

**RIVER MEASE SPECIAL AREA OF CONSERVATION  
WATER QUALITY MANAGEMENT PLAN**

**DEVELOPER CONTRIBUTION SCHEME 2**

**Final Version**

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**Prepared by**



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# River Mease Water Quality Management Plan: Developer Contributions Scheme (2)

This Developer Contributions Scheme (DCS) is a requirement of the River Mease Special Area of Conservation Water Quality (Phosphate) Management Plan (WQMP).

This document replaces the first DCS (dated October 2012) and is likewise divided into eight sections which are introduced below. Much of the document is unchanged from the original DCS with sections C.4, E & F having been updated.

- **Section A** sets the scope of the Developer Contributions Scheme and the development to which it relates
- **Section B** provides relevant background
- **Section C** explains the basis upon which the scheme is required and establishes the links to existing planning policy
- **Section D** provides the evidence base in relation to the negative effects of phosphorus
- **Section E** introduces how the contributions will be assigned and linked to the nature and scale of proposed development
- **Section F** sets out the list of measures that will be funded by the scheme with associated costings and specifies the contribution per dwelling
- **Section G** refers to the role of monitoring and ongoing review
- **Section H** considers the potential for bespoke solutions

## A Relevance of developments to this scheme

The developer contribution scheme (DCS) is relevant to development which results in a net increase in phosphorus load being discharged to the River Mease Special Area of Conservation (SAC). It currently applies to all development which contributes additional wastewater via the mains sewerage network to a sewage treatment works which discharges into the catchment of the River Mease SAC. The following wastewater treatment works are affected:

- Snarestone
- Norton juxta Twycross
- Donisthorpe
- Overseal
- Netherseal
- Measham
- Clifton Campville
- Packington
- Edingale
- Smisby
- Chilcote

All new development which contributes additional wastewater to the foul water catchment areas of the above treatment works will be subject to a developer contribution. Development for which connection to the mains network is not a viable option will continue to be addressed on a case by case basis; the DCS may provide a solution to such development depending on the specific circumstances of each case.

## B Background to the Developer Contribution Scheme

### B.1 The River Mease SAC

The River Mease was designated by the Secretary of State as a Special Area of Conservation (SAC) under the EC Habitats Directive<sup>1</sup> on the 1<sup>st</sup> April 2005. The SAC is protected through the provisions of the Conservation of Habitats and Species Regulations 2010 (SI No. 490), commonly referred to as the Habitats Regulations.

The SAC incorporates the Gilwiskaw Brook downstream of Packington village and the River Mease from its confluence with the Gilwiskaw Brook to its confluence with the River Trent. It is designated for its internationally important habitats and species, which are collectively referred to as its 'interest features'. Natural England has drawn up conservation objectives for these features which are set out below<sup>2</sup>:

#### **Conservation Objectives for the River Mease SAC**

With regard to the SAC and the natural habitats and/or species for which the site has been designated ('the Qualifying Features' listed below), and subject to natural change;

**Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;**

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

This document should be read in conjunction with the accompanying *Supplementary Advice* document which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

#### **Qualifying Features:**

H3260. Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation; Rivers with floating vegetation often dominated by water-crowfoot  
S1092. *Austropotamobius pallipes*; White-clawed (or Atlantic stream) crayfish  
S1149. *Cobitis taenia*; Spined loach  
S1163. *Cottus gobio*; Bullhead  
S1355. *Lutra lutra*; Otter

*NB: The 'supplementary advice' referred to is not yet available*

Local planning authorities and the Environment Agency are 'competent authorities' under these regulations and must have regard to the requirements of the Habitats Directive in the exercise of any of their functions (regulation 9(5)).

<sup>1</sup> Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora

<sup>2</sup> European Site Conservation Objectives for River Mease Special Area of Conservation Site Code: UK0030258 Publication date 30 June 2014

In addition to this general provision to 'have regard' to the Habitats Directive, the Regulations also set out further protection in relation to the assessment of plans and projects. Part 6 of the regulations incorporates both 'assessment provisions' which are relevant to *new* consents, permissions or other authorisations and 'review provisions' which relate to *existing* decisions and consents.

## **B.2 The Review of Consents**

In accordance with these provisions, the Environment Agency has completed a review of the consents for which they are responsible, which were considered to be relevant to the River Mease SAC. Poor water quality, mainly due to high levels of phosphorus, was identified as representing a threat to the ability of the river to support its internationally important features in a sustainable way (referred to as the 'integrity' of the SAC in the Regulations). The review identified the need for stricter phosphorus limits at several treatment works, which have either been implemented, or are scheduled to be implemented over the next few years. In addition to these modifications, it was also recognised that further action, over and above the imposition of tighter phosphorus limits, needed to be taken by the Environment Agency (and other competent authorities) to ensure that their consents do not pose a threat to the SAC over the long term.

## **B.3 The Water Quality Management Plan**

The further action identified through the Environment Agency review will be coordinated by, and implemented through, a long term Water Quality Management Plan (WQMP) for the River Mease SAC. The plan was finalised in June 2011<sup>3</sup> with a primary purpose to '*reduce the levels of phosphate within the River Mease SAC, to enable the Conservation Objectives for the SAC to be met, and an adverse effect upon the SAC avoided*'; the primary objective of the WQMP is that '*the combined actions will result in a reduction in phosphate in the River Mease to no more than 0.06mg/l*<sup>4</sup> (this is the amount in milligrams per litre of the soluble reactive portion of the chemical phosphorus that should not be exceeded, and is referred to in the rest of this document as the 'Conservation Objective target').

With this plan now in place it is the view of the Environment Agency, as the relevant 'competent authority' in respect of discharges to the river, that action to be taken through the WQMP will ensure that their existing consents do not adversely affect the integrity of the SAC. This reliance on 'further action' effectively provides for a situation, such as that on the River Mease SAC, where existing consents *contribute* to an ongoing problem rather than causing it. Action to address the phosphate exceedence should have regard to the overall circumstances in the designated site, taking account of all potentially available measures; action taken forward should be the '*least onerous*' to those affected (regulation 64(4)).

The WQMP is currently entirely concerned with reducing levels of phosphate to enable the conservation objectives target to be met. It is therefore directly connected with and necessary to the management of the River Mease SAC. As such, both the plan itself and this developer contribution scheme are excluded from the assessment provisions of the Habitats Regulations.<sup>5</sup>

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<sup>3</sup> River Mease SAC Water Quality (Phosphate) Management Plan version 1.0, 27<sup>th</sup> June 2011.

