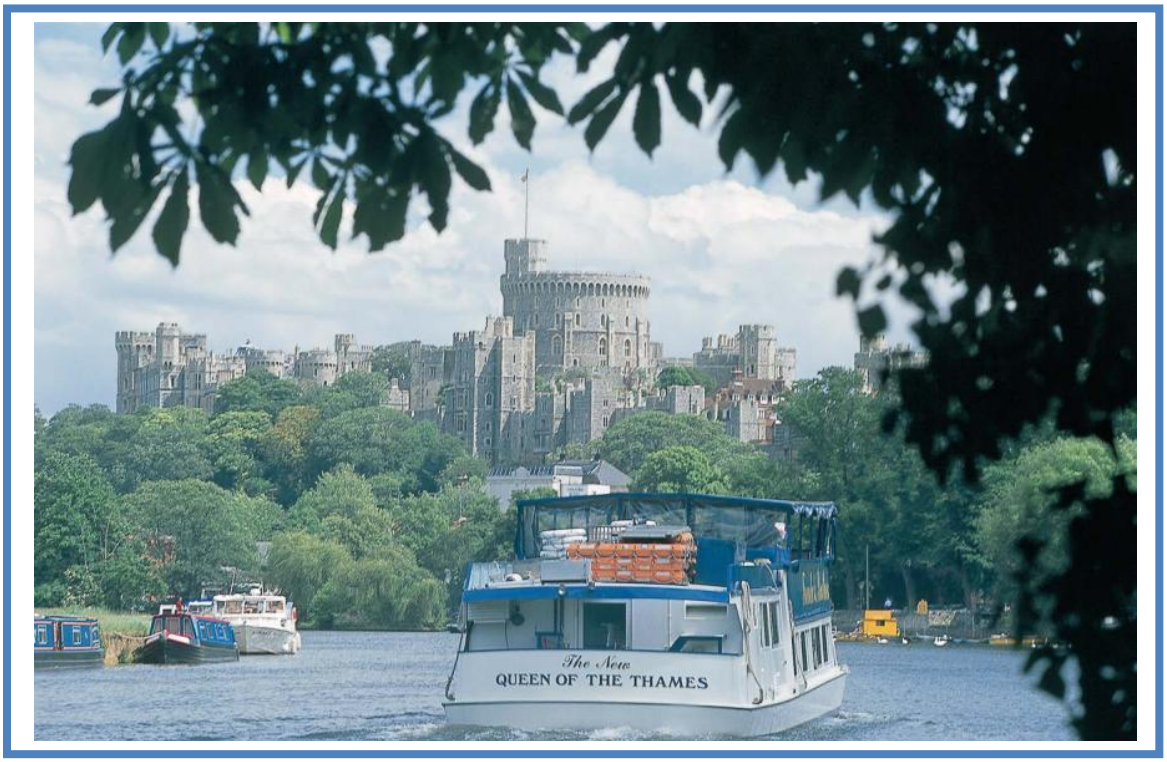
Environment Agency

Water for life and livelihoods



River basin management plan for the Thames River Basin District

Habitats Regulations Assessment

Updated December 2015

discover
enjoy
protect

LIT 10339

We are the Environment Agency. We protect and improve the environment and make it **a better place** for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local councils, other agencies, civil society groups and the communities we serve.

Published by:

Environment Agency
Horizon house, Deanery Road,
Bristol BS1 5AH
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

Further copies of this report are available from our publications catalogue:
www.gov.uk/government/publications

or our National Customer Contact Centre:
T: 03708 506506

Email: enquiries@environment-agency.gov.uk.

Executive Summary

A Habitats Regulations Assessment (HRA) of the River Basin Management Plan for Thames River Basin District has been carried out by the Environment Agency, in consultation with Natural England.

The purpose of a River Basin Management Plan (RBMP) is set out in UK Ministerial Guidance: 'An RBMP should be a strategic plan which gives everyone concerned with the river basin district a measure of certainty about the future of water management in that district. It will include objectives for each water body and a summary of the programme of measures necessary to reach those objectives'.

At this high-level plan stage, the detail of precisely where and how the programme of measures will be implemented has not yet been developed. This assessment informs any subsequent lower tier plan or project level HRA of the key risks to European sites and the range of potential control and mitigation techniques that could be applied. The assessment has identified potential hazards associated with implementation of the measures in the RBMP. These hazards are associated with the types of measures that are related to each significant water management issue (SWMI) in the RBMP and indicate the potential levels of risk to the range of features of the network of European sites. The level of detail of the plan does not allow detailed consideration of effects on individual European sites. However, at this strategic level, the assessment undertaken still allows confidence that the measures could go ahead without harm to European sites, subject to more detailed scrutiny of mitigation options at the lower tier plan or project level. This conclusion is primarily drawn because the RBMP does not constrain where or how the measures are implemented, and the process for deferring HRA to lower tier plan or project level, where necessary, will provide for a range of mitigation options to be pursued at the lower tier plan or project level.

The assessment demonstrates that controls are in place to identify any risks to European sites when the actions required to implement the measures are developed. The RBMP itself also makes it clear that before any measures in the plan are implemented they must be subject to the requirements of the Conservation of Habitats and Species Regulations 2010 (Habitats Regulations).

It is determined that, at this strategic plan level, the range of potential mitigation options available allow a conclusion that the RBMP is not likely to have any significant effects on any European sites, alone or in combination with other plans or projects. Given this conclusion, there is no requirement, at this strategic plan level, to progress to the next stage of the Habitats Regulations Assessment (an 'appropriate assessment' to examine the question of adverse effects on the integrity of European sites).

Acceptance that this Plan is consistent with the Habitats Regulations is on the basis of the level of detail of the plan. This conclusion, does not guarantee that any plan or project derived from the Plan will also be found to be consistent. As local actions are developed at a project level and the details of their scope and scale are known, this may identify additional effects on European sites that have not been assessed here, or were not appropriate to consider at this spatial scale of plan.

This conclusion does not therefore remove the need for later Habitats Regulations Assessment of any other plans, projects, or permissions associated with, or arising out of, the measures identified in the Plan. As the RBMP does not give weight to lower tier plans or projects, it is important to note that inclusion of projects within the RBMP should not have any influence on the lower tier or project level HRA conclusions. Any HRA at the lower tier for which adverse effects on site integrity cannot be ruled out, and cannot be mitigated, must consider the merits of the individual project to determine whether there are imperative reasons of overriding public interest for its implementation. Inclusion in this plan does not give any weight to any such conclusions.

Contents

1 Introduction 7
1.1 Introducing this report 7
1.2 Background to the RBMPs 7
1.3 The Thames RBMP 8
1.4 Background to Habitats Regulations Assessment 9
2 European sites in the Thames RBD 11
2.1 European sites that could be affected by the RBMP 12
2.2 European sites and their status for RBMPs 12
2.3 European sites and their management 13
3 Approach to HRA 14
3.1 Description of the RBMP Measures 14
3.2 Screening and Likely Significant Effects 16
3.2.1 Screening for SWMI required measures that will have potential effects 16
3.2.2 Screening of measures managing European sites 16
3.2.3 Assessment of SWMI required measures 16
3.2.4 Assessment of proposed programmes of measures 19
3.2.5 Controls and mitigation 19
3.3 Considering the need for further stages of assessment 20
4 Screening and Likely Significant Effects 21
4.1 Summary of SWMI required measures 21
4.2 The assessment of SWMI required measures 22
4.2.1 Measures required to address physical modifications 22
4.2.2 Measures required to manage pollution from waste water and from towns, cities and transport 24
4.2.3 Measures required for pollution from rural areas 25
4.2.4 Measures required to manage changes to natural flow and levels of water 27
4.2.5 Measures required to manage invasive non-native species 28
4.3 The highest risk SWMI required measures for the Thames RBD 29
4.3.1 Identification of the most sensitive European site features within the RBD 29
4.3.2 Potential project-level mitigation for highest risks 31
4.4 The specific programmes of measures in the updated RBMP 32
4.4.1 Measures to prevent deterioration 32
4.4.2 Measures to deliver 2021 outcomes 33
4.4.3 Measures to achieve outcomes for 2027 or beyond 40
4.4.4 Additional measures for protected areas 41
4.5 Consideration of results and conclusion 42

5 In combination effects with other plans and projects 44
6 Conclusion and future HRAs 47

APPENDICES

Appendix 1:

Table A1 - Potential Impacts of Measures on qualifying features of European sites in the Thames RBD

Table A2 - Potential Hazards arising from Measures proposed within the Thames RBMP

Table A3 – European site features against Hazards for the Thames RBD

Appendix 2: Project level control and mitigation for SWMI required measures

Appendix 3: Descriptions of Hazards used within the HRA

Appendix 4: European sites within the Thames RBD

1 Introduction

1.1 Introducing this report

This report sets out the results of a Habitat Regulations Assessment (HRA) into the likely significant effects on designated 'European sites' of the 2015 updated River Basin Management Plan (RBMP) for the Thames River Basin District updated in December 2015. This report has been produced by the Environment Agency as the 'competent authority' for the HRA as part of preparing the updated RBMPs for approval by the Secretary of State for Environment, Food and Rural Affairs. In preparing the HRA report the Environment Agency has consulted with Natural England (for English River Basin Districts) and Natural Resource Wales (for English-Welsh cross border River Basin Districts).

RBMPs provide a long-term framework for the management of all issues that affect the water environment in a River Basin District (RBD). They rely on a range of more detailed plans that government or key sectors are responsible for developing to enable the objectives of the RBMP to be achieved. The HRA has been carried out at the level of detail published in the RBMP, which is high-level and does not include specific details of actions on the ground. The HRA informs subsequent lower tier plans and/or project level HRAs of the likely risks and possible need for mitigation and controls that will need further consideration once measures are developed as specific local actions. Potential mitigation and control techniques that could be applied are described, but will need further investigation at the lower tier project/plan level.

This report describes each of the main stages and results of the updated RBMP HRA, as follows:

- Describing the European sites within the RBD
- The approach to the HRA
- Screening, assessing likely significant effects and consideration of further HRA stages
- In combination effects of other plans and projects
- Conclusion and future HRAs.

1.2 Background to the RBMPs

The purpose of a River Basin Management Plan (RBMP) is set out in UK Ministerial Guidance: 'An RBMP should be a strategic plan which gives everyone concerned with the river basin district a measure of certainty about the future of water management in that district. It will include objectives for each water body and a summary of the programme of measures necessary to reach those objectives. The RBMP should also be a gateway, providing easy access to relevant supporting information.' It goes on to say that RBMPs should:

- record outcomes from the river basin planning process
- set the policy framework for how regulatory decisions affecting the water environment in that river basin district will be made
- report to the public and the European Commission on the implementation of the Water Framework Directive (WFD)

The Water Framework Directive (WFD) requires member states to meet the following objectives:

- Prevent deterioration in the status of surface waters and groundwater
- Achieve 'Protected Area' objectives and standards
- Aim to achieve good status for all water bodies
- Aim to achieve good ecological potential and good surface water chemical status for artificial and heavily modified water bodies.

In preparing the updated RBMPs the Environment Agency consulted in June 2013 on the range of 'Significant Water Management Issues' (SWMIs) that the RBMP would need to address to meet WFD objectives. There was a further consultation in October 2014 on the range of interventions (measures) that would be worthwhile to prevent deterioration, achieve protected area objectives and meet water body status objectives. Worthwhile measures are those that have been assessed as cost-beneficial without funding or timescale constraints. Following these consultations, the range of SWMI required measures has been reviewed and set out in the updated RBMP as proposed programmes of measures, under the following headings:

- Measures to prevent deterioration
- Measures to deliver 2021 outcomes
- Measures to achieve outcomes for 2027 or beyond
- Additional measures for protected areas.

The focus of the updated RBMP is on programmes of measures that will deliver outcomes for 2021. These have been drawn from proposed investment plans of government and key sectors and set out measures where there is confidence that they are affordable, planned for 2021 and expected to deliver a WFD outcome.

1.3 The Thames RBMP

The Thames River Basin District (RBD) covers a relatively small area of the UK in terms area but contains a large proportion of the population, around 15 million people. The majority of people live in London. Other large centres of growing population include Reading, Swindon and Crawley. Intensification of land use is resulting in increased rainfall runoff in both urban and rural areas where land has been developed and is used productively.

The Thames RBD has many significant wetland and wildlife sites including protected marshes and chalk streams. There are many areas where the water environment is particularly important including rare wildlife habitats, bathing waters and areas where drinking water is abstracted.

The Thames RBD is made up of 17 management catchments (see figure 1). The next level down comprises the operational catchments. These cover a number of smaller water bodies based around the same local geography or affected by common pressures on the water environment. There are also operational catchments specific to certain larger water bodies, for example groundwaters, which, due to their size, can cross management catchment boundaries and even river basin districts In the Thames RBD there are 38 operational catchments.

