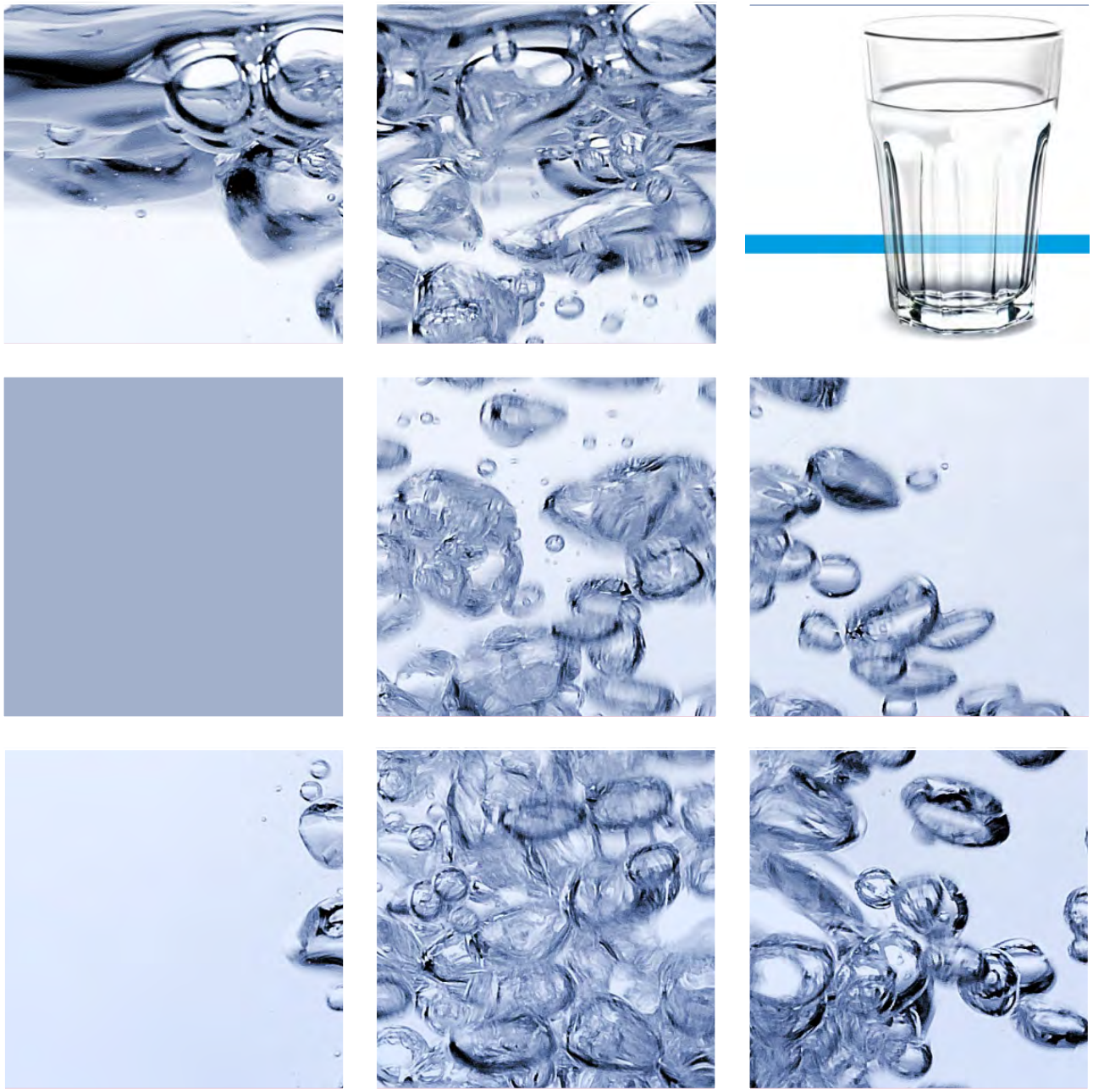
Uisce Éireann - Lead in Drinking Water Mitigation Plan

Screening for Appropriate Assessment

399 Portlaw WTP - Portlaw WSZ (3100PUB1081)



Lead in Drinking Water Mitigation Plan

Screening for Appropriate Assessment 399 Portlaw (3100PUB1081) WSZ – Portlaw WTP

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GLOSSARY OF TERMS & ABBREVIATIONS

Appropriate Assessment: An assessment of the effects of a plan or project on European Sites.

Biodiversity: Word commonly used for biological diversity and defined as assemblage of living organisms from all habitats including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part.

Birds Directive: Council Directive of 2nd April 1979 on the conservation of wild birds (79/409/EEC) as codified by Directive 2009/147/EC.

Geographical Information System (GIS): A GIS is a computer-based system for capturing, storing, checking, integrating, manipulating, analysing and displaying data that are spatially referenced.

Habitats Directive: European Community Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Flora and Fauna and has been transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011). It establishes a system to protect certain fauna, flora and habitats deemed to be of European conservation importance.

Mitigation measures: Measures to avoid/prevent, minimise/reduce, or as fully as possible, offset/compensate for any significant adverse effects on the environment, as a result of implementing a plan or project.

Natura 2000: European network of protected sites, which represent areas of the highest value for natural habitats and species of plants and animals, which are rare, endangered or vulnerable in the European Community. The Natura 2000 network of sites will include two types of area. Areas may be designated as Special Areas of Conservation (SAC) where they support rare, endangered or vulnerable natural habitats and species of plants or animals (other than birds). Where areas support significant numbers of wild birds and their habitats, they may become Special Protection Areas (SPA). SACs are designated under the Habitats Directive and SPAs are classified under the Birds Directive. In some situations, there may be overlap in extent of SAC and SPA.

Screening: The determination of whether implementation of a plan or project would be likely to have significant environmental effects on the Natura 2000 network.

Special Area for Conservation (SAC): An SAC designation is an internationally important site, protected for its habitats and species. It is designated, as required, under the EC Habitats Directive (1992).

Special Protection Area (SPA): An SPA is a site of international importance for breeding, feeding and roosting habitat for bird species. It is designated under the EC Birds Directive (1979).

Statutory Instrument: Any order, regulation, rule, scheme or byelaw made in exercise of a power conferred by statute.

1 INTRODUCTION

RPS was commissioned by Uisce Éireann (UE) to undertake Screening for Appropriate Assessment (AA) for the proposed orthophosphate dosing (herein referred to as the proposed project) of drinking water supplied by Portlaw Water Treatment Plant (WTP), Portlaw, Co. Waterford.

This report comprises information to support the Screening for AA in line with the requirements of Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (hereafter referred to as the Habitats Directive). The report assesses the potential for likely significant effects resulting from the additional phosphorus (P) load to environmental receptors, resulting from orthophosphate dosing being undertaken to mitigate against consumer exposure to lead in drinking water. It is therefore necessary to consider the sources, pathways and receptors in relation to added phosphorus.

1.1 PURPOSE OF THIS REPORT

The overall purpose of the Screening for AA, as a first step in determining the requirement for AA, is to determine whether the Project is likely to have a significant effect on any European Site within the zone of influence (ZoI) of the Water Supply Zone (WSZ), either individually or in combination with other plans or projects, in view of the site's Conservation Objectives. This Screening report complies with the requirements of Article 6 of the Habitats Directive transposed in Ireland principally through the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations, S.I. No. 477 of 2011 (as amended). In the context of the proposed project, the governing legislation is the EC Birds and Habitats Regulations 2011 (as amended).

1.2 THE PLAN

Uisce Éireann, as the national public water utility, prepared a Lead in Drinking Water Mitigation Plan (LDWMP) in 2016 (here after referred to as the Plan). The Plan provides a framework of measures for implementation to effectively address the currently elevated levels of lead in drinking water experienced by some UE customers as a result of lead piping. The Plan was prepared in response to the recommendations in the *National Strategy to reduce exposure to Lead in Drinking Water* which was published by the Department of Environment, Community and Local Government[1] and Department of Health in June 2015.

The overall objective of the Plan is to effectively address the risk of failure to comply with the drinking water quality standard for lead due to lead pipework in as far as is practical within the areas of UE's responsibility. Lead in drinking water is derived from lead pipes that are still in place in the supply network. These pipes are mostly in old shared connections or in the short pipes connecting the (public) water main to the (private) water supply pipes (UE, 2016[2]). Problems can also be caused by lead leaching from domestic plumbing components made of brass and from lead-containing solder, with the most significant portion of the lead pipework lying outside of UE's ownership in private properties (UE, 2016). Lead can be dissolved in water as it travels through lead supply pipes and internal lead plumbing. When lead is in contact with water it can slowly dissolve, a process known as

[1] Now known as the Department of Housing, Planning and Local Government (DHPLG).
[2] Uisce Éireann (UE) (2016) Lead in Drinking Water Mitigation Plan

plumbosolvency. The degree to which lead dissolves varies with the length of lead pipe, local water chemistry, temperature and the amount of water used at the property.

Health studies have identified risks to human health from ingestion of lead. In December 2013, the acceptable limit for lead in drinking water was reduced to 10 micrograms per litre (µg/l) as per the European Union (Drinking Water) Regulations. From 2003 to 2013, the limit was 25µg/l, which was a reduction on the previous limit (i.e. pre 2003) of 50µg/l.

The World Health Organisation (WHO), Environmental Protection Agency (EPA) and Health Service Executive (HSE) recommend lead pipe replacement (both lead service connections in the public supply, and lead supply pipes and internal plumbing in private properties) as the ultimate goal in reducing long-term exposure to lead. It is recognised that this will inevitably take a considerable period of time. In recognition of this, short to medium term proposals to mitigate the risk are being examined.

The Plan sets out the short, medium and longer term actions that UE intends to undertake, subject to the approval of the economic regulator, the Commission for Regulation of Utilities (CRU). It is currently estimated that 85% to 95% of properties meet the lead compliance standards when sampled at the customer's tap. The goal is to increase this compliance rate to 98% by end of 2021 and 99% by the end of 2027 (UE, 2016). This is subject to a technological alternative to lead replacement being deemed environmentally viable.

The permanent solution to the lead issue is to replace all water mains that contain lead. UE proposes that a national programme of replacement of public lead service pipes is required. However, replacing the public supply pipe or the private pipe on its own will not resolve the problem. Research indicates that unless both are replaced, lead levels in the drinking water could remain higher than the Regulation standards. Where lead pipework or plumbing fittings occur within a private property, it is the responsibility of the property owner to replace it.

The Plan assesses a number of other lead mitigation options available to UE. Other measures, including corrective water treatment in the form of pH adjustment and orthophosphate treatment, are being considered as an interim measure for the reduction of lead concentrations in drinking water in some WSZs.

UE initially assessed 400 water treatment plants for the introduction of corrective water treatment. Following this process 138 priority plants have been identified and corrective water treatment will be rolled out during the Lead in Drinking Water Mitigation programme, subject to site-specific environmental assessments. The corrective water treatment will reduce plumbosolvency risk over the short to medium term in high risk water supplies where it is technically, economically and environmentally viable to do so. This practice is now the accepted method of lead mitigation in many countries e.g. Great Britain and Northern Ireland. The dosing would be required to continue whilst lead pipework is still in use, subject to annual review on a scheme by scheme basis.

Orthophosphate is added in the form of Phosphoric acid, which is approved for use as a food additive (E338) in dairy, cereals, soft drinks, meat and cheese. The average adult person consumes between 1,000 and 1,500 milligrams (mg) of phosphorus every day as part of the normal diet. The quantity of orthophosphate that UE will be required to add to treated water is between 0.5 mg/l to 1.5 mg/l. At Portlaw WTP orthophosphate will be added at a rate of 0.8 mg/l with seasonal variation in the proposed dose, as set out within the Preliminary Design Report for the proposed dosing.

The typical concentration of phosphorus ingested from drinking 3 litres of water per day that has been treated with food grade phosphoric acid at 1.5 mg/l phosphorus, would be 4.5 milligrams.

The orthophosphate is dosed into the water at a rate which is dependent on raw water chemistry in a similar process to the addition of chlorine for disinfection. Orthophosphate dosing takes a period of 6-12 months to develop a full coating, after which dosing must be maintained in order to sustain the protective coating.

1.3 PROJECT BACKGROUND

Phosphorus can influence water quality status through the process of nutrient enrichment and promotion of excessive plant growth (eutrophication). It is therefore necessary to evaluate the significance of any potential environmental impact and the pathways by which the added orthophosphate may reach environmental receptors. To facilitate the assessment, an Environmental Assessment Methodology (EAM) has been developed based on a conceptual model of phosphorus transfer (from the water distribution and wastewater collection systems), using the source-pathway-receptor framework.

The first step of the EAM is to identify the European Sites that have a hydrological or hydrogeological connectivity to the WSZs affected by the proposed orthophosphate dosing. The EAM recognises that for those European Sites with nutrient sensitive Qualifying Interests (habitats and species) and connectivity to the WSZ indicates that pathways for effects exist. The project effects on these European Sites, and an evaluation as to whether these are potentially significant, are the subject of the Screening for AA. The Screening report applies objective scientific information from the EAM as outlined in this document in the context of the Site Specific Conservation Objectives (SSCO) as published on the NPWS website.

The EAM process identified 24 European Sites with potential hydrological or hydrogeological connectivity to the WSZ:

- SAC sites: Lower River Suir SAC, Comeragh Mountains SAC, Nier Valley Woodlands SAC, River Barrow and River Nore SAC, Hook Head SAC, Bannow Bay SAC, Ballyteigue Burrow SAC, Saltee Islands SAC, Tacumshin Lake SAC, Lady's Island Lake SAC, Carnsore Point SAC, Tramore Dunes and Back Strand SAC, Helvick Head SAC and Ardmore Head SAC; and

- SPA sites: Bannow Bay SPA, Keeragh Islands SPA, Ballyteigue Burrow SPA, Saltee Islands SPA, Tacumshin Lake SPA, Lady's Island Lake SPA, Tramore Back Strand SPA, Mid-Waterford Coast SPA, Dungarvan Harbour SPA and Helvick Head to Ballyquin SPA.

Each of these European Sites includes habitats and/or species identified as nutrient sensitive. Following the precautionary principle the potential for likely significant effects arising from the proposed project requires assessment, due to connectivity to each of the identified European Sites, in light of their nutrient sensitive Qualifying Interests.

2 APPROPRIATE ASSESSMENT METHODOLOGY

2.1 LEGISLATIVE CONTEXT

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora better known as the "Habitats Directive" provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC.

The obligation to undertake appropriate assessment derives from Articles 6(3) and 6(4) of the Habitats Directive and both involve a number of steps and tests that need to be applied in sequential order. Article 6(3), which is concerned with the strict protection of sites, establishes the requirement for AA:

"Any plan or project not directly connected with or necessary to the management of the [European] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public".

Article 6(4) states:

"If, in spite of a negative assessment of the implications for the [European] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted".

The results of each step must be documented and recorded so there is full traceability and transparency of the decisions made.

Over time legal interpretation has been sought on the practical application of the legislation concerning AA, as some terminology has been found to be unclear. European and National case law has clarified a number of issues and some aspects of European Commission (EC) published guidance documents have been superseded by case law.

2.2 GUIDANCE FOR THE APPROPRIATE ASSESSMENT PROCESS

The assessment completed has had regard to the following legislation and guidance documents:

European and National Legislation:

- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (also known as the 'Habitats Directive');
- Council Directive 2009/147/EC on the conservation of wild birds, codified version, (also known as the 'Birds Directive');
- European Communities (Birds and Natural Habitats) Regulations 2011 to 2015; and
- Planning and Development Act 2000 (as amended).

Guidance / Case Law:

- *Article 6 of the Habitats Directive – Rulings of the European Court of Justice*. Final Draft September 2014;
- *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities.* DEHLG (2009, revised 10/02/10);
- *Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.* European Commission (2002);
- *Communication from the Commission on the Precautionary Principle*. European Commission (2000b);
- *EC study on evaluating and improving permitting procedures related to Natura 2000 requirements under Article 6.3 of the Habitats Directive 92/43/EEC*. European Commission (2013);
- *Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission*. European Commission (2007); and
- *Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. European Commission (2000a).

Departmental/NPWS Circulars:

- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPWS 1/10 and PSSP 2/10. (DEHLG, 2010);
- *Appropriate Assessment of Land Use Plans*. Circular Letter SEA 1/08 & NPWS 1/08;
- *Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments*. Circular L8/08;
- *Guidance on Compliance with Regulation 23 of the Habitats Directive.* Circular Letter NPWS 2/07; and

- *Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites*. Circular Letter PD 2/07 and NPWS 1/07.

2.3 STAGES OF THE APPROPRIATE ASSESSMENT PROCESS

According to European Commission Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive, the assessment requirements of Article 6 establish a four-staged approach as described below. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The four stages are as follows:

- Stage 1 – Screening of the proposed plan or project for AA;
- Stage 2 – An AA of the proposed plan or project;
- Stage 3 – Assessment of alternative solutions; and
- Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI)/ Derogation.

Stages 1 and 2 relate to Article 6(3) of the Habitats Directive; and Stages 3 and 4 to Article 6(4).

Stage 1: Screening for a likely significant effect

The aim of screening is to assess firstly if the plan or project is directly connected with or necessary to the management of European Site(s); or in view of best scientific knowledge, if the plan or project, individually or in combination with other plans or projects, is likely to have a significant effect on a European Site. This is done by examining the proposed plan or project and the conservation objectives of any European Sites that might potentially be affected. If screening determines that there is potential for likely significant effects or there is uncertainty regarding the significance of effects then it will be recommended that the plan is brought forward to full AA.

Stage 2: Appropriate Assessment (Natura Impact Statement or NIS)

The aim of stage 2 of the AA process is to identify any adverse impacts that the plan or project might have on the integrity of relevant European Sites. As part of the assessment, a key consideration is 'in combination' effects with other plans or projects. Where adverse impacts are identified, mitigation measures can be proposed that would avoid, reduce or remedy any such negative impacts and the plan or project should then be amended accordingly, thereby avoiding the need to progress to Stage 3.

Stage 3: Assessment of Alternative Solutions

If it is not possible during the stage 2 to reduce impacts to acceptable, non-significant levels by avoidance and/or mitigation, stage 3 of the process must be undertaken which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. Explicitly, this means alternative solutions that do not have negative impacts on the integrity of a European Site. It should also be noted that EU guidance on this stage of the process states that, 'other assessment criteria, such as economic criteria, cannot be seen as overruling ecological criteria' (EC, 2002). In other words, if alternative solutions exist that do not have negative impacts on European Sites; they should be adopted regardless of economic considerations.

Stage 4: Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

This stage of the AA process is undertaken where no alternative solutions exist and where adverse impacts remain. At this stage of the AA process, it is the characteristics of the plan or project itself that will determine whether or not the competent authority can allow it to progress. This is the determination of 'over-riding public interest'.

It is important to note that in the case of European Sites that include in their qualifying features 'priority' habitats or species, as defined in Annex I and II of the Directive, the demonstration of 'over-riding public interest' is not sufficient and it must be demonstrated that the plan or project is necessary for 'human health or safety considerations'. Where plans or projects meet these criteria, they can be allowed, provided adequate compensatory measures are proposed. Stage 4 of the process defines and describes these compensation measures.

2.4 INFORMATION SOURCES CONSULTED

To inform the assessment for the project and preparation of this Screening report, the following key sources of information have been consulted, however it should be noted that this is not an exhaustive list and does not reflect liaison and/ or discussion with technical and specialist parties from UE, RPS, NPWS, IFI, EPA etc. as part of Plan development.

- Information provided by UE as part of the project;
- Environmental Protection Agency – Water Quality www.epa.ie and www.catchments.ie;
- Geological Survey of Ireland – Geology, Soils and Hydrogeology www.gsi.ie;
- Information on the conservation status of birds in Ireland (Colhoun & Cummins 2013);
- National Parks and Wildlife Service – online Natura 2000 network information www.npws.ie;
- National Biodiversity Action Plan 2017 - 2021 (DCHG 2017);
- Article 17 Overview Report Volume 1 (NPWS, 2019a);
- Article 17 Habitat Conservation Assessments Volume 2 (NPWS, 2019b);
- Article 17 Species Conservation Assessment Volume 3 (NPWS, 2019c);
- EPA Qualifying Interests database, (EPA, 2015) and updated EPA Characterisation Qualifying Interests database (EPA/RPS, September 2016);
- River Basin Management Plan for Ireland 2018 - 2021 - www.housing.gov.ie;
- Ordnance Survey of Ireland – Mapping and Aerial photography www.osi.ie;
- National Summary for Article 12 (Cummins et al., 2019); and
- Format for a Prioritised Action Framework (PAF) for Natura 2000 (2014) www.npws.ie/sites/default/files/general/PAF-IE-2014.pdf.

2.5 EVALUATION OF THE RECEIVING ENVIRONMENT

Ireland has obligations under EU law to protect and conserve biodiversity. This relates to habitats and species both within and outside designated sites. Nationally, Ireland has developed a National Biodiversity Plan (DCHG, 2017) to address issues and halt the loss of biodiversity, in line with international commitments. The vision for biodiversity is outlined: "*That biodiversity and ecosystems*

in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally".

Ireland aims to conserve habitats and species, through designation of conservation areas under both European and Irish law. The focus of this Screening report is on those habitats and species designated pursuant to the EU Birds and EU Habitats Directives in the first instance, however it is recognised that wider biodiversity features have a supporting role to play in many cases if the integrity of designated sites is to be maintained/restored.

In relation to protected water-dependent habitats and species under the Birds and Habitats Directive, the river basin management planning process contributes towards achieving water related environmental supporting conditions that support Favourable Conservation Status. In preparing the RBMP (2018-2021) (DHPLG, 2018[3]) the characterisation assessment carried out by the EPA for these water dependent European Site protected areas has focussed on looking at the risks to the water standards/objectives established for the purpose of supporting Good Ecological Status (GES), or High Ecological Status (HES) where required. GES, which is the default objective of the WFD, is considered adequate for supporting many water dependent European Site protected areas where site specific environmental supporting conditions have not been defined within SSCOs by the NPWS. A number of lake habitats (e.g. oligotrophic lakes) and species (e.g. the freshwater pearl mussel) will require a more stringent environmental objective i.e. high status. Where this applies, this has been taken into account in the EAM and evaluated within the context of this Screening report.