<sup>4</sup> This target has since been revised (refer primary objective of DCS on page 6)

<sup>5</sup> Ref Regulation 61(b)

#### **B.4 Why can action not be taken sooner?**

The Habitats Regulations do not specify a timescale within which such action must 'secure' the integrity of the SAC. Effects on site integrity can be highly complex in nature and are not always amenable to short term control; the nature of such action may need to involve long term management initiatives. Longer term approaches, such as the one being taken to address the high phosphate levels within the River Mease, are also reflected in the provisions of the Habitats Directive<sup>6</sup> (which is one of the underlying European directives transposed through the provisions of the Habitats Regulations). Article 6(1) requires, where necessary, appropriate management initiatives as part of the overall framework of protection for SACs, it states that:

***“Member States shall establish the necessary conservation measures involving, if need be, appropriate management plans specifically designed for the sites..... which correspond to the ecological requirements of the natural habitat types in Annex I and the species in Annex II present on the sites”.***

The review provisions themselves (in relation to the existing permitted activities affecting the river) are closely linked to the Article 6(2) obligation for Member States to *'take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats'*. The taking of steps to 'avoid deterioration' is not limited to action on currently permitted activities (such as the sewage treatment works), but such action is considered to be an 'appropriate' step in this case. Appropriate steps to avoid deterioration for the River Mease SAC therefore comprise:

- a) General action unrelated to any given 'consent or other authorisation', such as that taken forward through the long term management initiative in the River Mease WQMP and the River Mease SSSI/SAC Restoration Plan; and
- b) Specific action on existing consented activities (eg: wastewater treatment works), which is being taken forward through the regulation 63 review provisions.

The WQMP is a key mechanism to enable all of the various public bodies to ensure appropriate steps are taken to avoid deterioration, alongside modifications to existing consents themselves.

#### **B.5 What is a developer contribution?**

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 obligations and the infrastructure (eg transport and schools) 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.

#### **B.6 What is a Planning Obligation?**

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

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<sup>6</sup> Council Directive 92/43/EEC on the Conservation of natural habitats and of wild flora and fauna

community, infrastructure or environmental improvement needs associated with development. It may be a bilateral agreement between the Local Planning Authority and the developer, or simply a unilateral undertaking by the developer to provide the same. These are a 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). While 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 6<sup>th</sup> April 2010, the measures to be funded through the Developer Contribution Scheme are “environmental protection measures” and so are not subject to pooling restrictions. As such the responsible local authorities will continue to secure developer contributions through planning obligations / CIL to fund the short term and long term measures identified in Appendix 1.

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 Local Planning Authority, 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 the larger development sites. However in respect of the impacts on the River Mease, the Developer Contribution Scheme 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 considered to be appropriate.

## C The requirement for a Developer Contribution Scheme

The WQMP includes a list of actions and investigations relating to all types of sources which will help reduce the levels of phosphorus throughout the catchment and the River Mease SAC. One of the actions listed in Table 5.1 of the WQMP is to 'establish a developer contribution framework, in accordance with planning obligations best practice'. The 'outcome' for such action is given as 'developer contributions fund a programme of actions to restore and provide new benefits to the river'.

**The primary objective of the developer contribution scheme (DCS) is therefore to mitigate the negative effects of development. In doing so, the DCS will ensure that new development does not compromise the primary purpose of the WQMP; to reduce the levels of phosphate within the River Mease SAC to no more than 0.04mg/L in Gilwiskaw Brook and 0.05mg/L in the River Mease to Croxhall.**

### ***C.1 Why a developer contribution is required when there is 'headroom' available at the sewage treatment works?***

There may be volumetric 'headroom' or 'capacity' available, for new development within the specific limits of the existing wastewater treatment work consents that discharge to the River Mease. However, it is important to recognise that the availability of such headroom is reliant on the WQMP being in place (because such consents were only affirmed *with* headroom under regulation 64(3), on the basis of the action '*to be taken*' through the plan). The availability of such headroom is therefore subject to any provisions or restrictions set out within the WQMP itself.

In spite of such consented headroom being available, the WQMP recognises the negative potential for any increases in phosphorus associated with new development to off-set any reductions that may be achieved through positive actions taken forward as part of the overall WQMP. The developer contribution scheme therefore provides a mechanism through which new development which increases P load to the river will mitigate the negative effects of development, as part of the overall package of reductions being delivered through the wider WQMP and the permit modifications identified through the review. **New development that contributes to the scheme will not conflict with the overall objectives and purposes of the WQMP.**

### ***C.2 Roles and Responsibilities***

Whilst the responsibility for the WQMP is shared between the Environment Agency and Natural England, its implementation relies on a wider partnership, including the relevant local planning authorities. The responsible local authorities in areas where the DCS is likely to apply are North West Leicestershire District Council, South Derbyshire District Council and Lichfield District Council. It has been agreed that North West Leicestershire District Council will take a lead role on behalf of all the responsible local authorities and will facilitate co-ordination of the DCS between them where necessary.

### **C.3 Development affected by the DCS**

As outlined in section A, the DCS currently applies to all development which contributes additional wastewater via the mains sewerage network to a sewage treatment works which discharges into the catchment of the River Mease SAC. Development for which connection to the mains network is not a viable option will continue to be addressed on a case by case basis; the DCS may provide a solution to such development depending on the specific circumstances of each case.

Contributions are sought on an equitable basis whereby different sized dwellings make different contributions relative to the scale of their potential impact. Further detail is provided in section F below dealing with assignment of the developer contribution.

### **C.4 Links to Planning Policy**

It is necessary to link the requirement for a developer contribution to planning policy. The National Planning Policy Framework, which came into effect on 27<sup>th</sup> March 2012, places the highest level of policy protection on European sites, such as the River Mease SAC, designated for their international nature conservation importance. Paragraph 119 makes it clear that the Framework's presumption in favour of sustainable development does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined.

The planning authorities are all embedding relevant policies relating to the protection of the River Mease into their Local Development Framework documents, to which the Developer Contribution Scheme will be linked in the future, as summarised below

- The South Derbyshire Part 1 Local Plan includes a number of policies which seek to improve water quality in watercourses throughout the District. In respect of the River Mease Special Area of Conservation key policies include Policy SD3 (Sustainable Water Supply, Drainage and Sewerage Infrastructure) which seeks to secure financial contributions from relevant developments that could lead to a deterioration in water quality in the SAC and BNE3 (Biodiversity) which supports long term plans to restore the River Mease to a more natural condition and improve water quality.
- The Lichfield District Local Plan Strategy was adopted on 17<sup>th</sup> February 2015 and contains relevant policies to protect and enhance designated sites such as SAC and SSSI (Core Policy 13: Our Natural Resources); a generic policy which protects and enhances protected species and their habitats (Policy NR3) and a policy specifically relating to the impacts of development upon the River Mease SAC (Policy NR8).
- In the North West Leicestershire Local Plan, Policy En2 'River Mease Special Area of Conservation' is a bespoke policy referring to the Water Quality Management Plan and this Developer Contribution Scheme.

All the planning authorities will progress the production of relevant supplementary planning documents where appropriate, including those covering detailed development management policies and developer contributions.