The updated Thames RBMP provides a summary of the extent of Significant Water Management Issues (SWMIs), as follows:

- **Physical modifications** – affecting 44% of water bodies in the river basin district
- **Pollution from waste water** – affecting 45% of water bodies in the river basin district
- **Pollution from rural areas** – affecting 27% of water bodies in the river basin district
- **Changes to the natural flow and level of water** – affecting 12% of water bodies in the river basin district
- **Pollution from towns, cities and transport** – affecting 17% of water bodies in the river basin district
- **Negative effects of non-native invasive species** – affecting 3% of water bodies in the river basin district.
- **Pollution from abandoned mines** - affecting <1% of water bodies in this river basin district

Further details of the measures proposed to address the Significant Water Management Issues for the Thames RBD are described in section 4.1.

Figure 1 Map of the Thames river basin district and management catchments

1.4 Background to Habitats Regulations Assessment

In England, the Conservation of Habitats and Species Regulations 2010, as amended, commonly termed the Habitats Regulations, implements the European Union Habitats Directive (Directive (92/43/EEC) on the Conservation of natural habitats and of wild flora and

fauna, and of the Wild Birds Directive (2009/147/EC). This legislation provides the legal framework for the protection of habitats and species of European importance in England.

European sites protected under the Habitats Regulations comprise Special Protection Areas (SPA), Special Areas of Conservation (SAC), candidate SACs (cSAC), Sites of Community Importance (SCI) and, as a matter of government policy, to potential Special Protection Areas (pSPA), areas formally provided as compensation for European site and Ramsar sites (sites designated under the 1971 Ramsar Convention for their internationally important wetlands). These sites are referred to collectively in this report as 'European sites'.

Regulation 9(3) of the Habitats Regulations requires that a 'competent authority' must consider the requirements of Habitats Directive in exercising any of its functions. Article 6(3) of the Habitats Directive and Regulations 61 and 62 of the Habitats Regulations, define the requirements for assessment of plans and projects potentially affecting European sites. This requires that a competent authority, before deciding to undertake, or give any consent or authorisation for a plan or project which is likely to have a significant effect on a European site, and is not directly connected with or necessary to the management of that site, must carry out an appropriate assessment. The term commonly referred to for the whole, step by step assessment process is, 'Habitats Regulations Assessment' or HRA.

The Thames RBMP is considered to fit within the definitions of a 'plan' as defined by the Habitats Directive, and requires a HRA. The RBMP is a high-level planning document for the Thames RBD, therefore the HRA needs to be tailored to be appropriate for the spatial area of coverage and the strategic nature of the plan.

The HRA has followed a framework of four distinct stages, only moving to the next stage if required by the results of that stage of the assessment. The four stages are:

Stage 1: Screening and Likely Significant Effects is the process which initially identifies the likely impacts upon a European site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts may be significant. This stage also includes the development of mitigation to avoid or reduce any possible effects.

Stage 2: Appropriate Assessment is the detailed consideration of the impact on the integrity of the European site of the plan or project, either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function. This is to determine whether there is objective evidence that adverse effects on the integrity of the site can be excluded. This stage also includes the development of mitigation to avoid or reduce any possible impacts.

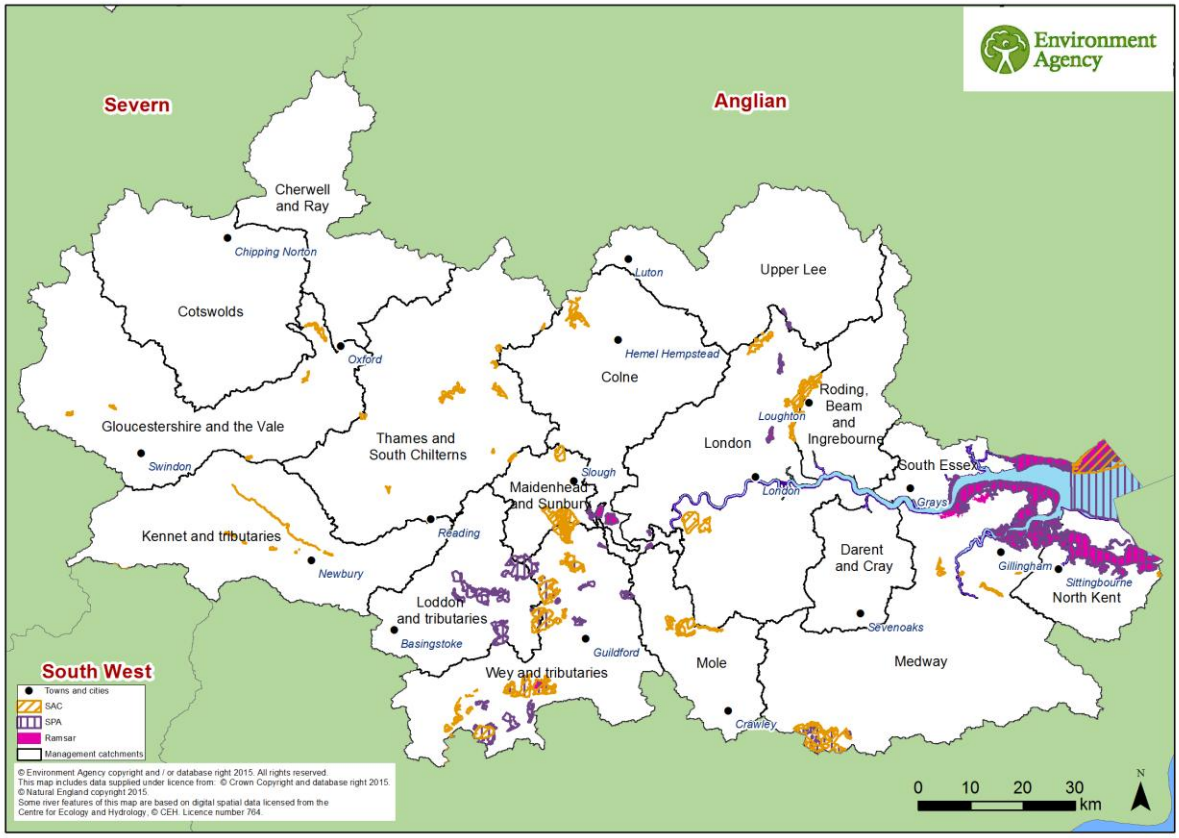
Stage 3: Assessment of alternative solutions is the process which examines alternative ways of achieving the objectives of the plan or project that would avoid adverse impacts on the integrity of the European site, should avoidance or mitigation be unable to avoid adverse effects.

Stage 4: Assessment where no alternative solutions exist and where adverse effects remain is made with regard to whether or not the plan or project is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of any required compensatory measures.

2 European sites in the Thames RBD

Within the Thames RBD there are 29 SACs, 12 SPAs, and 8 Ramsar sites. Several sites have multiple designations such as the Lee Valley, Medway Estuary and Marshes, and the South West London Waterbodies, parts of these sites being designated as both Ramsar and SPA sites.

Figure 2 - Map of the European sites in the Thames River Basin District



Although most of the European sites in the RBD contain a variety of habitat types, broadly speaking they can be described as coastal/marine sites, freshwater sites such as gravel pits, water supply reservoirs and semi-natural lakes and terrestrial sites such as woodlands, several types of grasslands, and bogs. The European sites are broadly clustered in either the central southern, or far eastern area of the RBD, with a relative absence of sites towards the west.

Of the 8 Ramsar sites in the RBD, 5 are coastal which occur in the Thames Estuary. One of the largest at 6,500ha is The Swale on the North Kent coast, a complex of brackish and freshwater habitats where birds breed in important numbers. By contrast a significantly smaller inland freshwater site (at 830ha) is the South West London Waterbodies in Surrey, a series of embanked freshwater reservoirs and former gravel pits which provide important feeding and roosting sites for a diverse range of wintering wildfowl.

Of the 12 SPA sites in the RBD, 6 are coastal and 4 inland terrestrial. Of the coastal sites, Benfleet and Southend Marshes (2,251ha), located on the north shore of the Thames Estuary is particularly renowned regionally for cockle shell banks, extensive mudflats and grassland that support a diverse flora and fauna and provide a wide range of feeding and

roosting opportunities for internationally important numbers of wintering wildfowl and waders. Ashdown Forest is an example of a terrestrial inland SPA site in East Sussex (3,207ha) that has a diverse range of scrub and mixed woodland and contains one of the largest single continuous blocks of lowland heath in south-east England.

SACs make up the largest number of European sites in the RBD and are also the most widespread in occurrence, covering a diversity of habitat types. These sites range from internationally rare chalk streams and sites with diverse habitats such as Thursley Ash Pirbright and Chobham SAC, to mixed use parkland sites such as Richmond Park, and mosaics of heath, scrub and bog, such as Shortheath Common in Hampshire.

Appendix 4 contains a summary of the European sites present within the Thames RBD. This includes their geographic area and whether they are identified as 'Natura 2000 protected areas' under the WFD. It is worth noting that in some cases only part of the European site is within the Thames RBD and therefore not all interest features may lie inside the RBD boundary.

2.1 European sites that could be affected by the RBMP

The RBMP is a long term plan for the water environment that could potentially affect both water dependent and non-water dependent European sites and their qualifying features.

Water dependent sites are classified as protected areas under the WFD; each protected area European site has specific objectives to ensure their favourable conservation status. Supporting measures within the RBMP should therefore predominantly be beneficial for the conservation status of water dependent European sites. However, this does not mean that water-dependent sites may not be adversely affected, since other measures within the RBMP could still have unintended consequences for these sites.

Effects on non water dependent European sites and their qualifying features are also possible. Measures proposed within the plan take a wide variety of forms, including interventions on land as well as water bodies. Potential effects on non water dependent European sites therefore cannot be ruled out and are considered as part of the assessment.

2.2 European sites and their status for RBMPs

The RBMP provides summary information on the current status and baseline for water dependent European sites as part of its monitoring data. These are Protected Areas under the Water Framework Directive, and provide an indicator of those that are most likely to be influenced by changes to the water environment.

European sites in England, with the occasional exception, are also designated as SSSIs. Natural England monitors the conditions of SSSIs and their component units using six reportable condition categories: favourable; unfavourable recovering; unfavourable no change; unfavourable declining; part destroyed and destroyed.

The current status of water-dependent European site protected areas for the Thames RBD is summarised in the table below. This gives the current area of water-dependent SSSI units of European protected areas in different condition categories as currently recorded on Natural England's designated site data system. SSSI units underpin European protected areas and Natural England collects data at a SSSI unit level, but those assessments have regard for the current condition of European features as well as SSSI features. When SSSI units are in

favourable condition, they are usually deemed to be meeting their European level conservation objectives. Caution is required however, as the SSSI condition assessment is a snapshot in time, and achievement of European level conservation objectives is reliant upon long term maintenance.

This shows that for the Thames RBD, 24% of water-dependent SSSI units of European protected area sites currently do not meet their SSSI conservation objectives.

Table 1 WFD status of water dependent SSSIs for the Thames RBD[1]

Condition	Thames RBD (ha)
Favourable	24,708
Destroyed / Part destroyed	0
Unfavourable declining	131
Unfavourable no change	227
Unfavourable recovering	7,357
Total Area Unfavourable	7,715
% Unfavourable	24

The generic pressures on such sites in the Thames region include most commonly lack of direct corrective action to improve condition of sites, such as weed control in water dependent habitats but also application of inappropriate agricultural practices. These can include over cutting or mowing, or under-grazing of grassland sites and inappropriate scrub control in heathland areas. Public disturbance can also be a pressure, particularly on ancient woodland SSSIs. There are also long term national threats to habitats and especially species, including climate change, alterations in hydrological and coastal processes and invasive non-native species.

2.3 European sites and their management

As part of a new strategic approach to managing all England's European sites, new measures needed to achieve favourable conservation status for all European sites interest features in England have been developed by Natural England. These are collectively referred to as Site Improvement Plans (SIPs), and have been developed by the Improvement Programme for England's Natura 2000 sites (IPENS).

In relation to RBMPs, which include objectives and actions specifically for WFD Natura 2000 Protected Areas, these Protected Areas' objectives and actions are informed by the SIPs developed by Natural England, and inform the RBMP. Water dependent/protected area sites in the Anglian RBD are referenced in the table in Appendix 4.

[1] Source: Extract from Natural England databases August 2015.

3 Approach to HRA

The steps undertaken to complete the HRA are as follows:

- Describe the plan and the measures proposed.
- Screen and assess the likely significance of any effects on European sites.
- Consider need for further stages of assessment (i.e. appropriate assessment, alternative solutions and IROPI)
- Determine a conclusion.

3.1 Description of the RBMP Measures

RBMPs set out long-term objectives for sustainable use of the water environment, covering rivers, lakes, coasts and groundwater. They are strategic documents which set the framework for local action to be taken to meet long-term objectives for the water environment. The RBMP is underpinned by a programme of investigations that determine: Whether there is a problem (i.e. Significant Water Management Issue, SWMI) with the current status of water bodies; if so, the reasons the water body is failing; and the types of measures required for the water body to attain good status.