2.5.1 Identification of European Sites

Current guidance (DEHLG, 2010) on the ZoI to be considered during the Screening for AA states the following:

"A distance of 15km is currently recommended in the case of plans, and derives from UK guidance (Scott Wilson et al., 2006). For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in-combination effects".

As stated above, a buffer of 15km is typically taken as the initial ZoI extending beyond the reach of the footprint of a plan or project, although there may be scientifically appropriate reasons for extending this ZoI further depending on pathways for potential impacts. With regard to the current project, the 15km distance is considered inadequate to screen all likely significant effects that might impact upon European Sites. This is primarily due to the need to consider the potential for likely significant effects on European Sites with regard to aquatic and water dependent receptors. Therefore, the ZoI for this project includes all of the hydrologically connected surface water sub catchments and groundwater bodies ((**Figure 4-2**).

[3] DHPLG (2018) The River Basin Management Plan for Ireland (2018-2021). Available at: https://www.housing.gov.ie/water/water-quality/river-basin-management-plans/river-basin-management-plan-2018-2021-0

2.5.2 Conservation Objectives

Article 6(3) of the Habitats Directive states that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications of the site in view of the site's ***conservation objectives****.*

Qualifying Interests (QIs)/ Special Conservation Interests (SCIs) are annexed habitats and annexed species of community interest for which an SAC or SPA has been designated respectively. The Conservation Objectives (COs) for European Sites are set out to ensure that the QIs/ SCIs of that site are maintained or restored to a favourable conservation condition. Maintenance of favourable conservation condition of habitats and species at a site level in turn contributes to maintaining or restoring favourable conservation status of habitats and species at a national level and ultimately at the Natura 2000 Network level.

In Ireland 'generic' COs have been prepared for all European Sites, while 'site specific' COs have been prepared for a number of individual Sites to take account of the specific QIs/ SCIs of that Site. Both the generic and site specific COs aim to define favourable conservation condition for habitats and species at the site level.

Generic COs which have been developed by NPWS encompass the spirit of site specific COs in the context of maintaining and restoring favourable conservation condition as follows:

For SACs:

- '*To maintain or restore the favourable conservation condition of the Annex I habitats and/or Annex II species for which the SAC has been selected'.*

For SPAs:

- '*To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA*'.

Favourable Conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is "favourable".

Favourable Conservation status of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats;

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis.

A full listing of the COs and QIs/ SCIs for each European Site, as well as the attributes and targets to maintain or restore the QIs/ SCIs to a favourable conservation condition, are available from the NPWS website www.npws.ie. Web links for COs for the European Sites relevant for this Screening report, are included in **Appendix A**.

2.5.3 Existing Threats and Pressures to EU Protected Habitats and Species

Given the nature of the proposed project, a review has been undertaken of those QIs/SCIs which have been identified as having sensitivity to orthophosphate loading. Information has been extracted primarily from a number of NPWS authored reports, including recently available statutory assessments on the conservation status of habitats and species in Ireland namely; *The Status of EU Protected Habitats and Species in Ireland* (NPWS 2013a, b & c) and on information contained in Ireland's most recent Article 12 submission to the EU on *the Status and Trends of Birds Species* (NPWS 2013d). Water dependent habitats and species were identified as having the greatest sensitivity to the proposed dosing activities, and the Water Framework Directive SAC water dependency list (NPWS, December 2015), was used as part of the criteria for screening European Sites.

There are 60 habitats, 25 species and 68 bird species which are water dependent and / or where nutrients are a key pressure or threat and where compliance with the Environmental Quality Standards for nutrient levels (including orthophosphate) will contribute to achieving or maintaining favourable conservation status. These are listed in **Appendix B**.

3 DESCRIPTION OF THE PROJECT

3.1 OVERVIEW OF THE PROPOSAL

Portlaw WTP supplies Portlaw, a town in County Waterford, situated approximately 19 km northwest of Waterford City. The distribution input for Portlaw is 386 m^3/day (70% of which is accounted for) serving a population in excess of 1,489. The non-domestic demand is 9% of the distribution input.

The area is served by Portlaw WWTP (D0274), which is licensed in accordance with the requirements of the Waste Water Discharge (Authorisation) Regulations 2007 as amended and the impact of the orthophosphate dosing on the emission limit values and the receiving water body downstream of the point of discharge are assessed. It is estimated that there are 79 properties across the WSZ that are serviced by a DWWTS (see **Appendix C**).

Portlaw WTP lies on the Darrigal_010 (IE_SE_16D290570) adjacent to the Middle Suir Estuary (IE_SE_100_0550), in the Suir catchment (HA16). The EAM process identified 24 European Sites with potential hydrological or hydrogeological connectivity to the WSZ:

- SAC sites: Lower River Suir SAC, Comeragh Mountains SAC, Nier Valley Woodlands SAC, River Barrow and River Nore SAC, Hook Head SAC, Bannow Bay SAC, Ballyteigue Burrow SAC, Saltee Islands SAC, Tacumshin Lake SAC, Lady's Island Lake SAC, Carnsore Point SAC, Tramore Dunes and Back Strand SAC, Helvick Head SAC and Ardmore Head SAC; and

- SPA sites: Bannow Bay SPA, Keeragh Islands SPA, Ballyteigue Burrow SPA, Saltee Islands SPA, Tacumshin Lake SPA, Lady's Island Lake SPA, Tramore Back Strand SPA, Mid-Waterford Coast SPA, Dungarvan Harbour SPA and Helvick Head to Ballyquin SPA.

3.2 CONSTRUCTION OF CORRECTIVE WATER TREATMENT WORKS

The corrective water treatment works at Portlaw WTP will involve the provision of orthophosphate dosing and associated safety equipment.

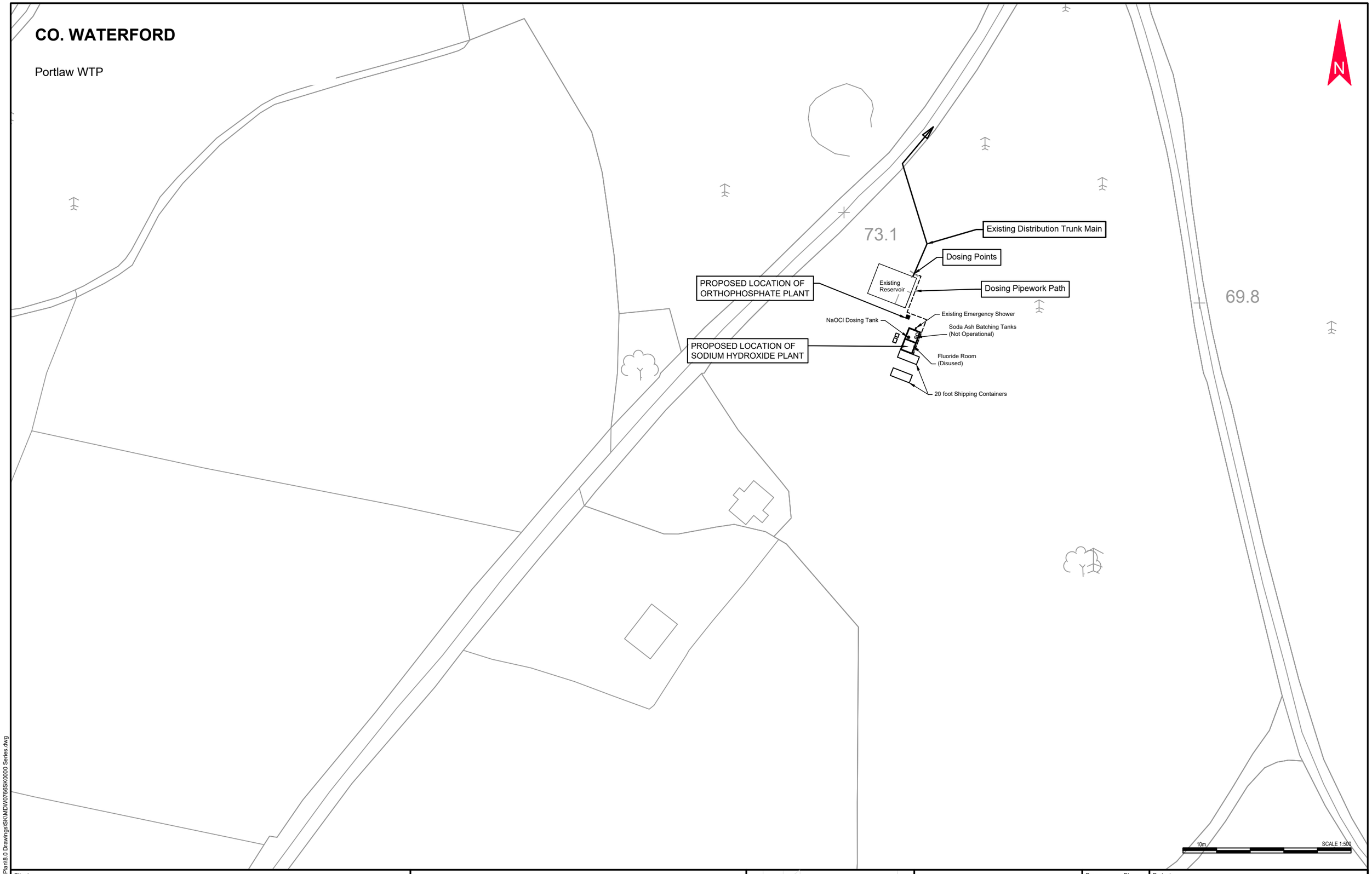
The location of the orthophosphate dosing system at Portlaw WTP will be adjacent to the existing treatment building and Treated Water Storage Reservoir and therefore will be located within the confines of the existing Portlaw WTP boundary.

A stable pH is critical to facilitate effective plumbosolvency control and pH correction works are proposed for the Portlaw WTP. The pH correction infrastructure will be located within the disused Fluoride storage and dosing room.

The surrounding landscape is dominated by woodland (Kilbunny Woods surrounds the WTP) and agricultural grassland. The location of the works is shown on **Figure 3-1**.

CO. WATERFORD

Portlaw WTP



Client

Uisce Éireann Irish Water

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No.	Date	Dn. Chk.	Amendment / Issue	App
A01	Mar'19	BL BR	Issue for Client Approval	GJG
D01	Dec'18	BL BR	Draft	GJG

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Checked	BR
Approved	GJG
Date	12/03/2019
Scale	1:500 @ A1
	1:1,000 @ A3

Project: **LEAD MITIGATION PLAN**

Title: FIGURE 3.1: PORTLAW WATER TREATMENT PLANT - SITE LAYOUT

Job No.	File Ref.	Drg. No.	Rev.
MDW0766	MDW0766SK0000 Series.dwg	SK0399 WTP	A01

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The implementation of orthophosphate dosing at the Portlaw WTP will require the following elements:

- 1 no. Bulk Storage tank for phosphoric acid;
- 2 no. Bulk storage tanks for pH Control;
- Dosing pumps;
- Dosing pipework and carrier water pipework;
- Associated electrical installations.

The bulk storage tanks (3 no. tanks, phosphoric acid tank will have a working volume of 50 litres and the each of the Sodium Hydroxide tanks for pH control will have a working volume of 500 litres) will sit upon skid mounting. The skid mounting will support the combined weight of the storage tanks, electrical and control equipment and total volume of chemical to be stored on one skid. This is metal frame which will be assembled off site including mounting the tanks and associated equipment and set into position at the Portlaw WTP.

Each storage tank will be self-bunded to accommodate greater than 110% of the tank working volume. The tanks shall conform to UE design guidelines and will include the following environmental safety design features; level detection sensors, visual level indicators and alarms and a bund leak detection system. All materials and associated equipment, fixtures and fittings shall be compatible with 75% phosphoric acid.

Dosing pipelines, carrier water pipework and electrical cables shall be installed within 100mm diameter ducts, placed in trenches constructed within existing made ground at the Portlaw WTP. The ducts will be installed at approximately 700mm below ground level and following installation the trench will be backfilled and the surface reinstated to match the existing surface. Where pipework and cables are routed through existing structures, they shall be surface mounted within trunking.

A suitable kiosk will be installed upon skid mounting to house all electrical and control equipment required for the orthophosphate system. Skid mounting is a metal frame that will be assembled off-site and set into position at the WTP. This control system will be incorporated into the existing supervisory control and data acquisition (SCADA) system on site. The proposed automation solution will be managed using a new programmable logic computer (PLC) / human machine interface (HMI) controller.

3.3 CONSTRUCTION METHODOLOGY

The proposed works will be carried out by suitably qualified contractors. The proposed dosing unit will be located within the bounds of the existing Portlaw WTP.

3.4 OPERATION OF CORRECTIVE WATER TREATMENT WORKS

The operational stage for the corrective water treatment works will be a part of the day to day activities of the WTP and will be operated in accordance with the SOPs.

The orthophosphate dosing system will be controlled by the site SCADA system, whereby, orthophosphoric acid will be dosed proportional to the flow of the water being distributed to the network. At Portlaw WTP, orthophosphate will be added to treated water at a rate of 0.8 mg/l. The onsite storage tanks have been designed to provide 60 days of storage so it is anticipated that deliveries will be approximately once every two months. All deliveries will be via existing access roads within the boundary of the WTP.

3.5 LDWMP APPROACH TO ASSESSMENT

3.5.1 Work Flow Process

In line with the relevant guidance, the Screening report for AA comprises of two steps:

- **Impact Prediction** – where the likely impacts of this project (impact source and impact pathways) are examined.
- **Assessment of Effects** - where the significance of project effects are assessed on the basis of best scientific knowledge (the EAM); in order to identify whether they are likely to give rise to likely significant effects on any European Sites, in view of their conservation objectives.

At the early stages of consideration, UE identified the requirement to evaluate environmental impact and the pathways by which the added orthophosphate may reach and / or affect environmental receptors including European Sites. In order to carry out a robust and defensible environmental assessment and to ensure a transparent and consistent approach, UE devised a conceptual model based on the 'source – pathway – receptor' framework. This sets out a specific environmental risk assessment of any proposed orthophosphate treatment and provides a methodology to determine the risk to the receiving environment of this corrective water treatment.

This EAM conceptual model, has been discussed with the EPA and has been developed using EPA datasets including the orthophosphate susceptibility output mapping for subsurface pathways; the nutrient risk assessment for water bodies; water quality information; available low flow estimation for gauged and ungauged catchments; and a new methodology which has been developed for the assessment of water quality risk from domestic wastewater treatment systems.

Depending on the potential impacts identified, appropriate measures may be built into the project proposal, as part of an iterative process to avoid / reduce those potential impacts for the orthophosphate treatment being proposed. Project measures adopted within the overall design proposal may include selected placement of the orthophosphate treatment point within the WSZ; enhanced wastewater treatment (to potentially remove equivalent phosphorus levels related to the orthophosphate treatment at the WTP); reduced treatment rate; and water network leakage control. The EAM will be the basis of the decision support matrix to inform any programmes developed as part of the LDWMP. Further detail on the model is presented in **Section 3.5.2** below.

3.5.2 Environmental Assessment Methodology

The EAM has been developed based on a conceptual model of phosphorus transfer (see **Figure 3-1**), based on the source-pathway-receptor model, from the water distribution and wastewater collection systems.

- The source of phosphorus is defined as the orthophosphate dosing at the water treatment plant which will be dependent on the water chemistry of the raw water quality, the integrity of the distribution network and the extent of lead piping.
- Pathways include discharges from the wastewater collection system (WWTP discharges and intermittent discharges – Storm Water Overflows (SWOs)), leakage from the distribution system and small point source discharges from DWWTSs.
- Receptors refer to SACs and SPAs which may receive orthophosphate dosed water via the pathway examples outlined above. Receptors and their sensitivity, is of key consideration in the EAM. A water body may be more sensitive to additional phosphorus loadings where it has a low capacity for assimilating the load e.g. high status sites, such as the habitat of the freshwater pearl mussel or oligotrophic lakes. Where a SAC/SPA could receive orthophosphate dosing inputs at more than one WSZ, the cumulative effects are considered in the EAM.

A flow chart of the methodology applied in the EAM is provided in **Figure 3-2** and illustrates the importance of the European Sites in the process. In all instances where nutrient sensitive qualifying features within the Natura 2000 network are hydrologically linked with the WSZ, a Screening to inform AA will be required in the first instance.

For each WSZ where orthophosphate treatment is proposed, the conceptual model allows the quantification of loads in a mass balance approach to identify potentially significant pathways, as part of the risk assessment process. A summary report outlining the EAM results is available in **Appendix C**, which further outlines P dynamics and the consideration of P trends and capacity in receiving waters and the risk to WFD objectives from any increase in P load from orthophosphate dosing.

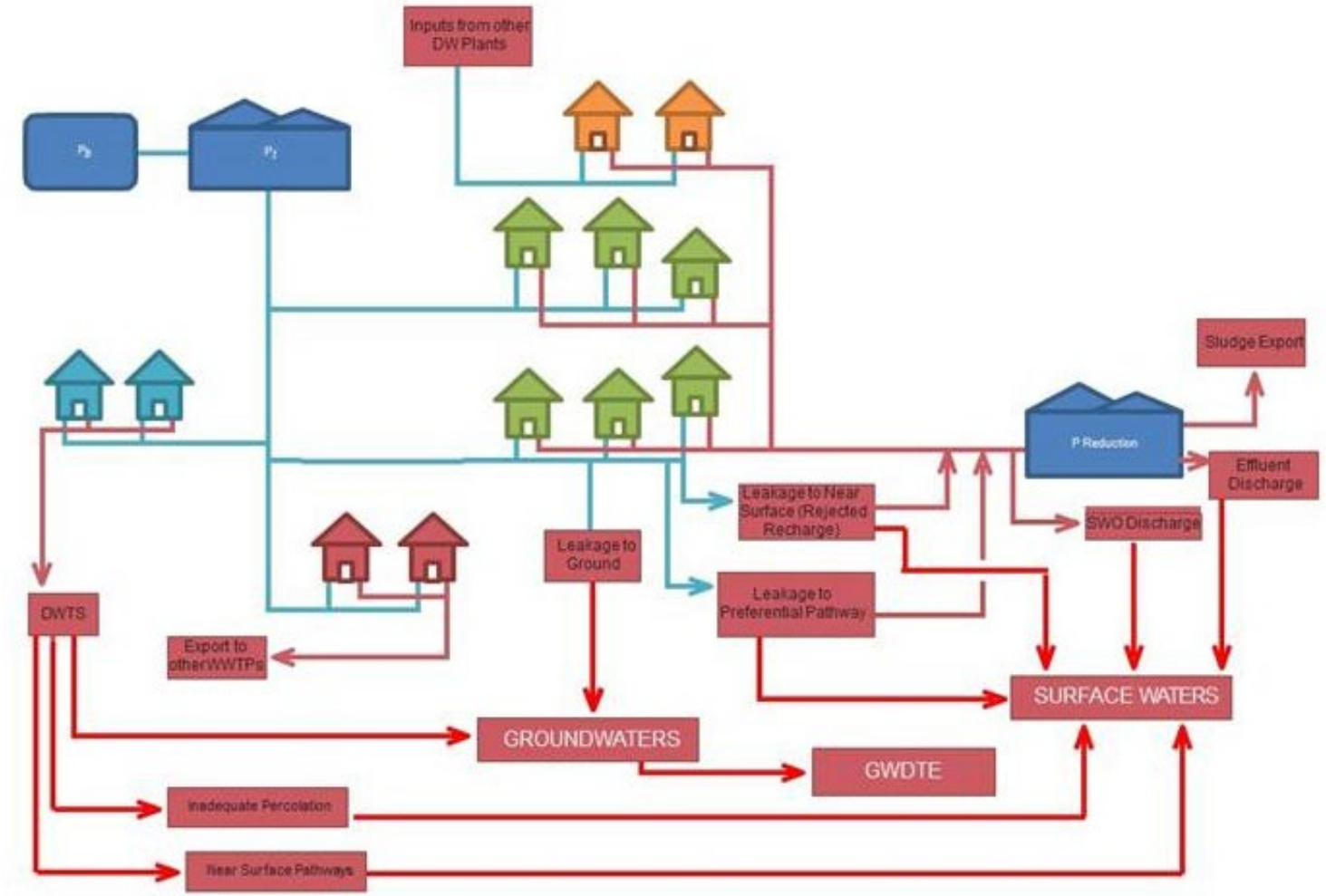


Figure 3-1: Conceptual Model of P Transfer

(Diagrammatic layout of P transfers from drinking water source (top left), through DW distribution (blue), wastewater collection (brown) and treatment systems to environmental receptors (red). P transfers that by-pass the WWTP (leakages, storm overflows, discharges to ground, and misconnections) are also indicated.)

