



# NUTRIENT NEUTRALITY north west



## Guidance Note on the use of Package Treatment Plants

Developments which are hydrologically linked to the four following catchment areas may be required to deliver nutrient neutrality:

- Esthwaite Water
- River Derwent and Bassenthwaite Lake
- River Eden
- River Kent

Nutrient Neutrality requires finding mitigation solutions to offset any harm on protected Habitat Sites. This document has been produced to aid that process.

Further information regarding nutrient neutrality and affected catchments/developments can be found at <http://nutrientneutralitynw.co.uk>.

This Guidance Note has been developed by the following partners. The advice within it is based on accepted guidelines used in Somerset and Cornwall and elsewhere.

- Cumberland Council
- Environment Agency
- Lake District National Park Authority
- Natural England
- United Utilities
- Westmorland and Furness Council

Cumberland Council, Lake District National Park Authority and Westmorland and Furness Council will use this guidance when undertaking their development management function. Please note that this document may be updated periodically, always make sure you are using the latest version.

## Abbreviations

**AA** – Appropriate Assessment

**FDA1 Form** – Foul Drainage Assessment form

**HRA** – Habitats Regulations Assessment

**LDNPA** – Lake District National Park Authority

**LPA** – Local Planning Authority

**NE** – Natural England

**P** -Phosphorus

**PTP** – Package Treatment Plant

**ST** – Septic Tanks

**WWTW** – Waste Water Treatment Works

**Habitats Site** - National Site Network Sites, formerly known as Natura 2000 sites.

## 1. General Information

### What is the difference between a septic tank and a Package Treatment Plant?

Both systems treat wastewater, albeit in slightly different ways, and are used where a development cannot reasonably connect to the main sewer network.

A septic tank is a primary treatment system which uses an anaerobic process to clarify waste; solids settle to the bottom and decompose whilst the wastewater is discharged into the ground through a drainage field or soakaway. Solid waste is then collected and taken away. Discharge from a septic tank cannot be discharged into a watercourse due to its poor quality.

PTPs are one of the most cost-effective nutrient mitigation solutions. They require an electrical connection but take up less space, require less emptying and are generally more efficient in terms of removing nutrients from wastewater. They do however need to be maintained as advised by the manufacturer. PTPs can be discharged into soakaways, surface water, groundwater or drainage field.

The waste byproducts of septic tanks and PTPs are likely to be classified as sewage sludge and would need to be disposed according to requirements of the Environment Agency. Some companies are however exploring opportunities to turn such sludge from PTPs (post secondary treatment) into usable fertiliser product.

“A RECENT SCOTTISH NATURAL HERITAGE REPORT (SNH 2011) STATES THAT A DISCHARGE FROM A PTP WILL CONTAIN ABOUT 5MG P/L COMPARED TO AN AVERAGE ST DISCHARGE OF 10MG P/L” *CREW (See resource list for link)*

### Can wastewater from my new development be discharged into a PTP?

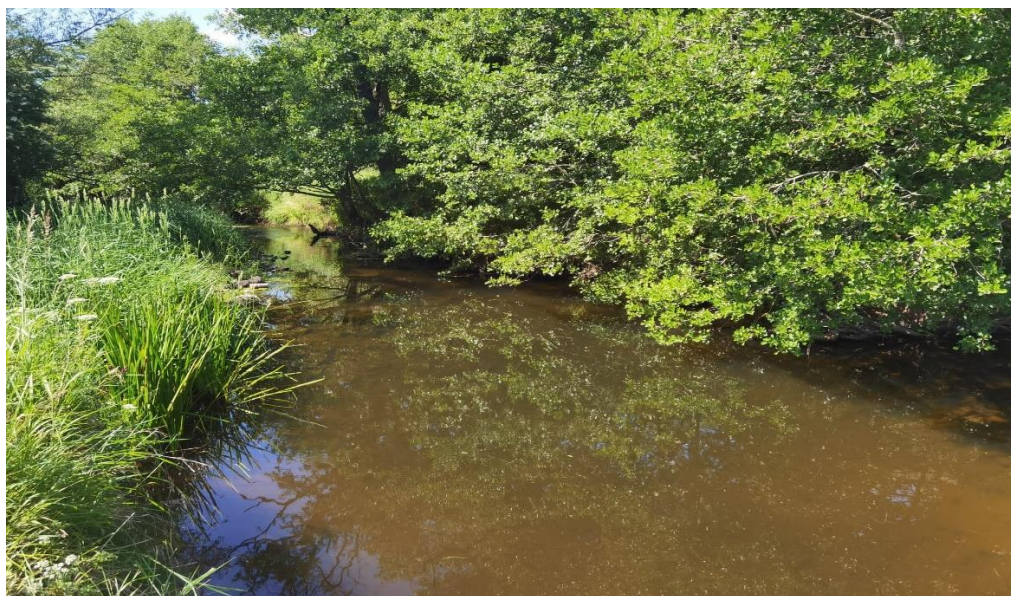
Planning Practice Guidance (Water supply, wastewater and water quality para 20) contains a presumption against private sewage treatment works in areas served by mains sewers. New development must therefore discharge into a mains sewer system where it is reasonable to do so. The EA may however accept private PTPs where the new facility will be managed by an OFWAT-appointed statutory sewerage undertaker.

When considering if a connection to the mains network is reasonable, consideration will be given to the cost and/or practicability and whether the PTP poses a risk to a designated site in accordance with Approved Document H of the Building Regulations 2010 and General Binding Rules.

THE MITIGATION SOLUTIONS REPORT STATES THAT 2,522KG OF PHOSPHORUS ARE DISCHARGED INTO THE FOUR AFFECTED CATCHMENTS FROM PRIVATE SEWERAGE SYSTEMS EACH YEAR (modelled load)

### When do I need an EA permit?

If your septic tank or small PTP meets the Environment Agency's general binding rules then a permit will not be required. Further information on the General Binding Rules can be found here: [General binding rules: small sewage discharge to the ground - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/general-binding-rules-small-sewage-discharge-to-the-ground)



### When do I need planning permission or Building Regulations?

New PTPs will usually require planning permission and at planning application stage consideration will be given to impacts on the wider environment and residential amenity through odour, noise, visual impacts etc. These issues should be considered when deciding where to locate any new PTPs.

At planning application stage, details of the proposed PTP should be provided along with management arrangements to ensure the system is properly maintained and operates correctly. Full details of where the PTP will discharge to (e.g. a soakaway, surface water, groundwater or drainage field) will also be required.

Where the PTP will discharge to a drainage field, arrangements will need to be put in place in order to ensure this does not become saturated. This could mean directing the discharge to a different area after a certain period of time.

