure

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01	18/01/24	Final	EBP	JL	RG

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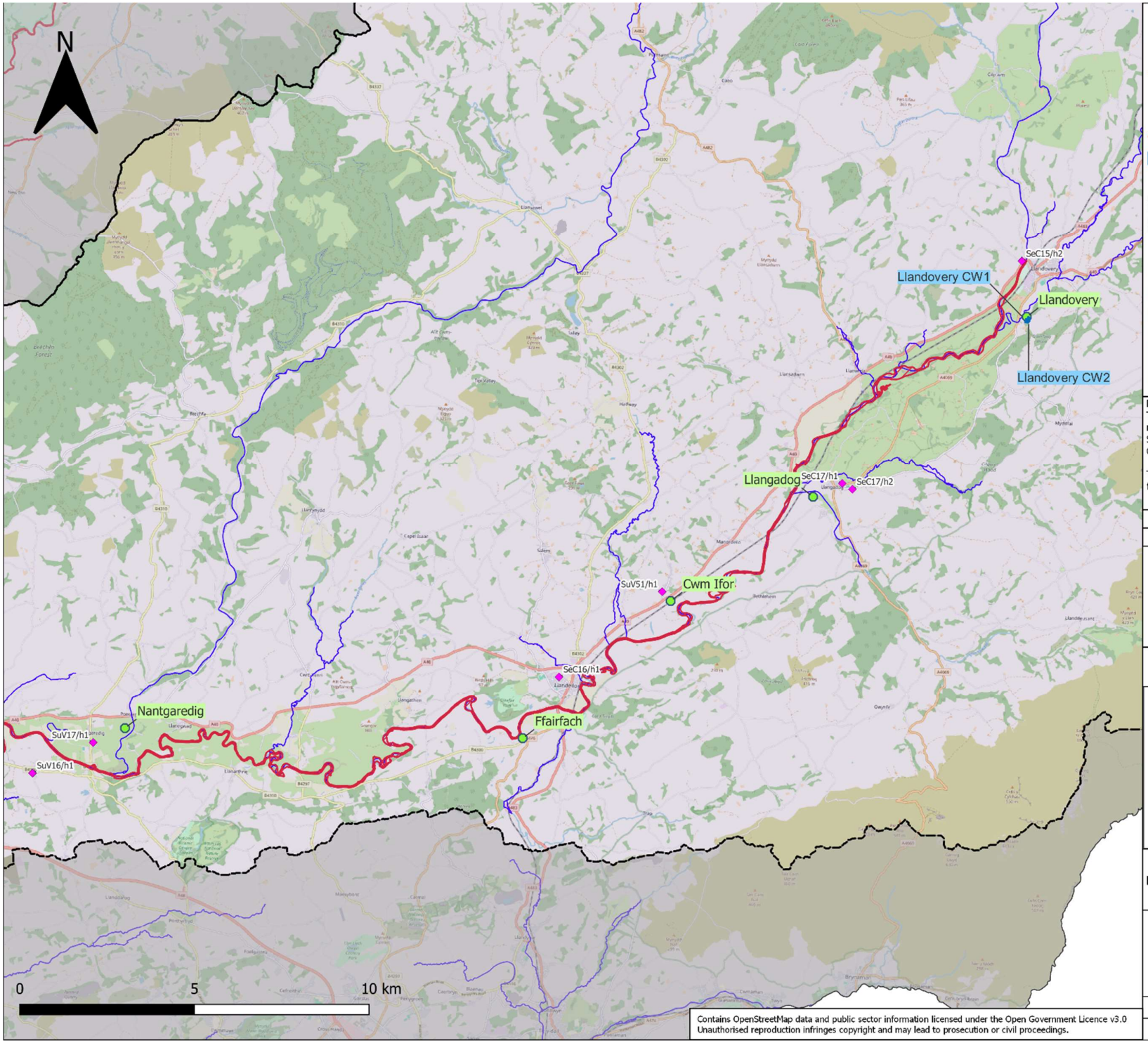
Appendix A Figure A2 - Afon Teifi Carmarthenshire rLDP Site Allocations and Wetland Opportunities Overview