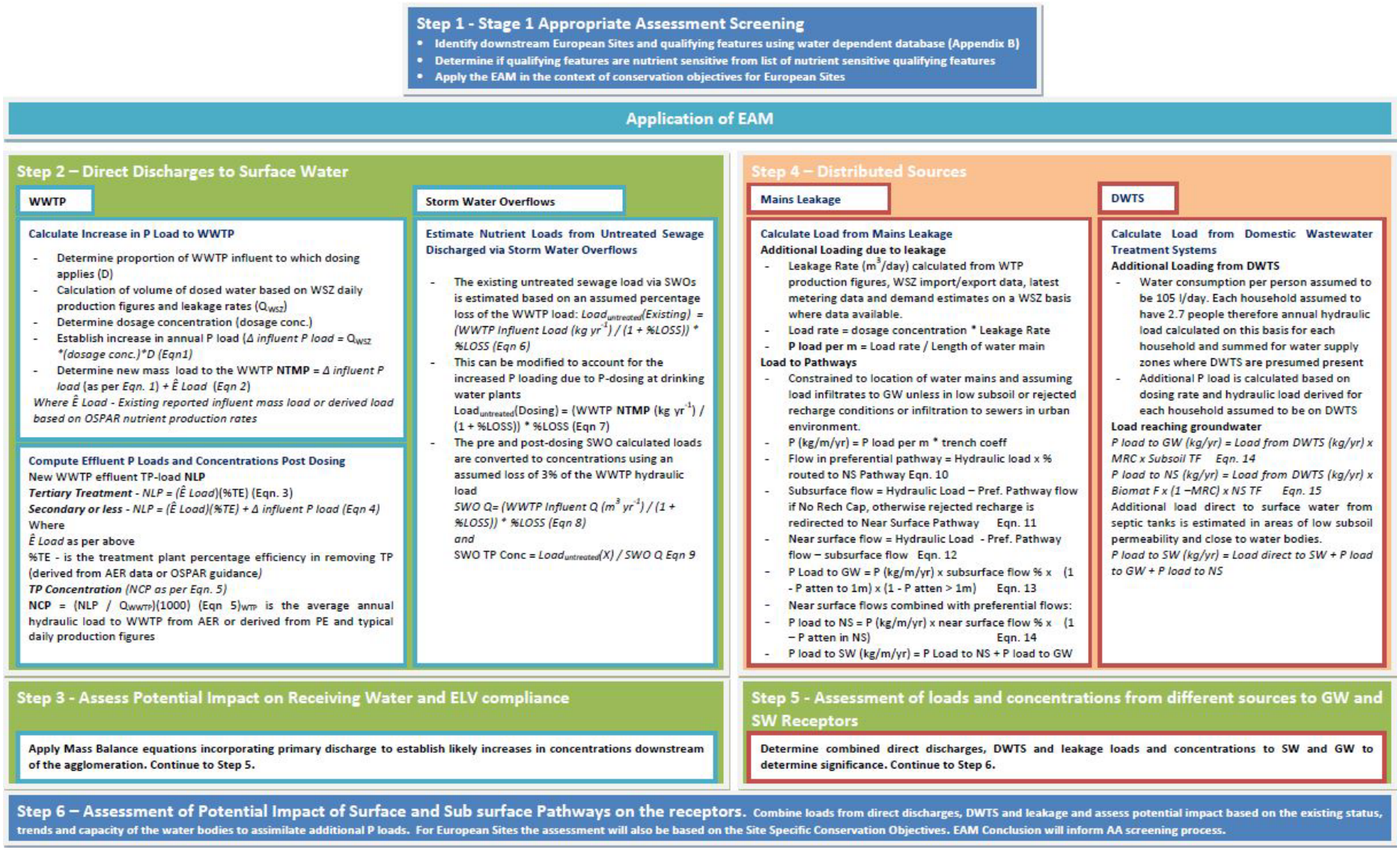


Figure 3-2: Stepwise approach to the Environmental Assessment Methodology

4 PROJECT CONNECTIVITY TO EUROPEAN SITES

4.1 OVERVIEW OF THE PROJECT ZONE OF INFLUENCE

4.1.1 Construction Phase

The construction phase of the proposed project will take place within the confines of the existing Portlaw WTP. The WTP is not located within or directly adjacent to the boundary of any European Site. Given the small-scale nature of construction works, the ZoI was considered to include the footprint of the existing Portlaw WTP followed by a review of hydrological and hydrogeological connectivity between the proposed development site and European Sites. The European Sites within ZoI for the construction phase of the project are listed in **Table 4-1** and displayed in Error! Reference source not found..

Table 4-1: European Sites within the ZoI of the Proposed Project – Construction Phase

	Site Name	SAC / SPA Code	Direct Impact	Water Dependent Species / Habitats	Surface Water Connectivity	Groundwater Connectivity[4,]	Potential Source Pathway Receptor
1	Lower River Suir SAC	002137	No	Yes	Yes (Clodiagh (Portlaw)_050)	Yes (Comeragh)	Yes

4.1.2 Operational Phase

The ZoI for the proposed Project was determined by establishing the potential for hydrological and hydrogeological connectivity between the Portlaw WTP and associated WSZ and European Sites. The ZoI was therefore defined by the surface and groundwater bodies that are hydrologically and hydrogeologically connected with the Project.

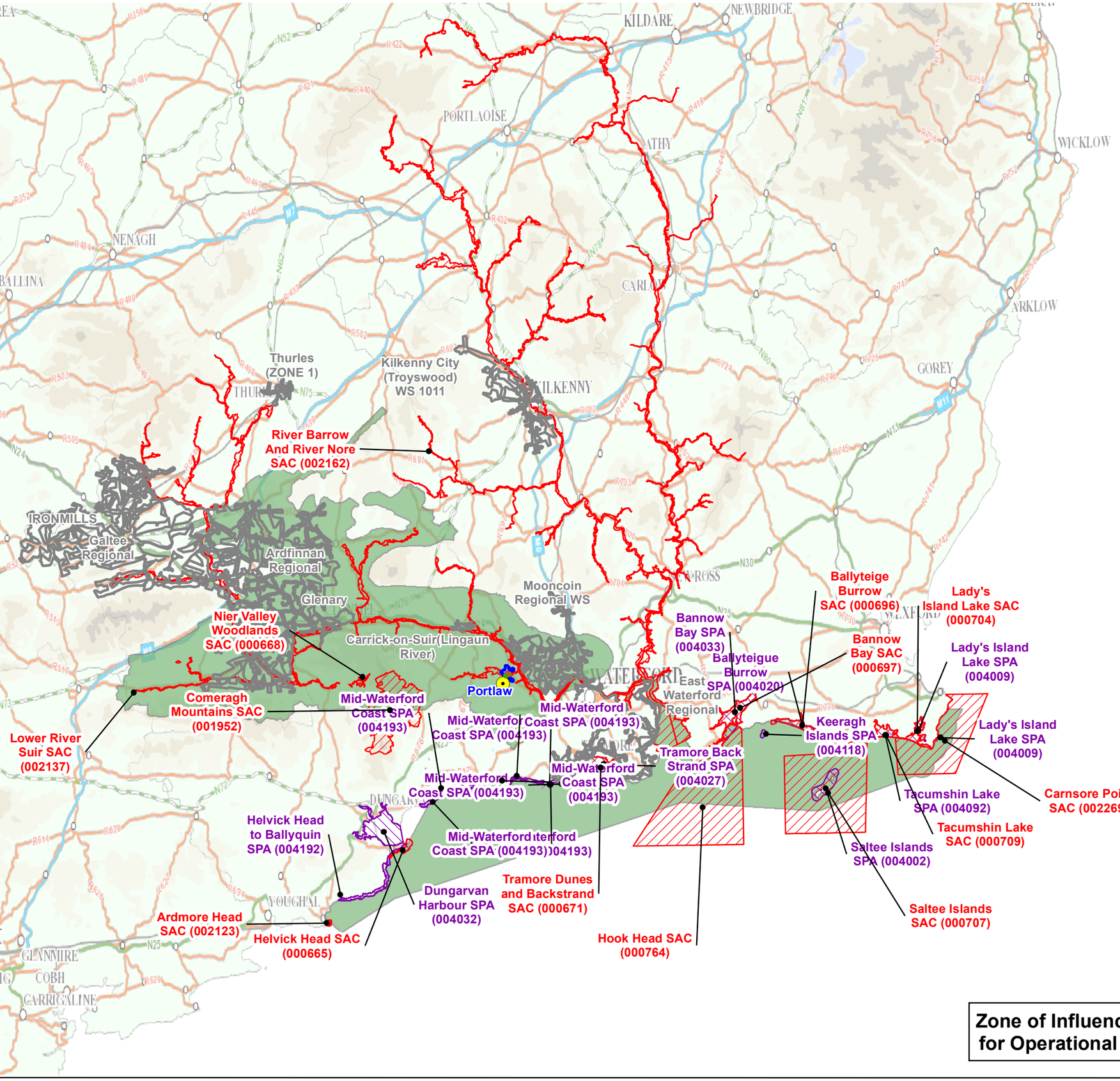
In the EAM, all water bodies linked to the WSZ have been identified. Downstream water bodies to the estuary and coastal water bodies have also been identified. Groundwater bodies touching or intersecting the WSZs are also included in the ZoI. Hydrogeological linkages in karst areas have also been taken into account. European Sites within the ZoI are listed in **Table 4-2** and are displayed in **Figure 4-1**.

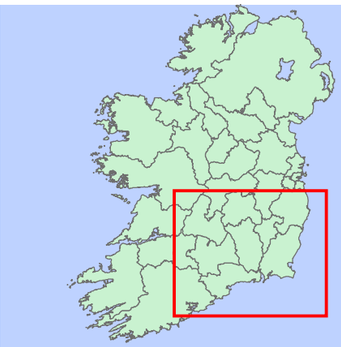
[4] Portlaw WTP overlies the Comeragh (IE_SH_G_154) groundwater body. All European Sites overlying or supporting connectivity to this groundwater body have been assessed to determine potential source pathway receptors. This groundwater body is poorly productive. Due to the poorly productive nature of the groundwater body and the topography (mountains to the west and estuary to the east) it is assumed that flow pathways are likely to be short and flowing towards the estuary. and groundwater is forced into associated surface water bodies such Clodiagh (Portlaw)_050. Therefore any potential groundwater flow from the WTP site will join the surface water pathway as discussed in Section 5.3.1.

Table 4-2: European Sites within the ZoI of the proposed project – Operational Phase

	Site Name	SAC / SPA Code	Water Dependent Species / Habitats	Nutrient Sensitive	Surface Water Connectivity	Groundwater Connectivity	Potential Source Pathway Receptor
1	Lower River Suir SAC	002137	Yes	Yes	Yes – RWB (Clodiagh, Tinhalla)	Yes	Yes
2	Comeragh Mountains SAC	001952	Yes	Yes	Yes- RWB (Clodiagh, Tinhalla)	Yes	No
3	Nier Valley Woodlands SAC	000668	No	Yes	No	Yes	No
4	River Barrow and River Nore SAC	002162	Yes	Yes	Yes – TWB Lower Suir Estuary	No	Yes
5	Hook Head SAC	000764	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
6	Bannow Bay SAC	000697	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
7	Ballyteigue Burrow SAC	000696	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
8	Saltee Islands SAC	000707	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
9	Tacumshin Lake SAC	000709	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
10	Lady's Island Lake SAC	000704	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
11	Carnsore Point SAC	002269	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
12	Tramore Dunes & Back Strand SAC	000671	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
13	Helvick Head SAC	000665	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
14	Ardmore Head SAC	002123	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
15	Bannow Bay SPA	004033	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
16	Keeragh Islands SPA	004118	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
17	Ballyteigue Burrow SPA	004020	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
18	Saltee Islands SPA	004002	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
19	Tacumshin Lake SPA	004092	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
20	Lady's Island Lake SPA	004009	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes
21	Tramore Back Strand SPA	004027	Yes	Yes	Yes – CWBs Eastern Celtic Sea, Tramore Bay	No	Yes
22	Mid-Waterford Coast SPA	004193	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes

	Site Name	SAC / SPA Code	Water Dependent Species / Habitats	Nutrient Sensitive	Surface Water Connectivity	Groundwater Connectivity	Potential Source Pathway Receptor
23	Dungarvan Harbour SPA	004032	Yes	Yes	Yes – CWBs Eastern Celtic Sea, Dungarvan Harbour	No	Yes
24	Helvick Head to Ballyquin SPA	004192	Yes	Yes	Yes – CWB Eastern Celtic Sea	No	Yes





Legend

LEMA Emission Type

- Primary Discharge Point
- Secondary Discharge Point
- Storm Water Overflow
- Waste Water Treatment Plant
- Portlaw WTP
- Water Supply Zone Boundary (WSZ)
- Additional WSZ considered for dosing
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Zone of Influence

Data Source:
Irish Water
NPWS (June 2019)
EPA

N

0 5 10 20 Kilometres

Client

Uisce Éireann
Irish Water

Project Lead Mitigation Plan
Corrective Water Treatment Works

Figure 4.1

Portlaw

European Sites within the Zol of the Proposed Project

Zone of Influence (Zol) for Operational Phase

RPS

Scale: 1:600,000 @ A3	**Date:** 24/07/2019
File Ref: MDW0766Arc0035aF01	**Map Projection:** Irish National Grid (TM65)

4.2 IDENTIFICATION OF RELEVANT EUROPEAN SITES

For the construction and operational phase of the project each European Site was assessed for the presence of water dependent habitats and species, their associated nutrient sensitivity, together with the hydrological/hydrogeological connectivity of each site to the proposed project. A number of sites are excluded from further assessment at this stage of the assessment those sites included for further assessment, are detailed in **Table 4-3** and are displayed in Error! Reference source not found.. One site is included for further assessment for the construction phase and operational phase, with justification provided below.

The construction phase of the proposed project will take place within the confines of the existing Portlaw WTP. There is potential for surface water connectivity to Lower River Suir SAC, via the (Clodiagh (Portlaw)_050). The WTP is located within the Comeragh groundwater body (IE_SE_G_154) and there is potential hydrogeological connectivity between the proposed development site and Lower River Suir SAC.

For the operational phase of the project, the WSZ for the Portlaw Region is quite small and located adjacent to the Upper Suir Estuary. The WSZ intersects the Lower River Suir SAC and therefore are included for further assessment in Sections 5 and Section 6.

The WSZ also intersects three groundwater bodies – Clonmel (IE_SE_G_040), Carrick-on-Suir (IE_SE_G_030) and Comeragh (IE_SE_G_154) (**Table 3, Appendix C**). The following three European Sites overlay or intersect these groundwater bodies – Lower River Suir SAC, Nier Valley Woodlands SAC and Comeragh Mountains SAC.

The Lower River Suir SAC, which is hydrogeologically connected to Clonmel (IE_SE_G_040), Carrick-on-Suir (IE_SE_G_030) and Comeragh (IE_SE_G_154), is screened into the assessment due to intersecting the WSZ as discussed above. For European sites which have only hydrogeologically connections, i.e. Nier Valley Woodlands SAC and Comeragh Mountains SAC, an assessment was made of the direction of flow in the groundwater body forming the connection, in this case, the Comeragh (IE_SE_G_154) groundwater body.

Groundwater flows through voids such as connected pore spaces in sand and gravel aquifers and through fissures, faults, joints and bedding planes in bedrock aquifers. Regional groundwater flows tend to follow the regional topography and generally discharge towards main surface water bodies including rivers, lakes and coastal water bodies. In areas of karstified limestones, high permeability zones give rise to rapid groundwater velocities with more complex flow directions, which may vary seasonally and are difficult to predict with certainty. In this case, the assumption is that groundwater flow direction is from areas of higher elevations to lower elevations, unless groundwater specific information indicates otherwise. Groundwater body specific information relating to flow and discharge is available from the GSI[5] for the majority of GWBs however there was no information in relation to the Comeragh GWB.

The Comeragh groundwater body is poorly productive. The most eastern point of the groundwater body intersects a small portion of the WSZ. The Comeragh Mountains SAC lies approximately 20 km to the west of the WSZ, while the Nier Valley Woodlands SAC lies approximately 33 km to the west of

[5] https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx

the WSZ. Due to the distance between the WSZ and the SACs, the poorly productive nature of the groundwater body and the topography (mountains to the west and estuary to the east) it is assumed that flow pathways are likely to be short and flowing towards the estuary. In addition, the modelled-post-dosing concentration for the Comeragh GWB is not detectable (0.0000 mg/l) therefore there is no risk of deterioration in the good status of this water body. For these reasons, both the Comeragh Mountains SAC and Nier Valley Woodlands SAC excluded from further assessment.

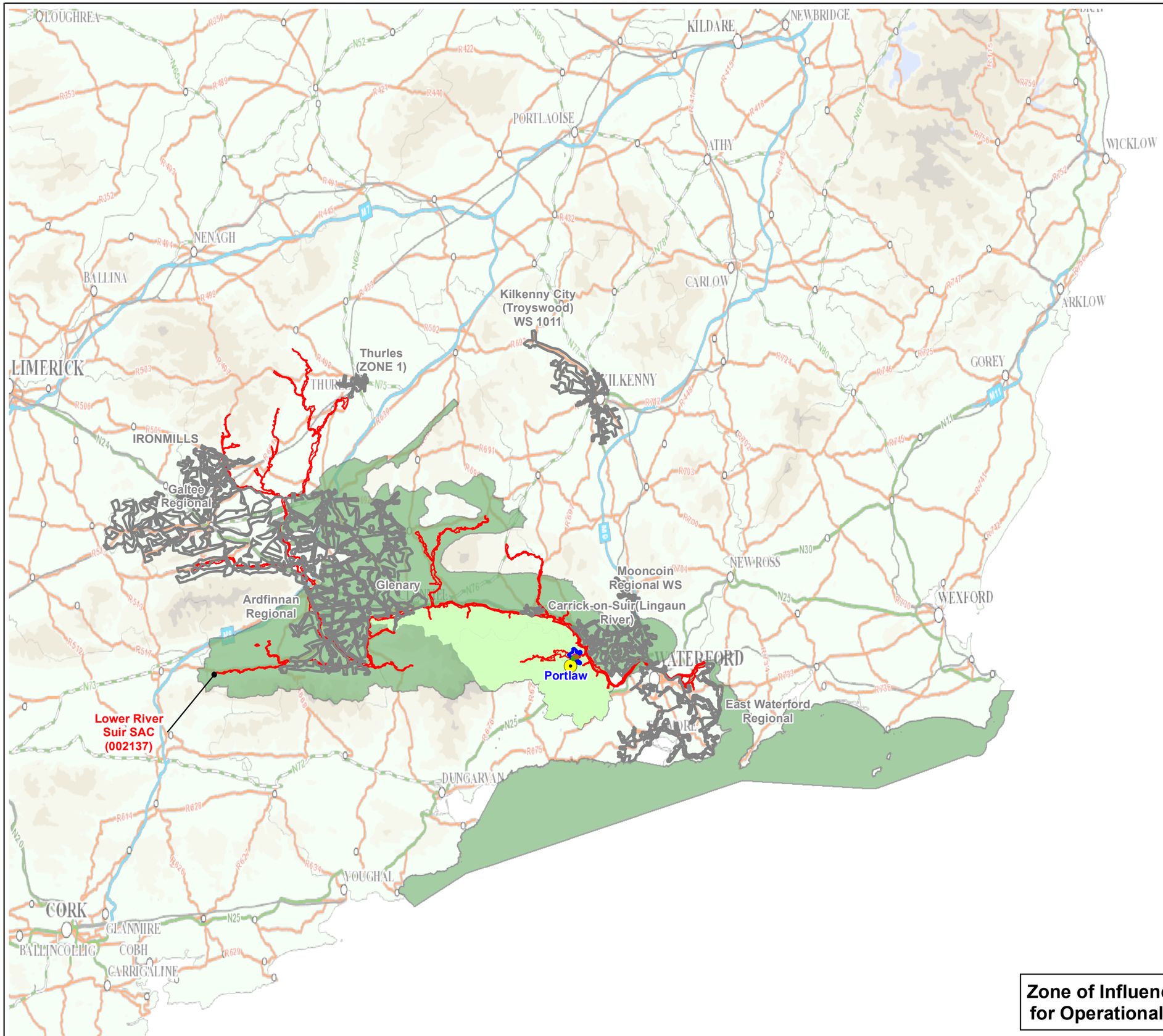
A large coastal water body i.e. the Eastern Celtic Sea lies downstream of the WSZ. However, the WSZ discharges directly into a transitional water body – Middle Suir Estuary, and then Waterford Harbour coastal water body, before entering the Eastern Celtic Sea coastal water body. The EAM results demonstrate that the potential increase in orthophosphate as a result of dosing at Portlaw WTP is not detectable in the Upper Suir Estuary (0.0000 mg/l) (see **Table 5-2** below). Therefore, the ZoI for the operational phase of the project has been determined to terminate at the Upper Suir Estuary transitional water body, and the following sites are excluded from further assessment: River Barrow and River Nore SAC, Hook Head SAC, Bannow Bay SAC, Ballyteigue Burrow SAC, Saltee Islands SAC, Tacumshin Lake SAC, Lady's Island Lake SAC, Carnsore Point SAC, Tramore Dunes and Back Strand SAC, Helvick Head SAC, Ardmore Head SAC, Bannow Bay SPA, Keeragh Islands SPA, Ballyteigue Burrow SPA, Saltee Islands SPA, Tacumshin Lake SPA, Lady's Island Lake SPA, Tramore Back Strand SPA, Mid-Waterford Coast SPA, Dungarvan Harbour SPA and Helvick Head to Ballyquin SPA.

On this basis, one site has been included for further assessment in order to evaluate the significance of potential effects arising during the construction and operational phases in Sections 5 and 6 below i.e. Lower River Suir SAC.

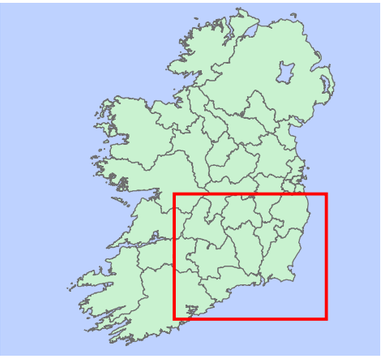
Table 4-3: European Sites hydrologically or hydrogeologically connected to or downstream of the WTP and WSZ

Site Name	SAC / SPA Code	Conservation Objectives Establishment Date	Feature Code	Qualifying Interests / Special Conservation Interests	Water Dependent Species / Habitats	Nutrient Sensitive	Potential Hydrological / Hydrogeological Connectivity	Potential Source Pathway Receptor
Construction and Operational Phase								
Lower River Suir SAC	SAC 002137	28th Mar 2017 Version 1	1029	Freshwater Pearl Mussel (*Margaritifera margaritifera*)	Yes	Yes	Yes	Yes
			1092	White-clawed Crayfish (*Austropotamobius pallipes*)	Yes	Yes		
			1095	Sea Lamprey (*Petromyzon marinus*)	Yes	Yes		
			1096	Brook Lamprey (*Lampetra planeri*)	Yes	Yes		
			1099	River Lamprey (*Lampetra fluviatilis*)	Yes	Yes		
			1103	Twaite Shad (*Alosa fallax fallax*)	Yes	Yes		
			1106	Salmon (*Salmo salar*)	Yes	Yes		
			1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Yes	Yes		
			1355	Otter (*Lutra lutra*)	Yes	Yes		
			1410	Mediterranean salt meadows (*Juncetalia maritimi*)	Yes	Yes		
			3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Yes	Yes		
			6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Yes	Yes		

Site Name	SAC / SPA Code	Conservation Objectives Establishment Date	Feature Code	Qualifying Interests / Special Conservation Interests	Water Dependent Species / Habitats	Nutrient Sensitive	Potential Hydrological / Hydrogeological Connectivity	Potential Source Pathway Receptor
			91A0	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	No	Yes		
			91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*	Yes	Yes		
			91J0	*Taxus baccata* woods of the British Isles*	No	No		



Zone of Influence (ZoI) for Operational Phase



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LEMA Emission Type

- Primary Discharge Point
- Secondary Discharge Point
- Storm Water Overflow
- Waste Water Treatment Plant
- Portlaw WTP
- Water Supply Zone Boundary (WSZ)
- Additional WSZ considered for dosing
- Special Area of Conservation (SAC)
- Subcatchments intersecting Water Supply Zone(s) related to the WTP
- Zone of Influence

Data Source:
Irish Water
NPWS (June 2019)
EPA

N

0 5 10 20 Kilometres

Client

Uisce Éireann
Irish Water

Project **Lead Mitigation Plan**
Corrective Water Treatment Works

Figure 4.2

Portlaw

European Sites within the ZoI which are hydro(geo)logically connected

RPS

Scale: 1:600,000 @ A3	**Date:** 29/07/2019
File Ref: MDW0766Arc0035bF01	**Map Projection:** Irish National Grid (TM65)

5 EVALUATION OF POTENTIAL IMPACTS

5.1 CONTEXT FOR IMPACT PREDICTION

The methodology for the assessment of impacts is derived from the *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites* (EC, 2002). When describing changes/activities and impacts on ecosystem structure and function, the types of impacts that are commonly presented include:

- Direct and indirect effects;
- Short and long-term effects;
- Construction, operational and decommissioning effects; and
- Isolated, interactive and cumulative effects.