Proposals have been put to Government to allow the installation of new PTP systems under permitted development rights. Local Authorities also have the option of producing Local Development Orders to negate the need for planning permission<sup>2</sup>. However, until such legislation is adopted, or an LDO is in place, Local Planning Authorities may still require planning applications to be submitted<sup>3</sup>.

Building regulations approval will be required for new septic tanks or PTPs or when you are changing the location of an existing system.

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<sup>1</sup> River Eden NN Catchment

<sup>2</sup> Some Cumbrian Authorities are currently considering potential LDOs to deal with this issue

<sup>3</sup> Please check with your LPA as to whether permission is required

## 2. Nutrient Neutrality Mitigation

Will discharging surface and waste-water from my development to a package treatment plant make the development nutrient neutral?

Not unless there is no phosphorus being released into the catchment from the PTP. Normally there will be phosphorus entering the catchment through a soakaway, surface water, groundwater or drainage field and this needs to be mitigated unless small-scale thresholds are met.

What is a small-scale threshold?

An Appropriate Assessment is required where the HRA screening process identifies that the development is likely to have significant effects on a Habitats Site. In terms of effects caused by phosphorus pollution, these can be screened out in the following circumstances and in such cases an AA would not be required<sup>4</sup>:

- a) Where there is clearly no pathway between the development and the sensitive interest features of the Habitats Site, or
- b) A pathway has been identified at screening stage but there is sufficient evidence to show that the proposed development would not result in an increase in phosphorus levels; or
- c) A pathway has been identified but there is sufficient evidence to show that any additional phosphorus from the development would clearly be insignificant both alone and in combination (i.e. the development meets the small-scale threshold)

When carrying out the HRA consideration must be given to the following in accordance with HRA legislation<sup>5</sup>:

- Sensitivity of the designated site feature
- Vulnerability of the Site
- Contribution of the development
- Potential for cumulative effects

Developers will be required to provide robust evidence to demonstrate compliance with one of the above criteria. Where such evidence is not available a full AA should be carried out in line with the precautionary principle.

In order to demonstrate that the development meets **criteria c** above **all** of the following conditions listed in Table 1 overleaf must be met.

It is recognised that it can be time consuming and costly to undertake site specific monitoring linked to a number of the conditions (e.g. groundwater depth). In such cases modelled or national data can be used where they provide the best available data and are scientifically robust. For example<sup>6</sup>:

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<sup>4</sup> An AA may still be required for other potential effects aside from phosphorus pollution

<sup>5</sup> <https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site>

<sup>6</sup> There are also a number of other useful datasets referred to in the Mitigation Solutions Report

- Soil Types (Cranfield University for Government - National Soil Map): <https://www.data.gov.uk/dataset/ea1442bf-ba77-42cc-80e7-2ea339ccb28a/natmap-national-soil-map>
- Soil Types (UK Soil Observatory – British Geological Survey): <https://mapapps2.bgs.ac.uk/ukso/home.html>
- Rainfall (Environment Agency - Water Situation Reports for England): <https://www.gov.uk/government/collections/water-situation-reports-for-england>
- Rainfall (Met Office - UK Climate Maps and Data): <https://www.metoffice.gov.uk/research/climate/maps-and-data>
- Rainfall (UK Centre for Ecology and Hydrology): <https://nrfa.ceh.ac.uk/rainfall-data>

When considering Condition 9 any sewer flood data, information on local geology, groundwater phosphorus concentration monitoring within the catchment or other local information that is available should be used. *Elevated concentrations of phosphorus in groundwater would indicate phosphorus transport being expedited in that the phosphorus is not being absorbed to the soil effectively or being remobilised. It can be assumed that phosphorus is not remobilised unless there is existing evidence at the discharge location or within the wider catchment which suggest that this may be occurring in the same conditions to those present at the location of the proposed discharge. Such evidence could include investigations, known soil or geological conditions or groundwater water quality data from similar soil/geological conditions within the catchment<sup>7</sup>.*

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<sup>7</sup> <https://www.cornwall.gov.uk/media/jscb5lza/interim-guidelines-river-camel-sac.pdf>

## Guidance Note on the use of Package Treatment Plants

Table 1: Small Scale Discharges Checklist

Condition		Justification	Linked documents
<b>Note: All conditions must be met to constitute a small scale discharge</b>			
<b>1</b>	The PTP must discharge to the ground via a drainage field	Most of p is removed as the wastewater percolates through the ground. Discharges to water are considered to be high risk.	<b>General Binding Rules</b>  <a href="http://www.gov.uk">General binding rules: small sewage discharge to the ground - GOV.UK (www.gov.uk)</a>  <b>NECR Documents</b>  NECR170: <a href="http://naturalengland.org.uk">The impact of phosphorus inputs from small discharges on designated freshwater sites - NECR170 (naturalengland.org.uk)</a>  NECR171: <a href="http://naturalengland.org.uk">Development of a risk assessment tool to assess the significance of septic tanks around freshwater SSSIs: Phase 1 – Understanding better the retention of phosphorus in the drainage field - NECR171 (naturalengland.org.uk)</a>  NECR222: <a href="http://naturalengland.org.uk">Development of a Risk Assessment Tool to Evaluate the Significance of Septic Tanks Around Freshwater SSSIs - NECR222 (naturalengland.org.uk)</a>  <b>Building Regulations Document H</b>
<b>2</b>	Discharges are less than 2m <sup>3</sup> per day (2000 litres per day) <sup>8</sup>	This limit is based on the General Binding Rules.	
<b>3</b>	The drainage field has been subject to ground percolation tests and average Vp values lie within the range of between 12 and 100 as per the Building Regulations Document H (or any regulation which replaces it)	To reduce the risk of hydraulic failure and ensure the ground conditions and soil type provides adequate levels of infiltration.	
<b>4</b>	The drainage field is more than 50m from the designated site boundary (or sensitive interest feature)	50m is the distance as which no phosphorus signal was detected at this distance (NECR171, NECR222)	
<b>5</b>	The drainage field is more than 40m from any surface water feature e.g. ditch, drain, watercourse;	40m is the distance that represents a low risk, based on there was a weak phosphorus signal this distance for some of the small discharges (NECR171 and NECR222)	
<b>6</b>	The drainage field in an area with a slope no greater than 15%	15% is the slope that represents a low risk based on the methodology outlined in NECR222	
<b>7</b>	The drainage field is in an area where the high-water table groundwater depth is at least 2m below the surface at all times	2m is the groundwater depth that represents a low risk, based on very low levels being detected in soil at depth below this (NECR171 and NECR222).	