The RBMPs do not include the detail of local actions, but are a high level summary of measures, developed through consultation about how society and specific sectors should contribute to their long-term objectives. There are sources of information about the implementation of RBMP actions that have informed the RBMP but are not part of the published plan, including the Environment Agency's Catchment Data Explorer[2] and government and other sector investment programmes.

Consultation of the updated RBMP

For the consultation on the updated RBMP, proposed measures were assessed as worthwhile and put forward to address significant water management issues (SWMIs) to achieve the long-term objectives for the water environment. These also included measures that would prevent deterioration and support protected area objectives. Worthwhile measures are those that have been assessed as cost-beneficial without funding or timescale constraints. They were summarised as follows:

Table 2 SWMI required measures in the RBMP

Categories of Significant Water Management Issue	SWMI Required Measures (may be referred to as tier 2 measures)
Physical modification	Removal or easement of barriers to fish migration
	Removal or modification of engineering structure
	Improvement to condition of channel/bed and/or banks/shoreline
	Improvement to condition of riparian zone and /or wetland habitats
	Vegetation management
	Changes to operation and maintenance

[2] A web-based interactive map to navigate to catchments and water bodies, view catchment summaries and download data, to support updates to the river basin management plans.

Manage pollution from waste water	Mitigate/remediate point source impacts on receptor
	Reduce point source pollution at source
	Reduce point source pollution pathways (i.e. control entry to the water environment)
	Reduce diffuse pollution at source
Manage pollution from towns, cities and transport	Reduce diffuse pollution pathways (i.e. control entry to the water environment)
	Mitigate/remediate diffuse pollution impacts on the receptor, Reduce diffuse pollution at source
	Reduce diffuse pollution at source
Improve the natural flow and level of water	Control pattern/timing of abstraction
	Water demand management
	Improvement to condition of channel/bed and/or banks/shoreline
	Use alternative source/relocate abstraction or discharge
Manage invasive non-native species	Prevent introduction
	Mitigation, control and eradication (to reduce extent)
	Building awareness and understanding (to slow the spread)
	Early detection, monitoring and rapid response (to reduce the risk of establishment)
Manage pollution from rural areas	Reduce diffuse pollution at source
	Mitigate/remediate diffuse pollution impacts on the receptor
	Reduce diffuse pollution pathways (i.e. control entry to the water environment)

Publication of the updated RBMP

For the 2015 updated RBMP, the SWMI required measures are set out as programmes of measures led by government and key sectors and related to more specific WFD objectives within the river basin planning cycles[3], as follows:

- Measures to prevent deterioration
- Measures to deliver 2021 outcomes
- Measures to achieve outcomes for 2027 or beyond
- Additional measures for protected areas.

The programmes to deliver 2021 outcomes have taken forward those SWMI required measures that were assessed as worthwhile but only where there is confidence in government and key sectors over funding and planned delivery by 2021. Some of these measures have predicted water body improvements that will achieve specific WFD objectives. Other measures will make a contribution to improvements but without predicted WFD outcomes. All other SWMI required measures that were assessed as worthwhile but not planned to deliver outcomes by 2021 have been carried forward as requirements for future programmes for 2027 and beyond.

[3] RBMPs are required to be reviewed every 6 years. These 6 year periods are called cycles. Cycle 1 was 2009-15, cycle 2 is 2015-21 and cycle 3 will be 2021-27.

3.2 Screening and Likely Significant Effects

The screening and assessment of likely significant effects has involved the following steps:

1. Consider measures not requiring assessment (to be screened out)
2. Assess the effects of SWMI required measures in the consulted on updated RBMP
3. Consider the programmes of measures in the 2015 updated RBMP.

Measures that have been screened out at this stage are on the basis of the current level of information available. However, this does not mean that they are automatically screened out at the project level. Therefore, when they are implemented, further consideration should be given to any potential effects on European sites.

3.2.1 Screening for SWMI required measures that will have potential effects

There are over 20 categories of SWMI required measures in the Thames RBMP. Of these, the following 3 measures have been screened out as having little or no effect on European sites:

- Reduce waste water point source pollution at source
- Prevent introduction of invasive non-native species
- Building awareness and understanding to slow the spread of invasive non-native species.

Measures to reduce waste water point source pollution at source are considered likely to be implemented within the confines of existing waste water treatment works, and therefore not give rise to significant hazards. The measures relating to invasive, non-native species are based around preventative measures and education and awareness, will not give rise to significant interventions on the ground, and therefore are not considered likely to give rise to significant hazards to which European sites could be susceptible.

3.2.2 Screening of measures managing European sites

If there are measures in the plan that are directly connected with or necessary for the management of European sites, then these are normally screened out of consideration in the HRA, provided that there is no likely significant effect on the designated features of other European sites.

While the RBMP as a whole is not considered to be directly connected with or necessary for the management of European sites, the RBMP includes measures for a number of designated Protected Areas, which includes water dependent European sites (SACs and SPAs). The measures for those water dependent sites will incorporate the information from the Site Improvement Plans (SIPs) published by Natural England. The plans outline the priority measures required to improve the condition of the sites' qualifying features, and are thus directly necessary for their management. For HRA purposes these Protected Area measures are therefore not required to be considered further.

3.2.3 Assessment of SWMI required measures

The HRA has been carried out on the range of SWMI required measures to achieve long-term WFD objectives, as set out in the updated RBMP for consultation. These are measures that prevent deterioration, achieve protected area objectives and meet water body status

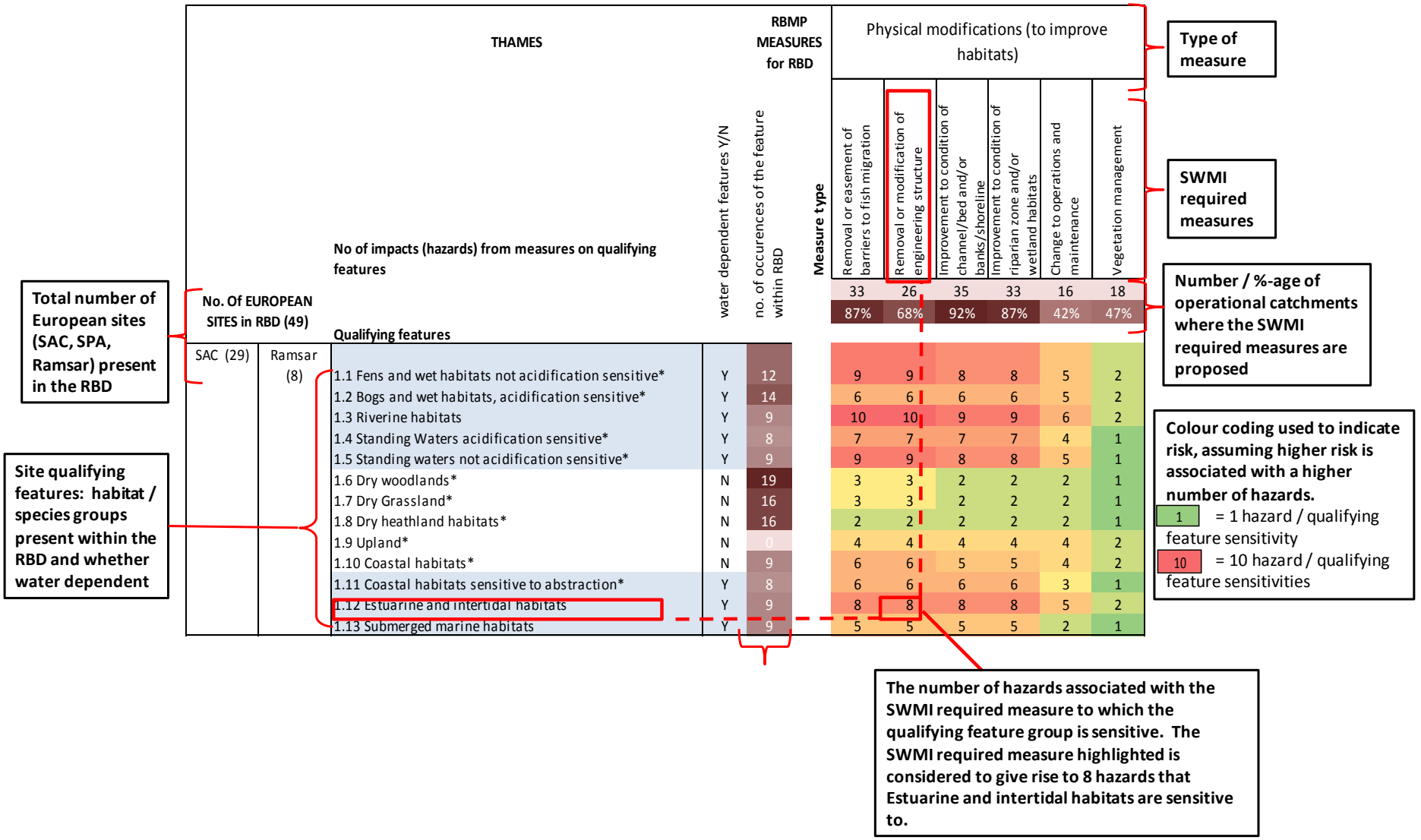
objectives, and that for the consultation stage of preparation are assessed as cost-beneficial without any constrains on affordability or timescales of delivery.

The SWMI required measures are high level summaries of the range of actions required to address the SWMIs, without any specific details as to the precise location, design and method of implementation. At this strategic level, there are significant constraints as to the extent to which the effects on European sites can be assessed. The RBMP HRA provides a high level assessment of potential hazards and risks to European sites, which subsequent plans or projects will be able to use to inform assessment in more detail, along with the types of mitigation that may be required to enable a measure to be implemented in accordance with the Habitats Regulations. The results of the assessment are provided in section 4.1 and 4.2; further consideration of the highest risk measures for the RBD is provided in section 4.3.

The potential effects from the SWMI required measures on European sites was assessed by identifying their potential hazards and relating these to the range of features for which the sites in the RBD are designated, using the national tables from the Environment Agency's Habitats Directive Handbook. Appendix 1 (Table A1) sets out the potential hazards to qualifying features of European sites in the Thames RBD. The table shows the frequency of different SWMI required measures (across catchments) and the frequency of occurrence of qualifying features (within SACs, SPAs and Ramsar sites) within the RBD. Where the measure have greater potential for hazards on the European site features in the RBD, this is illustrated by the numbering and colour coding within the table. This matrix of potential hazards has been developed from the Environment Agency Habitats Directive Handbook's national tables, shown in Table A2 and A3 (Appendix 1). An extract from the table is provided in Table 3 below to illustrate the approach.

Although the proposed measures are set out according to management and operational catchments, the details of where the measures will be implemented and their methods of implementation are not included within the plan. The measures have been assessed on the basis of the potential hazards they may give rise to, combined with the potential sensitivities of site features present in the RBD. The assessment identifies potential risks to European sites and their features, but cannot determine at this stage whether those risks would lead to impacts on specific European sites and features, or the nature and scale of those impacts. Therefore, the assessment is not accurate indication of cumulative impact, but it flags where there may be greater risk due to frequency. The assessment also identifies the range of controls and mitigation that more detailed plans and projects will need to consider to address the potential risks (see section 4). This gives confidence that there are options available at the lower tier to adequately mitigate for any potential impacts, notwithstanding the fact that lower tier HRA will still be required.

Table 3 Potential Impacts of Measures on qualifying features of European sites in the Thames RBD *(extract of Table A1 in Appendix 1)*



3.2.4 Assessment of proposed programmes of measures

Following the consultation on the updated RBMP SWMI required measures, the RBMP has drawn on government and key sector plans to identify more specific programmes of measures that will deliver specific WFD objectives in specific timescales for the 2015 updated RBMP, as follows:

- Measures to prevent deterioration – these are national regulations or mechanisms that operate to safeguard the water environment
- Measures to deliver 2021 outcomes – these are specific programmes of investment planned by government and key sectors to deliver improvements in the 2nd cycle of the RBMP
- Measures for 2027 and beyond – these are future required levels of investment nationally by government or sectors to achieve the objectives of water bodies
- Measures for protected areas – these are the national set of action plans in place for different designated protected areas, including drinking water protected areas, shellfish waters, bathing waters, nutrient sensitive areas and Natura 2000 (European) Sites.

In preparing the updated RBMP programmes of measures, any likely significant effects of SWMI required measures on European sites, as identified from the HRA, were highlighted so that programmes of measures could take account of required controls and mitigation.

The HRA further considered each of these programmes of measures to assess if any further detail was given about their nature and scope, beyond what has been assessed for the SWMI required measures. The main focus is on the measures delivering 2021 outcomes, where there are a series of national programmes related to different funding sources, and a range of local measures developed by catchment partnerships across the RBD. The HRA considered each of these in order to identify any more specific risks of the proposed measures, and any more specific controls and mitigation that would be required as more detailed plans and projects are developed.