5.2 IMPACT IDENTIFICATION

In considering the potential for impacts from implementation of the project, a "source–pathway–receptor" approach has been applied.

The Screening for AA has considered the potential for the following likely significant effects:

- Altered structure and functions relating to the physical components of a habitat ("structure") and the ecological processes that drive it ("functions"). For aquatic habitats these include attributes such as vegetation and water quality;
- Altered species composition due to changes in abiotic conditions such as water quality;
- Reduced breeding success (e.g. due to disturbance, habitat alteration, pollution) possibly resulting in reduced population viability; and
- Impacts to surface water and groundwater and the species they support (changes to key indicators).

5.2.1 Construction Phase

The source-pathway-receptor approach has identified a number of impact pathways associated with the construction of orthophosphate treatment works at Adamstown WTP. These will be evaluated with regard to the potential for likely significant effects on European Sites. These are potential effects and in the absence of pathways (which is evaluated in **Section** Error! Reference source not found. below) the construction phase may not give rise to these effects.

- Sediment laden run-off from excavation areas (trenches for dosing pipelines, carrier water pipework and electrical cables) and the introduction of fine sediments to watercourses connected to the works area causing a deterioration in water quality;
- Dust and noise emissions from excavation (trenches for dosing pipelines, carrier water pipework and electrical cables and transportation of material and equipment close to watercourses causing a deterioration in water quality or disturbance to species (e.g. birds);

- Environmental incident or accident during the construction phase e.g. spillage of a contaminant such as diesel or phosphoric acid causing a deterioration in water quality;
- Groundwater level drawdown through the excavation of trenches for dosing pipelines, carrier water pipework and electrical cables.

5.2.2 Operational Phase

The source-pathway-receptor approach has identified a number of impact pathways associated with the operation of orthophosphate treatment works at Portlaw WTP. These will be evaluated with regard to the potential for likely significant effects on European Sites in relation to:

- Excessive phosphate within an aquatic ecosystem may lead to eutrophication with a corresponding reduction in oxygen levels, reduction in species diversity and subsequent impacts on animal life;
- Groundwater dependent habitats include both surface water habitats (e.g. hard oligo-mesotrophic lakes) and Groundwater Dependent Terrestrial Ecosystems (GWDTEs, e.g. alkaline fens). Any change in the water quality of these systems may have subsequent impacts for these habitats and species;
- The discharge of additional orthophosphate loads to the environment (through surface and sub surface pathways) may have potentially negative effects on nutrient sensitive species such as the freshwater pearl mussel, Atlantic salmon and the white-clawed crayfish;
- Phosphorus in wastewater collection systems is the result of drinking water and derived from a number of other sources, including phosphorus imported from areas outside the agglomeration through import of sludges or leachates for treatment at the plant. The disposal and use of phosphorus removed in wastewater sludge is regulated (i.e. through nutrient management plans) and should not pose further threat of environmental impact;
- Leakage of phosphates from the drinking water supply network to the environment from use of orthophosphate;
- Direct discharges of increased orthophosphate to water bodies from the wastewater treatment plant licensed discharges; and
- Potential discharges to water bodies of untreated effluent potentially high in orthophosphate from Storm Water Overflows (SWOs).

5.3 ASSESSMENT OF IMPACTS

Article 6 of the Habitats Directive states that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications of the site in view of the site's conservation objectives.

The focus of this Screening to inform AA is the evaluation of the potential for likely significant effects associated with the additional orthophosphate load due to orthophosphate dosing and the construction of treatment works at Portlaw WTP.

5.3.1 Construction Phase

The location of the orthophosphate dosing system at Portlaw WTP will be located within the confines of the existing WTP boundary upon an area of made ground. In addition, a proposed pH dosing system will be located within the confines of the existing WTP, which supports made ground / artificial surfaces that do not support connectivity to the surrounding environment. The assessment of impacts associated with construction of the corrective water treatment works was conducted taking the whole Portlaw WTP into account and therefore included both possible locations for the orthophosphate dosing system and the pH dosing system. The assessment of impacts associated with the construction of the corrective water treatment works at Portlaw WTP is presented in **Table 5-1** and is based on a desktop study using the following information:

- Design descriptions and drawings for the proposed corrective water treatment works at Portlaw WTP;
- A review of hydrological connectivity between the proposed works and European Sites using the EPA Mapping Resources: http://gis.epa.ie/; www.Catchments.ie;
- Ordnance Survey Ireland Geo Hive Map viewer: https://webapps.geohive.ie/mapviewer/index.html; and
- Site synopses, conservation objectives and qualifying interest data for European Sites.

Table 5-1: Likely significant effects to European Sites arising as a result of the construction of the corrective water treatment works

Site Name (Code)	Contributing WB Code_Name	WB Type[6]	Evaluation
Lower River Suir SAC (002137)	Comeragh (IE_SE_G_149)	GWB	The construction works will be located within the confines of the existing Portlaw WTP. Portlaw WTP is not located within or directly adjoins a European Site. **Surface water** There are no surface water bodies within the confines of Portlaw WTP. The WTP footprint and proposed construction works are located 155m south east of the Clodiagh (Portlaw)_050 (IE_SE_16C030750) the lower reaches of which are designated as part of the Lower River Suir SAC, 1.2 kms north of the WTP site. Clodiagh (Portlaw)_050 is a tributary of the River Suir main channel. There are no surface water linkages providing connectivity between Portlaw WTP, Clodiagh (Portlaw)_050 and those downstream sections of the Lower River Suir SAC. In addition, the proposed construction works are small scale in nature and will be undertaken within the confines of the existing built infrastructure associated with Portlaw WTP. There will be no aspects of the proposed works that will result in the release of potential impacts sources identified in
	Clodiagh (Portlaw)_050 IE_SE_16C030750	RWB	

[6] Monitoring period is annual unless specified.

Site Name (Code)	Contributing WB Code_Name	WB Type[6]	Evaluation
			Section 5.2.1. The works will be localised and contained to the immediate development area which supports buildings, artificial surfaces associated within the in-situ built infrastructure of Portlaw WTP and the built infrastructure is surrounded by woodland. Works such as excavations will be contained to the defined working area and necessary works with cast in place concrete will be undertaken within sealed shuttered units. Such works practices will retain all potential construction related pollutants at source. **Groundwater** The WTP overlies the Comeragh (IE_SE_G_154) groundwater body. The excavation of trenches to install dosing pipelines, carrier water pipework and electrical cables to 700mm below ground level has the potential to interfere with the water table potentially causing groundwater drawdown. Portlaw WTP overlies the Comeragh (IE_SE_G_154) groundwater body. The Comeragh groundwater body is poorly productive. The most eastern point of the groundwater body intersects a small portion of the WSZ. Due to the poorly productive nature of the groundwater body and the topography (mountains to the west and estuary to the east) it is assumed that flow pathways are likely to be short and flowing towards the estuary. and groundwater is forced into associated surface water bodies such Clodiagh (Portlaw)_050. Therefore, preferential groundwater flow paths for Portlaw WTP and surrounds are likely to be to those nearby areas of Clodiagh (Portlaw)_050. Clodiagh (Portlaw)_050 (IE_SE_16C030750) is designated as part of the Lower River Suir SAC ca. 50m downstream of its intersection with the L4029 in Portlaw. This stream is also a tributary of the River Suir main channel which is designated as part of the Lower River Suir SAC. This River Suir main channel provides connectivity to those transitional and coastal water bodies located downstream including the Upper Suir Estuary (IE_SE_100_0600), Middle Suir Estuary (IE_SE_100_0550), Lower Suir Estuary (IE_SE_100_0500), Barrow Suir Nore Estuary (IE_SE_100_0100) and the Waterford Harbour coastal water body (IE_SE_100_0000). The Barrow Suir Nore Estuary transitional water body supports the River Barrow and River Nore SAC. As the excavation works will not be extensive (up to c. 30m for pipework and to an approximate depth of 700mm) and upon made ground, interference with

Site Name (Code)	Contributing WB Code_Name	WB Type[6]	Evaluation
			water table will be unlikely to occur. Any interference would be localised within the WTP site, minor and temporary. Therefore, there is no potential for likely significant effects to the underlying groundwater body, the receiving surface water features and subsequently those hydrologically connected European Sites included for further assessment, as a result of the construction of the corrective water treatment works at Portlaw WTP.

5.3.2 Operational Phase

In the case of the additional orthophosphate load due to dosing at Portlaw WTP (via Adamstown parent plant), the EAM conceptual model developed for orthophosphate transfer identified the surface and groundwater bodies that have the potential to be affected by the orthophosphate dosing and for which a hydrological or hydrogeological pathways to the European Sites exist. These water bodies are listed in **Table 5-2.** The table identifies the following:

- European Sites included for assessment;
- Water bodies hydrologically or hydrogeologically connected to the European Sites;
- Existing orthophosphate indicative quality and trend of each water body as presented in the EPA's WFD APP;
- The baseline orthophosphate concentration of each water body;
- 75% of the upper threshold for the indicative quality;
- Cumulative orthophosphate load to surface from leakage, DWWTS and agglomerations;
- The modelled orthophosphate concentration following dosing at the WTP; and,
- The orthophosphate potential baseline concentration (mg/l) following dosing at the WTP.

The EAM has been undertaken assuming the capacity of a water body is a measure of its ability to absorb extra pressures before its indicative quality changes. In order to do this the indicative quality as presented in the EPA's WFD APP is used as the baseline concentration for the different monitoring points within a water body. For example, a river water body with Good orthophosphate indicative quality will have mean orthophosphate value in the range 0.025 to 0.035 mg/l. River water bodies with mean orthophosphate concentrations of 0.0275 mg/l have 75% capacity left, i.e. high capacity, while river water bodies with a mean of 0.0325 mg/l have lower capacity (25%) as the baseline concentrations are closer to the Good/Moderate indicative quality boundary.

When assessing the increase in orthophosphate concentrations as a result of proposed dosing, an increase which is <5% of the Good / High indicative quality boundary, i.e. 0.00125mg/l, is excluded from further assessment and is assumed to result in no significant impact to a water body. If the baseline orthophosphate concentration in addition to the potential increase in orthophosphate concentration as a result of dosing is less than the 75% upper threshold of the indicative quality band for a water body, this also results in no significant impact. Where a water body does not have

monitored orthophosphate concentrations, a conservative approach is used whereby the surrogate indicative quality is calculated based on the ecological status assigned to that water body by the EPA.

For significance threshold band (i.e. 75% of the upper threshold for the indicative quality band) in transitional and coastal water bodies, a sliding linear scale is used depending on median salinity. The EAM determines if the dosing will result in a baseline concentration that exceeds the relevant 75% threshold for the indicative quality bands (based on salinities) in order to evaluate whether there could be an increased risk of deterioration in indicative quality.

Where a transitional or coastal water body does not have monitored orthophosphate concentrations or salinity levels, a conservative approach is used whereby the surrogate indicative quality is calculated based on inputting water bodies or pressures acting on the ecological status assigned to that water body by the EPA but the more conservative freshwater orthophosphate limits for the different indicative quality bands are applied[7].

Therefore, in assessing the additional loads from the proposed orthophosphate dosing, the capacity of the water body will be assessed. This information is available on the WFD App on a national basis using the "Distance to Threshold" parameter, where water bodies with high capacity are termed "Far" from the threshold and those with low capacity are "Near" the threshold.

It is predicted that orthophosphate dosing will not have a significant effect on water bodies (or the Conservation Objectives of a European Site) where it does not cause the P concentration to increase to a level within 25% of the remaining capacity left within the existing orthophosphate indicative quality band, i.e. cause a change in the distance to threshold from far to near. This assessment will be supported by trend analysis as outlined below to ensure the additional orthophosphate dosing and statistically significant trends for a water body will not result in deterioration in status even where the distance to threshold is currently assessed to be far. Where the water body baseline indicative quality concentration is "Near" to the threshold before the effect of orthophosphate dosing is considered, this does not cause an automatic fail for this test. If the predicted increase in concentration due to orthophosphate is very low (i.e. below 5% of the Good/Moderate indicative quality this test will pass as the orthophosphate dosing itself can be defined as having no risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.

The identification of statistically and environmentally significant trends for water bodies is a specific requirement of the WFD and the Groundwater Daughter Directive. Guidance on trends in groundwater assessments (UKTAG 2009, EPA 2010) indicates that trends are environmentally significant if they indicate that the Good Ecological Status will not be achieved within two future river basin cycles, i.e. within the next 12 years.

This test applies only when the trend for orthophosphate concentration for the water body is considered statistically significant in the WFD App. For surface water bodies, the predicted concentration is given and the additional concentration due to orthophosphate dosing is added and

[7] The conservative thresholds in transitional and coastal water bodies for orthophosphate indicative quality in unassigned water bodies i.e. upper limits are: High 0.025 mg/l; Good 0.04 mg/l; Moderate 0.06 mg/l; Poor 0.09 mg/l; Bad – N/A. The higher range for transitional and coastal water bodies with a median salinity ≤ 17mg/l are: High 0.03 mg/l; Good 0.06 mg/l; Moderate 0.1 mg/l; Poor 0.2 mg/l; Bad N/A.

assessed as appropriate. If the new calculated predicted concentration prevents the achievement of good indicative quality then this test fails.

This assessment assumes a dosing rate of 0.8 mg/l.

An additional test for groundwater bodies states that downward trends should not be reversed as a result of pollution. This test applies to GWB with statistically significant trends according to the WFD App and the Sens Slope provided is used to assess direction and strength of trend. If the trend is negative and the predicted increase in orthophosphate concentration is lower than the absolute value of the Sens Slope, then the test passes.

The initial assessment is automated using existing WFD App data. If tests fail and more investigation is required, more recent data can be used and the assessment rerun. For example, if 2019 - 2021 concentrations for a river water body are available, the 2019 – 2021 average can be used instead of the 2017 baseline provided in the WFD App.

Table 5-2: Surface and groundwater bodies within the WSZ with a hydrological or hydrogeological connection to European Sites

Site Name (Code)	Contributing WB Code_Name	WB Type[8]	Ortho P Indicative Quality [9] and Trends[10]	Baseline[11] Ortho P Conc.[12] (mg/l)	75% of Indicative Quality Upper Threshold (mg/l)	Total Ortho P load to SW from Leakage, DWWTS & Agglom. (kg/yr)	Modelled Increase in Conc.[13] (mg/l)	Post-dosing Ortho P Potential Baseline Conc. (mg/l)[14]	Evaluation
Lower River Suir SAC (002137)	IE_SE_16T310740 Tinhalla_010	RWB	*Moderate*	*0.046*	*0.051*	*0.2*	*0.0000*	*0.046*	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
	IE_SE_16C030750 Clodiagh (Portlaw)_050	RWB Multiple Monitoring Points	High Upwards Near	0.025	0.019	4.2	0.0000	0.025	The post-dosing orthophosphate potential baseline is exceeding the 75% of the upper indicative quality threshold because of the baseline orthophosphate concentration. The modelled concentration is 0.0000mg/l, and there is no risk of deterioration in the Ortho P indicative quality or

[8] Monitoring period is annual unless specified.
[9] Surrogate Indicative Quality in italic.
[10] Distance to threshold.
[11] Baseline year is 2014 for surface water bodies and 2012 for groundwater bodies.
[12] Surrogate concentration is given in italic mg/l
[13] Values above 5% of Good / High indicative quality boundary (0.00125 mg/l) for SW or 5% of Good / Fail indicative quality boundary (0.00175 mg/l) for GW highlighted in yellow.
[14] Green cells signify that there is no risk of deterioration in indicative quality of the waterbody following dosing at the WTP.

Site Name (Code)	Contributing WB Code_Name	WB Type[8]	Ortho P Indicative Quality [9] and Trends[10]	Baseline[11] Ortho P Conc.[12] (mg/l)	75% of Indicative Quality Upper Threshold (mg/l)	Total Ortho P load to SW from Leakage, DWWTS & Agglom. (kg/yr)	Modelled Increase in Conc.[13] (mg/l)	Post-dosing Ortho P Potential Baseline Conc. (mg/l)[14]	Evaluation
									of preventing the achievement of WFD objectives.
			Good Upwards Far	0.032	0.033			0.032	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives
			Good	0.030	0.033			0.030	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
	IE_SE_16D290570 Darrigal_010	RWB	*Good*	*0.030*	*0.033*	*0.0*	*0.0000*	*0.030*	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
	IE_SE_100_0600 Upper Suir Estuary	TWB Summer	High (S) None Far	0.006	0.019	4.5	0.0000	0.006‡	The post-dosing orthophosphate potential baseline for winter is exceeding the 75% of the upper indicative quality threshold because of the baseline orthophosphate

Site Name (Code)	Contributing WB Code_Name	WB Type[8]	Ortho P Indicative Quality [9] and Trends[10]	Baseline[11] Ortho P Conc.[12] (mg/l)	75% of Indicative Quality Upper Threshold (mg/l)	Total Ortho P load to SW from Leakage, DWWTS & Agglom. (kg/yr)	Modelled Increase in Conc.[13] (mg/l)	Post-dosing Ortho P Potential Baseline Conc. (mg/l)[14]	Evaluation
		TWB Winter	High (W) None Near	0.023	0.019			0.023‡	concentration. The modelled concentration is undetectable, 0.0000mg/l, and there is no risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
	IE_SE_G_154 Comeragh	GWB	Good Upwards Far	0.018	0.026	0.1	0.0000	0.018	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
	IE_SE_G_030 Carrick-on-Suir	GWB	Good Upwards Far	0.033	0.026	1.0	0.0000	0.033*	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
	IE_SE_G_040 Clonmel	GWB Multiple Monitoring Points	Good Upwards Far	0.005	0.026	0.2	0.0000	0.005	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
			Good Upwards Far	0.005	0.026			0.005	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.

Site Name (Code)	Contributing WB Code_Name	WB Type[8]	Ortho P Indicative Quality [9] and Trends[10]	Baseline[11] Ortho P Conc.[12] (mg/l)	75% of Indicative Quality Upper Threshold (mg/l)	Total Ortho P load to SW from Leakage, DWWTS & Agglom. (kg/yr)	Modelled Increase in Conc.[13] (mg/l)	Post-dosing Ortho P Potential Baseline Conc. (mg/l)[14]	Evaluation
			Good None Far	0.012	0.026			0.012	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.
			Good Upwards Far	0.008	0.026			0.008	No risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives.

‡ Load from WWTP / SWO following treatment added

NB: Cumulative load assessment using 2021 baseline data has confirmed that the water bodies are not at Risk of failing WFD Objectives.

5.3.3 Assessment of Potential Direct Impacts from WWTPs and Storm Water Overflows

The conceptual model developed for P transfer identifies a number of pathways by which orthophosphate can reach receptors. In the case of these pathways, factors contributing to potential direct impacts are:

- the quantitative increase in P loading to wastewater collecting systems;
- the efficiency of P removal at WWTPs;
- the increased P loading to surface waters via storm water overflows; and
- the sensitivity of receptors.

For the purposes of assessing the potential impact on the receiving environment a number of scenarios have been assessed at the agglomerations which receive water from the WSZ **(Table 5-3).** The existing baseline prior to orthophosphate dosing is established and compared to the potential impact on the receiving waters post-dosing. In-combination effects of the operation of the SWO and the continuous discharge from the WWTP were also assessed.

The pre-dosing scenario is based on a mass balance calculation of both the intermittent SWO discharges, in combination with the continuous discharge from the WWTP. A comparison of the pre- and post-dosing scenarios is made to identify changes in predicted concentrations downstream of the point of discharge. A summary of the results and evaluation of orthophosphate dosing downstream of each agglomeration is provided below.

The quantification of loads in a mass balance calculation was carried out using the standardised approach developed in the EAM which was devised using national data sets and applying a series of conservative and robust assumptions. The model was prepared in discussion with and utilises data supplied by the EPA, NPWS and the DHPLG to ensure that a robust model simulation is provided.

Table 5-3 provides the data used for the WWTP continuous discharge, and the SWO intermittent discharge, to compare with the emission limit values (ELVs) from the waste water discharge licence (WWDL) (if it has been set) that are applicable to the agglomeration discharge to transitional waters or freshwaters. The resultant concentration in the waters downstream of the discharge point from the agglomerations is provided in **Table 5-4**, assuming mean flows**.**

Table 5-3: Increased loading/concentration due to Orthophosphate Dosing – Dosing rate = 0.8 mg/l

Agglom. and Discharge Type	ELV from WWDL (Ortho P mg/l)	Scenario	TP Load Kg/Yr	Ortho P Concentration mg/l *TP – Ortho P Conversion factor varied for sensitivity analysis (40%, 50%, 68%)*		
				0.5	*0.4*	*0.68*
Portlaw Primary Discharge	**3.0 & 3.6 condition 2** Compliant with the ELV's set in the WWDL in the 2017 AER report	**Existing**	538.8	1.216	0.973	1.654
		Post Dosing	538.8	1.216	0.973	1.654
Portlaw SWOs (1 no.)	n/a	**Existing**	104.6	8.106	6.485	11.025
		Post Dosing	106.7	8.266	6.612	11.241

Table 5-4: Mass balance assessment based on 0.8 mg/l dosing using available background concentrations and mean flow information.