There is therefore an adequate policy framework at national, local and emerging Local Plan level intended to protect the River Mease and providing a sound policy basis for this developer contribution scheme.



## D The Evidence Base

### ***D.1 Historic monitoring data for phosphorus loading to the River Mease catchment***

Monitoring data<sup>7</sup> shows that there have been significant improvements in phosphate concentrations within the River Mease from 2005 to present. These reductions are largely as a result of improvements to sewage treatment work discharges implemented by Severn Trent Water as a result of changes identified by the Environment Agency through their review of consents. Whilst the improvements have resulted in significant reductions to phosphate levels, and associated benefits to ecological functioning, the conservation objective target needed to support the internationally important features of the River Mease SAC over the long term has not yet been met.

### ***D.2 The effects of phosphorus on ecological functioning***

A recent Natural England Research Report<sup>8</sup> identified the key biodiversity concerns that are associated with nutrient enrichment as being:

- a) Changes in the composition and increased abundance/biomass of the algal community.
- b) Changes in the composition and increased abundance/biomass of the rooted aquatic plant community, with a reduction in extent of species adapted to conditions of lower nutrient availability.
- c) A choking of river channels with submerged higher plants and algae, with high nocturnal respiration rates and diurnal sags in dissolved oxygen in the water column.
- d) Loss of aquatic plant abundance associated with algal smothering of riverbed substrates, attracting enhanced siltation and causing poor substrate conditions for benthic invertebrates and fish species with a requirement for coarse open sediments with high interstitial dissolved oxygen concentrations.
- e) Changes in invertebrate and fish community abundance and composition associated with changes in the plant community.

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<sup>7</sup> See data presented in section 3.4 and Appendix 7 of the WQMP

<sup>8</sup> Natural England Research Report NERR034: An evidence base for setting nutrient targets to protect river habitat. Mainstone, Nov 2010.

## E Measures to reduce phosphorus

The phosphate concentrations in the River Mease are contributed by one of two types of sources: point sources (primarily sewage treatment works), and diffuse sources (both urban and rural). There are various measures that can be taken to reduce phosphorus loading to the River. In order to secure a given environmental standard such as the conservation objective target, action will need to be aimed at both diffuse and point sources. Information contained within Appendix 8 of the WQMP considers the significance of action on both sources; reductions in diffuse sources become more significant as tighter point source limits are secured.

### E.1 The Water Quality Management Plan

The actions tables contained within section 5 of the WQMP detail the broad range of measures being progressed as part of the WQMP. The DCS is one such measure, to mitigate the negative effects of new development, thereby ensuring that such development does not compromise the primary purpose of the WQMP. The DCS will identify further actions, over and above those already progressed through the WQMP that will be implemented, managed and monitored through the use of developer contributions.

The funding streams for the DCS and the wider WQMP are intentionally separated in order to demonstrate that the tests of paragraph 204 of the National Planning Policy Framework 2012 are met, namely that the related planning obligations through which they would be collected would be: necessary to make the development acceptable in planning terms; directly related to the development; and fairly and reasonably related in scale and kind to the development. Moreover:

- a. Developer contributions will not be used to deliver the wider UK obligations required under Articles 6 (1) and (2) of the Habitats Directive in relation to management measures and appropriate steps to avoid deterioration.
- b. Phosphorus reduction measures delivered through the WQMP will achieve overall *reductions* in phosphorus levels in the river, rather than simply off-setting increases associated with new development and thereby maintaining the status quo.

The measures being progressed through the WQMP include wider investigative actions, aimed at improving the evidence base against which to better understand both the main sources of phosphorus within the catchment, and the potential reduction measures that offer the most likely benefits in terms of tangible phosphorus reductions. Action funded through developer contributions however must be linked to the negative effects associated with development; the primary objective of the DCS being to *mitigate* them.

In order for actions funded through the DCS to *mitigate* the negative effects of development, they must lead to phosphorus reductions. Actions which are purely investigative in nature cannot provide such mitigation; whilst they may add to the evidence base against which mitigation measures are considered, they do not lead to actual reductions in the river and hence will not themselves *mitigate* the effects of development. Subject to the provision in section H, in relation to investigative elements of a bespoke solution which are considered by the planning authorities and Natural England to be of such significance as to provide benefits of primary importance to the overall objectives of the wider WQMP, investigative actions will not generally be appropriate for funding through the DCS.

## **E.2 The River Mease Restoration Plan**

The River Mease SSSI/SAC Restoration Plan<sup>9</sup> was finalised in March 2012 to help achieve the objectives of the Habitats Directive and Water Framework Directive. The aim of the restoration plan is ‘*to identify river restoration and enhancement actions that can address physical modifications to the River Mease SSSI/SAC which contribute to unfavourable condition*’. The plan intends to provide a framework for the improvement of the River Mease SSSI/SAC for the next 20 -30 years and includes an outline restoration plan for the river on a reach by reach basis.

Whilst measures within the Restoration Plan can be linked to site management and the avoidance of deterioration, the scope of the plan goes beyond Article 6(1) and 6(2) obligations. The actions identified are broader than those which would otherwise happen under those general UK duties.

The plan incorporates a range of restoration measures, some of which can be directly linked to associated benefits in terms of reducing levels of phosphorus. The different categories against which actions are listed have been considered by relevant specialists and those which provide benefits in terms of phosphorus reductions have been identified.

## **E.3 Further potential mitigation measures**

Beyond the implementation of measures identified within the River Restoration Plan referred to in E.2 above, further measures have been identified for DCS2 which could deliver phosphate reductions. These are briefly summarised below:

- **Compensatory surface water removal:** this is where DCS funds remove surface water from the main sewage network thereby reducing the volume of flow (and hence the amount of P) entering the river. By way of example, potential schemes might involving rainwater harvesting from public amenity buildings (such as schools or libraries), where surface water currently goes into the foul sewer. Once collected this ‘grey’ water could be for reused within the buildings facilities such as water supply for flushing toilets. This would reduce the overall wastewater flows from the building and also reduce water usage providing additional sustainability benefits.
- **Sustainable urban drainage schemes (SuDS):** SuDS schemes are generally associated with a reduction in other pollutants entering the river (such as sediment and pollutants from roads). There are circumstances however where the location and design of a SuDS scheme might also deliver associated phosphate reductions.

## **E.4 What about measures at the wastewater treatment works?**

Direct improvements to the wastewater treatment works (WWTW) themselves would provide an efficient means of mitigating the negative effects of development, and would be easily managed and monitored through the ongoing operation of the works. Severn Trent Water has advised however that whilst this would appear to be a *logical* use of developer contributions it would not be a *lawful* use of such contributions.