The main national programmes are:

- Water company investment programme
- Countryside Stewardship
- Highways England's environment fund
- Flood risk management investment programme
- Catchment level grant in aid funded improvements
- Water resources sustainability measures.

The range of local measures proposed by the catchment partnerships were considered together as a bundle of measures across the RBD.

3.2.5 Controls and mitigation

Assessing likely significant effects on European sites for the RBMP requires consideration of the scope for controls and mitigation to avoid significant effects. These will be required if lower tier HRAs determine that adverse effects cannot be ruled out in the absence of mitigation. The detail of the control and mitigation will be set out as part of more detailed

plans and projects during the implementation of the RBMP, led by different sectors and investment programmes.

Controls: The principal controls on measures proposed within the RBMP are the subsequent tiers of regulation and consenting, and the further requirement for HRA on more detailed plans/projects. The Habitats Regulations require that the competent authority[4] for any plan or project to ensure the requirements of the Habitats Regulations are met before undertaking or permitting any project. Any project developer is required to provide the competent authority with information necessary for the HRA of that project. The competent authority must consult Natural England, as statutory conservation adviser, on the HRA and its conclusions before it can undertake the measure or authorise consent for another to do so. It should be noted that in the context of the Habitats Directive and Habitats Regulations, the term 'project' is widely defined. Projects are not limited to construction works, and may include variations in the use, or the intensity of use of land or water. In cases where activities cease, potential effects on European sites will be taken into account and the statutory conservation body consulted.

Mitigation: A subsequent tier of plan or project, if deemed likely to result in significant effect on one or more European sites, will need to include mitigation to avoid or reduce potential effects. The precise specification of mitigation measures is best determined at project level, where greater detail is known about the design, location and extent of the project, and its potential influences on European sites and their qualifying features.

Appendix 2 sets out generic examples of mitigation/approaches that can be applied to the RBMP measures. These include statutory planning, regulatory and consenting processes, and project level mitigation options to avoid and/or reduce potential adverse effects.

3.3 Considering the need for further stages of assessment

The assessment of likely significant effects on European sites from measures in the plan will result in a conclusion as to whether the effects may be significant or not. If they are, then this would trigger the need for more detailed consideration of effects in a further stage of HRA called Appropriate Assessment. Where any adverse effects are unable to be avoided or mitigated fully, then consideration of alternative solutions is required. In the event there are no available alternatives, then a case for imperative reasons of overriding public interest (IROPI) would have to be made to the Secretary of State for Environment, Food and Rural Affairs. This would need to include proposals for compensatory measures. The HRA report sets out the requirements for these levels of further consideration (see section 4.5).

[4] A competent authority, as defined by the Habitats Regulations, is a Minister, government office, statutory undertaker or public body, with authority to give consent, or with authority to carry out projects (or plans) themselves.

4 Screening and Likely Significant Effects

This section reports on the results of screening and consideration of likely significant effects. These are summarised under the following headings:

- The range of SWMI required measures (as set out in the consultation)
- The highest risk SWMI required measures for the Thames RBD
- The specific programmes of measures in the updated RBMP
- Likely Significant Effects conclusion.

4.1 Summary of SWMI required measures

We have considered the likely significant effects on European sites of the full range of SWMI required measures that were considered worthwhile and put forward for **consultation in the updated RBMP**. Table 4 below summarises the results of this, with section 4.2 reporting on each type of measure related to SWMIs. The summary draws directly from the potential hazards matrix – Table A1 in Appendix 1, and focuses on the measures with highest numbers of potential hazards, and the European sites with features likely to be most vulnerable to these hazards.

Table 4 Summary of potential risks to European sites in the Thames RBD

SWMI required measures and their numbers of hazards to European sites and frequency across catchments	**Measures with higher no. of hazards to European sites (10-8)**		**Measures with medium no. of hazards to European sites (7-4)**		**Measures with lower no. of hazards to European sites (3-1)**	
	SWMI measure (no. of)	Occurring in % of RBD catchments	SWMI measure (no. of)	Occurring in % of RBD catchments	SWMI measure (no. of)	Occurring in % of RBD catchments
Physical modification	4	68-92%	1	42%	1	47%
Pollution from waste water					3	37-71%
Pollution from towns, cities and transport			1	24%	2	11-66%
Changes to natural flow & levels of water	1	26%	1	5%	2	24-26%
Invasive non-native species					2	11-47%
Pollution from rural areas			1	29%	1	79%

The 5 highest risk measures are (% occurrence in RBD catchments):

Physical modification:
- Removal or easement of barriers to fish migration (87%)
- Removal or modification of engineering structure (68%)
- Improvement to condition of channel/bed and/or banks/shoreline (92%)
- Improvement to condition of riparian zone and/or wetland habitats (87%)

Changes to natural flow and levels of water:
- Improvement to condition of channel/bed and/or banks/shoreline (26%)

The most frequently occurring qualifying features in the RBD that would potentially be most affected by these measures are (no of sites in RBD with qualifying features):

- (1.1) SAC/Ramsar with fens and wet habitats, not acidification sensitive (up to 12 sites)
- (2.10) SAC/Ramsar with amphibia (up to 12 sites)
- (3.6) SPA/Ramsar with birds of lowland freshwaters & their margins (up to 14 sites)
- (3.8) SPA/Ramsar with birds of coastal habitats (up to 12 sites)
- (3.9) SPA/Ramsar with birds of estuarine habitats (up to 14 sites)

See section 4.3 for summary of highest risk SWMI related measures.

4.2 The assessment of SWMI required measures

Each section below sets out the HRA assessment on each type of measure related to SWMIs and a list of more specific measures by drawing on the potential hazards matrix (Table A1 in Appendix 1). The risks of each measure on the features of European sites are considered, as well as the range of controls and mitigation that may be required for more detailed plans and projects that will implement these measures.

4.2.1 Measures required to address physical modifications

Physical modifications affect 44% of water bodies in the Thames RBD. The measures required to address this are present in up to 92% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Improve modified physical habitats	Removal or easement of barriers to fish migration	33 (87%)
	Removal or modification of engineering structure	26 (68%)
	Improvement to condition of channel/bed and/or banks/shoreline	35 (92%)
	Improvement to condition of riparian zone and /or wetland habitats	33 (87%)
	Changes to operation and maintenance	16 (42%)
	Vegetation management	18 (47%)

Consideration of effects

Of the measures proposed within the Thames RBD, the measures that make up the physical modifications to improve habitats have the greatest potential to lead to hazards, which could in turn present risks to designated site features; with the exception of operational / maintenance changes and vegetation management, which in general are considered to present a lower potential risk. Physical modifications are proposed in over three quarters of the operational catchments in the RBD. These include measures to remove engineering structures, which can present barriers to fish migration, and works intended primarily to improve the condition of riverine habitats, wetlands and shoreline areas.

These measures have potential to generate a range of hazards that may present risks to sensitive European site features, where they are located in proximity to the measures, comprising potential changes in water levels, flows/velocities and physical regime, (noise or visual) disturbance, loss of habitat, physical damage and potential changes to water quality. Changes in operations and maintenance and vegetation management, proposed in less than half the catchments, are considered to present a smaller range of potential hazards.

Changes in water levels, flows/velocities and physical regime, and potential water quality changes, may be temporary, arising from construction, or more long term due to the changed behaviour of flows/sedimentary regime due to the removal of a structure or changed profile of the riparian zone/channel/banks or shoreline. Changes to water levels, flows and physical characteristics of rivers, wetlands or coastal / estuarine environments can potentially affect habitats within the zone of influence of the measures, and the species upon which they depend. Many of the SAC / Ramsar habitats, particularly water-dependent, such as riverine habitats, fenland, bogs and wet / standing water habitats are particularly susceptible. Dry grasslands, dry woodlands, uplands and heathland habitats are considered generally less vulnerable due to their lower levels of dependence on hydrological regimes. Similarly, aquatic / water dependent SAC / SPA species and SPA / Ramsar bird populations, including birds of lowland wet grassland, freshwaters and their margins and coastal / estuarine habitats are more susceptible to potential hazards arising from these measures.

Risks to qualifying species and supporting habitats can also result from hazards generated during construction, including changes to turbidity, siltation, temporary habitat damage / loss or disturbance. These hazards are likely to generally be short term, arising principally during construction activities.

Controls and mitigation

The main mechanisms for controlling hazards arising from these measures are project level HRA where European sites are identified as affected, and would include planning permission where significant schemes are involved. Some work can be undertaken under permitted development rights and where a European site may be affected the statutory consultation body is consulted. Should the measures be found to have likely significant effect then the application for consent is made to the local planning authority. Any physical modifications on or near a main river or river/sea flood defences would require flood defence consent from the Environment Agency, or its equivalent consent for ordinary watercourses from the relevant Internal Drainage Board (IDB) or Lead Local Flood Authority (LLFA). In the marine context, for any measures involving works below the mean high water spring (MHWS) tidal limit, a marine licence would be required from the Marine Management Organisation (MMO). These consenting organisations would be the competent authority[5] under the Habitats Regulations, and would consult with Natural England on the HRA, including any proposals for mitigation.

Any physical works that have potential to impact upon a SSSI requires the prior assent from Natural England before the works can commence. SSSI designations underpin the majority

[5] Where multiple consents are required a single authority is identified as the 'lead competent authority'.

of European sites in England, therefore potential impacts on European sites (and requirement for HRA) would be considered through the SSSI assent process[6].

Project-level mitigation for these measures would focus on appropriate controls for the hazards identified, along with consideration of any site specific sensitivities of the affected qualifying features. For loss of habitat, physical damage and disturbance, key project-level mitigation would focus on the avoidance of working on, or in proximity to sensitive habitats; the use of fencing and screening to minimise visual and noise disturbance, and also segregation/prevention of construction activity on or near sensitive habitats. Works can also be timed to avoid ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Such mitigation can best be developed by consideration of the existing habitats and species and their sensitivities, carried out as part of the project-level HRA, supported by appropriate survey as necessary, and informed through site specific knowledge, established through early consultation with Natural England.

Impacts of temporary changes during construction can be mitigated through sensitive timings and construction methods of working, for example removal of a fish barrier during low flow conditions to minimise risk of silt plumes, or breach of a bank for a managed realignment during neap tides to minimise scour/erosion of inter-tidal habitat at the breach location. Consideration of longer term/operational impacts would be considered through building of mitigation in to the design. Taking for example the measure 'removal or easement of barriers to fish migration', the design of the project would consider potential upstream and downstream effects of changes to the hydrodynamic regime, any potential consequences for European site habitats, and build in mitigation. Such mitigation may include design of the scheme to reduce potential changes in flow velocities, and erosion/accretion downstream effects.

4.2.2 Measures required to manage pollution from waste water and from towns, cities and transport

Pollution from waste water affects 45% of water bodies in the Thames RBD. The measures required to address this are present in up to 71% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from waste water	Reduce diffuse pollution at source	14 (37%)
	Reduce point source pollution pathways (i.e. control entry to the water environment)	27 (71%)
	Mitigate/remediate point source impacts on receptor	24 (63%)
	Reduce point source pollution at source	17 (45%)

[6] The Countryside and Rights of Way (CRoW) Act 2000 requires the prior assent from Natural England before any operations likely to damage a SSSI can commence.

Consideration of effects

Measures proposed to manage pollution from waste water i.e. point source pollution are proposed in approximately two thirds of the Thames RBD operational catchments. These measures are considered to present a relatively low risk to designated European site features as the measures are likely to result in a narrower range of hazards.

Pollution from towns, cities and transport affects 17% of water bodies in the Thames RBD. The measures required to address this are present in up to 66% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from towns, cities and transport	Reduce diffuse pollution pathways (i.e. control entry to the water environment)	25 (66%)
	Mitigate/remediate diffuse pollution impacts on the receptor	9 (2%)
	Reduce diffuse pollution at source	4 (11%)

Consideration of effects

The measures required to manage pollution from towns, cities and transport, for over a half the operational catchments in the RBD, are considered to generally present a relatively low risk to European site features, although measures targeting the impacts of diffuse pollution from these sources on receptors may present a slightly higher risk. For these measures, the SAC / Ramsar species, with the exception of vascular grassland plants, liverworts, invertebrates of wooded habitat and coastal plants, are considered slightly more susceptible, as are the birds of lowland and coastal/estuarine habitats.

Controls and mitigation

Management of pollution from towns, cities and transport and from waste water all involve consenting/regulatory mechanisms. Measures in relation to waste water may require environmental permits under the Environmental Permitting Regulations. Predicted hazards from these measures are varied and therefore mechanisms/project-level mitigation approaches will have different areas of focus or emphasis given the urban / transport context of the measures.

Projects should include details of all mitigation measures and how they will be delivered if the project proceeds. Proponents of projects and/or competent authorities should seek the advice of Natural England at an early stage in the development of a project; that way any mitigation can be agreed early on, built into the project's appraisal and design, and incorporated within sensitive construction methods of working.