Agglom.	RWB Name / Code for Primary Discharge	Background Conc.[15] (mg/l)	Modelled Conc. Existing (mg/l)	Modelled Conc. Post Dosing (mg/l)	% Inc
Portlaw (D0274)	Clodiagh (Portlaw)_050 IE_SE_16C030750	0.0248	0.0277	0.0278	0.0

Portlaw Agglomeration

The Portlaw agglomeration discharges into Clodiagh (Portlaw)_050 (IE_SE_16C030750) which is within the Lower River Suir SAC. The modelled concentrations for both existing and post dosing scenarios are compliant with total phosphorus ELVs set in WWDL. Secondary treatment is operational at this plant and therefore there is no treatment reduction assumed and the entire additional load from orthophosphate dosing is assumed to be discharged into the receiving water. The plant is compliant with its current ELVs. When mean flow is taken into account the increase in the receiving water is undetectable (0.0%) (**Table 5-4**)

Therefore, there is no risk to the achievement of WFD objectives of the Clodiagh (Portlaw)_050 (IE_SE_16C030750) water body, and its hydrologically connected European Sites as a result of dosing at Portlaw WTP.

5.3.4 Assessment of Potential Indirect Impact from Subsurface Flow

5.3.4.1 Sub surface flows from leakage and DWWTP

Step 4 of the EAM model assesses the distributed inputs to river water bodies from subsurface pathways (**Appendix C**). The modelled concentrations due to subsurface pathways are insignificant in all water bodies, i.e. < 0.00125 mg/l (5% of the High / Good indicative boundary for surface water bodies).

The modelled concentration for the transitional water body, the Upper Suir Estuary (IE_SE_100_0600), is not detectable (0.0000 mg/l). This estuary intersects the Lower River Suir SAC.

Therefore, there is no risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives within water bodies hydrologically/hydrogeologically connected to European Sites as a result of dosing at Portlaw WTP.

5.3.4.2 Groundwater assessment

The predicted loads and concentrations to groundwater bodies (GWBs) are undetectable (i.e. <0.00175 mg/l = 5% of the Good / Fail indicative quality boundary) as shown in **Table 3 of Appendix C**.

[15] Annual mean from AER u/s monitoring point

The subsurface assessment takes into account the groundwater/surface water interaction and as the potential for impact on surface water is not significant, and none of the overlying surface water bodies are at Bad indicative quality, there is no risk of impact on groundwater receptors due to orthophosphate dosing.

Therefore, there is no risk of deterioration in the Ortho P indicative quality or of preventing the achievement of WFD objectives within the hydrogeologically connected groundwater bodies due to orthophosphate dosing as indicated in Table 3, Appendix C.

5.3.5 Combined Assessment

Table 4-A of Appendix C provides details of the combined orthophosphate inputs to river water bodies from direct discharges, DWWTSs and leakage loads. The increased loads due to orthophosphate dosing are not predicted to be significant i.e. are <0.00125 mg/l (5% of High / Good indicative quality boundary). The dosing therefore poses no risk of deterioration in the orthophosphate indicative quality of the river water bodies identified in **Table 5-2**, or of preventing their achievement of WFD objectives.

The baseline concentration for one monitoring point within Clodiagh (Portlaw)_050 (IE_SE_16C030750) is above 75% of the upper orthophosphate indicative quality threshold, but the modelled concentration is undetectable (0.0000mg/l). The increased load due to the WWTP also has a negligible impact and will not impact Portlaw WWTP ELVs in the post dosing scenario.

Table 4-B of Appendix C provides the loads and concentrations to transitional water bodies. The 2021 baseline concentration for the winter monitoring periods in the transitional water body IE_SE_100_0550 Middle Suir Estuary is above 75% of the upper orthophosphate indicative quality threshold, however the modelled concentration is not detectable (0.0000 mg/l) and will not cause a deterioration in the orthophosphate indicative quality of the transitional water body or prevent the achievement of WFD objectives.

Therefore, there will be no likely significant effect to the receiving water bodies as a result of dosing at Portlaw WTP.

5.3.6 Assessment of Cumulative Impacts from other WSZs

The cumulative loads to the Suir Catchment (HA 16) associated with the orthophosphate dosing have been assessed with the Portlaw WSZ. The common water bodies that are impacted by the WSZs supplied by these WTPs have been summarised in **Table 5-5** below.

- 010 Adamstown WTP - East Waterford Regional
- 037 Troyswood WTP – Kilkenny City (1500PUB1011)
- 021 Rossadrehid WTP - Galtee Regional
- 041 Glenary WTP – Glenary
- 047 Goatenbridge WTP - Ardfinnan Regional
- 098 Mooncoin WTP - Mooncoin Regional WS
- 138 Thurles WTP - Thurles
- 177 Linguan WTP – Carrick on Suir
- 190 Ironmills Pump Station - Ironmills

The winter baseline concentrations for the Upper Suir Estuary (IE_SE_100_0600), Barrow Suir Nore Estuary (IE_SE_100_0100) and Waterford Harbour (IE_SE_100_0000) are above 75% of the upper orthophosphate indicative quality threshold. The modelled increase in concentration is insignificant (0.0002mg/l, 0.0004 mg/l and 0.0003 mg/l respectively). The summer baseline concentration for the Lower Suir Estuary (Little Island - Cheekpoint) is above 75% of the upper orthophosphate indicative quality threshold however the modelled increase in concentration is also insignificant (0.0010 mg/l) and therefore orthophosphate dosing will not cause a deterioration in the orthophosphate indicative quality of the water body or prevent the achievement of WFD objectives. The cumulative assessment has demonstrated that there will not be significant impact on the receiving waters and the dosing will not cause deterioration in status or prevent the achievement of the WFD objectives.

Table 5-5: Cumulative assessment of the increased loading and concentrations to receiving water bodies from Portlaw and other WSZs proposed for corrective water treatment in the upstream catchments

EU_CD/Name	Periond	Ortho P Indicative Quality and Trends (distance to threshold) *Surrogate Indicative Quality indicated in italic*	Baseline Year 2011 and Conc. *Surrogate Conc. given in*	75% of Ortho P Indicative Quality upper threshold mg/l	Cumulative Ortho P load to SW from leakage, DWWTS & agglomerations kg/yr	Conc. using Flows (30%ile tidal or gauged) mg/l	PO4 Potential Baseline Conc. following dosing mg/l
IE_SE_100_0600 Upper Suir Estuary	TWB Summer	High (S) None Far	0.006	0.019	535.4	0.0002	0.006
	TWB Winter	High (W) None Near	0.023	0.019			0.023
IE_SE_100_0550 Middle Suir Estuary	TWB Summer	Good (S) Upwards Far	0.029	0.053	2618.7	0.0010	0.030
	TWB Winter	Good (W) Upwards Far	0.037	0.053			0.038
IE_SE_100_0500 Lower Suir Estuary (Little Island - Cheekpoint)	TWB Summer	High (S)	0.026	0.023	2647.8	0.0010	0.027
	TWB Winter	Good (W)	0.053	0.053			0.054
IE_SE_100_0100 Barrow Suir Nore Estuary	TWB Summer	High (S) Upwards Far	0.019	0.019	3751.2	0.0004	0.019
	TWB Winter	Good (W) None Far	0.045	0.042			0.045
IE_SE_100_0000 Waterford Harbour	TWB Summer	High (S) Downwards Far	0.005	0.019	3850.8	0.0003	0.006
	TWB Winter	High (W) Downwards Far	0.020	0.019			0.020
IE_SE_050_0000 Eastern Celtic Sea (HAs 13;17)	CWB	*High*	*0.013*	*0.019*	*4715.3*	*0.0000*	*0.013*

‡ Load from WWTP / SWO following treatment added.

5.3.7 Conclusions

The modelled increased orthophosphate dosing concentrations from direct discharges are not resulting in a noticeable effect with an increase in the orthophosphate concentrations in the receiving Clodiagh (Portlaw)_050 water body 0.0% as shown by the mass balance assessment in **Table 2 Appendix C**.

The modelled concentrations due to subsurface pathways are insignificant in all river water bodies, i.e. < 0.00125 mg/l (5% of the High / Good indicative quality boundary for surface water bodies) and therefore there is no risk of deterioration in the orthophosphate indicative quality of the river water bodies, or of preventing the achievement of their WFD objectives.

The modelled concentrations due to subsurface pathways is undetectable in the Upper Suir Estuary (IE_SE_100_0600) transitional water body, i.e. < 0.00125 mg/l (5% of the High / Good indicative quality boundary for surface water bodies) and therefore there is no risk of deterioration in the orthophosphate indicative quality of this transitional water body, or of preventing the achievement of the WFD objectives.

The predicted loads to groundwater bodies are all undetectable (i.e. < 0.00175 mg/l = 5% of the Good / Fail indicative quality boundary). There are no coastal water bodies directly affected by the Portlaw WTP.

The cumulative assessment of dosing at Portlaw WTP together with other WTPs which may be subject to dosing in the same catchments, has demonstrated that there will not be a significant effect on receiving water bodies. These WTPs are also subject to their own Screening for AA.

Therefore there is no risk of deterioration in the orthophosphate indicative quality of the water bodies as a result of the proposed project and the dosing will not prevent the achievement of the WFD objectives for these water bodies.

6 EVALUATION OF LIKELY SIGNIFICANT EFFECTS

The key pressure associated with the proposed orthophosphate dosing is the potential for increased orthophosphate levels in the receiving waters which support the Qualifying Interests (habitats and species) identified in **Table 4-3** that are both water dependent and nutrient sensitive (**Appendix B**).). The likelihood of significant effects on these habitats and species, in view of their conservation objectives, are assessed in detail below.

6.1 CONSTRUCTION PHASE

Portlaw WTP is not located within or directly adjacent to the boundary of any European Site. The WTP footprint and proposed construction works are located 155m south east of the Clodiagh (Portlaw)_050 (IE_SE_16C030750) the lower reaches of which are designated as part of the Lower River Suir SAC, 1.2 kms north of the WTP site. Clodiagh (Portlaw)_050 is a tributary of the River Suir main channel. There are no surface water linkages providing connectivity between Portlaw WTP, Clodiagh (Portlaw)_050 and those downstream sections of the Lower River Suir SAC. The proposed construction works (to facilitate both the orthophosphate and pH dosing units) will be localised and contained within the WTP site development boundary which comprises buildings and artificial surfaces. Works such as excavations, will be contained to the defined working area and necessary works with cast in place concrete will be undertaken within sealed shuttered units. Such works practices will retain all potential construction related pollutants at source.

In addition, Portlaw WTP overlies the Comeragh (IE_SE_G_154) groundwater body. The Comeragh groundwater body is poorly productive. The most eastern point of the groundwater body intersects a small portion of the WSZ. Due to the poorly productive nature of the groundwater body and the topography (mountains to the west and estuary to the east) it is assumed that flow pathways are likely to be short and flowing towards the estuary. and groundwater is forced into associated surface water bodies such Clodiagh (Portlaw)_050. Therefore, preferential groundwater flow paths for Portlaw WTP and surrounds are likely to be to those nearby areas of Clodiagh (Portlaw)_050. Therefore, preferential groundwater flow paths for the Portlaw WTP and surrounds are likely to be to those nearby areas of Clodiagh (Portlaw)_050 Stream. The proposed excavation works will not be extensive (up to c. 30 m for pipework and to an approximate depth of 700 mm) and will be situated upon made ground within the WTP development site. Interference with the underlying water table will be unlikely to occur and any potential interference would be localised, minor and temporary.

Therefore, there is no potential for likely significant effects to the underlying groundwater body, the receiving surface water features and subsequently those hydrologically connected European Sites included for further assessment, as a result of the construction of the corrective water treatment works at Portlaw WTP.

It can be concluded on the basis of objective scientific information that the construction of the corrective water treatment works at Portlaw WTP, individually or in combination with other plans or projects, will not have a likely significant effect on any European Site.

6.2 OPERATIONAL PHASE

The key pressure associated with the proposed orthophosphate dosing is the potential for increased orthophosphate levels in the receiving waters which support the qualifying interests (habitats and

species) identified in **Table 4-3** that are both water dependent and nutrient sensitive (**Appendix B**). The likelihood of significant effects on these habitats and species, in view of their conservation objectives, are assessed in detail below.

6.2.1 Lower River Suir SAC 002137

6.2.1.1 (1029) Freshwater Pearl Mussel (*Margaritifera margaritifera*)

Conservation objectives for the species in the Lower River Suir SAC have been set; however an orthophosphate specific level is not defined. In addition, the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations S.I. No. 296 of 2009, set ecological quality objectives for the Freshwater pearl mussel habitat, which are the equivalent of High WFD status. The European Communities Environmental Objectives (Surface Water) Regulations S.I. No. 272 of 2009 (as amended) set a limit of ≤0.025 (mean) or ≤0.045 (95%ile) mg/l for Molybdate Reactive Phosphorus (MRP) (mg P/l) for High WFD Status waters, however the level required is likely to be even lower than this standard. These objectives have framed the impact assessment for this species within this SAC for this proposed project.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP:

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE_SE_16D290570 Darrigal_010.
- The transitional water body hydrologically connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

The Freshwater pearl mussel in this SAC is located in the Clodiagh River, which discharges into the Middle Suir Estuary. The Clodiagh population is designated under the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, S.I. No. 296 of 2009.

The Clodiagh population lies upstream of Portlaw in Co. Waterford, with a marginal overlap between the suitable habitat and the Portlaw WSZ. The distribution of the Freshwater pearl mussel in the Clodiagh catchment is presented in **Figure 6-1** below[16]. The Freshwater pearl mussel was found to be present almost continually but in low numbers from Clonea to Portlaw[16] in a 2006 survey and were not abundant in any stretch, but ranged from occasional to frequent or common. No juvenile mussels were recorded during the survey.

[16] Clodiagh Freshwater Pearl Mussel Sub-basin Management Plan 2009 – 2015. Final. August 2010.

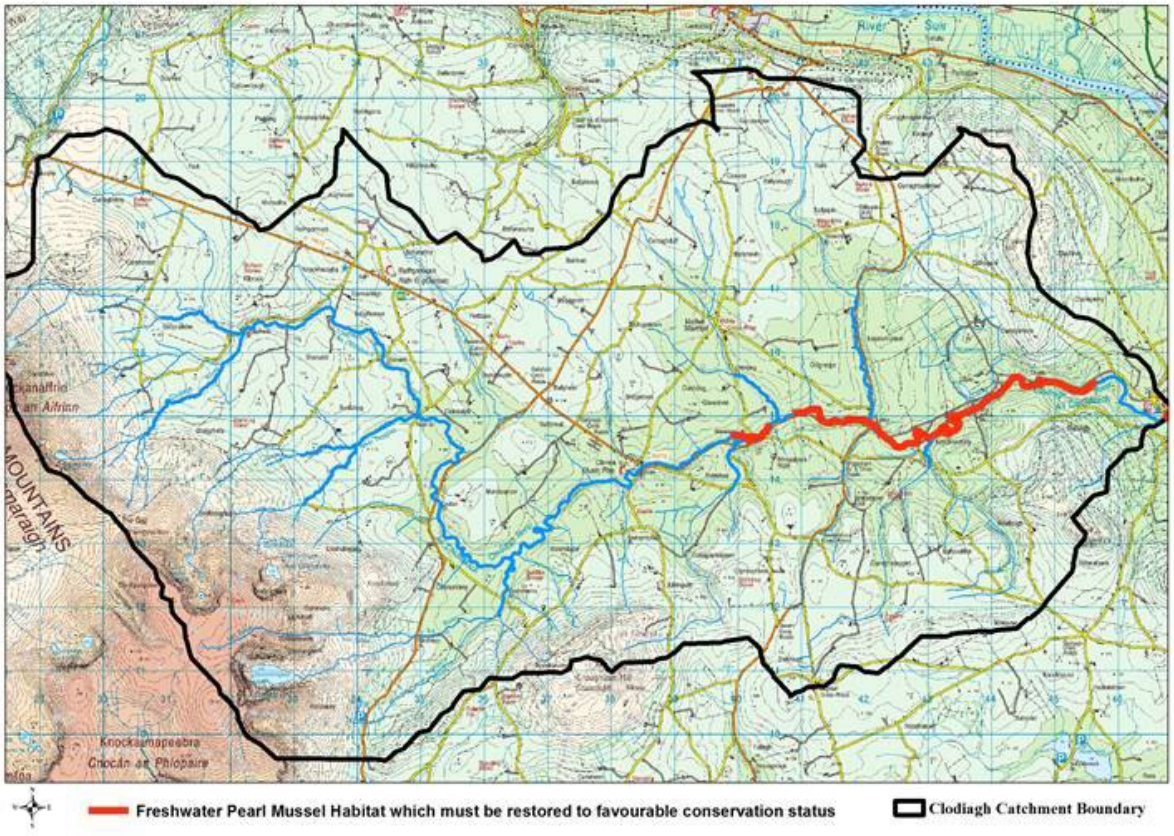

Figure 6-1: Freshwater Pearl Mussel habitat within the Clodiagh catchment.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

As described above, three river water bodies are connected to the WSZ and to the Lower River Suir SAC. Clodiagh (Portlaw)_050 (IE_SE_16C030750) river water body is currently at good indicative quality for orthophosphate at the furthest most downstream station, i.e. ≤0.035 mg/l (mean) or ≤0.075 mg/l (95%ile), and is showing an upwards trend in concentrations. Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) are also at moderate and good surrogate indicative quality for orthophosphate.

The modelled increases in concentrations from the combined assessment are undetectable (0.0000 mg/l) for Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570). Therefore there will be no risk of deterioration in the existing Ortho P indicative quality or of preventing the achievement of WFD objectives of these three river water bodies.

The modelled orthophosphate concentration in the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) are not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies.

The transitional water body directly affected by the Portlaw WSZ is Upper Suir Estuary (IE_SE_100_0600). The modelled post-dosing concentration for this water body is not detectable (0.0000 mg/l). There are no coastal water bodies directly affected by this WSZ. See **Section 6.2.1.3** for the assessment of likely significant effects to Atlantic salmon which are the host fish to freshwater pearl mussel larval glochidia.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on the freshwater pearl mussel can be excluded. Furthermore, dosing will not prevent the restoration of the favourable conservation condition of this species in this SAC.

6.2.1.2 (1092) White-clawed Crayfish (*Austropotamobius pallipes*)

A review of the targets and measures for the white-clawed crayfish found no nutrient specific targets for the species (NPWS, 2017[17]). However, white-clawed crayfish have a general water quality requirement for moderate to good water quality (i.e. Q3-4 or higher; NPWS, 2013[18]), therefore any reduction in water quality as a result of orthophosphate dosing would be contrary to the conservation objectives for this species.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE_SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

White-clawed crayfish occurs extensively in the River Suir and in many of its tributaries. On the river Suir main channel, the species has been recorded in almost the entire length of non-tidal river from the most upstream point at Cabragh, near Thurles, to downstream of Kilsheelan. It is also present on the following tributaries: Anner and Clashawley, Clodiagh and Owenbeg, Multeen, Tar, Nier and Clodiagh Lower. All locations designated for white-clawed crayfish along the Lower River Suir SAC are located upstream of the water bodies identified in **Table 5-2**. However there are historic records in the Clodiagh (Portlaw)_050 (NBDC, 1996 and 2007)[19], the closest of which is approximately 5 km upstream of the Portlaw WSZ, a tributary of the River Suir. All other white-clawed crayfish records occur upstream of where this tributary joins the River Suir. A recent survey carried out in September 2017 by GMIT in response the an outbreak of the Crayfish Plague (*Aphanomyces astaci*) in the River Suir recorded no crayfish in the Clodiagh (Portlaw)_050[20]. Crayfish Plague positive locations are upstream of the Portlaw WSZ and the September 2017 survey indicates that there are no crayfish in any of the sites sampled downstream of the Crayfish Plague positive locations. Notwithstanding this,

[17] NPWS (2017) Lower River Suir 002137 Conservation Objectives
[18] NPWS (2013) The Status of EU Protected Habitats and Species in Ireland. Species Assessments Volume 3. Version 1.0. Unpublished Report, National Parks & Wildlife
[19] National Biodiversity Centre - Biodiversity Maps, Freshwater White-clawed Crayfish
[20] Crayfish Plague Outbreaks Update October 2017 - Information note issued by National Parks and Wildlife Service and Marine Institute

an assessment has been undertaken on a precautionary basis, given records for the Clodiagh (Portlaw)_050 from 1996 and 2007.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on the white-clawed crayfish can be excluded. Furthermore, dosing will not prevent the maintenance of the favourable conservation condition of this species.

6.2.1.3 (1095) Sea lamprey (*Petromyzon marinus*), (1096) Brook lamprey (*Lampetra planeri*), (1099), River lamprey (*Lampetra fluviatilis*), (1103), Twaite shad (*Alosa fallax*) and (1106), Atlantic salmon (*Salmo salar*) (only in fresh water)

Water quality is a particular threat to all fish fauna listed as Qualifying Interests. The latest Red List of Irish amphibians, reptiles and freshwater fish (King *et al*., 2011[21]) highlights the deterioration in water quality and ongoing point and diffuse sources of pollution as a key threat to these species and includes the potential effects from municipal discharges. The SSCO (NPWS, 2017[17]) for these fish species requires that the spawning habitat should not be reduced. Deterioration in water quality has the potential for a detrimental effect on spawning habitats, particularly where nutrient conditions result in excessive algal growth and macrophyte abundance, leading to smothering, shading effects, alteration of macroinvertebrate communities and silt deposition. The SSCO for salmon also requires a Q-value of at least 4, which equates to good ecological status.

[21] King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE_SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

Details on the distribution of Sea lamprey; Brook lamprey; River lamprey; Twaite shad; and Atlantic salmon (only in fresh water) are not provided for the site. It is therefore considered that there is potential for the Brook lamprey; River lamprey; and Atlantic salmon to occur in all river water bodies identified in **Table 5-2**, and for Sea lamprey and Twaite shad to occur in all river; transitional and coastal water bodies identified in **Table 5-2.**

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on these Annex II species can be excluded. Furthermore, dosing will not prevent the restoration of the favourable conservation condition of these species.