Severn Trent Water has a general duty under section 94 of the Water Industry Act to effectually drain the area. It is the opinion of Severn Trent Water, following the *Barratt Homes Ltd v Dwr Cymru Cyfyngedig (Welsh Water)* [2009] UKSC 13 case (“Barratts case”),

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<sup>9</sup> River Mease SSSI/SAC Restoration Plan, Environment Agency and Natural England, March 2012.

that the law has been clarified such that this general duty extends to sewerage systems as well as sewage treatment works. To this end if either a) additional capacity or b) improvement (commonly referred to as 'quality obligation') is required at a WWTW these must be funded by Severn Trent Water. Whilst this may appear to be somewhat frustrating to the situation on the River Mease, such restrictions are necessary to ensure that a water company meets its obligations in a manner that represents the least possible cost to customers. Accepting additional quality obligations outside of the normal procedures will, in effect, place an additional burden on customers that will not have been subject to the proper OFWAT scrutiny, even if they are third party funded.

Of critical importance to the development of DCS2, is an agreement which has been reached since the development and implementation of DCS1. Following recent discussions between Natural England, the Environment Agency and Severn Trent Water, the following statement has been issued.

*Severn Trent, Environment Agency and Natural England have assessed the options to meet the SAC conservation objectives in relation to flow and phosphate, and agree that pumping sewage effluent from Packington and Measham sewage works out of the Mease catchment is the most effective long term solution.*

*The primary reason to move flow out of the River Mease catchment would be to ensure the SAC flow targets are met. In addition this will also remove phosphate for which the River Mease is currently failing to meet the SAC target.*

*All parties are committed to working together to progress the development of an appropriate scheme with a view to it being included in the next round of the asset management planning process for scrutiny within the 2019 Periodic Review.*

*It is fully accepted by all parties that implementation of such a solution will take time and would be subject to appropriate scrutiny by OFWAT in respect of the necessary investment costs by Severn Trent Water being passed onto their customers.*

By way of clarification, as set out above, the scheme to pump flows out of the catchment will not be funded by developer contributions as this would not be a lawful use of such contributions. The delivery of such a scheme will be subject to appropriate scrutiny by OFWAT and funded by Severn Trent Water.

### **E.5 The delivery of DCS2 measures**

The need for DCS2 has been identified in response to the development allocations within the North West Leicestershire District Council Local Plan, which is currently being finalised. The Local Plan was subject to assessment under the Habitats Regulations<sup>10</sup> and the Developer Contribution Scheme was identified as a key mechanism to provide NWLDC, and other LPAs, with the necessary confidence that development allocated within the catchment of the river will not be likely to have a significant effect on the River Mease SAC.

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<sup>10</sup> DTA Ecology Shadow Habitats Regulations Assessment to inform the HRA of the Local Development Plan, June 2016.

The HRA of the Local Plan recognises that, upon implementation, the recent agreement in respect of pumping flows from Packington and Measham out of catchment will provide an immediate solution to the impacts upon the River Mease SAC from wastewater associated with development connecting to these works. As such, of the development provided for within the Local Plan, 1150 dwellings are phased for delivery towards the end of the plan period, following the implementation of the scheme to pump flows out of catchment (anticipated for delivery by 2025). The need for DCS 2 is limited to the delivery of mitigation to facilitate the remaining 1826 additional dwellings which are anticipated to come forwards before the flows are pumped out of catchment. On the basis of the estimated 'Volume to Mains' provided in table F.3, an estimate of phosphate contributions from these dwellings (assuming 1826 three bedroom dwellings) would be an additional 509m<sup>3</sup>/day of treated effluent entering the Mease catchment.

## F Assigning the Developer Contribution

### F.1 How different types and scales of development generate phosphorus

Phosphorus associated with development is primarily derived from household detergents and human waste. Wastewater from new development within the foul water catchment of the River Mease is ultimately discharged into the river following treatment at the local sewage treatment works.

The main sewage treatment works that discharge to the River Mease are subject to consent limits for phosphorus. The treatment works which contribute 89% of the phosphorus load to the river from point sources are subject to a 1mg/L total phosphorus limit (category A works); the smaller works which contribute the remaining 11% of the P load have a consent limit of 2mg/L total phosphorus (category B works).

- **Category A works** with a 1mg/L limit include Packington, Measham, Donisthorpe, Overseal and Snarestone
- **Category B works** with a 2mg/L limit include Netherseal, Clifton Campville, Edingale and Norton Juxta.

These limits represent the maximum concentration permissible under the relevant environmental permit. Due to existing operating practices the water companies tend to operate at levels below these limits to ensure compliance; it is simply not possible to manage the works in such a way to achieve a steady concentration of total phosphorus at the consent limit.

On a precautionary basis therefore, it follows that for every 1 litre of flow derived from new development connected to category A works, a maximum of 1mg of phosphorus will be discharged to the river. Likewise, for every 1 litre of flow derived from new development connected to a category B works, a maximum of 2mg of phosphorus will be discharged to the river.

The phosphorus loading to the river from new development is directly linked to the volume of flow generated by new development. For residential development, this in turn is linked to the occupancy of the new dwellings. For non-residential development, this will instead be linked to the nature and scale of the proposed development which will need to be assessed on a case by case basis.

It is therefore possible to estimate the phosphorus contribution to the River Mease from new development on the basis of the estimated flow from the development concerned and the consent limit at the sewage treatment works to which the development will connect.

The increase in phosphate loading to the river associated with development is dependent on which receiving works the flow is directed to. On a precautionary basis, DCS1 was drafted on the assumption that all flow would be directed to a works operating at 1mg/L. However monitoring of effluent flows during the implementation of DCS1 has provided evidence that adopting this approach for the purpose of DCS2 may be excessively precautionary. By way of example, whilst the existing permit at the works set a limit of 1mg/L, recent monitoring data of effluent quality is as follows:

Treatment Works	Relative proportion of dry weather flow (DWF) into catchment	Average effluent P concentration
Packington	60%	2011-2014 = 0.47mg/l 2015 – now = 0.14mg/l
Measham	18%	2014 – current = 0.69mg/l
Donisthorpe	10%	2014 – current = 0.27mg/l
Overseal	6%	2014 – current = 0.33mg/l
Snarestone	6%	2014 – current = 0.68

Table F.1: Monitoring data of average effluent concentrations from treatments works pumping into the Mease catchment

Taking the average effluent quality and applying a weighting to take account of the relative proportion of dry weather flow (DWF) the average phosphate concentration from effluent being discharged into the Mease catchment over the last two years is 0.494mg/L. In light of this data, whilst it is appropriate to take a precautionary approach to the development coming forwards through DCS2, this should not be excessive. The basis upon which contributions are sought needs to be reasonable.

For the purpose of DCS2, the spatial distribution of the number of dwellings provided for within DCS2 is largely known. It is therefore possible to more accurately estimate the phosphate loading from DCS2, taking account of the number of dwellings connecting to each works. A precautionary yet reasonable estimate of the average effluent phosphate concentration from each receiving works has been agreed by the Technical Group as set out below. An average phosphate concentration from all works discharging into the Mease catchment (on the basis of these precautionary estimates) is applied to Windfall development, where the receiving works is not yet known.