4.2.3 Measures required for pollution from rural areas

Pollution from rural areas affects 27% of water bodies in the Thames RBD. The measures required to address this are present in up to 79% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage pollution from rural areas	Reduce diffuse pollution at source	30 (79%)
	Mitigate/Remediate diffuse pollution impacts on receptor	11 (29%)

Consideration of effects

The management of pollution from rural areas, with measures focused on diffuse rather than point source pollution, is considered to present a relatively low level of risk to site features. The risk does not vary significantly across the SWMI required measures, although measures to address diffuse pollution impacts on receptors may present a slightly higher risk to site features. Potential hazards are identified as disturbance, habitat loss, physical damage, turbidity and surface water flooding changes. The features identified as potentially more susceptible to hazards are birds of lowland freshwaters and margins and birds of coastal / estuarine habitats, fish, amphibia and mammals of riverine habitats, riverine, fens and wet habitats and estuarine / intertidal habitats. However, these measures are proposed in less than a third of the operational catchments in the Thames RBD, whereas measures to reduce diffuse pollution pathways are proposed in more three quarters of the operational catchments.

Controls and mitigation

Consenting/regulatory mechanisms may vary, depending on their nature and location. For example, remediation measures may consider physical interventions such as sediment removal or river restoration, which is subject to flood defence consent, or requires a marine licence, with physical works in or next to rivers subject to the requirements of the EIA (Land Drainage Improvement Works) Regulations. These consenting regimes will all trigger the requirement for project level HRA where European sites are potentially affected.

Other measures comprise agricultural and land use management, which may not necessarily require a specific consent for their implementation. However any operations or activities that have potential to impact upon a SSSI site, requires prior assent from Natural England before the operations or activities can commence. SSSI designations underpin the majority of European sites in England, therefore potential impacts on European sites (and requirement for HRA) would be considered through the SSSI assent process[7]. Advance consultation with Natural England would ensure any new/changed management practices were checked against the list of operations likely to damage affected SSSI units and inform changes to SSSI management agreements, where appropriate.

[7] The Countryside and Rights of Way (CRoW) Act 2000 requires the prior assent from Natural England before any operations likely to damage a SSSI can commence.

Project-level mitigation would consider timing of management activities to avoid sensitive periods and implementation methods to reduce disturbance, habitat loss and physical damage.

4.2.4 Measures required to manage changes to natural flow and levels of water

Changes to the natural flow and level of water affects 12% of water bodies in the Thames RBD. The measures required to address this are present in up to 26% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Improve the natural flow and level of water	Control pattern/timing of abstraction	10 (26%)
	Improvement to condition of channel/bed and/or banks/shoreline	10 (26%)
	Water demand management	9 (24%)
	Use alternative source/relocate abstraction or discharge	2 (5%)

Consideration of effects

Measures proposed to result in or address changes to natural flow and levels of water through improvements in water demand management, physical improvements and changes to the pattern and control of abstraction are proposed in around a quarter of the operational catchments, with measures considering use of alternative sources, relocation of abstractions or discharges proposed in only 2 of the 38 operational catchments.

Measures considering water demand management and abstraction timing controls are considered to present a relatively low risk to designated SAC and SPA qualifying features. Measures considering sources / locations of abstractions or discharges present a higher risk to qualifying features, in generally equal measure across the features. However, as noted above, these measures are only proposed in a limited number of catchments in the RBD. The measures proposed to improve condition of channel/bed and/or banks/shoreline present the highest potential risk to Ramsar / SPA / SAC features. The majority of SAC features are considered more vulnerable, with the exception of dry woodland / heathland / grassland and upland (non water-dependent) habitats, and marine mammals, vascular grassland plants and invertebrates of wooded habitats. Similarly, SPA water-dependent features are likely to be more vulnerable, particularly birds of lowland and coastal / estuarine habitats.

Potential hazards from physical improvements and alternative sources/locations of abstractions/discharges include habitat loss, physical damage and disturbance, as well as changes to water levels and flows/velocity regime. As the principal purpose of the measures is to supporting return to natural flow conditions and improve the morphology of water bodies and their margins, the potential effects, particularly for water dependent SAC/SPA/Ramsar sites and features in the Thames RBD is expected to be positive.

Controls and mitigation

Measures targeting the improvement in condition of channel/bed and/or banks/shoreline, and to a lesser extent, measures considering alternative sources/locations of abstractions or discharges, were identified as having the greatest range of potential hazards, with potential risks to qualifying site features, where in proximity to measures. Consenting mechanisms for these measures require project level HRA where European sites are identified as affected. These include planning permission where significant schemes are involved; some work can be undertaken under permitted development rights and should the measures be found to have likely significant effect on a European site then the application for consent is made to the local planning authority; flood defence consent/ordinary watercourse consent where these measures involve building or removal of structures or alteration to river channel/bed/bank profiles; and marine licence for any measures below MHWS. Alternative sources/locations of abstractions would be subject to an application for a water abstraction licence, and for discharges, require environmental permits from the Environment Agency under the Environmental Permitting Regulations. Measures involving changes to natural flow and levels of water may also require an impoundment licence from the Environment Agency.

Construction mitigation would focus on avoidance of working on/near sensitive habitats, fencing/screening/segregation of activity as well as sensitive timing of works. Operational changes in water levels, flows/velocities and physical regime, due to new or changed abstractions or discharges, would be mitigated as part the appraisal/design. For example, depending on the complexity of changes, modelling may be required to understand the potential changes to the flow regime, and any potential secondary effects on channel morphology, and how this in turn may affect dependent habitats and species of European sites, where in proximity or within the area of influence of the measure/s.

4.2.5 Measures required to manage invasive non-native species

Negative effects of non-native invasive species affects 3% of water bodies in the Thames RBD. The measures required to address this are present in up to 47% of operational catchments. For the consultation of the updated RBMP the following measures were proposed to address these:

Type of measure	Description of measures	Number of operational catchments where measure proposed
Manage invasive non-native species	Early detection, monitoring and rapid response (to reduce the risk of establishment)	4 (11%)
	Building awareness and understanding (to slow the spread)	9 (24%)
	Prevent introduction	2 (5%)
	Mitigation, control and eradication (to reduce extent)	18 (47%)

Consideration of effects

Measures proposed to manage invasive non-native species, are considered generally to present a low risk to European site qualifying features, with two of the four SWMI required measures (building awareness and prevent introduction) screened out, having been

determined as likely to have little or no effect on European sites. The remaining two SWMI required measures have identical patterns of potential risk to site features, although measures focusing on mitigation control and eradication of non-native species are proposed in approximately half of the RBD's operational catchments.

Controls and mitigation

Measures for managing invasive non-native species may not necessarily require a specific consent for their implementation. However any operations or activities that have potential to impact upon a SSSI site, requires prior assent from Natural England before the operations or activities can commence. SSSI designations underpin the majority of European sites in England, therefore potential impacts on European sites (and requirement for HRA) would be considered through the SSSI assent process[8]. Advance consultation with Natural England would ensure any new/changed management practices were checked against the list of operations likely to damage affected SSSI units and inform changes to SSSI management agreements, where appropriate.

Project-level mitigation would consider timing of management activities to avoid sensitive periods, implementation methods to reduce disturbance and physical damage.

4.3 The highest risk SWMI required measures for the Thames RBD

Of the SWMI required measures proposed within the updated RBMP, those identified with the highest potential risk for SAC/SPA/Ramsar site features were as follows:

- Removal or easement of barriers to fish migration
- Removal or modification of engineering structure
- Improvement to condition of riparian zone and/or wetland habitats
- Improvement to condition of channel/bed and/or banks/shoreline.

All 4 measures relate to the 'physical modification' SWMI, and 'improvement to condition of channel/bed and/or banks/shoreline' also relates to the 'changes to natural flow and levels of water' SWMI. Each of these measures is required in a significant proportion, over two thirds of the operational catchments of the Thames RBD[9].

4.3.1 Identification of the most sensitive European site features within the RBD

The potential hazards of these measures to European site features present in the Thames RBD are highlighted in table 5.

Table 5 Potential hazards and sensitivities of site features of the highest risk measures proposed in the Thames RBMP

[8] The Countryside and Rights of Way (CRoW) Act 2000 requires the prior assent from Natural England before any operations likely to damage a SSSI can commence.

[9] As part of 'physical modifications' improvement to condition of channel/bed and/or banks/shoreline is proposed in 18 of the 32 operational catchments; and as part of 'changes to natural flow and levels of water' in 12 of the 32 operational catchments.

	Hazards:	Change in water levels or table	Changes in flow or velocity regime	Changes in physical regime	Competition from non-native species	Disturbance (noise or visual)	Habitat loss	Killing/injury or removal of fish or other animals	Physical damage	Salinity	Siltation	Turbidity
RBMP Measures	**No oprt'l catchments**											
Removal or easement of barriers to fish migration	33	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Removal or modification of engineering structure	26	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Improvement to condition of channel/bed and/or banks/shoreline	35/10	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Improvement to condition of riparian zone +/or wetland habitats	33	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Habitats	**No. of occur-ences in RBD**											
Fens and wet habitats not acidification sensitive	12	✓	✓		✓	✓	✓		✓	✓	✓	✓
Riverine habitats	9	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Standing waters not acidification sensitive	9	✓	✓	✓	✓		✓		✓	✓	✓	✓
Estuarine and intertidal habitats	9	✓	✓			✓	✓		✓	✓	✓	✓
Species												
Anadromous fish	8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-migratory fish and invertebrates of rivers	9	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Mammals of riverine habitats	8	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Amphibia	12	✓	✓			✓	✓		✓	✓	✓	✓
Bird Species												
Birds of lowland freshwaters & their margins	14	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Birds of coastal habitats	12	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Birds of estuarine habitats	12	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

The following **habitat groups** of the European sites within the RBD were considered to be particularly sensitive to the hazards that may occur as a result of these measures:

- fens and wet habitats not acidification sensitive
- riverine habitats
- standing waters not acidification sensitive
- estuarine and intertidal habitats.

The following **species groups** of the European sites within the RBD were considered to be particularly sensitive to the hazards that may occur as a result of these measures:

- anadromous fish
- non-migratory fish and invertebrates of rivers
- mammals of riverine habitats
- amphibia.

The following SPA/Ramsar **bird species groups** within the RBD were considered to be particularly sensitive to the hazards that may occur as a result of these measures:

- birds of lowland freshwaters & their margins
- birds of coastal habitats
- birds of estuarine habitats.

Of the most sensitive features identified, the most commonly occurring in the RBD are the birds of lowland freshwaters and their margins, and birds of estuarine and coastal habitats, occurring in 14/12 designated (SPA/Ramsar) sites within the RBD. The hazards for which they were identified as sensitive were: changes in water levels or table; changes in flow or velocity regime; changes in physical regime; competition from non-native species;

disturbance (noise or visual); habitat loss; killing/injury or removal; physical damage; salinity; siltation; and turbidity.

4.3.2 Potential project-level mitigation for highest risks

At this level of RBD detail, it is not possible to define the precise locations of the substantial majority of the measures, their spatial scale or the nature of their implementation. Specification of mitigation should be tailored to the specifics of the projects, and to the sites and features potentially affected, through the project level HRA process and consultation with Natural England, ideally early in the project's appraisal and design. That way, mitigation can be incorporated into the way that the project is designed and built, tailored to the specifics of the site/s and their qualifying features, and therefore be most effective in avoiding or reducing potential adverse effects.

Mitigation of risks to bird species

Project-level mitigation for the commonly occurring sensitive bird species of the SPAs/ Ramsar sites in the Thames RBD (birds of lowland freshwaters & margins, coastal and estuarine habitats) would consider the potential impacts arising from construction and operation of the project/measure, alongside any site specific sensitivities of the affected individual qualifying features.

Depending on the nature of the project/measure, identification of the use of site habitats in proximity by bird populations and the functioning role of supporting habitat/s potentially affected, may either be established by existing data/studies or may need to be established through site survey.

Construction-related mitigation should consider managing the timing of activities to avoid sensitive periods, such as breeding, over-wintering or migratory passage periods for birds. The exact timings for these construction 'windows' may vary for different sites in the RBD, depending on the assemblages of bird species present as qualifying features. However, with the majority of SPA/Ramsar sites in the RBD, and all estuarine/coastal SPA and Ramsar sites designated due to regularly supporting at least 20,000 waterfowl, constraints on construction activity during the over-wintering period (typically October through to March) may be appropriate. Construction timings may also need to consider other sensitive times of year; for example, SPA/Ramsar sites in the RBD have migratory bird species present as qualifying features (e.g. redshank, ringed plover) whose numbers peak during the spring and autumn migration periods; and are designated for breeding species (e.g. little tern, sandwich tern), generally breeding between April and July.

Avoidance or reduction of visual or noise disturbance to bird species may also consider the use of techniques such as screening, segregation or establishing buffer zones, recognising that some bird species may be more vulnerable (e.g. little tern, sandwich tern) to disturbance and vary in their flight response compared to others.