Scale	Original Size	Datum	Grid
1:160,000	A3	mAOD	OSGB 27700



Legend

- CCC revised Local Development Plan Site Allocations
- Main Rivers
- WwTWs (Category A)
- WwTWs (Category B)
- Riverine Special Areas of Conservation (SAC)
- Constructed Treatment Wetlands Opportunities

Water Framework Directive Catchments

- Afon Teifi
- Afon Tywi

Local Authorities

- Carmarthenshire
- Ceredigion
- Pembrokeshire

- Category A WwTW
- Category B WwTW
- Wetland Opportunity

Notes

This map only shows the relevant layers within the Afon Teifi and Tywi riverine SAC catchments. A number of Phosphorus Sensitive riverine SACs, including the Afon Gwy / River Wye and Afonydd Cleddau / Cleddau Rivers are outside the council boundary.

The Ceredigion and Pembrokeshire site allocations are not shown in this figure .

Revision	Date	Status	Author	Checker	Approver
01	18/01/24	Final	EBP	JL	RG

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Appendix A Figure A3 - Afon Tywi Carmarthenshire rLDP Site Allocations and Wetland Opportunities Overview

Scale	Original Size	Datum	Grid
1:100,000	A3	mAOD	OSGB 27700

Appendix B

Interventions Matrix

Table B-18 - Intervention Measures Matrix

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Reduction of Agricultural Phosphorus at source	Category 2	This solution focusses on changing farming practices. **Advantages:** Removes P at source, thus reducing pressure on traditional WwTW and nature-based solutions. Increases sustainability of soil. Associated pre-treated sludge biosolid spreading by DCWW as a single accredited stakeholder. **Disadvantages:** Multiple stakeholders required to change long standing practices. Difficult to manage / monitor. Legacy P requires consideration i.e., 20years of continued P export needs to be considered in the land use change. **Delivery Partners:** Landowners, WG, The Council, NRW, NFU Cymru, DCWW, Env. NGOs	Increased biodiversity from a reduction in nutrient enrichment and in soil Aesthetic value Carbon sequestration	**Low**	**Medium**	**High**	Dairy Project Wales Land Management Forum Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Farming Source Control	Category 2	Farm improvement works to prevent Phosphorus from entering watercourses, which can include fencing. **Advantages:** A simple scheme that increases farm value and there is already an existing grant scheme, which can last a long time (50+ years) **Disadvantages:** Multiple stakeholders which may create long term management difficulties and requires seasonal vegetation management. **Delivery Partners:** DCWW, NRW, NFU Cymru, Landowners/land managers, The Council, WG: WG Spending Commitments, Basic Payment Scheme, SFS, Glastir Advanced, Commons and Organic contracts scheme, National Forest for Wales, Food accreditation scheme, Farm Business Grant Scheme post 2024	Increased biodiversity in watercourse habitats from a reduction in nutrient enrichment and in soil Aesthetic value	**High**	**Medium**	**High**	Dairy Project Wales Land Management Forum Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Surface Water Separation	Category 1 & Category 2	This solution focuses on separating wastewater flows from new and existing developments to capture stormwater. **Advantages:** Already normal practice for new developments, leads to reduced CSO discharges into the watercourse and reduced sewage treatment costs. Similar compensatory surface water removal approach already in place for Carmarthen Bay and Estuaries European Marine site. **Disadvantages:** Costly to retrofit in urban areas, limited reduction in Phosphorus unless effective SuDS are incorporated, long term effectiveness depends on operating practices at WwTWs. **Delivery Partners:** Developers, The Council, DCWW, Wales Green Infrastructure Forum	Increased Capacity and efficiencies at WwTW	**High**	**Low**	**Low**	Wales Land Management Forum Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Enhanced Wastewater Treatment Works	Category 1	Increasing the ability of WwTWs to remove Phosphate. **Advantages:** Increase environmental headroom for new development, clear delivery mechanisms within DCWW. Opportunity to explore developer contributions. **Disadvantages**: Requires long term investment and long lead times. May transfer issues to biosolid spreading which would require extra controls. **Delivery Partners:** DCWW: Existing and new WWTW funding, Spending commitments. Developers, NRW, Ofwat, NFU Cymru, WG Spending Commitments.	Improved Water Efficiency and water quality	Medium	**High**	**High**	Wales Land Management Forum Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