Treatment Works	Number of dwellings	Precautionary P conc in effluent	Volume to mains	P contribution
Packington	749	0.5mg/L	210 m <sup>3</sup> /day	105g/day
Measham	539	0.9mg/L	150 m <sup>3</sup> /day	135g/day
Donisthorpe	76	0.5mg/l	21 m <sup>3</sup> /day	11g/day
Overseal	0	N/A	-	-
Snarestone	12	0.9mg/L	3.3 m <sup>3</sup> /day	3g/day
WINDFALL (STW unknown)	450	0.6mg/L	125 m <sup>3</sup> /day	75g/day
<b>TOTAL P contribution from DCS2</b>				<b>329 g/day</b>

Table F.2: Phosphate loading to river from development provided for within DCS2

## **F.2 How phosphorus reductions will be assigned**

Prior to the collection of any contributions, work has been undertaken by the Technical Group members to identify a suite of measures which are considered to mitigate the negative effects of development which is assigned to this development 'window' (see Appendix 1 for further details). For each proposed measure an estimate has therefore been made of the phosphorus that is expected to be removed upon implementation. Due to the nature of the available measures, and the complexities of working within a highly dynamic natural riverine ecosystem, estimates have had to be based on best available information and expert judgement.

Phosphorus reduction values for each measure have been estimated by relevant experts within the Environment Agency and Natural England, but a degree of uncertainty is unavoidable. If the DCS is to *ensure* effective mitigation of the negative effects of development, these uncertainties need to be acknowledged and addressed. The DCS proposes to address these uncertainties in three ways.

- a) Firstly, uncertainties will be minimised by relevant experts taking a precautionary approach to the estimated reductions that will be associated with each measure, such that achieving a greater reduction than anticipated is more likely than achieving less.
- b) Secondly, whilst being reasonable, the estimates of phosphorus load from new development remain precautionary in light of recent monitoring data of actual effluent quality.
- c) Thirdly, where feasible, ongoing monitoring of measures to best assess the *actual* reductions achieved upon implementation is an integral part of the DCS, together with monitoring of the final effluent to calculate the *actual* P load associated with the additional flow. The rolling review model allows for the monitoring results from one 'window' to feed into the actions progressed through the next 'window'. This will ensure that the measures taken forward *overall* will mitigate the negative effects of development.

It is acknowledged that the precautionary manner in which the DCS deals with uncertainties may well result in monitoring showing that the measures within a given 'window' actually removed more phosphorus than was anticipated. The complexities of working within such a complex and dynamic environment means that the potential for such a scenario is unavoidable if the DCS is to be progressed in a manner which ensures mitigation for the negative effects of development. Any benefits to the SAC over and above mitigating the negative effects of new development, if realised, can be considered to be of wider biodiversity gain, in accordance with the WQMP and the National Planning Policy Framework.

## **F.3 How contributions will be linked to phosphorus reductions**

DCS2 will be taken forward in a strategic manner such that, as far as possible, the costs associated with the measures identified for each development window will be calculated up front. The overall financial costs associated with the delivery, management and monitoring of those measures can then be calculated per mg of phosphorus to be removed per day.

Contributions for each window will be assigned in a fair and equitable manner on the basis of the phosphorus load associated with each development proposal. As set out in section F1



above, the phosphorus load can be calculated from the volume of water going to the mains from each development proposal in light of the relevant phosphorus consent limit at the receiving sewage treatments works.

In terms of residential development the following volumes are assumed, which have been calculated on the basis of the average occupancy values<sup>11</sup> for proposed dwellings. Part G of the Building Regulations requires all new homes to achieve *domestic* water consumption of a maximum of 120 litres/head/day (125 litres/head/day if garden water usage is included).

Size of dwelling	Average occupancy	Volume to mains (L/day) (at 120 l/h/d)
1 bed	1.17	140.4
2 bed	1.72	206.4
3 bed	2.32	278.4
4 bed +	3.24	388.8

Table F.3: Assumed volume to mains based on size of dwelling and average occupancy

Non-residential development will need to be assessed on a case by case basis with the contribution being calculated on the basis of the estimated volume of wastewater to mains associated with the nature and scale of the development being proposed.

In order for the DCS to mitigate the negative effects of development, it is important that the reduction measures are implemented in a timely manner which reflects the rate at which development comes forward. Payment of developer contributions will therefore be due upon implementation. In the case of larger scale development, phased payment can be negotiated with the planning authority on a case by case basis as appropriate.

#### **F.4 Projects and Cost Allocations**

The actions list will need to ensure that the overall objective of the DCS (to mitigate the negative effects of development) is secure. To realise this objective the DCS will need to address the requirement for the list of specific phosphorus reduction actions to be adequately managed and monitored. It is therefore envisaged that the overall actions list will be broken down into:

- Phosphorus reduction actions (including any ongoing maintenance)
- Monitoring actions (to monitor the effectiveness of the phosphorus reduction actions allowing the DCS to adapt accordingly)
- Management actions (to co-ordinate and manage the implementation of the list of phosphorus reduction and monitoring actions)

The second development window has been set for 329g of P. A full list of actions associated with DCS2 which are considered to mitigate the negative effects of development which will contribute an additional 329g phosphate, in both the short and long term (as necessary), is provided in Appendix 1, including a breakdown of estimated costs.

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<sup>11</sup> As provided by NWLDC

From Appendix 1 it can be seen that the cost of phosphorus mitigation measures to remove 329g of P, in both the short and long term, during the first phase of the second development window is £821K. This is equivalent to approximately:

**£2,495 / g P / day**

**or**

**£2.50/ mg P / day**

As set out in E.5 and F.1 above, the development provided for within DCS2 will contribute an additional flow to the sewage treatments works of 509m<sup>3</sup>/day. This in turn will lead to an additional phosphate loading of 329g P/day which is equivalent to an average effluent phosphate concentration of **0.65 mg P / day**. On the basis of the volume to mains data set out in table F.3 above, the P loading to the river is as follows:

Size of dwelling	Average occupancy	Volume to mains (L/day)	P loading to river (mg/day)
1 bed	1.17	140.4	91
2 bed	1.72	206.4	134
3 bed	2.32	278.4	181
4 bed +	3.24	388.8	253

Table F.4: Assumed P loading based on sustainable homes standard and volume to mains

On the basis of the cost allocations for the list of actions identified in relation to DCS2 set out in Appendix 1, the cost for removal of 1 mg/day of phosphorus is given as £2.50. The contributions for residential development can therefore be calculated by multiplying the daily phosphorus loading (mg) from each dwelling type (in table F.4) by 2.5, and are provided in table F.3 below:

Size of dwelling	Average occupancy	DCS Contribution
1 bed	1.17	£228
2 bed	1.72	£335
3 bed	2.32	£453
4 bed +	3.24	£633

Table F.5: DCS2 contributions from residential development

## **F.6 Contributions from non-residential development**

The contributions from non-residential development will be calculated on a case by case basis in light of the estimated increased phosphorus loading to the river, which in turn is calculated from the estimated volume of wastewater to mains associated with the nature and scale of the development being proposed whereby:

$$\text{Contribution (£)} = \text{P load to river* (mg/day)} \times 2.5$$

\*the P load to the river (mg/day) is equal to the volume (L/day) from proposed development multiplied by the P consent limit at the receiving works (ie: 1mg/L for category A works and 2mg/L for category B works as set out in section F1 )

New trade effluent discharges to sewer are subject to trade effluent permits which are issued by the sewerage undertaker. Trade effluent permits contain a volumetric condition in cubic metres per day. This volumetric condition can be used to calculate the developer contribution where a trade effluent permit is required.