6.2.1.4 (1330) Atlantic salt meadows (Glauco-Puccinellietalia maritimae)

A review of the SSCOs (NPWS, 2017[17]) for the site found no nutrient specific targets for this habitat; however, one attribute common to both habitats under physical structure is flooding regime. The target is to maintain the natural tidal regime. The CO supporting document on coastal habitats (NPWS,

2017[22]) for the Lower River Suir SAC was reviewed, and discusses the flooding regime attribute and associated target in further detail. The regular ebb and flow of the tide brings salinity, but also nutrients, organic matter and sediment, which are central to the development, growth and survival of saltmarshes.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP:

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE _SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

The habitat Atlantic salt meadow is located at Belmont House at the north-west end of the Kings Channel; in low-lying land to the north of the Little Island slipway (Ballynakill House); and distributed along the southern side of the Kings Channel. The habitat is located within the transitional water body Lower Suir Estuary (Little Island - Cheekpoint) (IE_SE_100_0500) and downstream of the Middle Suir Estuary (IE_SE_100_0550); Clodiagh (Portlaw)_050 (IE_SE_16C030750); Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE _SE_16D290570) river water bodies.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on this

[22] NPWS (2017) Lower River Suir 002137 Conservation Objectives supporting document - coastal habitats

habitat can be excluded. Furthermore, dosing will not prevent the restoration of the favourable conservation condition of the habitat.

6.2.1.5 (1410) Mediterranean salt meadows (*Juncetalia maritimi*)

A review of the SSCOs (NPWS, 2017[17]) for the site found no nutrient specific targets for this habitat; however, one attribute common to both habitats under physical structure is flooding regime. The target is to maintain the natural tidal regime. The CO supporting document on coastal habitats (NPWS, 2017[22]) for the Lower River Suir SAC was reviewed, and discusses the flooding regime attribute and associated target in further detail. The regular ebb and flow of the tide brings salinity, but also nutrients, organic matter and sediment, which are central to the development, growth and survival of saltmarshes.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP:

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE _SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

Mediterranean salt meadows habitat was not recorded in Lower River Suir SAC during the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009[23]). Thus, the total area of the qualifying habitat in the SAC is unknown. An NPWS survey in the 1990s noted stands of sea rush (*Juncus maritimus*), indicative of Mediterranean salt meadows, on the saltmarsh at Grantstown but the habitat was not recorded in the Little Island sub-site during the SMP in 2007 (McCorry and Ryle, 2009). Unsurveyed areas may be present within the SAC. On this basis, a conservative assessment has been undertaken and has assumed that this habitat may be present downstream of the WSZ.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high

[23] McCorry, M. and Ryle, T. (2009) Saltmarsh monitoring project 2007-2008. Unpublished report to NPWS.

orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on this habitat can be excluded. Furthermore, dosing will not prevent the restoration of the favourable conservation condition of the habitat.

6.2.1.6 (1355) Otter (*Lutra lutra*)

A review of the SSCOs (NPWS, 2017[17]) found no specific attributes or targets relating to water quality. The National Parks and Wildlife Service's 'Threat Response Plan for the Otter' (NPWS, 2009[24]), which comprised a review of and response to the pressures and threats to otters in Ireland, categorized three principal risks to otters: i) habitat destruction and degradation; ii) water pollution; and, iii) accidental death and/or persecution.

There will be no interference with the terrestrial, marine or freshwater habitat of the species as a result of this project. The diet of the species varies locally and seasonally; however, it is dominated by fish, in particular salmonids, eels and sticklebacks in freshwater.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP:

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE _SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

The distribution of otter terrestrial habitat in the SAC is calculated as 116.17ha above high water mark (HWM) and 726.61ha along river banks. The area of marine habitat is calculated as 712.27ha and the length of freshwater (river) calculated is 382.31km. It is therefore assumed that otter have the potential to interact with all surface water bodies identified **Table 5-2**.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

[24] NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.

The modelled orthophosphate concentration in the river water bodies Tinhalla_010 The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on this species can be excluded. Furthermore, dosing will not prevent the maintenance of the favourable conservation condition of the species.

6.2.1.7 (6430) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

A review of the SSCOs (NPWS, 2017[17]) for this site do not contain nutrient specific water quality targets for this habitat, however an important attribute for the habitat is hydrological regime, namely flooding depth/height of the water table. The habitat relies on winter inundation, which results in deposition of naturally nutrient-rich sediment.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP:

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE _SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

The location of this habitat has not been mapped in detail for the Lower River Suir SAC and therefore the total area of the qualifying habitat in the SAC is unknown. It is assumed that the habitat has the potential to be hydrologically connected to all surface water bodies identified **Table 5-2**.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on this habitat can be excluded. Furthermore, dosing will not prevent the maintenance of the favourable conservation condition of the habitat.

6.2.1.8 (91E0) * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)

A review of the SSCOs for this habitat found no nutrient specific targets. The habitat is assessed based on woodland structure, and requires periodic flooding to maintain alluvial woodlands along river floodplains. The main threats to this habitat are drainage and reclamation, together with non-native and invasive species encroachment.

Table 5-2 identifies the surface and groundwater bodies which are hydrologically or hydrogeologically connected to Lower River Suir SAC and will receive inputs from the proposed orthophosphate dosing at Portlaw WTP:

- The river water bodies that are hydrologically connected include IE_SE_16C030750 Clodiagh (Portlaw)_050, IE_SE_16T310740 Tinhalla_010 and IE _SE_16D290570 Darrigal_010.
- The transitional water body connected to the site is the IE_SE_100_0550 Middle Suir Estuary.
- The groundwater bodies hydrogeologically connected to the site include IE_SE_G_154 Comeragh, IE_SE_G_030 Carrick-on-Suir and IE_SE_G_040 Clonmel.

Alluvial forest was surveyed in Lower River Suir SAC by Perrin *et al*. (2008[25]) as part of the National Survey of Native Woodlands (NSNW) at Fiddown (NSNW site code: 0022), Mountbolton (NSNW site code: 1823) and Ballycanvan Big (NSNW site code: 1839). The area of alluvial woodlands in the surveyed sites within the SAC is estimated to be 32.9ha. It is important to note that further unsurveyed areas of alluvial forest are present within the SAC, for example at islands below Carrick-on-Suir, at

[25] Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A. National survey of native woodlands 2003-2008. Unpublished report to NPWS

Shanbally (Coillte LIFE project site), Tibberaghny Marshes, along the lower stretches of the more westerly of the Suir tributaries and along both banks of the Suir as far east as the Dawn River. Alluvial woodlands occur in the IE_SE_100_0550 Middle Suir Estuary. However, the habitats are located upstream of the Portlaw WSZ and the river water bodies that are hydrologically connected to the WSZ: Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE _SE_16D290570). Given that there are potentially further unsurveyed areas, a precautionary approach has been taken for this assessment and it has been assumed that the habitat may be present in the water bodies intersected by the Portlaw WSZ.

The EAM has assessed the potential for impact on orthophosphate indicative quality and has based this assessment on a conservative basis using all available flows data. Full details of the assessment results are provided in **Appendix C** and discussed above in **Section 5.**

The modelled orthophosphate concentration in the river water bodies Clodiagh (Portlaw)_050 (IE_SE_16C030750), Tinhalla_010 (IE_SE_16T310740) and Darrigal_010 (IE_SE_16D290570) following dosing at Portlaw WTP is not detectable (0.0000 mg/l). These concentrations are within 5% of the Good/ High boundary indicative quality (0.00125 mg/l) threshold. There is therefore no risk of deterioration in the orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

Similarly, the transitional water body Upper Suir Estuary (IE_SE_100_0600) has a modelled post-dosing concentration of 0.0000 mg/l and therefore there is no risk of deterioration in the high orthophosphate indicative quality of this water body, or of preventing the achievement of WFD objectives.

For the groundwater bodies Comeragh (IE_SE_G_154), Carrick-on-Suir (IE_SE_G_030) and Clonmel (IE_SE_G_040) the modelled orthophosphate concentration post dosing is not detectable (0.0000 mg/l). Therefore there is no risk of deterioration in the existing good orthophosphate indicative quality of these water bodies, or of preventing the achievement of WFD objectives.

In light of the EAM assessment results, which evaluate the additional orthophosphate loading from dosing at Portlaw WTP, it has been demonstrated that the potential for likely significant effects on this habitat can be excluded. Furthermore, dosing will not prevent the restoration of the favourable conservation condition of the habitat.

6.3 ASSESSMENT OF IN-COMBINATION EFFECTS WITH OTHER PLANS OR PROJECTS

In order to ensure all potential impacts upon European Sites within the project's ZoI were considered, including those direct and indirect impacts that are a result of cumulative or in-combination effects, the following steps were completed:

1. Identify projects/ plans which might act in combination: identify all possible sources of effects from the project or plan under consideration, together with all other sources in the existing environment and any other effects likely to arise from other proposed projects or plans;
2. Impacts identification: identify the types of impacts that are likely to affect aspects of the structure and functions of the site vulnerable to change;

3. Define the boundaries for assessment: define boundaries for examination of cumulative effects; these will be different for different types of impact and may include remote locations;
4. Pathway identification: identify potential cumulative pathways (e.g., via water, air, etc.; accumulations of effects in time or space);
5. Prediction: prediction of magnitude/ extent of identified likely cumulative effects, and
6. Assessment: comment on whether or not the potential cumulative impacts are likely to be significant.

A search of Waterford County Council's planning enquiry system was conducted for developments that may have in-combination effects on European Sites with the ZoI. Plans and projects relevant to the area were searched in order to identify any elements of the plans and projects that may act cumulatively or in-combination with the proposed development.

Based on this search and the Project Teams knowledge of the study area a list of those projects and plans which may potentially contribute to cumulative or in-combination effects with the proposed project was generated as listed in **Table 6-1** below.

Table 6-1: In-combination impacts with other plans, programmes and policies

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
Waterford City and County Development Plan 2022 - 2028 The policies, objectives and zonings of relevance in the Waterford City and County Development Plan 2022 - 2028 include under Infrastructure and Water Services: **UTL02 Water Services** To collaborate support and work, in conjunction with Irish Water [Uisce Éireann], to ensure the timely delivery and provision, extension and upgrading of existing and new high quality, climate resilient, water services infrastructure, in order to facilitate the sustainable growth and development of our City and County, in accordance with an ecosystem services and integrated catchment management approach, and the Development Plan Core and Settlement strategies. **UTL03 Water Supply & Drinking Water Regulations** We will collaborate with Irish Water [Uisce Éireann] in contributing towards compliance with the European Union (Drinking Water) Regulations Drinking Water Regulations 2014 (as amended) and compliance of water supplies with the parameters identified in these Regulations. **UTL04 Drinking Water Report for Public Water Supplies** In conjunction with Irish Water [Uisce Éireann], we will have regard to the EPA 2020 publication "Drinking Water Report for Public Water Supplies 2019" (and any subsequent update) in the establishment and maintenance of water sources in the County. **UTL05 EPA's Remedial Action List** In conjunction with Irish Water [Uisce Éireann], undertake recommendations made by the EPA arising from any failure to meet drinking water standards and any enlistment on the EPA's Remedial Action List. **UTL08 Protection of Water Resources** To work together with Irish Water [Uisce Éireann] towards a common goal of protecting our drinking water sources. This will be achieved by: • Supporting the preparation and implementation of Drinking Water Protection Plans by Irish Water [Uisce Éireann], to protect sources of public water supply, in accordance with the requirements of the Water Framework Directive. • Having regard to the EPA 2019 publication 'Drinking Water Report for Public Water Supplies 2018' (and any subsequent update) in the establishment and maintenance of water sources in the County in conjunction with Irish Water.	▪ N/A	Waterford City and County Development Plan 2022 - 2028 emphasis the objectives of their water services which include the enhancement and improved quality of the service to its consumers. The plans also outline the importance of compliance with the National River Basin Management Plan 2018-2021), and emphasis compliance with environmental objectives. There is no potential for cumulative impacts with these plans.

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
• Protecting both ground and surface water resources including taking account of the impacts of climate change, the cumulative impacts of septic tanks and waste water treatment systems, and to work with and support Irish Water [Uisce Éireann] to develop and implement Water Safety Plans to protect sources of public water supply and their contributing catchment. The Waterford City and County Development Plan 2022 - 2028 outlines it's function in the delivery of water supply, water conservation, water quality monitoring, main drainage and waste water treatment provision. The Adamstown water treatment plant supplies all the drinking water for Waterford City and infrastructure investments secure Waterford City's water supply, quantity and quality into the future.		
River Basin Management Plan For Ireland 2022 – 2027 The Third Cycle Draft River Basin Management Plan 2022-2027 Consultation Report has been published. This report presents a summary of the issues raised in the submissions reviewed from the public consultation on the draft River Basin Management Plan for Ireland 2022-2027. The 3rd cycle of River Basin Management Plan (RBMP) for the period of 2022-2027 is currently being prepared by Department of Housing, Local Government and Heritage (DHLGH) in line with the EU Water Framework Directive (WFD) (2000/60/EC). The document (Chapter 3) sets out the condition of waters in Ireland and a summary of status for all monitored waters in the 2013 – 2018 period, including a description of the changes since 2007 – 2009 and 2010-2015. A large number of river waterbodies are still declining and unless this is addressed, sustained and progressive improvements in water quality will be difficult to achieve. Overall, 53% of surface waters are in good or high ecological status while the remaining 47% are in unsatisfactory ecological status. For groundwater bodies, 92% are in good chemical and quantitative status. Chapter 3 of the RBMP presents results of the catchment characterisation process, which identifies the significant pressures on each water body that is *At Risk* of not meeting the environmental objectives of the WFD. Importantly, the assessment includes a review of trends over time to see if conditions were likely to remain stable, improve or deteriorate by 2027. This work was presented in the RBMP for 4,842 water	▪ N/A	The objectives of the RBMP are to • Prevent deterioration; • Restore good status; • Reduce chemical pollution; and • Achieve water related protected areas objectives The implementation of the RBMP seeks compliance with the environmental objectives set under the plan, which will be documented for each water body. This includes compliance with the European Communities (Surface Waters) Regulations S.I. No. 272 of 2009 (as amended). The implementation of this plan will have a positive impact on biodiversity and the Project will not affect the achievement of the RBMP objectives given the detailed assessment of the effects of dosing on water body environmental objectives under the EAM.

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
bodies nationally. 1,603 water bodies were classed *At Risk* or 33%. An assessment of significant environmental pressures found that agriculture was the most significant pressure in 1,000 water bodies that are *At Risk*. Urban waste water, hydromorphology and forestry were also significant pressures amongst others.		
Catchment based Flood Risk Assessment and Management (CFRAM) Programme, under the Floods Directive The Office of Public Works (OPW) is responsible for the implementation of the Floods Directive 2007/60/EC which is being carried out through a Catchment based Flood Risk Assessment and Management (CFRAM) Programme. As part of the directive Ireland is required to undertake a Preliminary Flood Risk Assessment, to identify areas of existing or potentially significant future flood risk and to prepare flood hazard and risk maps for these areas. Following this, flood risk management plans are developed for these areas setting objectives for managing the flood risk and setting out a prioritised set of measures to achieve the objectives. The CFRAM programme is currently being rolled out and Draft Flood Risk Management Plans have been prepared. These plans have been subject AA.	▪ Habitat loss or destruction; ▪ Habitat fragmentation or degradation; ▪ Alterations to water quality and/or water movement; ▪ Disturbance; ▪ In-combination impacts within the same scheme.	CFRAM Studies and their product Flood Risk Management Plans will each undergo AA. Any future flood plans will have to take into account the design and implementation of water management infrastructure as it has the potential to impact on hydromorphology and potentially on the ecological status and favourable conservation status of water bodies. The establishment of how flooding may be contributing to deterioration in water quality in areas where other relevant pressures are absent is a significant consideration in terms of achieving the objectives of the WFD. The AA of the plans will need to consider the potential for impacts from hard engineering solutions and how they might affect hydrological connectivity and hydromorphological supporting conditions for protected habitats and species. There is no potential for cumulative impacts with the CFRAMS programme as no infrastructure is proposed as part of this project.
Foodwise 2025 Foodwise 2025 strategy identifies significant growth opportunities across all subsectors of the Irish agri-food industry. Growth Projection includes increasing the value added in the agri-food, fisheries and wood products sector by 70% to in excess of €13 billion.	▪ Land use change or intensification; ▪ Water pollution; ▪ Nitrogen deposition; ▪ Disturbance to habitats / species.	Foodwise 2025 was subject to its own AA[26]. Growth is to be achieved through sustainable intensification to maximise production efficiency whilst minimising the effects on the environment however there is increased risk of nutrient discharge to receiving waters and in turn a potential risk to biodiversity and Europe Sites if not controlled. With the required mitigation in the Food Wise Plan, no significant in-combination impacts are predicted. Mitigation measures included cross

[26] http://www.agriculture.gov.ie/media/migration/foodindustrydevelopmenttrademarkets/agri-foodandtheeconomy/foodwise2025/environmentalanalysis/AgriFoodStrategy2025NISDRAFT300615.pdf

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
		compliance with 13 Statutory Management Requirements, EIA Agricultural Regulations 2011, GLAS, and AA Screening of licencing and permitting in the forestry and seafood sectors.
Rural Development Policy 2014 – 2020 The agricultural sector is actively enhancing competitiveness whilst trying to achieve more sustainable management of natural resources. The common set of objectives, principles and rules through which the European Union co-ordinates support for European agriculture is outlined in the Rural Development Programme (RDP) 2014-2020 under the Common Agricultural Policy. The focus of the programme is to assist with the sustainable development of rural communities and while improvements are sought in relation to water management. Within the RDP are two targeted agri-environment schemes; Green Low Carbon Agri-Environment Scheme (GLAS) and Targeted Agriculture Modernisation Scheme (TAMS). They provide the role of a supportive measure to improve water quality and thus provide direct benefits in achieving the measures within the RBMP. The achievement of the objectives outlined within GLAS, to improve water quality, mitigate against climate change and promote biodiversity will be of direct positive benefit in achieving the measures within the RBMP and the goals of the Natura Directives. The scheme has an expected participation for 2014-2020 of 50,000 farmers which have to engage in specific training and tasks in order to receive full payment. Farmers within the scheme must have a nutrient management plan which is a strategy for maximising the return from on and off-farm chemical and organic fertilizer resources. This has a direct positive contribution towards protecting water bodies from pollution through limiting the amount of fertiliser that is placed on the land. The scheme prioritises farms in vulnerable catchments with 'high status' water bodies and also focuses on educating farmers on best practices to try and improve efficiency along with environmental outcomes. The TAMS scheme is open to all farmers and is focused on supporting productive investment for modernisation. This financial grant for farmers is focused on the pig	▪ Overgrazing; ▪ Land use change or ▪ intensification; ▪ Water pollution; ▪ Nitrogen deposition; ▪ Disturbance to habitats / species.	The RDP for 2014 – 2020 has been subject to SEA[27], and AA[28]. The AA assessed the potential for impacts from the RDP measures e.g. for the GLAS scheme to result in inappropriate management prescriptions; minimum stocking rates under the Areas of Natural Constraints measure leading to overgrazing in sensitive habitats with dependent species, and TAMS supporting intensification. Mitigation included project specific AA for individual building, tourism or agricultural reclamation projects, consultations with key stakeholders during detailed measure development, and site-based monitoring of the effects of RDP measures. With such measures in place, it was concluded that there would be no significant in-combination impacts on Natura 2000 sites.

[27]

[28] https://www.agriculture.gov.ie/media/migration/agarchive/ruralenvironment/preparatoryworkfortherdp2014-2020/RDP20142020DraftAppropriateAssessmentReport160514.pdf

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
and poultry sectors, dairy equipment and the storage of slurry and other farmyard manures. Within the TAMS scheme are two further schemes; the Animal Welfare, Safety and Nutrient Storage Scheme and the Low Emission Slurry Spreading Scheme. Both schemes are focused on productivity for farmers but have the ability to contribute towards a reduction in point and diffuse source pollution through improved nutrient management.		
National Nitrates Action Programme Article 28 of the Good Agricultural Practice Regulations, in line with the Nitrates Directive (91/676/EEC), requires the Minister for Housing, Local Government and Heritage, in consultation with the Minister for Agriculture, Food and the Marine, to review the Nitrates Action Programme every four years. Ireland has published the Fifth Nitrates Action Programme on the 11th March 2022. The Programme sets out new measures that have been introduced since the Fourth Programme. This iteration of the NAP is developed in the context of significantly greater environmental ambition in the Programme for Government and at EU level. The key issues considered in the fifth iteration of the NAP include: ▪ Better Policy Alignment; ▪ Compliance and Enforcement; ▪ Climate Action Measures. ▪ Biodiversity Measures; and ▪ Nitrates Derogation.	▪ Land use change or intensification; ▪ Water pollution; ▪ Nitrogen deposition; ▪ Disturbance to habitats / species.	In accordance with the Directive 2001/42/EC on the assessment of effects of certain plans and programmes, as transposed into Irish law, a Strategic Environmental Assessment (SEA) is being undertaken and an Environmental Report has been prepared. Appropriate Assessment under EU Directive 92/43/EEC, as transposed into Irish law, is also being undertaken and a Natura Impact Statement (NIS) has been prepared It concluded that the NAP was an environmental programme which imposes environmental constraints on all agricultural systems in the state. Consultation and submission on the 5th NAP have been considered in the SEA Statement and the Natura Impact Statement of the adopted fifth Nitrates Action Programme. These documents provide information on the decision-making process and documents how environmental considerations, the views of consultees/stakeholders and the recommendations of the SEA Environmental Report and the assessment carried out under Article 6 of the Habitats Directive have influenced the final adopted Plan. Adherence to the recommendations in these documents and incorporation into he Plan will ensure that there is no potential for cumulative impacts with the proposed project.