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Condition		Justification	Linked documents
8	The drainage field will not be subject to significant flooding, e.g. it is not in flood zone 2 or 3	To reduce the risk of dispersal during flood events.	<a href="https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/442222/Drainage_and_waste_disposal_Aproved_Document_H_-_GOV.UK.pdf">Drainage and waste disposal: Approved Document H - GOV.UK (www.gov.uk)</a>
9	There are no other known factors which would expedite the transport of phosphorus for example fissured geology, insufficient soil below the drainage pipes, known sewer flooding, conditions in the soil/geology that would cause remobilisation phosphorus, presence of mineshafts, etc		<b>EA Flood Risk Maps</b>  <a href="https://flood-map-for-planning.service.gov.uk/">https://flood-map-for-planning.service.gov.uk/</a>
10	To ensure that there is no significant in combination effect, the discharge to ground should be at least 200m from any other discharge to ground	To ensure no significant in combination effects. The 200m is based on the 50m distance where no phosphorus signal was detected (NECR171). So for two drainage field areas not to overlap they need to be at least 100m apart. A safety factor of two is then applied to ensure that in the long term there will be the certainty that the effective drainage field phosphorus retention areas don't overlap. This also ensures that the maximum density of these systems is no more than one for every 4ha (or 25 per km <sup>2</sup> ), as identified in NECR170 <sup>9</sup>	
11	The drainage field must be 50m from a point of abstraction of any groundwater supply	In order to comply with Part H2 of the Building Regulations 2010	
12	The drainage field must not be in any groundwater Source Protection Zone 1	In order to comply with Part H2 of the Building Regulations 2010	
13	The drainage field must be at least 15m from any building	In order to comply with Part H2 of the Building Regulations 2010	

<sup>9</sup> <https://www.cornwall.gov.uk/media/jscb5lza/interim-guidelines-river-camel-sac.pdf>

If I replace an existing septic tank or PTP on site or elsewhere in the catchment with a new, more efficient PTP can this be used as NN mitigation?

Replacing an existing septic tank or PTP, on the development site or elsewhere, with a more modern and efficient system can result in reduced levels of phosphorus entering the catchment. Modern private sewage systems with field drainage can be highly efficient, removing between 67% and 100% of phosphorus<sup>10</sup>. This solution is also relatively cheap to deliver (average costs for a replacement system and installation are £10,000<sup>11</sup>) compared to other interventions. PTPs are however likely to need replacing at least once over the lifetime of the new development if they're to be used as a permanent solution.

A Management Plan must be submitted at the time of the planning application which demonstrates that management and maintenance regimes can be guaranteed over the lifetime of the mitigation.

Some residual p from the PTP discharge can be taken in by trees planted within the drainage field (e.g. apple orchards or willow plantations) or where effluent is discharged through a treatment wetland. Willow coppicing and orchards can also provide an additional income to the landowner<sup>12</sup>

Further information on PTP replacement can be found in Appendix B which is extracted from the Cumbrian Mitigation Solutions Report.

In order to be accepted as effective mitigation the conditions set out in Table 2 below must be met.

NATURAL ENGLAND DOCUMENT NE776 RECOGNISES REPLACING INEFFICIENT SEPTIC TANKS AND PTPS WITH IMPROVED PTPS AS AN ACCEPTABLE MITIGATION ACTIVITY.

“ASSUMING A DEFAULT PTP IS REPLACED WITH A NEW PTP WITH A TP EFFLUENT CONCENTRATION OF 0.5MG/L, APPROXIMATELY 0.9KG/YR COULD BE SAVED. THE REPLACEMENT WOULD HAVE AN ESTIMATED ADDITIONAL COST OF APPROXIMATELY £42,000<sup>11</sup>. THIS IS EQUIVALENT TO £46,153 KG TP/YR REDUCTION.”

“THE EFFLUENT QUALITY OF A NEW PTP IS VARIABLE, BUT TYPICALLY AROUND 2 - 3MG/L TP... FOR PTP WITHOUT P STRIPPING AND AS LOW AS 0.4 - 0.5 MG/L TP FOR A PTP WITH ADDITIONAL P STRIPPING. THEREFORE, REPLACING ONE DEFAULT SEPTIC TANK SERVING ONE PROPERTY WITH A PTP WITH P STRIPPING WILL DELIVER 0.9KG/YR TP... THIS IS A BEST-CASE SCENARIO CALCULATION TO PROVIDE AN INDICATION.”

<sup>10</sup> Cumbria Mitigation Solutions Report

<sup>11</sup> Operational costs are estimated to be £32,000 over 80 years - [Royal Haskoning Final Norfolk Nutrient Strategy Nutrient Mitigation Solutions Report \(southnorfolkandbroadland.gov.uk\)](https://www.southnorfolkandbroadland.gov.uk/nutrient-mitigation-solutions-report)

<sup>12</sup> Orchards on their own will not generally provide p savings unless there is a nutrient source i.e. discharge from a septic tank or PTP

\*<https://www.north-norfolk.gov.uk/media/8980/g15-norfolk-nutrient-guidance-nutrient-mitigation-solutions.pdf>

\*\* <https://www.gnlp.org.uk/sites/gnlp/files/2023-02/PC3719-RHD-ZZ-XX-RP-Z-0002-Norfolk%20Nutrient%20Solutions%2023.01.23.pdf>

## Guidance Note on the use of Package Treatment Plants

Table 2: Conditions for using Replacement PTPs as NN Mitigation

<b>General</b>
<ul style="list-style-type: none"><li>• The replacement PTP must be upstream of new development's discharge point and within the same catchment</li></ul>
<ul style="list-style-type: none"><li>• There must be sufficient robust evidence to demonstrate how much phosphorus the existing septic tank or PTP is discharging and how much the replacement PTP will discharge in order to demonstrate a benefit<sup>13</sup>. The default value in the Nutrient calculator will be used where evidence is unavailable or where the system doesn't currently meet the General Binding Rules (see pages 11 and 12).</li></ul>
<ul style="list-style-type: none"><li>• Evidence must be provided to show that the existing PTP has been operated correctly and maintained as per the manufacturers guidance during its lifetime</li></ul>
<ul style="list-style-type: none"><li>• PTPs or septic tanks that discharge to ground should only be replaced by units that also discharge to ground, where ground conditions are appropriate for drainage</li></ul>
<ul style="list-style-type: none"><li>• Existing units that currently discharge to water may be replaced by units that discharge to either directly to water, or to ground<sup>14</sup>.</li></ul>
<ul style="list-style-type: none"><li>• The replacement of existing units that meet the small scale discharge thresholds set out in section 1 above cannot be used as mitigation.</li></ul>
<ul style="list-style-type: none"><li>• The relevant permissions set out in section 1 must be sought where applicable.</li></ul>
<ul style="list-style-type: none"><li>• Water must flow through the scheme and not bypass it via groundwater</li></ul>
<b>Drainage Fields</b>
<ul style="list-style-type: none"><li>• Where using a drainage field, saturation tests must be carried out annually and should the field reach saturation, an alternative drainage field must be used. Drainage fields typically have a lifespan of 10-20 years<sup>15</sup>.</li></ul>
<ul style="list-style-type: none"><li>• Drainage fields should comprise a network of perforated pipes laid in a uniform gradient (trenches should not be steeper than 1:200)</li></ul>
<ul style="list-style-type: none"><li>• The drainage field should be downslope of groundwater sources, away from water supply pipes and away from any roads or paved surfaces</li></ul>
<ul style="list-style-type: none"><li>• Where planting orchards or willow plantations in the drainage field the Management Plan should set out how and when fruits will be harvested/willow coppiced to ensure the p doesn't return back to the ground.</li></ul>
<ul style="list-style-type: none"><li>• Where planting trees within the drainage field soil surveys must be carried out to ensure the ground is suitable for the species to be planted</li></ul>