Although protected bird species were grouped according to general habitat types for the purpose of this HRA, project level HRA should consider the specific qualifying bird assemblages present and the functioning habitats on which they depend. For instance the sensitivity of qualifying bird species and supporting habitat within the RBD depends predominantly on the degree of water dependency of European sites. For example, the Thames Basin Heaths SPA in Hampshire with its predominantly dry woodland/heathland

edge and gorse habitat is likely to be at risk of from a narrower range of hazards arising from the types of measure proposed in the Thames RBMP, compared to some of the water dependent sites and features in the RBD.

Mitigation of risks to habitats

Different habitats can be adversely affected in different ways, either directly through habitat loss or physical damage, or indirectly though changes in physical processes such as changed flow velocities/regimes, resulting in salinity changes, changes to erosion and deposition affecting the formation or functioning of different habitat types.

For loss of habitat and physical damage, key construction mitigation would focus on the avoidance of working on, or in proximity to sensitive habitats, and development of site sensitive construction techniques (e.g. avoiding heavy plant usage in particular areas) identified through the project-level HRA process, and supporting survey as required. This can be informed through site specific knowledge on habitats and features, established through early consultation with Natural England.

For operational changes in physical processes, e.g. flows/velocities and physical regime, and potential water quality changes, for example due to the removal of a structure or changed profile of the riparian zone/channel/banks or shoreline, consideration of mitigation should be through building of mitigation in to the design. Taking the example of physical modification measures, the appraisal and design of a project should consider potential upstream and downstream effects arising from the physical / functional changes to the hydrodynamic regime on important functioning habitats such as saltmarsh and mudflat, and the qualifying species they support such as SPA/Ramsar bird species, as identified through the project-level HRA. Mitigation may include refinement of the project's design, for example removal of a structure in phases to allow sufficient time for saltmarsh to re-establish, or designing / programming a structure's removal in such a way as to minimise short and long term changes to flow velocities and any erosion of functional supporting habitat such as saltmarsh and mudflat.

4.4 The specific programmes of measures in the updated RBMP

The updated RBMP sets out specific programmes of measures to meet the following WFD objectives:

- Measures to prevent deterioration
- Measures to deliver 2021 outcomes
- Measures to achieve outcomes for 2027 or beyond
- Additional measures for protected areas.

4.4.1 Measures to prevent deterioration

The updated RBMP sets out the range of regulations and operations that are in place nationally under various government and sector bodies, and will continue to operate to prevent deterioration across water bodies generally. The level of detail in the plan does not relate to SWMI required measures, and so the HRA is unable to consider any further specific risks related to these programmes.

4.4.2 Measures to deliver 2021 outcomes

The updated RBMP gives summaries and examples of the following sector specific programmes of measures and local measures that are expected to deliver outcomes by 2021. They are proposed investments to improve the water environment and achieve WFD objectives from government and key sectors having reviewed the SWMI required measures for long-term objectives, and considered the priorities related to funding, outcomes and delivery timescales. The measures for each programme are described in relation to whether they are likely to directly contribute to predicted improvements in water body element status by 2021; or will secure additional outcomes for the environment, but are not linked to specific improvements in element status by 2021. The programmes of measures for both outcomes are assessed in the following sub-sections, referred to as 'contributing to water body element improvements' and 'securing additional outcomes for the environment'.

- National Measures include:
    - Water company investment programme
    - Flood risk management investment programme
    - Countryside Stewardship
    - Highways England's environment fund
    - Catchment level grant in aid funded improvements
    - Water resources sustainability measures
- Local Measures are proposed measures from 26 catchment partnerships.

Some of these programmes will or have undergone their own HRA, or more likely, be part of a wider plan that is subject to HRA. To maintain a consistent approach to all of the programmes these individual assessments have not been taken into account at this strategic level. Nevertheless, these will have a significant influence at the lower tier plan or project level and should be taken into account.

The HRA has considered the range of SWMI required measures that make up these programmes, how these may give rise to any more specific risks to European sites, and any required mitigation, based on the assessment in the previous section (4.2) of the report.

The numbers of measures referred to in the HRA are from supporting information to the updated RBMP and may not be directly referred to in the published plan. It allows the programmes of measures to be summarised into groups of measures of each SWMI required measure type. The levels of potential risks of each group of measures can therefore be considered, based on the risks assessed for SWMI required measures in the previous steps of the HRA (sections 4.2 and 4.3).

4.4.2.1 Water company investment programme

The RBMP measures from the water company investment programme, identified as contributing to water body element improvements, comprise 62 measures for water bodies across the Thames RBD. Almost half the measures are to improve natural flow and levels of water, mostly through controlling the pattern/timing of abstractions. Around a quarter of the measures are to improve physically modified habitats with the remaining quarter being

measures targeted at point source pollution. There are also 4 measures aiming to build awareness and understanding to slow the spread of invasive non-native species.

Over half of the measures (16) comprise mitigating/remediating point source impacts on receptors, 7 measures target the reduction of point source pollution at source and there are 6 measures to control the pattern and/or timing of abstractions.

There are 32 measures to secure additional outcomes for the environment, the majority of these are measures are to improve modified habitat (26 measures), specifically through the removal or easement of barriers to fish migration. Five measures are to control or manage point source inputs, through mitigating/remediating point source impacts on receptors and 1 is measure to control or manage diffuse source by reducing diffuse pollution at source. In addition there are 4 national measures to control and manage abstraction and improve riverine habitats, targeting 39 locations in the Thames RBD. The exact nature of these measures and whether controlling the pattern/timing of abstraction or improving the condition of channel/bed/banks, is not defined.

Potential risks from this programme to European sites and features vary depending on the nature of the measures. The measures required to mitigate/remediate point source impacts on receptors and reduction of point source pathways, are considered to present a relatively low risk to European sites and features, as is the measure to reduce diffuse pollution at source.

The measures to remove or provide easement of barriers to fish migration, which make up the majority of the programme, are considered to potentially present a higher risk, with water-dependent European site features more vulnerable to the potential hazards. The specific nature, scale and details of implementation of these measures are not included in the plan, although the accompanying measures descriptions highlight that schemes in the main are to improve abstractions and outfalls to prevent the entrainment of eels/fish. Upstream/downstream water-dependent habitats are considered susceptible to these measures, in particular the riverine, fenland, bogs and wet habitats and standing waters, and also potentially coastal, estuarine and inter-tidal habitats where measures are to be implemented in coastal estuarine locations.

The risks during operation may result in changes in flow patterns/velocities, water levels/water table and physical regime, to which sensitive site features, where in proximity (upstream or downstream) to the measures may be sensitive. However, since the measures are proposed to improve habitat/connectivity and supporting physical processes, protected habitats and species, fish in particular, are expected to benefit.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. For measures addressing point source pollution, this is likely to be the environmental permits from the Environment Agency under the Environmental Permitting Regulations. For measures involving any physical works/modifications on or near a main river[10], flood defence consent from the Environment Agency and/or planning permission from the local planning

[10] For works on or near ordinary watercourses, the equivalent ordinary watercourse consent from the Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) would be required, which would also trigger the need for HRA where European site/a were potentially affected.

authority would trigger the requirement for project level HRA where European sites were potentially affected.

Mitigation for these measures relates to the consideration of operational changes in water levels, flows/velocities and physical regime. This would be mitigated through consideration of flow/water level requirements for European site features as part of any appraisal to support the consent applications. For example, depending on complexity of the proposed changes to the flow regime on river flow patterns, modelling may be required to assess changes to the flow and physical regime, potential secondary effects on channel morphology, and how this in turn may influence dependent European habitats and species. Such appraisal, supported by modelling if / where required, would be undertaken as part of project-level HRA, where required to support the consent applications.

Construction-related mitigation would consider the avoidance of working on or in proximity to sensitive habitats; the use of screening and sensitive working methods to minimise visual and noise disturbance to sensitive species, and also provide segregation/prevention of construction activity on or near sensitive habitats. Appropriate timing of works would reduce potential risks by avoiding ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species.

Such mitigation can be tailored at the project level, informed by project-level HRA, to the habitat types, affected species and their sensitivities, in order to build mitigation in to the design of the scheme and the methods of working.

4.4.2.2 Flood risk management investment programme

The RBMP measures from the flood risk management investment programme, identified as contributing to water body element improvements, comprise 2 measures for water bodies in the Thames RBD, specifically in the River Kennet and Tributaries catchment.

There are 13 measures relating to securing additional outcomes for the environment. These measures all target improving modified habitats either through improvement to condition of the riparian zone and/or wetland habitats or the removal or modification of engineering structures. Some of the measures will also contribute to the delivery of some European Site Improvement Plan actions.

The main potential risks from this programme to designated sites and features relate to the physical works and interventions required to achieve the improvements. The nature, scale and precise details of these interventions are not included in the plan. However, the hazards generated from the measures are likely to arise principally during their construction, and as such are likely to be short term in nature. The risks during operation are considered likely to be minimal, since the measures are proposed to improve habitat and supporting physical processes in order to achieve improvements in water body status. Protected species, in particular bird populations (of coastal/estuarine/freshwaters and wet grassland habitats), fish, mammals of riverine habitats and amphibians, are particularly susceptible to measures proposing physical modifications, with vascular plants and marine mammals considered generally less vulnerable. Habitats considered particularly susceptible to physical modifications are riverine, fens, bogs and standing waters, and also coastal, estuarine and inter-tidal habitats.

Project level HRA would be required where a European site is identified as potentially being affected by these measures, triggered by the consenting process. This would include planning permission where significant schemes were involved, and/or flood defence consent from the Environment Agency for any physical works/modifications on or near a main river[11]. Some work can be undertaken under permitted development rights and should the measures be found to have likely significant effect on a European site then the application for consent is made to the local planning authority. For any marine works, i.e. where inter-tidal habitat creation or improvement is proposed, any measures involving works below the mean high water spring (MHWS) tidal limit would require a marine licence, which would also trigger the requirement for project level HRA where European sites were potentially affected.

The main mitigation for these measures relates to the avoidance of working on, or in proximity to sensitive habitats; the use of fencing and screening to minimise visual and noise disturbance to sensitive species, and also segregation/prevention of construction activity on or near sensitive habitats. Appropriate timing of works would reduce potential risks by avoiding ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Such mitigation can be tailored at the project level, informed by project-level HRA, to the habitat types, affected species and their sensitivities, in order to build mitigation in to the design of the scheme and the methods of working.

4.4.2.3 Countryside Stewardship

The Countryside Stewardship programme is an entirely voluntary national scheme to enhance the natural environment, increase biodiversity and improve water quality. At this stage the programme does not identify outcomes contributing to water body element improvements because the uptake of measures is voluntary and the exact location of measures and their outcomes are not yet known. However, measures are expected to contribute significantly to securing additional outcomes for the environment, with 30% to 40% of rural England expected to be part of a Countryside Stewardship agreement by 2020.

Countryside Stewardship is expected to principally address diffuse pollution from rural areas, through soil management and reducing the effect of nutrients, sediment and faecal bacteria pollution on water bodies. Measures to address diffuse pollution are considered to be relatively low risk, with any effects on European sites and features are considered likely to primarily be beneficial, particularly for water-dependent sites.

Measures are also anticipated to comprise physical modifications, such as tree planting, re-naturalising rivers and coast defences, including making space for water and coastal realignment. As the uptake of measures is voluntary and the exact location of measures and their outcomes are not yet known, it is not possible to predict the likely impacts on European sites. Because the measures are to target improvements in water bodies, the effects on European sites are expected to be primarily beneficial. However, such measures and interventions have the potential to generate unintended consequences for European sites where in proximity of the measures. Measures for such physical modifications are expected to generate hazards similar to those identified for flood risk management (see section 4.4.2.2).

[11] For works on or near ordinary watercourses, the equivalent ordinary watercourse consent from the Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) would be required, which would also trigger the need for HRA where European site/a were potentially affected.

Such measures would be subject to HRA by Natural England prior to finalising the agreement (as it is a form of consent), and then subsequently project level HRA where required, such as planning permission or flood defence consent.

As part of the Countryside Stewardship programme, further research is planned that will help to evaluate the likely benefits of the programme for water. Such research could help in targeting mitigation to avoid adverse effects of the programmes of measures for European sites, and how the measures could be tailored to maximise the benefits for improvements in condition of European sites.

4.4.2.4 Highways England's environment fund

The Highways England's environment fund will in part be invested in addressing pollution from highway runoff (pollution from towns, cities and transport), but also physical modifications (to improve habitat). The measures from the programme are identified as contributing to securing additional outcomes for the environment. However, specific measures, or programmes for the Thames RBD are not identified at this stage, therefore there are no measures identified for contributing to water body element improvements.

Highway runoff is detritus that collects on roads made up of silt and grits mixed with contaminants such as metals and oils, which can wash off the road and reach water bodies and harm the ecology of the water environment. Measures to address this are likely to comprise Sustainable Drainage Systems (SuDS), measures that can trap pollutants from highway outfalls through a swale (shallow grassy ditch) to large balancing ponds that regulate flow quantity as well as allowing pollutants to settle out. These measures are therefore anticipated to be primarily beneficial for European sites, reducing sediment, nutrient and chemical loadings, metal concentrations and improved dissolved oxygen levels, particularly for downstream water-dependent sites and features within areas of influence of the discharges. Potential hazards may arise from the construction of these measures, such as disturbance, physical damage and habitat loss, depending on their size/scale and proximity to European sites.