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
Forest Policy Review: Forests, Products and People – A Renewed Vision (2014) / Forestry Programme 2014 - 2020 Ireland's forestry sector is striving to increase forestry cover and one of the recommended policy actions in the Forest Policy Review: Forests, Products and People – A Renewed Vision (2014) is to increase the level of afforestation annually over time and support afforestation and mobilisation measures under the Forestry Programme 2014-2020. Two key objectives within the Forestry Programme 2014-2020 that will influence the RBMP are to increase Ireland's forest cover to 18% and to establish 10,000 ha of new forests and woodlands per annum. As part of this programme there are a number of schemes that promote sustainable forest management and they include the Afforestation Scheme, the Woodland Improvement Scheme, the Forest Road Scheme and the Native Woodland Conservation Scheme. Under the Native Woodland Conservation Scheme funding is provided to restore existing native woodland which promotes Ireland's native woodland resource and associated biodiversity. Native woodlands provide wider ecosystem functions and services which once restored can contribute to the protection and enhancement of water quality and aquatic habitats. New guidance and plans are also being developed to address forestry adjacent to water bodies, Freshwater Pearl Mussel Plans for 8 priority catchments and a Hen Harrier Threat Response Plan (NPWS). The mitigation measures within these plans will be particularly important in terms of protecting sensitive habitats and species from such forestry increases.	▪ Habitat loss or destruction; ▪ Habitat fragmentation or degradation; ▪ Water quality changes; ▪ Disturbance to species.	Ireland's Forestry Programme 2014 – 2020 has undergone AA[29]. A key recommendation is that all proposed forestry projects should be subject to an assessment of their impacts and the proximity of Natura 2000 habitats and species should be taken into account when proposals are generated. In-combination effects will therefore be assessed at the project specific scale. Adherence to this recommendation will ensure that there is no potential for cumulative impacts with the proposed project.
Water Services Strategic Plan (WSSP, 2015) Uisce Éireann has prepared a Water Services Strategic Plan (WSSP, 2015), under Section 33 of the Water Service No. 2 Act of 2013 to address the delivery of strategic objectives which will contribute towards improved water quality and WFD requirements. The WSSP forms the highest tier of asset management plans (Tier 1) which Uisce Éireann prepare and it sets the overarching framework for subsequent detailed implementation plans (Tier 2) and water services projects (Tier 3). The WSSP sets out the challenges we face as a country in relation to the provision of water services and identifies strategic national priorities. It includes Uisce Éireann's short, medium and long term objectives and identifies strategies to achieve these objectives. As such, the plan provides the context for subsequent detailed implementation plans	▪ Habitat loss and disturbance from new / upgraded infrastructure; ▪ Species disturbance; ▪ Changes to water quality or quantity; ▪ Nutrient enrichment /eutrophication.	The overarching strategy was subject to AA and highlighted the need for additional plan/project environmental assessments to be carried out at the tier 2 and tier 3 level. Therefore, no likely significant in-combination effects are envisaged.

[29] https://www.agriculture.gov.ie/media/migration/forestry/publicconsultation/newforestryprogramme2014-2020/nis/ForestryProgrammeNaturalImpactStatement290914.pdf

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
(Tier 2) which will document the approach to be used for key water service areas such as water resource management, wastewater compliance and sludge management. The WSSP also sets out the strategic objectives against which the Uisce Éireann Capital Investment Programme is developed. The current version of the CAP outlines the proposals for capital expenditure in terms of upgrades and new builds within the Uisce Éireann owned asset and this is a significant piece of the puzzle in terms of the expected improvements from the RBMP.		
National Wastewater Sludge Management Plan (2016) The National Wastewater Sludge Management Plan was prepared in 2015, outlining the measures needed to improve the management of wastewater sludge.	▪ Habitat loss and disturbance from new / upgraded infrastructure; ▪ Species disturbance; ▪ Changes to water quality or quantity; ▪ Nutrient enrichment /eutrophication.	The plan was subject to both AA and SEA and includes a number of mitigation measures which were identified in relation to transport of materials, land spreading of sludge and additional education and research requirements. This plan does not specifically address domestic wastewater loads, only those relating to Uisce Éireann facilities. In relation to the plan as it stands, no in-combination effects are expected with the implementation of proposed mitigation measures.
National Water Resources Plan – Framework Plan This Framework will deliver a sustainable water supply on a catchment and water resource zone basis, meeting growth and demand requirements through drought and critical periods. The resources plan takes account of WFD objectives and the programme of measures proposed in the relevant catchments and water resource zones. Specific measures in the plan with relevance to Uisce Éireann include those for urban wastewater and urban runoff and also as part of other measures in relation to the lead in drinking water.	▪ Increased abstractions leading to changes / pressure on existing hydrology / hydrogeological regimes.	The plan will seek to develop sustainable water supplies but must consider particularly critical drought periods when assimilation capacity for diffuse runoff may be reduced. The SEA Environmental Report for the Framework Plan has made mitigation recommendations for the implementation of the Framework Plan which are included in the Environmental Action Plan (EAP), and the EAP will provide a basis for tracking recommendations from the SEA and NIS during the Framework Plan implementation and Regional Plan development. A Monitoring Plan has also been developed which covers the integration of environmental and sustainability considerations throughout implementation of the Framework Plan and the options development methodology and provides a framework for future long-

Plan / Programme/Policy	Key Types of Impacts	Potential for In-combination Effects
		term monitoring. Therefore, no likely significant in-combination effects are envisaged.
Planning Applications There are a large number of planning applications approved, pending or recently approved within the Portlaw WSZ, particularly within the town. The applications are predominantly for the construction of new infrastructure or renovations to existing infrastructure. These include for housing, schools and commercial premises.	▪ Habitat loss and disturbance from new / upgraded infrastructure; ▪ Species disturbance; ▪ Changes to water quality or quantity; ▪ Nutrient enrichment /eutrophication.	Adherence to the overarching policies and objectives of the Waterford City and County Development Plan 2022 - 2028 will ensure that local planning applications and subsequent grant of planning will comply with the requirements of relevant environmental legislation including the WFD and Habitats Directive.
Integrated Pollution Control (IPC) Licensing Portlaw has a low number of Industrial Emission licences (IEL) and IPC licensed facilities, for example Ormonde Organics Ltd. Under the Industrial Emissions Directive 2010/75/EU and Environmental Protection Agency Act, 1992 (as amended) industrial activities (e.g. waste facility) are licensed by the EPA to prevent or reduce emissions to air, water and land, reduce water and use energy/resources efficiently. An IPC licence is a single integrated licence which covers all emissions from the facility and its environmental management. All related operations that the licence holder carries in connection with the activity are controlled by this licence.	▪ Changes to water quality or quantity; ▪ Nutrient enrichment /eutrophication.	The EPA is responsible for monitoring emissions and dealing with any infringements on IPC licences. All emissions must be within set limits which must not be contravened. Limits are set for phosphorus where relevant. Compliance with the limits set for phosphorus will ensure that there will be no significant in-combination impacts on Natura 2000 sites.

7 SCREENING CONCLUSION STATEMENT

This Screening to inform the AA process has considered whether the proposed orthophosphate dosing at the Portlaw WTP within the Portlaw WSZ, in combination with other plans or projects, is likely to have a significant effect on European Sites.

The appraisal undertaken in this Screening assessment has been informed by an EAM (see **Appendix C**) with reference to qualifying interests/special conservation interests for the European Sites potentially affected by the proposed project, in order to provide a scientific basis for the evaluations.

During the construction phase of the corrective water treatment works at Adamstown WTP the potential for direct, indirect and cumulative impacts affecting European Sites within the ZoI (i.e. Lower River Suir SAC, River Barrow and River Nore SAC) has been assessed. There will be no significant direct, indirect or cumulative impacts that will result in likely significant effects to the qualifying interests/special conservation interests of the European Sites within the ZoI.

During the operational phase of orthophosphate dosing at Portlaw WTP the potential for direct, indirect and cumulative impacts affecting the Lower River Suir SAC has been assessed. Due to the low orthophosphate inputs following dosing at Portlaw WTP and no risk of deterioration in the orthophosphate indicative quality of the receiving water bodies or of preventing the achievement of WFD objectives, there will be no significant direct, indirect or cumulative impacts that will result in likely significant effects to the qualifying interests/special conservation interests of the European Sites within the ZoI. This is concluded with regard to the range, population densities and overall conservation status of the habitats and species for which these sites are designated (i.e. Conservation Objectives).

The screening has been carried out on the basis of the information presented in the Project Description. It has been concluded that the project it is not connected or necessary to the management of any European Site. It can be concluded on the basis of objective scientific information and in view of best scientific knowledge, the proposed orthophosphate dosing and associated construction works at the Portlaw WTP; individually or in combination with other plans or projects, will not have a significant effect on any European Sites. Therefore, AA is not required.

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APPENDIX A

European Sites

A full listing of the COs and QIs / SCIs for each European Site, as well as the attributes and targets to maintain or restore the QIs / SCIs to a favourable conservation condition, are available from the NPWS website www.npws.ie. Links to the COs for the European Sites relevant to this Screening for AA are provided below.

Site Name (Code)	Conservation Objectives Source
Lower River Suir SAC (002137)	https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002137.pdf

APPENDIX B

Nutrient Sensitive Qualifying Interests

Water dependant and nutrient sensitive SAC species

Code	Qualifying Interest	Water dependant	Nutrient sensitive
1013	Whorl snail (*Vertigo geyeri*)	Yes	Yes
1014	Whorl snail (*Vertigo angustior*)	Yes	Yes
1016	Whorl snail (*Vertigo moulinsiana*)	Yes	Yes
1024	Kerry Slug (*Geomalacus maculosus*)	No	Yes
1029	Freshwater Pearl mussel (*Margaritifera margaritifera*)	Yes	Yes
1065	Marsh Fritillary (*Euphydryas aurinia*)	Yes	No
1092	White-clawed crayfish (*Austropotamobius pallipes*)	Yes	Yes
1095	Sea lamprey (*Petromyzon marinus*)	Yes	Yes
1096	Brook lamprey (*Lampetra planeri*)	Yes	Yes
1099	River lamprey (*Lampetra fluviatilis*)	Yes	Yes
1103	Twaite shad (*Alosa fallax*)	Yes	Yes
1106	Atlantic salmon (*Salmo salar* (freshwater only))	Yes	Yes
1303	Lesser Horseshoe bat (*Rhinolophus hipposideros*)	No	Yes
1349	Bottlenose dolphin (*Tursiops truncatus*)	Yes	Yes
1351	Harbour porpoise (*Phocoena phocoena*)	Yes	Yes
1355	Otter (*Lutra lutra*)	Yes	Yes
1364	Grey seal (*Halichoerus grypus*)	Yes	Yes
1365	Common seal (*Phoca vitulina*)	Yes	Yes
1393	Shining sickle moss (*Drepanocladus vernicosus*)	Yes	No
1395	Petalwort (*Petalophyllum ralfsii*)	Yes	Yes
1421	Killarney fern (*Trichomanes speciosum*)	Yes	Yes
1528	Marsh saxifraga (*Saxifraga hirculus*)	Yes	Yes
1833	Slender naiad (*Najas flexilis*)	Yes	Yes
1990	Nore freshwater pearl mussel (*Margaritifera durrovensis*)	Yes	Yes
5046	Killarney shad (*Alosa fallax killarnensis*)	Yes	Yes

Water dependant and nutrient sensitive SAC habitats

Code	Qualifying Interest	Water dependant	GWDTE	Nutrient sensitive
1110	Sandbanks which are slightly covered by sea water all the time	Yes		Yes
1130	Estuaries	Yes		Yes
1140	Mudflats and sandflats not covered by seawater at low tide	Yes		Yes
1150	Coastal lagoons	Yes		Yes
1160	Large shallow inlets and bays	Yes		Yes
1170	Reefs	Yes		Yes
1180	Submarine structures made by leaking gases	No		No
1210	Annual vegetation of drift lines	Yes		Yes
1220	Perennial vegetation of stony banks	Yes		No
1230	Vegetated sea cliffs of the Atlantic and Baltic coasts	Yes		Yes
1310	Salicornia and other annuals colonising mud and sand	Yes		Yes
1320	Spartina swards (*Spartinion maritimae*)	No		No
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Yes	Yes	Yes
1410	Mediterranean salt meadows (*Juncetalia maritimi*)	Yes	Yes	Yes
1420	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	Yes		Yes
2110	Embryonic shifting dunes	Yes		Yes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)	Yes		Yes
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)	Yes		Yes
2140	Decalcified fixed dunes with *Empetrum nigrum*	Yes		Yes
2150	Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)	Yes		Yes
2170	Dunes with Salix repens ssp. argentea (*Salicion arenariae*)	Yes	Yes	Yes
2190	Humid dune slacks	Yes	Yes	Yes
21A0	Machairs (* in Ireland)	Yes	Yes	Yes
3110	Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*)	Yes		Yes
3130	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or Isoeto-Nanojuncetea	Yes		Yes
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	Yes		Yes
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Yes		Yes
3160	Natural dystrophic lakes and ponds	Yes		Yes
3180	Turloughs	Yes	Yes	Yes

Code	Qualifying Interest	Water dependant	GWDTE	Nutrient sensitive
3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Yes		Yes
3270	Rivers with muddy banks with *Chenopodion rubri* p.p. and Bidention p.p. vegetation	Yes	Yes	Yes
4010	Northern Atlantic wet heaths with Erica tetralix (Flushes only)	Yes	Yes	Yes
4030	European dry heaths	No		Yes
4060	Alpine and Boreal heaths	No		No
5130	Juniperus communis formations on heaths or calcareous grasslands	No		No
6130	Calaminarian grasslands of the *Violetalia calaminariae*	No (flood risk)*		Yes
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	No (flood risk)*		Yes
6230	Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)	No		No
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	Yes	Yes	Yes
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Yes	Yes	Yes
6510	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)	No (flood risk)*		Yes
7110	Active raised bogs	Yes	Yes	Yes
7120	Degraded raised bogs still capable of natural regeneration	Yes	Yes	Yes
7130	Blanket bogs (* if active bog)	Yes	Yes	Yes
7140	Transition mires and quaking bogs	Yes	Yes	Yes
7150	Depressions on peat substrates of the Rhynchosporion	Yes	Yes	Yes
7210	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	Yes	Yes	Yes
7220	Petrifying springs with tufa formation (*Cratoneurion*)	Yes	Yes	Yes
7230	Alkaline fens	Yes	Yes	Yes
8110	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)	No		No
8120	Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)	No		No
8210	Calcareous rocky slopes with chasmophytic vegetation	No		No
8220	Siliceous rocky slopes with chasmophytic vegetation	No		No
8240	Limestone pavements	No		Yes
8310	Caves not open to the public	Yes	Yes	Yes

Code	Qualifying Interest	Water dependant	GWDTE	Nutrient sensitive
8330	Submerged or partially submerged sea caves	Yes		Yes
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	No		Yes
91D0	Bog woodland	Yes	Yes	Yes
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)	Yes	Yes	Yes
91J0	Taxus baccata woods of the British Isles	No		No

*While this habitat is determined to be non-water dependent, it is incuded in the assessment in terms of flood risk only

Water dependant and nutrient sensitive SPA birds

Code	Species of special conservation interest	Water dependant	Nutrient sensitive
A001	Red-throated Diver (*Gavia stellata*)	Yes	Yes
A003	Great Northern Diver (*Gavia immer*)	Yes	Yes
A004	Little Grebe (*Tachybaptus ruficollis*)	Yes	Yes
A005	Great Crested Grebe (*Podiceps cristatus*)	Yes	Yes
A009	Fulmar (*Fulmarus glacialis*)	Yes	Yes
A013	Manx Shearwater (*Puffinus puffinus*)	Yes	Yes
A014	Storm Petrel (*Hydrobates pelagicus*)	Yes	Yes
A015	Leach's Storm-petrel (*Oceanodroma leucorhoa*)	Yes	Yes
A016	Gannet (*Morus bassanus*)	Yes	Yes
A017	Cormorant (*Phalacrocorax carbo*)	Yes	Yes
A018	Shag (*Phalacrocorax aristotelis*)	Yes	Yes
A028	Grey Heron (*Ardea cinerea*)	Yes	Yes
A037	Bewick's Swan (*Cygnus columbianus bewickii*)	Yes	Yes
A038	Whooper Swan (*Cygnus cygnus*)	Yes	Yes
A043	Greylag Goose (*Anser anser*)	Yes	Yes
A045	Barnacle Goose (*Branta leucopsis*)	Yes	Yes
A046	Light-bellied Brent Goose (*Branta bernicla hrota*)	Yes	Yes
A048	Shelduck (*Tadorna tadorna*)	Yes	Yes
A050	Wigeon (*Anas penelope*)	Yes	Yes
A051	Gadwall (*Anas strepera*)	Yes	Yes
A052	Teal (*Anas crecca*)	Yes	Yes
A053	Mallard (*Anas platyrhynchos*)	Yes	Yes
A054	Pintail (*Anas acuta*)	Yes	Yes
A056	Shoveler (*Anas clypeata*)	Yes	Yes
A059	Pochard (*Aythya ferina*)	Yes	Yes
A061	Tufted Duck (*Aythya fuligula*)	Yes	Yes
A062	Scaup (*Aythya marila*)	Yes	Yes
A063	Eider (*Somateria mollissima*)	Yes	Yes
A065	Common Scoter (*Melanitta nigra*)	Yes	Yes
A067	Goldeneye (*Bucephala clangula*)	Yes	Yes
A069	Red-breasted Merganser (*Mergus serrator*)	Yes	Yes
A082	Hen Harrier (*Circus cyaneus*)	Yes	Yes
A098	Merlin (*Falco columbarius*)	Yes	Yes
A103	Peregrine (*Falco peregrinus*)	Yes	Yes
A122	Corncrake (*Crex crex*)	Yes	Yes
A125	Coot (*Fulica atra*)	Yes	Yes
A130	Oystercatcher (*Haematopus ostralegus*)	Yes	Yes
A137	Ringed Plover (*Charadrius hiaticula*)	Yes	Yes

Code	Species of special conservation interest	Water dependant	Nutrient sensitive
A140	Golden Plover (*Pluvialis apricaria*)	Yes	Yes
A141	Grey Plover (*Pluvialis squatarola*)	Yes	Yes
A142	Lapwing (*Vanellus vanellus*)	Yes	Yes
A143	Knot (*Calidris canutus*)	Yes	Yes
A144	Sanderling (*Calidris alba*)	Yes	Yes
A148	Purple Sandpiper (*Calidris maritima*)	Yes	Yes
A149	Dunlin (*Calidris alpina*) (non-breeding)	Yes	Yes
A156	Black-tailed Godwit (*Limosa limosa*)	Yes	Yes
A157	Bar-tailed Godwit (*Limosa lapponica*)	Yes	Yes
A160	Curlew (*Numenius arquata*)	Yes	Yes
A162	Redshank (*Tringa totanus*)	Yes	Yes
A164	Greenshank (*Tringa nebularia*)	Yes	Yes
A169	Turnstone (*Arenaria interpres*)	Yes	Yes
A179	Black-headed Gull (*Larus ridibundus*)	Yes	Yes
A182	Common Gull (*Larus canus*)	Yes	Yes
A183	Lesser Black-backed Gull (*Larus fuscus*)	Yes	Yes
A184	Herring Gull (*Larus argentatus*)	Yes	Yes
A188	Kittiwake (*Rissa tridactyla*)	Yes	Yes
A191	Sandwich Tern (*Sterna sandvicensis*)	Yes	Yes
A192	Roseate Tern (*Sterna dougallii*)	Yes	Yes
A193	Common Tern (*Sterna hirundo*)	Yes	Yes
A194	Arctic Tern (*Sterna paradisaea*)	Yes	Yes
A195	Little Tern (*Sterna albifrons*)	Yes	Yes
A199	Guillemot (*Uria aalge*)	Yes	Yes
A200	Razorbill (*Alca torda*)	Yes	Yes
A204	Puffin (*Fratercula arctica*)	Yes	Yes
A229	Kingfisher (*Alcedo atthis*)	Yes	Yes
A346	Chough (*Pyrrhocorax pyrrhocorax*)	Yes	Yes
A395	Greenland White-fronted Goose (*Anser albifrons flavirostris*)	Yes	Yes
A466	Dunlin (*Calidris alpina schinzii*) (breeding)	Yes	Yes

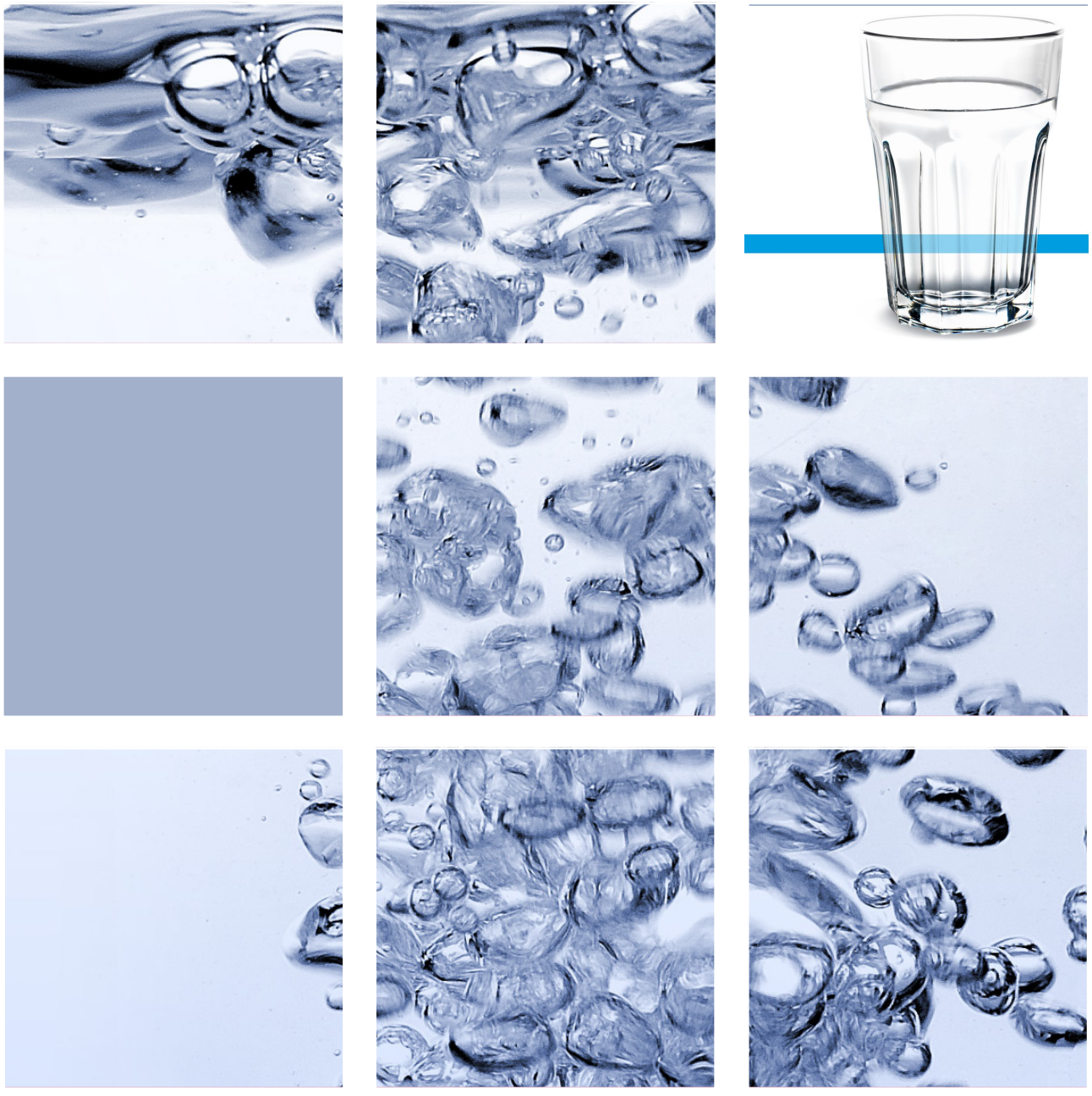
APPENDIX C

EAM Summary Report

Uisce Éireann - Lead in Drinking Water Mitigation Plan

Environmental Assessment Methodology (EAM) Summary Report

399 Portlaw WTP – Portlaw (3100PUB1081)



National Lead in Water Mitigation Strategy

Environmental Assessment Methodology Report – 399 Portlaw WTP - Portlaw (3100PUB1081)

Document Control Sheet

Client:	Uisce Éireann
Project Title:	National Lead in Water Mitigation Strategy
Document Title:	Environmental Assessment Methodology Report: 399 Portlaw WTP – Portlaw (3100PUB1081)
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Text Pages:	8	Appendices:	-

Rev.	Status	Date	Author(s)		Reviewed By		Approved By	
F01	Final	22nd Aug 2018	YE		IP		DC	
F02	Final	4th Oct 2018	MH		MM		DC	
F03	Final	10th May 2019	IP		MM		DC	
F04	Final	24th Apr 2023	YE		IP		MM	

399 Portlaw WTP – Portlaw (3100PUB1081)

Supporting spreadsheet: 399_Portlaw WTP_Portlaw_V08

This EAM report should be read in conjunction with the Uisce Éireann Lead in Drinking Water Mitigation Plan – Environmental Assessment Methodology report (MDE1218Rp0005 F02).