<sup>13</sup> Not every replacement will result in p savings

<sup>14</sup> Under existing General Binding Rules septic tanks should not discharge to water

<sup>15</sup> Draft Cumbria Mitigation Solutions Report

If I improve the performance of an existing PTP elsewhere e.g. through installing a secondary treatment technology can that be used as mitigation?

Alterations to existing septic tanks or PTPs (e.g. through incorporating add on technologies or secondary and tertiary treatments/solutions) that remove further phosphorus from discharges can create p credits. Measures can include:

- Reed beds or wetland treatment systems; these interventions purify the wastewater as it moves through a gravel bed or substrate and p is then taken up by the vegetation roots once established. Both HF and vertical flow systems are suitable.
- Add on technologies such as reverse osmosis solutions that are usually housed in separate containers and require an electricity source. There are different types of such system in development or on the market at present. Data from trial testing shows positive results.

There is limited data available on the effectiveness of such systems, however early trials undertaken elsewhere in the country are showing positive results<sup>16</sup>.

More information can be found in Appendix C which is taken from the Mitigation Solutions Report.

Is chemical dosing an acceptable means of improving the performance of a PTP to generate credits?

Chemical dosing will only be acceptable in rare circumstances and should be avoided where possible as there are uncertainties around the long term implications of chemical dosing treatments and their effect on the environment. Systems which require chemical dosing are also more difficult to monitor and maintain and can lose their efficiency if not managed correctly. They also pose additional risks to the environment where the chemicals involved are stored inappropriately.

Where chemical dosing is a viable option and a means of securing long term maintenance has been agreed with a LPA, systems using ferric rather than aluminium salts must be used. Some forms of aluminium can be highly toxic, particularly to some freshwater species. Natural England's advice is that the use of aluminium should be avoided, particularly within the catchment of a Habitats Site, as it is not currently possible with any certainty to determine what levels would avoid adverse environmental impacts, making it difficult to conclude through an Appropriate Assessment that there would be no harm to the SSSI.

Natural England will only support chemical dosing where they have confidence that it will be undertaken and managed appropriately, as over or underdosing can have its own environmental impacts. For this reason, where dosing has been accepted, it should be carried out by a suitably qualified and accredited person or company rather than the property owner. This will be secured by a planning condition to ensue the dosing is undertaken in line with manufacturers guidelines and specifications.

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<sup>16</sup> <https://salinitysolutions.co.uk/trial-brings-hope-for-phosphate-mitigation-funding/>

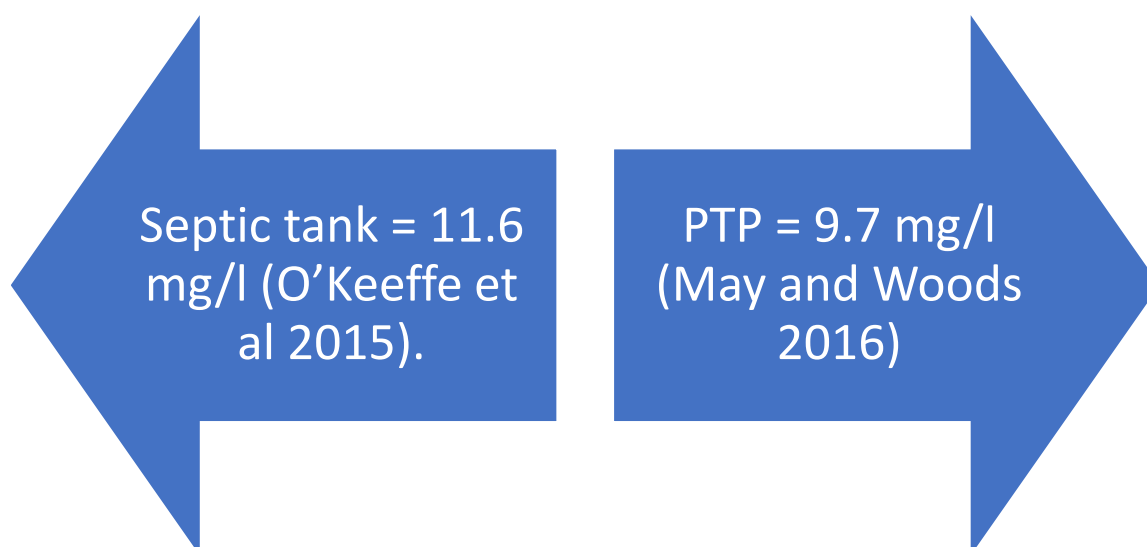
Biological (non-chemical dosing) PTPs will be acceptable however it should be noted that not every biological PTP with secondary treatment is always designed for P removal so the effluent quality, will depend on the influent sewage and operation of the PTP.

How do I calculate the phosphorus reduction/number of credits from PTP improvement/replacement?

Whilst new septic tanks and PTPs now undergo independent third-party testing that they meet British Standards (BS EN 12566) not all will have been tested for phosphorus as this is not a requirement. Where the certificate (or test results from the independent test if it was undertaken but not included on the certificate) can be provided, this is sufficient evidence of the concentrations that the effluent will achieve. This will be sufficient evidence to demonstrate performance. British Water have produced a list of some smaller septic tanks/PTPs on the market with their test certificates<sup>17</sup>. This can also be used as valid evidence of performance.

Where there is no certificate and the system is not on the British Water list, independent testing carried out by an accredited third party and to British Standards can be relied upon. A list of the independent testing facilities which test to British Standards can be found here<sup>18</sup>.

Where none of the information above is available, or the type of system is not known then the load of the septic tank / PTP should be calculated using the default mean concentration values below:



Monitoring of the nutrient levels in the effluent from the PTP / septic tank to be replaced provides an alternative option, however, to be accepted such monitoring data should cover at least 8 months of typical operation.

The total nutrient loads expected from the existing facility can then be calculated using the standard calculators.