SuDS Source Control	Category 1	**Permeable paving** **Advantages:** Reduces peak flows and enhance water quality treatment. Dual use of the landscape, prevents ponding, can be used in high density developments **Disadvantages:** Not compatible with large sediment loads, only suitable for low traffic volume areas, maintenance to minimise silt clogging. **Delivery Partners:** Developers, The Council.	Natural Flood mitigations Temperature Regulation	**Medium**	**Low**	**High**	Rainscape National Surface Water Management and SuDS Group Members Teifi SAC Catchment Phosphate Reduction and Mitigation Project Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
	Category 1	**Green roofs** **Advantages:** Reduced peak waste water flows and enhanced water quality treatment along with reduced storm water overloading and CSO discharges, Mimics predevelopment state of water flows, can be retrofitted (site dependant), no additional land, can provide a return on investment from energy savings. **Disadvantages:** High cost compared to conventional roof, not appropriate for all sites and limited retrofitting abilities, requires high maintenance as any damage to roof membrane is more critical as water is encouraged to remain on the roof, limited impact of phosphate removal. **Delivery Partners:** Developers, The Council, DCWW, Business Improvements Districts for retrofits.	Increased Biodiversity Aesthetic value Thermal attenuation Climate resilience Water efficiency Noise Attenuation Air Quality improvements Health and wellbeing if accessible Increased longevity of roofs	**Medium**	**Medium**	**Medium**	Rainscape National Surface Water Management and SuDS Group Members Teifi SAC Catchment Phosphate Reduction and Mitigation Project Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Swales	Category 1	Shallow broad and vegetated channels designs to store and convey runoff to remove pollutants. **Advantages:** Easy to incorporate into landscaping, good removal of urban pollutants, reduces runoff rates and volumes and low capital cost. Maintenance can be incorporated into general landscape management, pollution and blockages are visible and easily dealt with. **Disadvantages:** Not suitable for steep areas with roadside parking, limits the opportunities to use trees for landscaping, risks of blockages in existing pipework. **Delivery Partners:** Developers, The Council, Local Highways Agencies, WG, National Surface Water Management and SuDS Group, Ofwat, Innovation Fund, Water Breakthrough Challenge, Water Discovery Challenge, NRW, Four Rivers for Life, Sustainable Drainage Feasibility Grant, DCWW: Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, Wales Green Infrastructure Forum, Living Streets Cymru, Active Travel and Safe Routes in Communities (SRiC) schemes, Heritage Lottery Fund, Esmee Fairburn Foundation	Biodiversity Amenity Aesthetic value Passive cooling	Medium	Low	Medium	Rainscape National Surface Water Management and SuDS Group Members Teifi SAC Catchment Phosphate Reduction and Mitigation Project Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Conveyance Chanels	Category 1	Channels and rills are open surface water channels with hard edges that can be planted with vegetation. **Advantages:** Effective water and pollution treatment can act as pre-treatment to remove silt before water is conveyed into further SuDS features, easy to construct. **Disadvantages:** Incorrect planting can cause silt build up, Need to give careful consideration to crossings, routine maintenance to remove litter/debris, large maintenance required every 5 years. **Delivery Partners**: Same as Swales	Biodiversity Increase Amenity Aesthetic value Passive cooling	Medium	Medium	Medium	Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Filtration Strips	Category 1	Filter strips of gently sloping grass and street trees **Advantages**: Well suited to implementation in areas with heavy traffic, encourages evaporation, infiltration and interception. Easy to construct and low construction cost, effective pre-treatment option **Disadvantages:** Not suitable for all locations. No significant attenuation or reduction of extreme flows. **Delivery Partners**: Same as Swales	Biodiversity Amenity Aesthetic value Health and wellbeing Can encourage active transport	Medium	Medium	Medium	Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