Portlaw WTP supplies Portlaw, a town in County Waterford, situated approximately 19 Km north-west of Waterford City. The distribution input for Portlaw is 386 m^3/day (70% of which is accounted for, with the remainder assumed to be lost through leakage) serving a population of approximately 1,500. The non-domestic demand is 9% of the distribution input.

The area is served by Portlaw WWTP (D0274), which is licenced in accordance with the requirements of the Waste Water Discharge (Authorisation) Regulations 2007 as amended. The impact of the orthophosphate dosing on the emission limit values and the receiving water body downstream of the point of discharge are assessed. It is estimated that there are 79 properties across the WSZ that are serviced by a DWWTS.

This assessment has been undertaken for the WSZ in isolation. However, if corrective water treatment is proposed for WTPs in the same catchment area, the cumulative impact from the combined loads to downstream water bodies are assessed. The WTPs listed in the summary and mitigation section are currently being considered for corrective water treatment in the Suir Catchment (HA 16). An assessment of these cumulative loads has been undertaken and is detailed in the summary and mitigation section.

<table>
<tr><td>Water Treatment Plant</td><td colspan="2">Portlaw WTP</td></tr>
<tr><td>Water Supply Zone</td><td colspan="2">Portlaw (3100PUB1081)
See Figure 4.1 / 4.2 of the AA Screening for a map of the WSZ and ZoI</td></tr>
<tr><td rowspan="6">Step 1 Appropriate Assessment Screening</td><td colspan="2">European Sites within Zone of Influence</td></tr>
<tr><td colspan="2">SACs</td></tr>
<tr><td>- Helvick Head SAC
- Nier Valley Woodlands SAC
- Ballyteige Burrow SAC
- Lady's Island Lake SAC
- Saltee Islands SAC
- Tacumshin Lake SAC</td><td>- Hook Head SAC
- Comeragh Mountains SAC
- Ardmore Head SAC
- Lower River Suir SAC
- River Barrow And River Nore SAC
- Carnsore Point SAC-</td></tr>
<tr><td colspan="2">SPAs</td></tr>
<tr><td>- Saltee Islands SPA
- Lady's Island Lake SPA
- Ballyteigue Burrow SPA
- Bannow Bay SPA</td><td>- Keeragh Islands SPA
- Helvick Head to Ballyquin SPA
- Mid-Waterford Coast SPA</td></tr>
<tr><td colspan="2">Nutrient Sensitive Qualifying Interests present – Yes
Appropriate Assessment Screening Required – see AA screening report for details</td></tr>
</table>

Step 2 – Direct Inputs to Surface Water

Table 1: Increased loading/concentration to agglomerations due to Orthophosphate Dosing – Dosing rate = 0.8 mg/l

Agglomeration and discharge type	ELV (Ortho-P unless otherwise stated) from WWDL (mg/l)	Scenario	TP Load kg/yr	Ortho P concentration mg/l *TP – Ortho P Conversion factor varied for sensitivity analysis (40%, 50%, 68%)*		
				0.5	*0.4*	*0.68*
Portlaw Primary Discharge	3	Existing	538.8	1.216	0.973	1.654
		Post Dosing	538.8	1.216	0.973	1.654
Portlaw SWOs (1 no.)	n/a	Existing	104.6	8.106	6.485	11.025
		Post Dosing	106.7	8.266	6.612	11.241

Note: Modelled to be compliant with orthophosphate ELVs set in WWDL (D0274) for both existing and post dosing concentrations.

As Portlaw receives tertiary treatment, i.e. chemical dosing for nutrient removal, the EAM assumes that the additional P loading to the plant can be dealt with and managed within the treatment process therefore there is no impact on the existing effluent quality.

Step 3 – Potential impact of Direct Inputs on Receiving Water Bodies

Table 2: Mass balance assessment based on 0.8 mg/l dosing using available background concentrations and mean flow information

Agglom. (WWDL code)	RWB Name / Code for Primary Discharge	Background Conc. (mg/l) (annual mean from AER u/s monitoring point)	Modelled Conc. existing (mg/l)	Modelled Conc. Post Dosing (mg/l)	% Inc.
Portlaw (D0274)	IE_SE_16C030750	0.0248	0.0277	0.0278	0.0

Surface Assessment

Portlaw *(IE_SE_16C030750)* – The existing effluent concentrations were non-compliant for ortho-P in 2021 AER on four occasions, cause of exceedance was dosing pump failure or maintenance at WWTP. The AER also notes that dosing is being reviewed and that Ferric dosing equipment will be upgraded in 2022. On 18th May 2023, it was confirmed that the Ferric dosing is operational at Portlaw. The predicted increase in loads and concentration from Portlaw WWTP, that uses tertiary treatment, is undetectable.

The dosing will therefore have an insignificant impact on the direct discharges to surface water from agglomerations within the WSZ.

Step 4 Distributed Inputs to surface water bodies from sub surface pathways

Subsurface Assessment

The modelled increases in concentrations in the subsurface pathways are undetectable for all river water bodies (0.0000 mg/l).

The transitional water body directly affected by this WSZ is Middle Suir Estuary (IE_SE_100_0550), which is modelled to receive an undetectable impact (0.0000 mg/l).

Step 5 and 6: Combined Inputs to Groundwater Bodies

Groundwater Bodies as receptors connected to WSZ

Table 3 gives the loads and modelled concentrations for the assessment of groundwater bodies.

The predicted increases in concentrations to groundwater bodies are undetectable (0.0000 mg/l). The subsurface assessment takes into account the groundwater/surface water interaction and as the potential for impact on surface water is not significant, and none of the overlying surface waterbodies are at Bad ecological status, there is no risk of impact on groundwater receptors due to orthophosphate dosing.

Table 3: Increased loading and concentrations to groundwater bodies connected to the WSZs ***(note: where existing monitoring data is not available, a surrogate indicative quality is derived from the initial characterisation of the WB, and the mid-range of that indicative quality is used as Baseline Concentration)***

EU_CD / Name	Ortho P Indicative Quality and Trends (distance to threshold) *[Surrogate indicative quality given in italic]*	Baseline Ortho P Conc. mg/l *[Surrogate Conc. given in italic]*	75% of indicative quality upper threshold mg/l	Total Ortho P load to GW kg/yr	Potential Increase in Ortho P Conc. due to Dosing mg/l	Potential Baseline for Ortho P Conc. following dosing mg/l	Notes
IE_SE_G_040 Clonmel	Good Upwards Far	0.005	0.026	0.2	0.0000	0.005	MP1
	Good Upwards Far	0.005	0.026			0.005	MP2
	Good None Far	0.012	0.026			0.012	MP3
	Good Upwards Far	0.008	0.026			0.008	MP4
IE_SE_G_030 Carrick-on-Suir	Good Upwards Far	0.033	0.026	1.0	0.0000	0.033	
IE_SE_G_154 Comeragh	Good Upwards Far	0.018	0.026	0.1	0.0000	0.018	*

* Trends are Statistically Significant.

MP: multiple Monitoring Points given for waterbody

Step 5 and 6: Combined Inputs to Surface Water Bodies

Combined Assessment

Table 4-A and Table 4-B give the loads and modelled concentrations for the combined assessment to rivers and receiving waterbodies respectively. The increased concentrations due to orthophosphate dosing are predicted to be insignificant, i.e. are below 5% of the Good / High boundary for Ortho P Indicative Quality (0.00125mg/l).

The baseline concentration for Clodiagh (Portlaw)_050 (IE_SE_16C030750) is above 75% of the upper Ortho P threshold, but the modelled increase in concentration would have an insignificant impact due to the insignificant increase.

Table 4-A: Increased loading and concentrations to River water bodies connected to the WSZs ***(note: where existing monitoring data is not available, a surrogate indicative quality is derived from ecological status of the WB or Ortho P indicative quality / Ecological status of the upstream and downstream WBS, the mid-range of that indicative quality is used as Baseline Concentration)***

EU_CD / Name	Ortho P Indicative Quality and Trends (distance to threshold) *[Surrogate indicative quality given in italic]*	Baseline Conc. mg/l *[Surrogate Conc. given in italic]*	75% of indicative quality upper threshold mg/l	Total Ortho P load in receiving waters kg/ yr	Potential Increase in Ortho P Conc. due to Dosing (30%ile or gauged) mg/l	Potential Baseline for Ortho P Conc. following dosing mg/l	Notes
IE_SE_16C030750 CLODIAGH (PORTLAW)_050	High Upwards Near	0.025	0.019	4.2	0.0000	0.025	‡
	Good Upwards Far	0.032	0.033			0.032	
	Good	0.030	0.033			0.030	
IE_SE_16D290570 DARRIGAL_010	*Good*	*0.030*	*0.033*	*0.0*	*0.0000*	*0.030*	
IE_SE_16T310740 TINHALLA_010	*Moderate*	*0.046*	*0.051*	*0.2*	*0.0000*	*0.046*	

‡ Load from WWTP / SWO following treatment added.
MP: multiple Monitoring Points given for waterbody

The baseline concentration the winter monitoring point for Upper Suir Estuary (IE_SE_100_0600) is above 75% of the upper Ortho P threshold, but the modelled increase concentration would not be considered to have an impact due to the undetectable increase (0.0000 mg/l).

Table 4-B: Increased loading and concentrations to Transitional and Coastal water bodies connected to the WSZs ***(note: where existing monitoring data is not available, a surrogate indicative quality is derived from the ecological status of the WB or Ortho P indicative quality / ecological status of upstream and downstream WBS, the mid-range of that indicative quality is used as Baseline Concentration)***

EU_CD / Name	Ortho P Indicative Quality and Trends (distance to threshold) *[Surrogate indicative quality given in italic]*	Baseline Conc. mg/l *[Surrogate Conc. given in italic]*	75% of indicative quality upper threshold mg/l	Total Ortho P load in receiving waters kg/ yr	Potential Increase in Ortho P Conc. due to Dosing (30%ile or gauged fluvial flows and tidal flows) mg/l	Potential Baseline for Ortho P Conc. following dosing mg/l	Notes
IE_SE_100_0600 Upper Suir Estuary	High (S) None Far	0.006	0.019	4.5	0.0000	0.006	‡
	High (W) None Near	0.023	0.019			0.023	

‡ Load from WWTP / SWO following treatment added.

S = Summer monitoring period, W = Winter monitoring period

Summary and Mitigation Proposed

Considering Portlaw WTP in isolation, orthophosphate dosing is predicted to have insignificant impact on all waterbodies. The modelled increase in load and concentrations to both groundwater and surface water receptors do not cause a risk to WFD objectives.

The fate of P loads from Portlaw WTP is depicted in Figure 1 and the breakdown from source to pathway is shown in Figure 2.

The cumulative impacts on Suir Catchment (HA 16), associated with the corrective water treatment at the following additional WTPs, have been assessed with Portlaw WTP. Additional loads due to dosing in the Ballyteigue-Bannow (HA13), Barrow (HA14) and Nore (HA15) are also included.

- 010 Adamstown WTP - East Waterford Regional
- 037 Troyswood WTP – Kilkenny City (1500PUB1011)
- 021 Rossadrehid WTP - Galtee Regional
- 041 Glenary WTP – Glenary
- 047 Goatenbridge WTP - Ardfinnan Regional
- 098 Mooncoin WTP - Mooncoin Regional WS
- 138 Thurles WTP - Thurles
- 177 Linguan WTP – Carrick on Suir
- 190 Ironmills Pump Station - Ironmills

The cumulative loads to water bodies that are impacted by the WSZs supplied by these WTPs have been summarised in Table 5 below.

Table 5: Cumulative assessment of the increased loading and concentrations to water bodies impacted by 399 Portlaw WTP – Portlaw and other WSZs proposed for corrective water treatment in the upstream catchments. ***(Note: where existing monitoring data is not available, a surrogate indicative quality is derived from the ecological status of the WB or Ortho P indicative quality / ecological status of upstream and downstream WBS, the mid-range of that indicative quality is used as Baseline Concentration)***

EU_CD/Name	Ortho P indicative quality and Trends (distance to threshold) *Surrogate indicative quality indicated in italic*	Baseline Conc. *Surrogate Conc. given in italic* mg/l	75% of indicative quality pper threshold mg/l	Cumulative Ortho P load to SW from leakage, DWWTS & agglomerations kg/yr	Conc. using 30%ile or gauged fluvial flows and tidal flows mg/l	PO4 Potential Baseline Conc. following dosing mg/l	Notes
IE_SE_100_0600 Upper Suir Estuary	High (S) None Far	0.006	0.019	535.4	0.0002	0.006	‡
	High (W) None Near	0.023	0.019			0.023	
IE_SE_100_0550 Middle Suir Estuary	Good (S) Upwards Far	0.029	0.053	2618.7	0.0010	0.030	‡
	Good (W) Upwards Far	0.037	0.053			0.038	
IE_SE_100_0500 Lower Suir Estuary (Little Island - Cheekpoint)	High (S)	0.026	0.023	2647.8	0.0010	0.027	‡
	Good (W)	0.053	0.053			0.054	
IE_SE_100_0100 Barrow Suir Nore Estuary	High (S) Upwards Far	0.019	0.019	3751.2	0.0004	0.019	‡
	Good (W) None Far	0.045	0.042			0.045	
IE_SE_100_0000 Waterford Harbour	High (S) Downwards Far	0.005	0.019	3850.8	0.0003	0.006	‡
	High (W) Downwards Far	0.020	0.019			0.020	
IE_SE_050_0000 Eastern Celtic Sea (HAs 13;17)	*High*	*0.013*	*0.019*	*4715.3*	*0.0000*	*0.013*	‡

‡ Load from WWTP / SWO following treatment added.
S = Summer monitoring period, W = Winter monitoring period

The cumulative assessment has demonstrated that there will not be significant impact on the receiving waters and the dosing will not cause deterioration in orthophosphate indicative quality or prevent the achievement of the WFD objectives.

	MITIGATION OPTION – None required RAG STATUS – GREEN

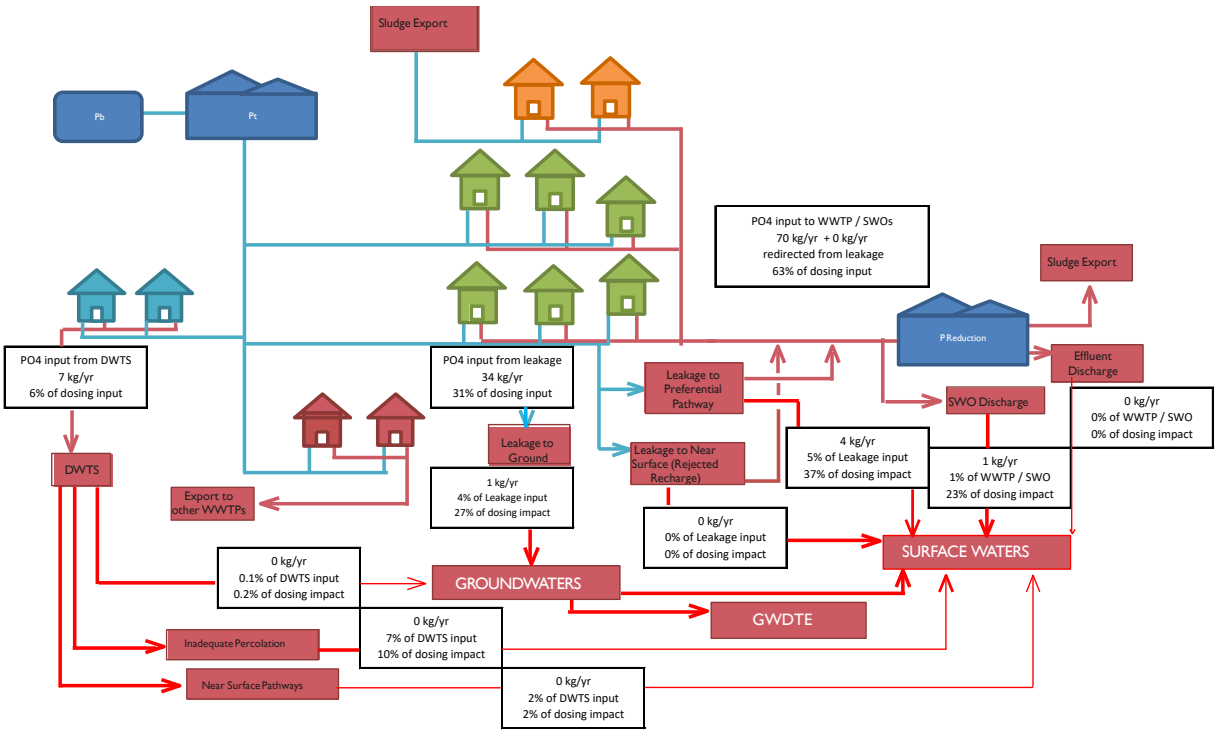
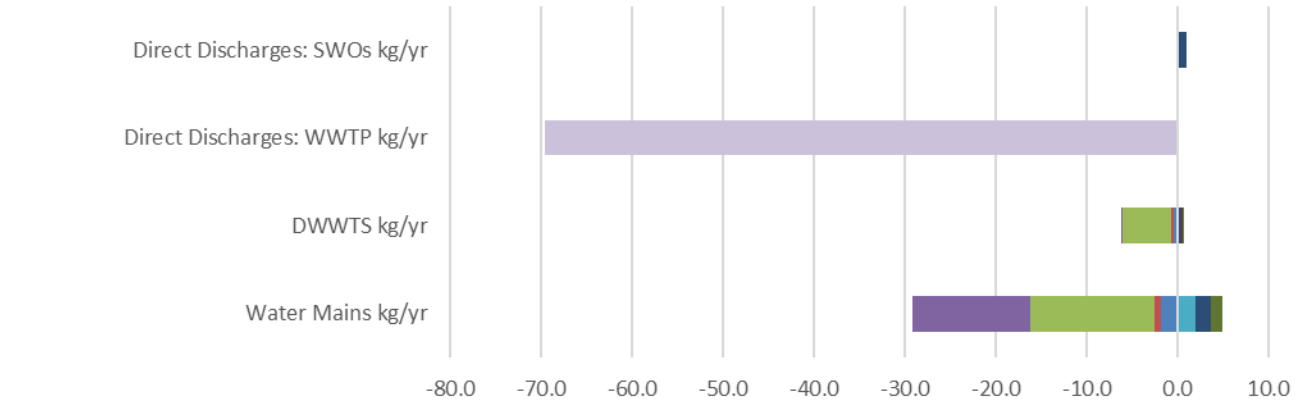


Figure 1 – Source Pathway Receptor model for Portlaw WTP illustrating key sources and pathways to the associated WSZs.



	Water Mains kg/yr	DWWTS kg/yr	Direct Discharges: WWTP kg/yr	Direct Discharges: SWOs kg/yr
Load attenuated in Preference (inadequate percolation) pathway	-1.8	-0.4		
Load attenuated in Near Surface Pathway	-0.7	-0.2		
Load attenuated in 1m below trench	-13.6	-5.5		
Load attenuated in Subsurface Pathway	-13.0	-0.1		
Load intercepted by gravity main in Preference Pathway	2.0			
Load intercepted by gravity main in Near Surface Pathway	0.0			
Load reaching SW direct or via Preference (inadequate percolation) Pathway	1.6	0.4	0.0	1.0
Load reaching SW via Near Surface Pathway	0.0	0.1		
Load reaching SW via Subsurface Pathway	1.2	0.0		
Load treated in WWTP			-69.6	

Figure 2 – Fate of orthophosphate loads modelled for Portlaw WTP impacting on Middle Suir Estuary [IE_SE_100_0550] due to dosing by source type, indicating levels of attenuation in pathways and relative impact on the surface water receptor.