<sup>17</sup> [List of Certified Small Wastewater Treatment Systems Up to 50PT \(britishwater.co.uk\)](http://britishwater.co.uk)

<sup>18</sup> [EUROPA – European Commission – Growth – Regulatory policy - SMCS](#)

### What monitoring and management arrangements need to be in place?

In order to be accepted as a mitigation solution the PTP will need to be maintained and monitored throughout the development's lifetime and replaced<sup>19</sup> once it ceases to be operational. Natural England guidance states that mitigation should be in place in perpetuity i.e. a period of between 80 to 125 years unless the solution is being used as a bridging/temporary measure (e.g. upto 2030 when United Utilities Technically Achievable Limits come into force).

At planning application stage, the developer should submit a Management Plan which sets out such arrangements. This will then be agreed through a Section 106 agreement with the local planning authority which will set out who is responsible for the delivery of the Management Plan<sup>20</sup> and what should happen in unexpected circumstances, e.g. in instances where the responsible organisation ceases trading. The S106 will also include details of the

The following measures should be included within the Management Plan<sup>21</sup>:

- Interannual/annual servicing e.g., pipe blockages
- Interannual/annual desludging of PTP/ST and associated (specific) disposal requirements
- Monthly checks of drainage field for water logging
- Annual monitoring of influent and effluent to make assumptions about TP loading to the drainage field
- A detailed sampling strategy incl. testing of filter material to determine max P saturation
- Replacement of filter material once max P saturation is reached
- Sampling programme will need to be reactive to rainfall events where possible in order to sample runoff entering and exiting the drainage field
- Robust design and maintenance and monitoring to ensure correct dosing in perpetuity, in the rare instances where chemical dosing is accepted
- Pre- and post-implementation monitoring outputs to gain credits for P (only for PTP/ST orchards)

### What is a first time rural sewerage scheme? Can that contribute towards mitigation?

First time rural sewerage is a duty put on water companies under Section 101A of the Water Industry Act 1991. It refers to the replacement of an existing septic tank or PTP with a connection to the mains sewer system. For this duty to apply, there must be more than one property involved and the existing septic tank(s) and/or PTPs must be causing a nuisance and/or environmental harm. Where this results in a reduction in phosphorous loads entering the catchment this can create p credits.

The methodology set out in sections above should be used for calculating p loads from the existing system that is to be replaced. The standard nutrient budget calculator should be used for the additional load that would require treatment by the WWTW.

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<sup>19</sup> With a new system of equal or better efficiency

<sup>20</sup> Monitoring must be carried out by a suitably qualified and accredited person or company

<sup>21</sup> Measures taken from the Cumbrian Mitigation Solutions Report

How do I identify which existing septic tanks and PTPs could be upgraded/replaced?

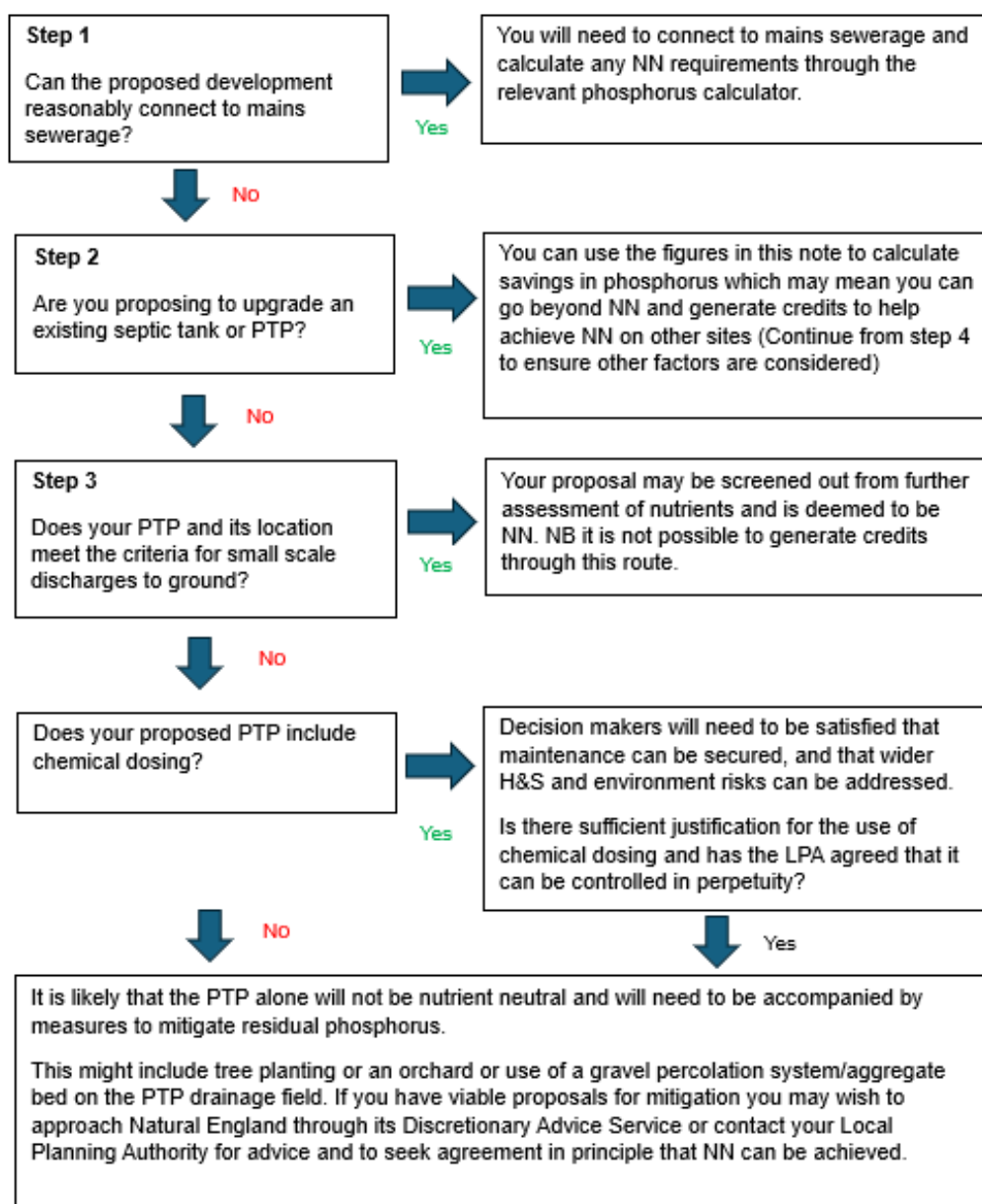
The LDNPA, on behalf of the Cumbrian authorities, will carry out a call for septic tanks/PTPs alongside the release of this guidance. PTP owners that are located within the affected catchments will be able to submit details of their system online. The project team will then broker an agreement with the landowner to replace or upgrade the system in order to generate credits which can then be sold to developers to unlock housing<sup>22</sup>.