	Category 1	Filter drains are stone filled trenched with underdrains alongside roads, paths or rail lines. **Advantages:** They can capture specific pollutants if there is a layer of treatment media included (the amount removed will depend on the treatment media used). Large ability for treatment since they are often created to be in parallel to the length of roads and paths. **Disadvantages:** It does not capture pollutants directly if treatment media is not added, No vegetation, Depending on the soil conditions and/or pollutant loads, there is risk of filter drains enabling phosphate pollution migration into the underlying ground water, Flow exceedance could lead to temporary flooding. **Delivery Partners**: Same as Swales		Biodiversity (microorganisms, insects and amphibians) Amenity Can filter out fine sediments, metals and hydrocarbons (depending on filter media used) Encourage adsorption and biodegradation process	Medium	Low	Medium	Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
	Category 1	Shallow landscaped areas with engineered soils, enhanced vegetation and filtration, which can also include trees. **Advantages:** Very effective in removing urban pollutants which can also reduce volume and runoff rates. Flexible layout to fit into landscape. Well-suited for installation in highly impervious areas, Good retrofit capability and when lined, can be used to manage surface water runoff from areas with high groundwater pollution risks. **Disadvantages:** Requires landscaping and management. Susceptible to clogging if surrounding landscape is not managed. Not suitable for areas with steep slope. Should be used in conjunction with other SuDS components **Delivery Partners**: Same as Swales		Biodiversity Amenity / Aesthetic value	Medium	Low	High	Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Infiltration Basins	Category 1	A solution based around, rain gardens, infiltration trenches and basins, soakaways, tree pits. **Advantages:** Rain gardens – Small and easy to retrofit, minimal land take, easy to maintain, flexible layout to fit into landscape and can be installed in impervious areas if designed correctly. Soakaways – Particulate P removal through sedimentation of solids upstream of soakaway and infiltration in the soakaway. Can reduce rate of run off and some volume reduction Tree pits – Can enhance the performance of other green infrastructure technologies. **Disadvantages:** Rain gardens – As they are often small, their impact can be limited, requires landscaping and management, susceptible to clogging if surrounding landscape is not managed. Not suitable for areas with steep slopes or impermeable soils. Soakaways – Phosphorus removal highly dependent on infiltration rate and if there is an overflow. Tree pits – Nutrients can be cascaded downstream in extreme events. **Delivery Partners**: Same as Swales		Biodiversity Amenity / Aesthetic value Natural flood mitigation Can reduce the risk of waterborne diseases	Medium	Medium	Medium	Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Retention Ponds	Category 1	Building of ponds to retain water (retention ponds) **Advantages:** Can cater for all storms and has good removal capability of urban pollutants. Can be used where groundwater is vulnerable, if lined. **Disadvantages:** No reduction in runoff volume. Anaerobic conditions can occur without regular inflow. Land take may limit use in high density sites. May not be suitable for steep sites, due to requirement for high embankments. Colonisation by invasive species could increase maintenance. Perceived health & safety risks may result in fencing and isolation of the pond. **Delivery Partners**: Same as Swales	Biodiversity Thermal attenuation Climate resilience Amenity Aesthetic value Recreation Natural flood mitigation	Medum	Medium	High	Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Detention Basins	Category 1	Detention basins are shallow vegetated areas which retain water at times. **Advantages:** Can cater for a wide range of rainfall events and can be used where groundwater is vulnerable, if lined. Simple to design and construct with a potential for dual land use. Easy to maintain. Safe and visible capture of accidental spillages. **Disadvantages:** Little reduction in runoff volume. Detention depths may be constrained by system inlet and outlet levels **Delivery Partners**: Same as Swales	Biodiversity Amenity Aesthetic value Health and wellbeing can double up as play and recreation areas Natural flood mitigation	High	Low	Medium	Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Ponds	Category 1	Larger bodies of standing water. Water is moved in out of the pond through runoff and flow. Can be surrounded by vegetation, grass, hard landscapes, and other surroundings **Advantages:** Uptake of phosphate by plants and aquatic flora. Phosphate can also sediment out onto the base of the pond **Disadvantages:** Good practice for construction must be followed as badly designed ponds can act as exporters of dissolved phosphate. Minimal direct infiltration potential. Cannot manage large inputs of water or exceedance flows **Development Partners:** Developers, The Council, Local Highways Agencies, WG, WG Spending Commitments, Besic Payment Scheme, SFS, National Surface Water Management and SuDS Group, DCWW Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, NRW, Sustainable Drainage Feasibility Grant, Four Rivers for Life, Wales Green Infrastructure Forum	Biodiversity Amenity Aesthetic value Recreation Thermal attenuation	Medium	Medium	Medium	Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Constructed Wetlands	Category 1	Wetland creation designed and maintained specifically for maximising P reduction from both storm and foul water discharges. Plant roots can absorb nutrients and incorporate them into the plant structure. Can provide for tertiary treatment after effective primary and secondary foul treatment processes. **Advantages:** Good removal capability for pollutants and can trap large volumes of sediments. If lined, can be used where groundwater is vulnerable. Large wider environmental benefits and high longevity for functioning effectively (50+ years), Reed bed systems can be incorporated into wetlands which can further enhance biodiversity. **Disadvantages:** Land take is high. Requires maintaining sufficient baseflows in dry periods and there is limited depth range for flow attenuation. May release nutrients during non-growing season, which must be mitigated by good design and maintenance. Little reduction in runoff volume and less effective for steep sites and will require significant earthworks. Colonisation by invasive species could increase maintenance. Performance vulnerable to high sediment inflows. P will be bound in sludge which may require disposal and will require extra pre-treatment with solar drying and well managed biosolid spreading to satisfy crop need. Desludging could be every 10 years but depends on the wetland design. May need to replace bed material if it is saturated with nutrients if artificial bed material is used. Seasonal vegetation removal and management. Potential mosquito habitat. **Development Partners:** Developers, The Council, Welsh Rivers Trust, DCWW Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, NRW, Sustainable Drainage Feasibility Grant, Four Rivers for Life, NFU Cymru, Local Nature Partnership for North East Wales, United Utilities, DCWW, WG, WG Spending Commitments, Besic Payment Scheme, SFS, Heritage Lottery Fund, Esmee Fairburn Foundation Ofwat Innovation Fund, Water Breakthrough Challenge, Water Discovery Challenge.	Biodiversity Amenity Aesthetic value Recreation Thermal attenuation/temperature regulation Climate resilience Carbon sequestration Natural flood mitigation Potential for water reuse	**Medium**	**Medium**	**High**	Upper Tywi Restoration Project The Wetlands Project The Pontbren Project Four Rivers for LIFE National Surface Water Management and SuDS Group Members Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative Teifi SAC Catchment Phosphate Reduction and Mitigation Project
Integrated Buffer Zones	Category 2	A solution involving increasing grassland, floodplain grassland, beetle banks, woodland and hedgerows. **Advantages:** Good capability for capture of pollutants and wider environmental benefits. **Disadvantages:** Reduced productive area under agriculture may release nutrients during non-growing season. Risk of increasing emissions of nitrous oxide and methane (greenhouse gases) **Development Partners:** Developers, The Council, Welsh Rivers Trust, DCWW, Rivers in Wales Environmental Investment, DCWW Community Fund, NRW, Sustainable Drainage Feasibility Grant, Four Rivers for Life, NFU Cymru, Cities for Trees, Local Nature Partnership Carmarthenshire , United Utilities, Salmon and Trout Conservation', WG, WG Spending Commitments, Besic Payment Scheme, SFS, Glastir Small Grant Scheme, Heritage Lottery Fund, Woodlands for Wales	Biodiversity Climate resilience Air quality Health and Wellbeing Educational Pest control Noise attenuation Amenity Aesthetic value	**Medium**	**Medium**	**High**	The Pontbren Project Four Rivers for LIFE National Surface Water Management and SuDS Group Members Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative Teifi SAC Catchment Phosphate Reduction and Mitigation Project