Non residential development which does not require a trade effluent permit from Severn Trent Water should estimate wastewater flow with reference to existing Environment Agency recommended guidance 'Flows and Loads-3'<sup>12</sup>.

### ***F.7 Selection of a rolling allocation***

The DCS has been implemented on the basis of a rolling allocation whereby sequential development 'windows' are identified. Due to uncertainties associated with the rate at which development will come forward, **each allocation 'window' is based on an overall total phosphorus load from new development assigned to that window.**

All contributions will fund the measures identified for the relevant development window until the phosphorus load allocation for that window has been assigned to development.

*This second 'development window' has a phosphorus load allocation of 329g/day, the developer contributions associated with this second window will together fund measures to remove at least 329g/day of phosphorus from within the catchment, both in the short and long term.*

*Once these measures have been delivered, any further development will be part of a subsequent development window. Further information is provided within section G below.*

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<sup>12</sup> 'Flows and Loads – 3: Sizing criteria, treatment capacity for sewage treatment systems'. British Water Code of Practice 2009

## **G Recording, Monitoring and Review**

Monitoring is a key aspect of the DCS; where feasible monitoring the effectiveness of the proposed phosphorus reduction actions across the SAC is important to provide the appropriate level of confidence for the local authorities to rely on them to mitigate the negative effects of development.

Monitoring to be undertaken will be twofold:

- a) Firstly, where feasible, the phosphorus reduction actions will be monitored, to identify the *actual* phosphorus reduction achieved within a given development window.
- b) Secondly, the final effluent phosphorus concentrations will be monitored to identify the *actual* phosphorus load associated with the additional flow from new development progressed within the given development window.

As long as the monitoring results show that the anticipated reductions have been achieved), the DCS will meet its primary objective.

The monitoring results will also be used to inform the consideration of future development windows.

### **G.1 Future Development Windows**

When the phosphorus allocation assigned to this development window is approaching the point where all the allocation will have been apportioned, a new development window will be considered. The development of this second DCS does not imply that viable actions to mitigate the negative effects of development will continue to be available over the long term. At the end of each development window a decision will be taken as to whether sufficient viable mitigation measures can be achieved in practice to allow for further development to be delivered, through the assignment of a new development window.

In this way, development is only progressed when actions to mitigate further phosphorus loading to the river are considered to be achievable in practice. The findings of the wider investigative actions delivered through the WQMP may inform the identification of novel reduction measures that can be delivered through subsequent development 'windows'. If a stage is reached whereby no further viable actions to remove phosphorus are achievable in practice then further new development will not be progressed unless any additional wastewater is dealt with in a way that would not compromise the primary objective of the WQMP.

The rolling review model will allow for the DCS to adapt accordingly in response to monitoring data. If monitoring were to show that the actions had failed to deliver sufficient phosphorus reductions, adjustments to the subsequent 'window' could potentially be used to offset any difference.

The measures referred to in section F3 should reduce the likelihood of the DCS removing less phosphorus than anticipated. It is not therefore considered likely that monitoring results will show any shortfall. However the DCS needs to consider this possibility, however unlikely, and address it. In order to ensure that the DCS meets its primary objective, to

mitigate the negative effects of development, where a development window fails to achieve sufficient phosphorus reduction, the contributions in subsequent development windows would need to off-set the difference. Consequently it is possible, that in a future window the contributions sought may need to fund phosphorus removal over and above that associated with the actual development delivered in that window. The desire to avoid such a scenario underpins the need for the precautionary approach outlined in section F3.

The list of measures associated with future development windows, and the corresponding phosphorus load allocated, are dependent upon the availability of appropriate measures at that time. It is considered likely that the associated costs of the measures for future windows will vary from one development window to the next, with associated variations in actual financial contributions sought.

The recommendations of the North West Leicestershire Water Cycle Study will be used to inform the consideration of future development windows. Once the maximum consented 'headroom', or dry weather flow capacity limits are reached, Severn Trent Water would need to apply for a new permit. At such a time the ongoing requirement for a developer contribution scheme will be considered in light of the permitting options available to provide for future growth.

## **H Bespoke Solutions**

The purpose of the DCS is to provide a strategic approach to mitigation that facilitates the delivery of new development within the catchment. The DCS does not preclude the local authority deciding to assess a particular individual planning application independently. Equally, when making an application, a developer could ask the authority to assess the application separately from the DCS. The planning authorities and Natural England remain committed to considering any bespoke mitigation proposals put forward on a case by case basis.

As outlined in section E1, investigative studies are not generally considered to provide the 'mitigation' required through the DCS, and there will be a presumption against their acceptance as bespoke solutions. However where investigative elements of a bespoke solution are considered by the planning authorities and Natural England to be of such significance as to provide benefits of primary importance to the overall objectives of the wider WQMP, they will be considered on their merits in light of the other measures proposed with them.

## Appendix 1:

### ***Measures to be funded through the Developer Contributions Scheme 2 (DCS2)***

**FINAL VERSION (June 2016)**

The need for DCS2 has been identified in response to the development allocations within the North West Leicestershire District Council Local Plan, which is currently being finalised. The Local Plan was subject to assessment under the Habitats Regulations<sup>1</sup> and the Developer Contribution Scheme was identified as a key mechanism to provide NWLDC with the necessary confidence that development allocated within the catchment of the river will not be likely to have a significant effect on the River Mease SAC.

The HRA of the Local Plan identified the need for DCS2 to deliver mitigation to facilitate the delivery of 1826 dwellings. On the basis of the estimated P loadings to the river from receiving works provided in E&F of DCS2, an estimate of phosphate contributions from these dwellings represents an increased loading of **329g P/day**.

Of critical importance to the development of DCS2, is an agreement which has been reached since the development and implementation of DCS1. Following recent discussions between Natural England, the Environment Agency and Severn Trent Water, the following statement has been issued.