It may also be possible for developers to identify existing septic tanks and PTPs through their own investigations. They could search activities licenced by the Environment Agency via the [Public Registers Online \(data.gov.uk\)](https://data.gov.uk), but this would not identify septic tanks or PTPs that operated under the general Binding Rules. They could seek advice from United Utilities or there are also private companies who will compile a list of unsewered properties for a fee.

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<sup>22</sup> As well as the cost of replacing the system when required, the credit price will also include costs associated with managing the site in accordance with the Management Plan.

**Flow chart to support the application of advice in this note**



## Appendix A: Resource List

### National Guidance and Legislation

A wetland framework for impact assessment at statutory sites in England and Wales

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/291628/scho0309bpoe-e-e.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291628/scho0309bpoe-e-e.pdf)

Building Regulations Document H: [Drainage and waste disposal: Approved Document H - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291628/scho0309bpoe-e-e.pdf)

Constructed Wetland Framework and Hub:

<https://www.local.gov.uk/sites/default/files/documents/Constructed%20Wetland%20Guidance%20%26%20Hub%20-%20LPA%20meeting%20Aug%202022.pdf>

EA Environmental Permits: [Discharges to surface water and groundwater: environmental permits - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291628/scho0309bpoe-e-e.pdf)

EA Flood Risk Maps: <https://flood-map-for-planning.service.gov.uk/>

FDA1 Form: <https://www.gov.uk/government/publications/foul-drainage-assessment-form-fda1>

General Binding Rules: [General binding rules: small sewage discharge to the ground - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291628/scho0309bpoe-e-e.pdf)

HRA Guidance <https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site>

Natural England Nutrient Neutrality Principles: <https://publications.naturalengland.org.uk/publication/5031421117988864>

NECR170: [The impact of phosphorus inputs from small discharges on designated freshwater sites - NECR170 \(naturalengland.org.uk\)](https://publications.naturalengland.org.uk/publication/5031421117988864)

NECR171: [Development of a risk assessment tool to assess the significance of septic tanks around freshwater SSSIs: Phase 1 – Understanding better the retention of phosphorus in the drainage field - NECR171 \(naturalengland.org.uk\)](https://publications.naturalengland.org.uk/publication/5031421117988864)

NECR222: [Development of a Risk Assessment Tool to Evaluate the Significance of Septic Tanks Around Freshwater SSSIs - NECR222 \(naturalengland.org.uk\)](https://publications.naturalengland.org.uk/publication/5031421117988864)

Planning Practice Guidance (Water Supply, Wastewater and Water Quality): <https://www.gov.uk/guidance/water-supply-wastewater-and-water-quality>

## Local NN information

Nutrient Neutrality local mitigation solutions project: <http://nutrientneutralitynw.gov.uk>

## Experience Elsewhere

Interim guidelines on small scale thresholds and nutrient neutrality principles for the hydrological catchment of the River Camel Special Area of Conservation September 2021: <https://www.cornwall.gov.uk/media/jscb5lza/interim-guidelines-river-camel-sac.pdf>

Free water surface treatment wetlands - Nutrient neutrality private mitigations (Herefordshire Council):  
<https://www.herefordshire.gov.uk/directory-record/6571/free-water-surface-treatment-wetlands>

Small Scale Discharges of Phosphorus (Norfolk Local Authorities): <https://www.southnorfolkandbroadland.gov.uk/downloads/file/5697/report-small-scale-discharges-of-phosphorous-low-risk-mapping>

Norfolk Nutrient Guidance: <https://www.southnorfolkandbroadland.gov.uk/downloads/file/5962/royal-haskoning-final-norfolk-nutrient-strategy-nutrient-mitigation-solutions-report>

River Clun SAC Phosphate Mitigation Solutions for Residential Development (Shropshire Council):

<https://www.shropshire.gov.uk/media/22806/gc4u-river-clun-sac-phosphate-mitigation-solutions-for-residential-development-final-report.pdf>

Somerset PTP Advice Note: [SCC - Public - ISSUE PTP and septic tanks - EA and NE Advice note for SLM Ramsar 22.09.2022.pdf \(sharepoint.com\)](https://www.somerset.gov.uk/media/22806/gc4u-river-clun-sac-phosphate-mitigation-solutions-for-residential-development-final-report.pdf)

## Other Guidance and Literature

Practical measures for reducing phosphorus and faecal microbial loads from onsite wastewater treatment system discharges to the environment A review (CREW Scotland Centre for Expertise for Water) [https://www.sepa.org.uk/media/163158/crew\\_septic\\_tanks.pdf](https://www.sepa.org.uk/media/163158/crew_septic_tanks.pdf)

The use of constructed wetland for mitigating nitrogen and phosphorus from agricultural runoff: a review (Universit of Reading) [https://centaur.reading.ac.uk/96215/1/Li%20et%20al.%202021\\_water-13-00476\\_Wetland%20and%20N%20P%20removal.pdf](https://centaur.reading.ac.uk/96215/1/Li%20et%20al.%202021_water-13-00476_Wetland%20and%20N%20P%20removal.pdf)

Vegetation contribution on phosphorus removal in constructed wetlands  
<https://www.sciencedirect.com/science/article/abs/pii/S0925857420301415>

## Appendix B

Table B-1 Private Sewerage with Field Drainage

Key option considerations	
Summary description of option	<ul style="list-style-type: none"> <li>• A small <b>PTP</b> or ST used to treat wastewater from properties which cannot connect to a mains sewer</li> <li>• Biological <b>PTP</b>/STs treat wastewater by promoting biological processes to remove nutrients; whilst chemical <b>PTP</b>/STs treat wastewater using chemical dosing to promote nutrient removal. Chemical and biological <b>PTP</b>s can be combined to increase nutrient removal</li> <li>• The effluent of a private sewerage system e.g., <b>PTP</b>/STs, is diverted to a drainage field. A drainage field is a network of discharge pipes laid in trenches under the ground surface so that effluent can be discharged to the ground</li> <li>• Orchards (fruit or coppicing) can also be planted where small <b>PTP</b>/STs discharge to the ground. They act as a mitigation solution through harvesting as nutrients are removed from the system via plant matter and yields</li> <li>• Treated effluent from private sewerage systems can also be diverted through a wetland to remove P</li> </ul>
Maintenance and monitoring requirements	<ul style="list-style-type: none"> <li>•</li> <li>• Interannual/annual servicing e.g., pipe blockages</li> <li>• Interannual/annual desludging of <b>PTP</b>/ST and associated (specific) disposal requirements</li> <li>• Chemical dosing (if applicable)</li> <li>• Monthly checks of drainage field for water logging</li> <li>• Annual monitoring of influent and effluent to make assumptions about TP loading to the drainage field</li> <li>• A detailed sampling strategy incl. testing of filter material to determine max P saturation</li> <li>• Replacement of filter material once max P saturation is reached</li> <li>• Sampling programme will need to be reactive to rainfall events in order to sample runoff entering and existing the drainage field</li> <li>• Robust design and maintenance and monitoring to ensure correct dosing in perpetuity</li> <li>• Pre- and post-implementation monitoring outputs to gain credits for P (only for <b>PTP</b>/ST orchards)</li> </ul>
Potential additional benefits	<ul style="list-style-type: none"> <li>• <b>PTP</b>/ST could deliver water purification benefits, amenity value, carbon sequestration, hazard reduction, biodiversity benefits, reduced soil degradation, and improved nutrient cycling through mycorrhizal associations (if applicable)</li> <li>• Profits from orchards and SRC can be increased with the potential for stable returns from tree crops within 5 years (crop dependant)</li> <li>• Orchards and SRC could provide community-level benefits if energy crops are used to provide combined neighbourhood energy and NN schemes</li> </ul>