Measures to address physical modification pressures will be implemented, such as fish and eel passes installed to allow fish migration, and will therefore be of potential benefit for site features, particularly anadromous fish. The main potential hazards from these measures, similar to flood risk management (see section 4.4.2.2) relate to the physical works required to achieve the improvements primarily during their construction, and as such are likely to be short term in nature.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, which would be triggered by the consenting process, such as planning permission or flood defence consent where in proximity to main rivers. Highways schemes can be afforded permitted development powers; however, where such schemes potentially affect European sites, planning permission is required unless supporting assessment can demonstrate no likely significant effect on European sites.

Mitigation for these measures would be similar to that of flood risk management, focused on construction related mitigation, such as avoidance of sensitive habitats; use of screening/segregation; sensitive timing of construction works and appropriate sensitive

construction working methods. Such mitigation can be tailored at the project level, informed by project-level HRA, to the habitat types, affected species and their sensitivities, in order to build mitigation in to the design of the scheme and the methods of working.

4.4.2.5 Catchment level grant in aid funded improvements

The RBMP measures from catchment level grant in aid (GiA), identified as contributing to water body element improvements, comprise 4 measures for water bodies across the Thames river basin district, all of which target the improvement of modified habitat through the improvement to condition of riparian zone and/or wetland habitats.

There are 29 measures (5 national[12] and 24 RBD-specific) to secure additional outcomes for the environment. Of the Thames RBD specific measures, 14 target improving modified physical habitats, 7 measures target managing pollution from towns, cities and transport and 4 measures target managing pollution from rural areas.

The main potential risks from this programme to European sites and features relate to the physical works and interventions required to achieve the improvements. The nature, scale and location of these interventions are not known at this stage. However, the hazards generated from the measures are likely to arise principally during their construction, and as such are likely to be short term in nature. The risks during operation are considered likely to be minimal, since the measures are proposed to improve habitat and supporting physical processes in order to achieve improvements in water body status. Protected species, in particular bird populations (of coastal/estuarine/freshwaters and wet grassland habitats), fish, mammals of riverine habitats and amphibia, are particularly susceptible to measures proposing physical modifications, with vascular plants, liverworts, invertebrates of wooded habitat and coastal plants considered generally less vulnerable. Habitats are considered susceptible to physical modifications, in particular the riverine, fens, bogs and wet habitats and standing waters, and also estuarine and inter-tidal habitats.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. This would include planning permission where significant schemes were involved, and/or flood defence consent from the Environment Agency for any physical works/modifications on or near a main river[13]. For any marine works, i.e. where inter-tidal habitat creation or improvement is proposed, any measures involving works below the mean high water spring (MHWS) tidal limit would require a marine licence, which would also trigger the requirement for project level HRA where European sites were potentially affected.

The main mitigation for these measures relate to the avoidance of working on, or in proximity to sensitive habitats; the use of fencing and screening to minimise visual and noise disturbance to sensitive species, and also segregation/prevention of construction activity on or near sensitive habitats. Appropriate timing of works would reduce potential risks by avoiding ecologically sensitive periods, such as breeding or migratory passage periods for birds, fish and other species. Such mitigation can be tailored at the project level, informed by

[12] The 5 national measures comprise 4 nationally created posts to deliver projects and programmes and 1 project to maintain efforts to eradicate two non-native species (topmouth gudgeon and Ludwigia).

[13] For works on or near ordinary watercourses, the equivalent ordinary watercourse consent from the Lead Local Flood Authority (LLFA) or Internal Drainage Board (IDB) would be required, which would also trigger the need for HRA where European site/a were potentially affected.

project-level HRA, to the habitat types, affected species and their sensitivities, in order to build mitigation in to the design of the scheme and the methods of working.

4.4.2.6 Water resources sustainability measures

There is 1 water resources sustainability measure identified as contributing to water body element improvements for water bodies in the Thames RBD. The measure relates to improving the natural flow and level of water, through controlling or managing abstraction.

The measures that relate to securing additional outcomes for the environment consist of 5 national measures and 1 Thames RBD measure. The 5 national measures relate to water demand management or controlling the pattern or timing of abstractions, principally through review of existing or new authorisations (currently exempt) for abstraction licences. The Thames RBD specific measure also relates to improving the natural flow and level of water, through controlling or managing abstraction.

Measures required to control the pattern or timing of abstraction are considered to present a relatively low risk to designated SAC and SPA/Ramsar sites and their features. Some European site features are considered more sensitive to these measures, with water-dependent features more susceptible to water levels and changes in flow regimes than non water-dependent features. Due to the nature of the measures, risks are likely to occur during operation, with little or no construction works likely to be required to implement abstraction regime changes. The risks during operation are generally considered likely to be minimal, particularly since the purpose of the measures is to improve water body status. Where the water body includes a water-dependent European site, this is also a WFD protected area, and the measure is therefore expected to target flow/water levels to protect and improve the status of these protected areas as part of the water body objective.

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, which would be triggered by the abstraction licence consenting process for any new abstraction licence or licence variation.

The main mitigation for these measures relates to the consideration of operational changes in water levels, flows/velocities and physical regime, due to changed abstraction timings/patterns. This would be mitigated through consideration of flow/water level requirements for European site features as part of any appraisal of any abstraction licence application/variation. For example, depending on complexity of the proposed changes to the abstraction regime on river flow patterns, modelling may be required to assess changes to the flow and physical regime, potential secondary effects on channel morphology, and how this in turn may influence dependent European habitats and species. Such appraisal, supported by modelling if / where required, would be undertaken as part of project-level HRA, where required to support the abstraction licence variation.

4.4.2.7 Local Measures from catchment partnerships

There are 21 local measures from catchment partnerships identified that will contribute to water body element improvements. The majority of these measures are targeting controlling or managing diffuse and point source pollution (9 and 8 measures respectively) whilst 4 measures are focussed on improving physically modified habitats.

There are local catchment partnership measures identified that will secure additional outcomes for the environment for management catchments across the Thames RBD, although the majority do not identify specific locations. The measures are diverse in nature and represent a wide spectrum across the SWMI required measures for the Thames RBD. The majority of the measures are to address physical modifications to improve habitats, for the benefits of fish and biodiversity, largely either through improving in-channel and riparian habitats or through the removal or easement of barriers to fish migration. The rest of the measures are largely split between managing pollution from rural areas and managing pollution from towns, cities and transport. There are also several measures relating to managing non-native species and raising public awareness of pollution and environmental issues.

Measures to manage pollution from rural areas and from towns, cities and transport and measures to control non-native invasive species are considered to generally be relatively low risk, with the outcomes of these interventions likely to be primarily positive for European sites.

The measures to improve modified physical habitats potentially generate a wider range of hazards and therefore considered to be of higher risk, depending on their proximity to European sites and sensitive features. The hazards generated from the measures are likely to arise principally during their construction, and as such are likely to be short term in nature. The risks during operation are considered likely to be minimal, since the measures are proposed to improve habitat and supporting physical processes in order to achieve improvements in water body status. Susceptible habitats and species to such physical modifications are as for those identified under flood risk management (see section 4.4.2.2).

Project level HRA would be required where a European site or sites were identified as potentially being affected by these measures, triggered by the consenting process. This would include planning permission where significant schemes were involved; flood defence consent from the Environment Agency for any physical works/modifications on or near a main river; and marine licence for any works below MHWS.

Mitigation for these measures are as identified under flood risk management (see section 4.4.2.2) and would consider the avoidance of working on/in proximity to sensitive habitats; use screening to minimise disturbance to sensitive species where appropriate; and also segregation/prevention of construction activity on or near sensitive habitats. Timing of construction works would also reduce potential risks by avoiding ecologically sensitive (breeding or migratory) periods. Such mitigation can be tailored at the project level, informed by project-level HRA, to the habitat types, affected species and their sensitivities, in order to build mitigation in to the design of the scheme and the methods of working.

4.4.3 Measures to achieve outcomes for 2027 or beyond

Where the programmes of measures expected to deliver outcomes by 2021 (section 4.4.2 above) are unable to include the further measures required to achieve all long-term WFD objectives in the RBD (and that have been assessed as worthwhile), then these have been carried forward as future investments and programmes for 2027 and beyond. The plan summarises this required investment in future measures under government and key sectors, and is at a level of detail that does not relate to SWMI required measures. The HRA is thus unable to consider any more specific risks related to these future programmes.

4.4.4 Additional measures for protected areas

The updated RBMP sets out the range of plans and programmes that are in place nationally to achieve the objectives of different protected areas – see Table 6 below. These are separate plans and programmes that will contribute to the RBMP objectives related to protected areas and have a range of lead organisations and authorities responsible for them. These plans and programmes will have had to consider HRA requirements as part of their development where required. Measures/projects taken forward that involve physical works will be subject to relevant consenting processes that will consider HRA requirements at a project level. The subsequent planning and consenting processes would be expected to address any potential effects on European sites at the level of detail of measures arising from these separate plans and programmes.

Table 6 Summary of measures for Protected Areas

Protected Area	Programme
Drinking water protected areas - surface water and groundwater	Safeguard zones have been established for water sources in drinking water protected areas where extra treatment is likely to be required in the future. Safeguard zone action plans have been developed including measures needed to manage activities that may threaten raw water quality for surface waters and ground waters.
Economically significant species (shellfish waters)	Shellfish water action plans have been produced for all designated shellfish waters, which include measures aiming to observe relevant microbial shellfish flesh standards.
Recreational waters (bathing waters)	Bathing water profiles have been produced for all designated sites. They include details of the measures needed to achieve compliance with the revised standards that come into force in 2015. Further information is available on the measures for those bathing waters at risk of not achieving sufficient in 2015 in the bathing water action plans (continuing at risk).
Nutrient sensitive areas (Urban Waste Water Treatment Directive)	Measures have been identified to make sure that all relevant discharges from waste water treatment plants within the sensitive area have appropriate phosphorus or nitrogen emission standards.
Nutrient sensitive areas (nitrate vulnerable zones)	Nitrate vulnerable zones have been designated in areas where water quality is affected by nitrates from agricultural sources. Measures to reduce nitrate concentrations within nitrate vulnerable zones include establishing a voluntary code of good agricultural practice and developing action programmes to reduce agricultural nitrate losses.
Natura 2000: Water dependent Special Areas of Conservation (SACs) and Special Protection Areas for Wild Birds (SPAs)	Natural England has developed site improvement plans (SIPs) for water dependent sites. SIPs provide an overview of issues affecting the site condition; identify priority actions, timescales for implementation and potential funding sources. Natural England monitors, reviews and updates SIPs where appropriate.

4.5 Consideration of results and conclusion

The assessment of likely significant effects has been carried out for required measures related to each SWMI from the consulted on updated RBMP, and for the programmes of measures drawn from government or key sector investment plans where further details could be considered by the HRA. The level of detail on the measures does not allow the assessment to consider effects on specific European sites. The HRA has considered potential hazards associated with the types of measures that are related to each SWMI in the RBMP, and indicates the potential levels of risk to the range of features of the European sites in the RBD.

The measures that may pose potentially higher risks to European sites have been identified in this HRA , and the range of mitigation options available have been explored, so that future project level assessment can consider these when the details of the nature and location of measures are known. For the Thames RBD, these measures are:

- Removal or easement of barriers to fish migration
- Removal or modification of engineering structure
- Improvement to condition of riparian zone and/or wetland habitats
- Improvement to condition of channel/bed and/or banks/shoreline.

The programmes of measures in the Thames RBMP that are more focussed on improving physical modifications in water bodies, and are more likely to include these potentially higher risk measures are:

- Water company investment programme
- Flood risk management investment programme
- Catchment level grant in aid funded improvements
- Local measures from catchment partnerships.

The HRA has considered the range of controls and mitigation that would be expected to address these potential risks, focused particularly on the potential higher risk measures and their effects. In terms of controls, before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations; any plans or projects required to implement the measures must undergo an ‘appropriate assessment’ if they are determined to be likely to result in a significant effect in a European sites or sites. While the assessment has identified where there are likely to be higher risks, this requirement applies to any lower tier plan or project where there is the possibility of a likely significant effect on a European site.

As part of the various consenting mechanisms, where likely significant effects cannot be ruled out at the project level, the competent authority will undertake an appropriate assessment and the measures cannot receive approval to proceed until it has been demonstrated that they will not result in adverse effects on integrity of any affected European sites. Or, where an adverse effect cannot be ruled out, and there are no alternative solutions to meeting the objectives of the project, a case for Imperative Reasons of Overriding Public Interest (IROPI), which includes the identification of compensatory measures, may be prepared, and must be approved by the Secretary of State. Appendix 2

provides additional detail on the consenting processes and the consideration of the Habitats Regulations as they relate to RBMP and SWMI required measures.