*Severn Trent, Environment Agency and Natural England have assessed the options to meet the SAC conservation objectives in relation to flow and phosphate, and agree that pumping sewage effluent from Packington and Measham sewage works out of the Mease catchment is the most effective long term solution.*

*The primary reason to move flow out of the River Mease catchment would be to ensure the SAC flow targets are met. In addition this will also remove phosphate for which the River Mease is currently failing to meet the SAC target.*

*All parties are committed to working together to progress the development of an appropriate scheme with a view to it being included in the next round of the asset management planning process for scrutiny within the 2019 Periodic Review.*

*It is fully accepted by all parties that implementation of such a solution will take time and would be subject to appropriate scrutiny by OFWAT in respect of the necessary investment costs by Severn Trent Water being passed onto their customers.*

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<sup>1</sup> Shadow Habitats Regulations Assessment to inform the HRA of the Local Development Plan, DTA Ecology June 2016.

## ***'Short term' measures***

### **Installation of silt traps**

Phosphorous release from silt can/will occur under anoxic and anaerobic conditions. In rivers, such conditions tend not to exist in thin layers of mobile silt, but tend to develop if significant silt accumulations are formed in slow moving sections of the river.

Road run off, especially where roadsides are being eroded, and the decomposition of organic matter are often the more important sources of phosphate release in rivers.

The use of silt traps can reduce total phosphorous in a river, as a consequence of removing silt holding phosphorous that has the potential to become soluble phosphorus downstream. The size of the reduction may be dependent upon the nature of the silt captured, but the more organic material capture the better.

Silt traps are normally constructed with a 'wetland' i.e. a water holding pond, planted up, with the actual silt trap structure at the end letting water out. The removal rate therefore increases when the phosphorous taken up by the wetland is considered.

Work on the River Eye with the installation of silt traps has resulted in a total phosphorous removal rate in the region of 50%. This concurs with research work undertaken by Lancaster University where it has been determined that phosphorous removal efficiencies of well designed sediment traps are likewise around 50%.

A good level of monitoring and maintenance is required for silt traps, both to remove silt captured and also to harvest the wetland plants at the end of the growing season to prevent die back and return of phosphorous to the river. The amount of phosphorous removed by harvested wetland plants can be quantified as 1 gram of phosphate per 5 kilograms of plant material such as reeds. On a precautionary basis, it is estimated that the installation of silt traps will remove 25% of total phosphorous.

**DCS2 funds will deliver silt traps to remove 329g P/day based on flow and average phosphate levels at that location. Three potential locations have been identified by the Technical Group.**

## ***The need for long term measures in DCS2?***

Silt traps start to remove phosphorous as soon as they are installed and will therefore deliver phosphorous reductions immediately, allowing development to come forwards. The approach taken in DCS1 recognised that the ongoing management and maintenance requirements associated with silt traps meant that, they are not considered to be sustainable in terms of delivering benefits over the lifetime of the development. As such, in DCS1 silt traps were not considered to be sustainable in the longer term, and they were regarded as a 'short term' measure. A key component of DCS1, in recognition of this, was the requirement to ALSO deliver additional longer term sustainable phosphorous removal measures, which can effectively *replace* the reductions which will be achieved through use of the any 'short term' silt traps. These were to be delivered in parallel with the short term silt trap measures. DCS1 assumes that once the long term measures are sufficiently established to provide phosphate removal benefits to the river any 'short term' silt trap measures will no longer be required and it is envisaged that any such silt traps will then be removed.

The agreement reached by Severn Trent Water, the Environment Agency and Natural England in respect of the commitment to work together to progress the development of a suitable scheme for *pumping sewage effluent from Packington and Measham sewage works out of the Mease catchment* represents material information which is highly relevant to the drafting of DCS2. Approved schemes are subsequently assigned to a programme of works for delivery between 2020-2025. As such, in respect of the impacts associated with development which connects to Packington and Measham treatment works, measures to offset the impacts associated with increase phosphate loading to the River Mease SAC no longer need to be scrutinised in light of the 'lifetime of the development'. Instead measures need to be sufficient to offset effects that might arise pre-2025 (or earlier if a scheme is scheduled for delivery within the programme of works before 2025). Of the 1,826 dwellings assigned to DCS2, 1,288 connect to either the Packington or Measham sewage treatment works. It would not be appropriate for developer contributions to deliver 'long term' measures in respect of such development as the impacts to the SAC will only exert an effect in the short term (pre 2025).

The decision to pump flows to Packington and Measham out of catchment will not however provide any benefits in respect of flows to other works within the catchment. As such it is still appropriate for DCS2 to also deliver 'long term measures'. Long term measures are required in respect of the dwellings which are anticipated to connect to the other, smaller works within the catchment. It is not known at this time which works the 'windfall' allocations might connect to. On a precautionary basis therefore, it is assumed that all the windfall development connects to one of these smaller works. **On the basis of the figures provided in table F.2 in the DCS long term measures are therefore required in respect of the delivery of 538 dwellings which are associated with a contribution of 89g P/day.**

### ***'Long term' measures***

There are various measures which would result in longer term reductions in phosphate levels within the river. DCS1 is delivering all the necessary long term measures through the implementation of actions identified in the River Mease Restoration Plan; work along seven reaches is being funded.



With regards the measures for DCS2, **Two reaches identified by the Technical Group include projects that could take place in the very near future as necessary landowner liaison is already underway.** These schemes are therefore considered to be 'secure' and can be funded by developer contributions.

## River Restoration Plan Schemes

Restoring a river to a more natural state clearly has significant benefits for river biodiversity and water quality. A river's ability to function as a diverse ecosystem, including its ability to 'clean' itself through its management of silt and nutrients in a sustainable way is highly dependent on a naturally functioning river channel and connectivity to its vital floodplain.

The River Mease River Restoration Plan, prepared by Natural England and the Environment Agency, sets out a vision for the SAC that addresses past modifications; restoring and enhancing natural river function which in turn will improve water quality and the river ecosystem. The plan sets out a long list of specific restoration proposals, with estimated costs. The plan refers to the Developer Contributions Scheme as one of the potential funding mechanisms.

The floodplain has the potential to take up phosphorous from the river. A properly functioning floodplain, typically supporting woodland or wet grassland habitats, slows down surface water input and therefore reduces sediment and the phosphorous it carries being brought into the river via surface water, and also allows the river to undertake the natural process of sediment deposition onto the floodplain in flood situations. Furthermore, taking floodplain land out of agricultural production removes the input of phosphate rich fertilisers or organic matter from that land. Re-profiling of river banks contributes to the reconnection of the river to its floodplain by enabling flood water to spill into the floodplain where modified banks have prevented this in the past.

As explained above for silt traps, wetland creation, if properly managed provides plant material to take up phosphorous. Likewise, riparian planting will also take up nutrients. Weir removal brings back the river's ability to properly manage its silt, and therefore phosphorous within that silt, and prevents the retention of phosphorous laden silt behind weir structures.