Guidance Note on the use of Package Treatment Plants

Key option considerations	
Development scale	<ul style="list-style-type: none"> <li>All development sizes (which can range from minor to major developments<sup>40</sup>)</li> </ul>
Spatial scale	<ul style="list-style-type: none"> <li>Small (0-0.5 ha or applicable at the household scale) or medium (0.5-2 ha of land required) for deployment (often within boundary of a PTP/ST)</li> <li>The orchard system is scalable, and can deliver more mitigation from larger schemes</li> </ul>
P removal method and efficiency	<ul style="list-style-type: none"> <li>The main process of P removal is the settlement of organic matter via gravity as solid waste is settled out within the system. If chemical dosing is used in a PTP/ST, chemical precipitation of P will be the main removal process</li> <li>The percolation of effluent through the soil (within the drainage field/orchard) immobilises any sediment bound P</li> <li>Sorption of soluble P onto the surface of sediments and soil particles</li> <li>High efficiency (67-100%)</li> </ul>
Factors affecting efficacy	<ul style="list-style-type: none"> <li>Type of PTP. Chemical PTPs have higher P removal capacities; whilst biological PTPs have lower P removal capacities</li> <li>Soil type. Average P retention of 97% in non-calcareous sediments and 69% in calcareous (Robertson, 2019)</li> <li>Hydraulic conductivity (i.e., the ability to drain water) of the soil. Smaller particles e.g., sandy soils decrease HC and increase saturation of soils and overland flow of effluent that had not undergone P removal</li> <li>Manufacturers, types of systems, sizes, population served, treatment processes, and maintenance regimes</li> <li>Filter media for drainage field - Polonite (with grains of 2-5 mm diameter) can have a 90% TP reduction over a two-year monitoring period (Renman and Renman, 2010). Gravels, sands, and soils generally have a low sorption capacity (&lt; 0.5 grams of TP per kg). Fine (&lt; 1 mm) blast furnace slag, fly ash, and Polonite have high phosphorous sorption capacities (over 1 gram of TP per kg) (Cucarella &amp; Renman, 2009). Lightweight expanded clay aggregates (LWAs) have a high P sorption capacity and a potential to be recycled</li> <li>Age of PTP/ST. Depending on the material used, the system may begin to deteriorate over time and leak untreated effluent with plastic, fibre glass, and concrete lasting longer than steel (May et al, 2015).</li> <li>The volume of settled organic matter (sludge). The greater the volume of settled sludge, the greater the decrease in sludge removal</li> </ul>
Time to effectiveness	<ul style="list-style-type: none"> <li>Between 1 - 3 years</li> </ul>
Design Requirements	<ul style="list-style-type: none"> <li>Water must flow through the scheme and not bypass it via groundwater</li> <li>Drainage fields should comprise a network of perforated pipes laid in a uniform gradient (trenches should not be steeper than 1:200)</li> <li>The drainage field/orchard should be downslope of groundwater sources, away from water supply pipes and away from any roads or paved surfaces</li> <li>Located in areas with verifiably high influent nutrient concentrations otherwise they are unlikely to provide any benefit</li> <li>Orchards require land with a nutrient source from a PTP/ST</li> </ul>

<sup>40</sup> See: Pre-application Community Consultation: Best Practice Guidance for Developers, available here: <https://gov.wales/planning-major-developments-guidance-pre-application-consultation> , accessed on: 05/05/2023

## Guidance Note on the use of Package Treatment Plants

Key option considerations	
Input sources	<ul style="list-style-type: none"> <li>• New development sites</li> </ul>
Longevity	<ul style="list-style-type: none"> <li>• The lifecycle is estimated to be between 10-40 years. Systems over 30 years old are 12 times more likely to cause water pollution issues than systems less than 10 years old (May et al, 2015). This figure is highly dependent on the materials used, the manufacturer guidelines, and the maintenance regime</li> <li>• A drainage field is assumed to have a 10 to 20-year lifespan. Assuming the private sewerage system and a drainage field would last 20 years, it may be necessary to replace and relocate a drainage field at least four times during the lifetime of a development to ensure P removal in perpetuity</li> </ul>
Certainty	<ul style="list-style-type: none"> <li>• Predictable performance in reductions of TP</li> </ul>
Cost	<ul style="list-style-type: none"> <li>• Cost of the PTP/ST, installation and ongoing maintenance means PTP/STs are ranked as medium cost relative to other mitigation options</li> </ul>
Constraints	<ul style="list-style-type: none"> <li>• Drainage fields eventually become saturated with P and cease to function effectively or potentially become a source of P to the environment (May, et al., 2015)</li> <li>• PTP/STs should only be used where it is not reasonable for development to connect to a public foul sewer</li> <li>• PTP/STs must be able to connect to an electricity supply</li> <li>• The drainage field/orchard must be at least 10 m from any watercourse or permeable drain, 50 m from boreholes or abstraction points, 15 m from buildings, sufficient distance from other drainage fields, and not in a Zone 1 groundwater protection zone</li> <li>• The water table must not come within 2 metres of the ground surface at any time</li> </ul>
Wider environmental considerations	<ul style="list-style-type: none"> <li>• If using a drainage field, consider climate change impacts on nutrient removal processes</li> <li>• If a chemical PTP/ST, aluminium treatment should not be used due to the likelihood of detrimental impacts on the surrounding environment/ecology</li> <li>• If a biological PTP/ST, it must be ensured the residents in dwellings linking to the private sewerage system being upgraded are not using chemicals or detergents which have the potential to negatively impact treatment</li> <li>• If possible, the previous land use on a proposed site should be determined to assess the likelihood of ground contamination and legacy P causing problems with water quality of water discharged from the PTP/ST drainage field</li> <li>• An orchard proposal may need to consider long-term inputs of the nutrients to the system, including the availability of "legacy" nutrients for removal by the trees</li> </ul>
Stakeholders for Engagement	<ul style="list-style-type: none"> <li>• NE</li> <li>• EA</li> <li>• Water companies</li> <li>• Landowners</li> <li>• LPAs</li> </ul>