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Private Sewerage Drainage Fields	Category 2	Network of discharge pipes from septic tank or Package Treatment Plant (PTP) laid in trenches under the ground surface so that effluent can be discharged to the ground. Effluent percolates through soil. Sediment bound P is immobilised and soluble P is bound to soils and sediments. **Advantages:** Likely to be less costly than a wetland system with less maintenance for same P removal performance. Can be delivered up to medium spatial scale (<100 units / <2.0 ha) **Disadvantages:** Longevity of scheme anticipated to be low (10-20 years). Increased usage of the drainage field with time can result in the soils or filter materials sorption capacity being reached. Fields where ground water flood risk is high or water table is within 2.0 m of ground surface are unsuitable. Provides no additional environmental benefits. **Development Partners:** Developers, DCWW Spending Commitments, NFU Cymru, The Council.	Efficiency and increased capacity at WwTW	Medium	Low	High	National Surface Water Management and SuDS Group Members Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
River Channel Re-naturalisation	Category 2	Works to return rivers to a more 'natural state' including: re-meandering, creating berms, pool-riffle systems, riparian planting and reconnecting channel to floodplain. **Advantages:** Good capability for capture of pollutants and wider environmental benefits. Can have high longevity for functioning effectively (50+ years). Minimal maintenance required during the establishment phase of the river channel. **Disadvantages:** Currently no industry standard regarding the design of larger scale river and floodplain re-naturalisation schemes to support the achievement of nutrient removal. Baseline and longer-term monitoring will be required prior to and following the implementation of a scheme in order to determine how much P the scheme is removing. P absorption to sediments is primary process of nutrient removal, however, the process is reversible with desorption occurring if P concentration of water drops below a threshold. Threshold is dynamic as the sorption capacity of sediments changes over time. Management regime may depend on the local context and degree of re-naturalisation. Potentially will be over a year until additional benefits are realised. **Development Partners:** The Council, DCWW Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, Welsh Rivers Trust , Salmon and Trout Conservation', Land owners / land managers, NRW, Sustainable Drainage Feasibility Grant, Four Rivers for Life, WG, WG Spending Commitments, Besic Payment Scheme, SFS, Heritage Lottery Fund, Ofwat, Innovation Fund, Water Breakthrough Challenge, Water Discovery Challenge	Natural flood mitigation Biodiversity Amenity Aesthetic value Carbon sequestration Additional pollutant removal Health and well being Air quality Climate resilience	High	Low	Medium	Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Drainage Ditch Blocking	Category 2	Placing of barriers across ditches to slow the flow, increase residence times and prevent downstream transport of sediments. **Advantages:** Easy to construct, low construction cost and low maintenance (mainly visual inspections needed). **Disadvantages:** Low predictability / certainty of success, and low removal performance. Lack of UK based evidence for effectiveness; baseline and long-term monitoring is recommended pre-and post-implementation and may result in localised flooding during heavy rainfall events. Dam failure would have implications for P removal efficiency. Limited research currently available on the effectiveness of this method for nutrient removal. **Development Partners:** Land owners / land managers, DCWW, DCWW Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, The Council, NFU Cymru, Environmental NGOs, NRW, Sustainable Drainage Feasibility Grant, WG.	Natural flood mitigation Biodiversity Additional pollutant removal Carbon sequestration	Medium	Low	Low	Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Engineered log Jams	Category 2	Leaky dams made of woody debris constructed to mimic beaver dams and slow flows and re-naturalise river reaches. **Advantages:** P removal achieved through sedimentation, chemicals sorption and biomass assimilation. Well-designed schemes will require little maintenance and could serve up to 100 units. **Disadvantages:** Risk being washed away in flood events – best suited to small watercourses < 2m wide. Lack of research for engineered log jams / beaver dams to confirm potential nutrient removal estimates; monitoring will be required pre/post scheme introduction to determine effectiveness. Potential for increased localised flooding. Adaptive management needed in case repairs are needed. Possibility that P removal may be short-term and that nutrients could be remobilised during floods. **Development Partners:** The Council, NRW, Sustainable Drainage Feasibility Grant, Four Rivers for Life, DCWW, DCWW Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, Welsh Rivers Trust , Salmon and Trout Conservation', Landowners / land managers, WG, WG Spending Commitments, Besic Payment Scheme, SFS, Heritage Lottery Fund, Esmee Fairburn Foundation, Ofwat, Innovation Fund, Water Breakthrough Challenge, Water Discovery Challenge	Natural flood mitigation Biodiversity Carbon sequestration Additional pollutant removal	Medium	Low	Low	Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Granular Treatment Media	Category 2	Granular treatment media that has been designed to treat various pollutants. There are phosphorus specific granular treatment media. **Advantages:** Up to 100% TP removal (if infiltration possible and depending on the manufacturer) **Disadvantaged:** P removal highly dependent on manufacturer and how well assets are maintained. Filter media will need to be changed periodically. **Development Partners:** Landowners / land managers, The Council, NRW, Sustainable Drainage Feasibility Grant, Developers, Local Highways Agencies, National Surface Water Management and SuDS Group, Living Streets Cymru.	Potential for grey water recycling May reduce unpleasant odours	Medium	Medium	Medium	Wales Water Management Forum National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative.