Whilst all actions to restore a more natural river function will contribute to the river's ability to manage and reduce nutrients, in proposing projects to be funded by the developer contributions scheme those that have more direct and clear links to phosphorous removal have been identified. Projects within the plan are divided into reaches, and there are 22 reach projects where the action will result in a clear phosphorous reduction.

Whilst the scientific justification for the fact that phosphorous will be removed is considered to be robust, the scheme specific uncertainties mean that exact figures for the amount of phosphorous that will be removed by each project cannot be provided. However the Technical Group have agreed a precautionary approach to estimating the removal of phosphate that might be associated with each 'stretch'.

**Precautionary calculations of total phosphorous removal for river restoration projects:**

**a) P removal during flood conditions:**

Average total phosphorous concentration in the River Mease = 0.32mg/l

Average flow in the River Mease, based on 5 sample locations provided by EA = 0.5 m<sup>3</sup> per second

= 43200m<sup>3</sup> per day

=43200000 litres per day

X 0.32 to get the mg of P per day = 13824000 mg P per day = 13824 g P per day

25% of P removed = 3456 g P, but as this is only 10% of the time then

10% of 3456 = 345.6 g P per day, on average.

If we divide this by the 22 reaches where phosphorous removing projects are proposed, then

= 16 g P per day per reach

**b) Phosphorous removal through amelioration of surface water input**

From above calculation the river carries 13824 g P per day. Diffuse sources contribute an average of 11.7% of the overall load<sup>[1]</sup>.

The measures delivered through the Restoration Plan are carried out on land adjacent to the SAC itself. The phosphorous load within the SAC associated with surface water run-off will be derived from two sources: i) the tributaries joining the river along the length of the SAC and ii) directly from land adjacent to the SAC itself. The Restoration Plan measures will only reduce surface water phosphorous load from land adjacent to the SAC itself (source ii). On a precautionary basis it is estimated that the delivery of the Restoration Plan measures along the length of the SAC itself will reduce the diffuse phosphorous load by 20%.

Diffuse P load = 11.7% of 13824 = 1520 g P per day

20% of diffuse load = 304 g P per day

If we divide this by the 22 reaches where phosphorous removal projects are proposed, then

= 14 g P per day per reach

**Overall phosphorous removal**

Combining the figures (a) and (b) above, the overall phosphorous removal from the delivery of the River Restoration Plan measures is:

**16 + 14 = 30 g P per day per reach**

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<sup>[1]</sup> Source: Environment Agency Review of Consents, River Mease SAC Stage 4 Site Action Plan

## Restoration of the disused coal pits

The disused coal pits off Sweptstone Road to the south east of Measham are within a stretch of the river not included in the River Restoration Plan. The site is located between stretches GIL005 and GIL006 and is currently the subject of detailed restoration proposals. These proposals relate to the restoration of the disused pits themselves and do not include works along the riverbanks intended to *restore* the healthy functioning of river. The landowner (UK Coal) has however agreed to DCS funding being used to include additional appropriate restoration measures along the river to be delivered alongside the restoration of the disused pits. This scheme delivers equivalent benefits to those identified for a typical stretch within the river restoration plan and is assumed to deliver a reduction of **30 g P per day**.

## **COSTINGS**

Measures have been identified in respect of offsetting the impacts associated with 329g phosphate. In view of the agreement to pump flows for Packington and Measham out of catchment 'short term' measures are required in respect of the full 329g phosphate. Long term measures are required to offset the impacts associated with flow directed to other, smaller works within the catchment in respect of 89g phosphate.

**Overall costs for the measures to be delivered within the first phase of the second development window to remove at least 329g/day in the short and 89g/day in the long term are detailed in Table 1 below.**

**Table 1: Measures to remove at least 329g P / day in the short term and 89g/day in the long term**

<b>P reduction and Monitoring Actions</b>					
<b>Action</b>	<b>Estimated P reduction (mg P/day)</b>	<b>Implementation &amp; maintenance Costs (£)</b>	<b>Monitoring approach</b>	<b>Monitoring cost (£)</b>	<b>Overall Costs (£)</b>
<b>SHORT TERM MEASURES</b>					
<p><b>Two silt traps projects at locations identified by Technical Group</b></p> <p>Costings based per trap</p> <ul style="list-style-type: none"> <li>a) Land drainage specialist to survey sites, design and oversee works</li> <li>b) Ground works</li> <li>c) Trap checks and maintenance (e.g. clean outs)</li> <li>d) Potential removal at 2031?</li> </ul>	<p>228g from location A</p> <p>100g from location B</p>	<p><u>Per trap costs</u></p> <ul style="list-style-type: none"> <li>a) £10k</li> <li>b) £15k</li> <li>c) £20</li> <li>d) £5k</li> </ul>	<p>Monitoring of water quality entering and exiting the trap, and potentially also take sediment samples entering and exiting. This will verify extent of P reduction and inform future silt trap projects</p>	<p><u>Per trap costs</u></p> <p>£30k (up to 2031)</p>	<p>£80k per trap (up to 2031)</p> <p>traps for the DCS2 development window</p> <p><b>TOTAL= £160k</b></p>

LONG TERM MEASURES					
<p><b>River restoration projects</b></p> <p>Specific in river projects (at stretches MEA001 and GIL004) to increase natural cleaning capacity of the river, in accordance with the river Restoration Plan. see river Restoration Plan for details</p>	60g	£22K min to £33k max for each reach	tbc		<p>Assume maximum cost of £66k for both reaches and pro rata 66K monitoring</p> <p><b>TOTAL = 132K</b></p>
<p><b>Long term measure – Restoration of river stretch alongside disused coal pits</b></p> <p>Specific in river projects to increase natural cleaning capacity of the river, equivalent to those delivered through the river Restoration Plan.</p>	30g	£20k min -30k max	tbc	100K To cover all projects	<p>Assume maximum cost of £30k and pro rata 34K monitoring</p> <p><b>TOTAL = 64K</b></p>
<p><b>Consultancy fees for design and oversight of the necessary work</b></p>	Implements measures above	£80K	n/a	n/a	<b>£80K</b>

Management Actions					
<b>Project officer</b> - staff cost (to cover the Plan period to 2031)	Implements measures above	£25k per year (to 2025) then 15K per year to 2031	Project Officer reports to the Programme Board	none	£25k/annum for 10 years = £250K Plus 15K per annum for 5 years = £75K <b>TOTAL = 325K</b>
<b>Project officer's implementation budget</b> - 3 x main campaigns over DCS2 period (one every five years)		20K per campaign	Project officer to provide feedback and a measure of effectiveness of campaigns as part of role, so no additional costs	none	3 campaigns at 20K each = <b>£60K</b>
Overall Costs					
<b>Delivery of All Measures</b>	<b>329 g/day (short term) and 89 g/day (long term)</b>				<b>£821K</b>