## Appendix C

Table B- 2 Private Sewerage Upgrade

Key option considerations	
Summary description of option	<ul style="list-style-type: none"> <li>• Aging private sewerage systems, such as a <b>PTP</b> or ST, are replaced or upgraded with a modern private sewerage system with certified TP removal rates</li> </ul>
Maintenance and monitoring requirements	<ul style="list-style-type: none"> <li>• Interannual/annual servicing e.g., pipe blockages</li> <li>• Interannual/annual desludging of sewerage treatment system and associated (specific) disposal requirements</li> <li>• Chemical dosing (if applicable)</li> <li>• Monthly checks of drainage field for water logging</li> <li>• Annual monitoring of influent and effluent to make assumptions about TP loading to the drainage field</li> <li>• A detailed sampling strategy incl. testing of filter material to determine max P saturation (if applicable)</li> <li>• Replacement of filter material once max P saturation is reached (if applicable)</li> <li>• Sampling programme will need to be reactive to rainfall events in order to sample runoff entering and existing the <b>PTP/ST</b></li> <li>• Robust design and maintenance and monitoring plan. Credits can be calculated upfront but maintenance required to ensure efficacy in perpetuity</li> </ul>
Potential additional benefits	<ul style="list-style-type: none"> <li>• <b>PTPs</b> could deliver water purification, amenity value, carbon sequestration, hazard reduction and biodiversity enhancement benefits</li> </ul>
Development scale	<ul style="list-style-type: none"> <li>• All development sizes (which can range from minor to major developments<sup>1</sup>)</li> </ul>
Spatial scale	<ul style="list-style-type: none"> <li>• Small (0-0.5 ha or applicable at the household scale) / medium (0.5-2 ha of land required) for deployment (often within boundary of <b>PTP/ST</b>)</li> </ul>
P removal method and efficiency	<ul style="list-style-type: none"> <li>• The main process of P removal is the settlement of organic matter via gravity as solid waste is settled out within the system. If chemical dosing is used in a <b>PTP/ST</b>, chemical precipitation of P will be the main removal process</li> <li>• High efficiency (67-100%)</li> </ul>
Factors affecting efficacy	<ul style="list-style-type: none"> <li>• Type of <b>PTP/ST</b>. Chemical <b>PTP/STs</b> have higher P removal capacities; whilst biological <b>PTP/STs</b> have lower P removal capacities</li> <li>• Manufacturers, types of systems, sizes, population served, treatment processes, and maintenance regimes</li> <li>• The volume of settled organic matter (sludge). The greater the volume of settled sludge, the greater the decrease in sludge removal</li> <li>• The type of system and nutrient removal technology being used to replace a treatment system</li> <li>• Filter media for drainage field - Polonite (with grains of 2-5 mm diameter) can have a 90% TP reduction over a two-year monitoring period (Renman and Renman, 2010). Gravels, sands, and soils generally have a low sorption capacity (&lt; 0.5 grams of TP per kg). Fine (&lt; 1 mm) blast furnace slag, fly ash, and Polonite have high phosphorous sorption capacities (over 1 gram of TP per kg) (Cucarella &amp; Renman, 2009). Lightweight expanded clay aggregates (LWAs) have a high P sorption capacity and a potential to be recycled</li> </ul>

## Guidance Note on the use of Package Treatment Plants

Key option considerations	
Time to effectiveness	<ul style="list-style-type: none"> <li>• &lt; 1 - 3 years</li> </ul>
Design Requirements	<ul style="list-style-type: none"> <li>• Water must flow through the scheme and not bypass it via groundwater</li> <li>• There is a positive correlation between the mitigation capacity of a drainage field and the discharge concentration of TP from a private sewerage system, thus a drainage field is therefore best placed at the discharge site of a PTP/ST with high effluent TP concentrations</li> <li>• PTP/ST with high daily flow permits to maximise mitigation</li> </ul>
Input sources	<ul style="list-style-type: none"> <li>• Urban areas</li> </ul>
Longevity	<ul style="list-style-type: none"> <li>• It should be assumed that it can continue to function effectively without requiring maintenance towards the lower end of the range (&lt;10 years)</li> </ul>
Certainty	<ul style="list-style-type: none"> <li>• Predictable performance in reductions of TP</li> </ul>
Cost	<ul style="list-style-type: none"> <li>• PTP / ST upgrades are significant capital infrastructure projects with a medium cost relative to other mitigation options</li> </ul>
Constraints	<ul style="list-style-type: none"> <li>• PTP/STs that discharge to ground should only be replaced by units that also discharge to ground, where ground conditions are appropriate for drainage</li> <li>• PTP/STs which meet the P thresholds for small scale discharges may not be used to generate credits</li> </ul>
Wider environmental considerations	<ul style="list-style-type: none"> <li>• If using a drainage field, an upgrade proposal may need to consider climate change impacts on nutrient removal processes</li> <li>• If upgrading a chemical PTP/ST, aluminium treatment should not be used due to the likelihood of detrimental impacts on the surrounding environment/ecology</li> <li>• If upgrading a biological PTP/ST, it must be ensured the residents in dwellings linking to the private sewerage system being upgraded are not using chemicals or detergents which have the potential to negatively impact treatment</li> </ul>
Stakeholders for Engagement	<ul style="list-style-type: none"> <li>• NE</li> <li>• EA</li> <li>• Water companies</li> <li>• Landowners</li> <li>• LPAs</li> </ul>
	<ul style="list-style-type: none"> <li>•</li> </ul>

## Appendix D: Checklist for Developers

<b>Information Required at Application Stage if a PTP system is proposed</b>	
Evidence to show that the development cannot be connected to the mains sewerage system	Any new or replacement system
If proposing a small scale discharge evidence to demonstrate the conditions in table 1 above have been met.	Small scale discharges
Completed Nutrient budget calculator - Details of the number of properties and bedrooms proposed, together with a calculation of how much sewage the development will generate per day	Any new or replacement system being used to deliver nutrient neutrality
Make, design specification, volume and details of discharge with respect to phosphate for the PTP	Any new or replacement system and any system proposed as mitigation
A Management Plan that sets out how the system will be managed and maintained over the lifetime of the development	Any new or replacement system and any system proposed as mitigation
The workings and results of percolation tests as outlined in 'FDA1 Form guidance note 4' and in line with 'Approved document H, Drainage and Waste Disposal, The Building Regulations 2010, H2.'	Any new or replacement system and any system proposed as mitigation
A completed FDA1 Form, providing full calculations, together with an accurate, annotated drawing and location plan for the soakaway/drainage field, with the planning application	Any new or replacement system and any system proposed as mitigation