Intervention	Mitigation Category	Discussion	Benefits	Feasibility	Maintenance	Effectiveness	Case Studies
Willow Beds	Category 2	Willow beds can be designed to treat stormwater from low/medium risk surfaces of small catchments. They allow capturing, attenuation, and evapotranspiration of captured flows. **Advantages:** Capture, attenuation and evapotranspiration of all flows so no discharge occurs. Uptake of P by the willow. Harvesting willow can be a valuable resource. If built as part of a closed systems, it is effective immediately. **Disadvantages:** Not commonly used in the UK, and where they are, they tend to be for private sewage treatment installations. To have optimal TP removal performance harvesting of willow will be required. Harvesting of willow is a valuable resource but the process is of harvesting it is onerous. Some sediment removal is required at the inlet and any suspended sediment may have to be removed periodically. Little information available currently regarding regulations on their implementation of water treatment. Effective only during the willow growing season. **Development Partners:** Landowners / land managers, The Council , NRW, Sustainable Drainage Feasibility Grant, Four Rivers for Life, DCWW, DCWW Spending Commitments, Rivers in Wales Environmental Investment, DCWW Community Fund, Developers: Could help to deliver Net Benefit for Biodiversity, DCWW, WG, WG Spending Commitments, Besic Payment Scheme, SFS, Heritage Lottery Fund, Ofwat, Innovation Fund, Water Breakthrough Challenge, Water Discovery Challenge.	Biodiversity Natural flood mitigation Aesthetic value Amenity value Carbon sequestration Can harvest the willow which could then be sold (offsets some of the maintenance costs)	Medium	Low	High	The Pontbren Project Natural Flood management plus in the Cadoxton catchment Four Rivers for LIFE National Surface Water Management and SuDS Group Members Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative
Attenuation storage tanks (lined)	Category 2	Lined cellular/crated or other storage below ground (no infiltration). **Advantages:** Particulate P removal through sedimentation of solids upstream of attenuation tank. **Disadvantages:** Attenuation tank is not designed to provide any P removal on its own. P removal highly dependent on upstream features and how well assets are maintained. Filters need changing every few years. **Development Partners:** Landowners / land managers, The Council, NRW, DCWW, DCWW Spending Commitments, Developers: Could help to deliver Net Benefit for Biodiversity, DCWW, WG, WG Spending Commitments, Besic Payment Scheme	Natural flood mitigation	Medium	High	High	Natural Flood management plus in the Cadoxton catchment Wales Water Management Forum Rivers Trust of Wales (Welsh Rivers Trust) Afonydd Cymru The West Wales Rivers Trust Taclo'r Tywi Initiative

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