The updated RBMP does not constrain the nature, scale and/or location of the measures proposed in the plan, so they can be developed in a way that will avoid the likelihood of any significant effects on European sites, or if supported by an appropriate assessment and legal means of securing any mitigation required, can prevent an adverse effect on site integrity.

At this strategic plan level, this assessment has concluded, for the plan itself that there are no likely significant effects, and at this stage there is no requirement to consider further stages of the HRA on the RBMP programme of measures. This is a plan level conclusion and does not give weight to any future conclusion of HRAs at the lower tier/project level. Each must be assessed on their individual merits and the inclusion of any measures in this plan does not influence the conclusions being drawn for future HRAs, and does not give any weight where imperative reasons may be pursued. Any possible in-combination effects of the RBMP with other plans are considered in section 5 below.

5 In combination effects with other plans and projects

Given the geographical scale of the RBMP, and the high level assessment being undertaken, it is not possible to undertake a comprehensive assessment of potential impacts in combination with other plans or projects. In-combination assessment requires the consideration of impacts that are not significant alone to be checked for the possibility of such impacts becoming significant when combined with the effects of other plans or projects. As this high level assessment has not been undertaken at a level of detail that allows for quantification of impacts, it is therefore not possible to judge whether potential effects will be significant alone, and whether they can be fully avoided or mitigated for, or that residual impacts may remain. In-combination assessment at this plan level therefore serves to highlight where such assessment may be relevant to future HRAs, and focuses on plans with a similar geographic scale to the river basin district (plans and projects of any scale should be considered at later stages when more detail on the project itself is available). The plans considered as part of the assessment of in-combination effects are taken from those reviewed as part of the Strategic Environmental Assessment (SEA). The SEA review generally found that the draft RBMP aligns very well with the objectives of other plans and programmes in the Thames region, particularly those aimed at promoting sustainability and nature conservation.

Table 7 below considers where such plans may potentially contribute to effects on European sites in combination with the Thames RBMP.

The risk of significant in combination effects on European sites with other plans is considered to be low, because the objectives and actions within the RBMP are aimed at improving the status of water bodies, and achieving favourable conservation status for water dependent European sites. Interactions with other strategic plans may potentially constrain the implementation of the RBMP objectives. However, the plans may also provide opportunities to co-deliver actions identified within the Site Improvement Plans (SIPs) for the Thames RBD to achieve favourable conservation status for water dependent European site features.

Habitats Regulations Assessments of measures or actions undertaken at later plan or project stages will still however require consideration of potential in combination effects, at an appropriate level of detail, i.e. in combination with plans or other relevant projects.

Table 7 Other Strategic Plans and potential in-combination effects with the Thames RBMP

Name of Plan	Potential in-combination effects with the RBMP on European sites
Flood Risk Management Plans (FRMP) for the Thames RBD	Where measures in the RBMP propose physical modifications, and to a lesser extent other SWMI required measures, there is potential for interaction with measures proposed within the FRMP that comprise physical intervention/s, where these are in proximity to European sites. Given RBMP actions are focused on water dependent European sites and FRMP measures focused on the water environment, these sites are likely to be more susceptible to potential in-combination effects. Such in-combination effects could include construction impacts, such as noise and visual disturbance, where the timing of implementation of measures co-incided, or impacts arising from operation such as changes to flows/water levels or the physical regime.
Water Resources Management Plan for Thames Water	Thames Water has produced the water resource plan for the Thames. The boundaries of the plan area are substantially the same as that for the RBD. The plan sets out the investment needed to ensure that there is sufficient water to continue supplying communities over the 25 years from 2015 to 2040. The plan contains similar objectives around the protection, improvement, sustainable management and use of the water environment in terms of quantity and quality. Interactions between the plans, particularly for water dependent European sites are likely; however, particularly given that water resource management plans are identified within the RBMPs as plans to work alongside the RBMP to address pressures on water body status and meet specific protection designation objectives, water resource management plans or actions arising from them should act as mechanisms to deliver RBMP objectives for water dependent European sites. A HRA was undertaken on the plan for the Thames and concluded that the plan was unlikely to result in any significant effects on European sites, either alone or in combination with other plans or projects.
Local Authority Core Strategies, various District Authorities National Park and AONB management plans	Promotion of growth within the core strategies, depending on location, may place pressure on both water dependent and non-water dependent European sites. These pressures are more likely in coastal areas of North Kent, South Essex and Surrey areas identified for growth which are in proximity to European sites. Development activities arising from core strategies could result in impacts on European sites through temporary disturbance during construction, adverse effects from encroachment of development on habitats or species displacement, or indirect effects such as alterations to drainage, increased surface water run-off and diffuse/point source pollution. Significant interactions with the Thames RBMP are unlikely, given that RBMP actions are focused on water body and water dependent European site improvements. However, development activities arising from the core strategies may inhibit the ability of the RBMP to achieve objectives relating to European site protected areas. National Park and AONB management plans set out how the purposes and objectives for the area will be achieved between partners. Planning authorities are required to have regard to the management plan when determining planning applications. The protection and restoration of wildlife and habitats is part of the vision for national parks. There is the potential for unanticipated effects where plans focus on recreation and increasing visitor numbers.
Marine Strategy Framework Directive – South East Inshore Marine Plan	The South East Inshore Marine Plan is not yet publicly available; however the principles that will be applied to the regional marine plans are set out in the Marine Strategy Framework Directive (MSFD). The geographical scope of the MSFD is focused on marine/coastal waters; therefore any interactions with the RBMP are only likely to affect the European sites in the coastal/estuarine locations in the RBD. The MSFD has complementary objectives to the RBMP, with an overall objective to achieve 'Good Environmental Status' in marine waters by 2020, including the same objectives for good ecological and chemical status. However, the MSFD also covers broader environmental aspects, such as noise, litter, and aspects of biodiversity, therefore is likely to complement objectives in the RBMP aimed at achieving favourable conservation status for European site protected areas. Potential conflicts could arise, however, in connection

	with development, resource extraction (e.g. marine aggregates) and infrastructure activities enabled by the policy framework set out in the emerging plan.
Medway Estuary and Swale, and Isle of Grain to South Foreland Shoreline Management Plans (SMPs)	Shoreline management Plans (SMPs) set out a strategic view of how coastal flood risk should be managed in the future. Policy options typically applied include: no active intervention, hold the line, and management realignment. The Medway Estuary and Swale SMP is located within the Thames RBD on the North Kent Coast; while the Isle of Grain to South Foreland SMP is located partially within the RBD between Faversham and Whitstable. The SMPs recommend a range of actions which include holding the coastal line to protect communities from coastal erosion and coastal flooding and partial managed realignment at discrete locations. As actions to implement these SMP policies will be undertaken along the coast, European sites on and within coastal and estuarine fringes of the Thames will potentially be the most vulnerable to potential combination effects. Impacts that could potentially arise as a result of the implementation of SMPs include changes in the physical, flow or velocity and altered flooding regimes and changes in coastal / estuarine erosion or deposition; changes to water chemistry / salinity changes or increased risk of pollution from, for example, flooding of coastal landfill sites / other contaminated land; habitat severance; disturbance during construction or maintenance; and habitat loss/physical damage as a result of coastal squeeze, sea level rise, the creation / maintenance of defences or conversely the retreat of the coastal flood defence line.

6 Conclusion and future HRAs

This HRA has been carried out at the level of published detail in the 2015 updated Thames RBMP. At this strategic plan stage of the RBMP the details of where and how the measures will be implemented are not included within the plan. This assessment has identified potential hazards to European Sites associated with implementation of the SWMI required measures in the RBMP, and the potential risks to European site qualifying features. The assessment has considered how these risks relate to the proposed programmes of measures with a focus on the programmes to deliver WFD outcomes by 2021.

The RBMP does not constrain exactly where or how those measures should be implemented, which will be determined at either a lower-tier plan or project level. The range of mitigation options that will be available have been considered as part of this assessment, and given the options available, there is confidence at this plan level that the measures can be implemented whilst harm to European sites is prevented. The RBMP also makes it clear that before any measures in the plan are implemented they must be subject to the requirements of the Habitats Regulations. A conclusion of no likely significant effect at the plan level does not infer any similar conclusion at the lower tier plan or project level and any plans, projects or permissions required to implement the measures must undergo an 'appropriate assessment' if they are likely to have a significant effect. Any mitigation measures required to ensure the project does not result in an adverse effect on the integrity of a site must be implemented. The Environment Agency will help and advise other parties on mitigation proposals as well as ensuring that they are incorporated into schemes it is responsible for.

The HRA has further considered the in combination effects of the updated RBMP with other plans at a strategic scale and determined that the risks are unlikely to be significant to European sites (see section 5). It is however acknowledged that it is not possible to do a comprehensive in-combination assessment at this strategic level, because the lack of detail available makes it impossible to adequately quantify any potential impacts. More robust in-combination assessment should be undertaken at the lower tier/project level.

It is concluded that for the updated RBMP the proposed measures are not likely to have any significant effects on any European sites, alone or in-combination with other plans or projects. This is a strategic plan level conclusion and relates to the plan only. Given this conclusion, there is no requirement to progress to the next stage of the Habitats Regulations assessment (an 'appropriate assessment' to examine the question of adverse effect on the integrity of European sites). This conclusion does not preclude the need for lower tier plan/project level appropriate assessment, nor does it give any weight to the conclusions that may be drawn at that level.

This HRA has been prepared in a way that should assist HRA at a subsequent level, i.e. lower tier strategies, plans or projects that implement measures. As local actions are developed at a project level and the details of their scope and scale are known, this may identify additional effects on European sites that have not been assessed here, or were not appropriate to consider at this spatial scale of plan.

Appendix 1 Table A1 - Potential Impacts of Measures on qualifying features of European sites in the Thames RBD

THAMES				RBMP MEASURES for RBD	Physical modifications (to improve habitats)						Managing pollution from waste water				Manage pollution from towns, cities and transport			Changes to natural flow and levels of water				Managing invasive non-native species				Manage pollution from rural areas			Manage pollution from mines	
				Measure type	Removal or easement of barriers to fish migration	Removal or modification of engineering structure	Improvement to condition of channel/bed and/or banks/shoreline	Improvement to condition of riparian zone and/or wetland habitats	Change to operations and maintenance	Vegetation management	Reduce diffuse source pollution at source	Reduce point source pathways (i.e. control entry to water environment)	Mitigate/Remediate point source impacts on receptor	Reduce point source pollution at source	Reduce diffuse pollution at source	Reduce diffuse pollution pathways (i.e. control entry to water environment)	Mitigate/Remediate diffuse pollution impacts on receptor	Use alternative source/relocate abstraction or discharge	Water Demand Management	Control pattern/timing of abstraction	Improvement to condition of channel/bed and/or banks/shoreline	Prevent introduction	Early detection, monitoring and rapid response (to reduce the risk of	Mitigation, control and eradication (to reduce extent)	Building awareness and understanding (to slow the spread)	Reduce diffuse pollution at source	Reduce diffuse pollution pathways (i.e. control entry to water environment)	Mitigate/Remediate diffuse pollution impacts on receptor	Mitigate/Remediate point source impacts on receptor	
		No of impacts (hazards) from measures on qualifying features	water dependent features Y/N	no. of occurences of the feature within RBD	33	26	35	33	16	18	14	27	24	17	4	25	9	2	9	10	10	2	4	18	9	30	0	11	0	No of Ops Ctchmt
No. Of EUROPEAN SITES in RBD (50)					87%	68%	92%	87%	42%	47%	37%	71%	63%	45%	11%	66%	24%	5%	24%	26%	26%	5%	11%	47%	24%	79%	0%	29%	0%	%of all Ops Ctchmt
		Qualifying features																												
SAC (30)	Ramsar (8)	1.1 Fens and wet habitats not acidification sensitive*	Y	12	9	9	8	8	5	2	3	3	3		3	3	4	5	2	2	8		2	2		3	3	4	3	
		1.2 Bogs and wet habitats, acidification sensitive*	Y	14	6	6	6	6	5	2	3	3	3		3	3	3	5	2	2	6		2	2		3	3	3	3	
		1.3 Riverine habitats	Y	9	10	10	9	9	6	2	3	3	3		3	3	4	5	2	2	9		2	2		3	3	4	3	
		1.4 Standing Waters acidification sensitive*	Y	8	7	7	7	7	4	1	2	2	2		2	1	3	4	2	2	7		1	1		2	1	3	2	
		1.5 Standing waters not acidification sensitive*	Y	9	9	9	8	8	5	1	2	2	2		2	1	3	4	2	2	8		1	1		2	1	3	2	
		1.6 Dry woodlands*	N	19	3	3	2	2	2	1	2	2	2		2	2	2	2	0	0	2		1	1		2	2	2	2	
		1.7 Dry Grassland*	N	16	3	3	2	2	2	1	2	2	2		2	1	2	2	0	0	2		1	1		2	1	2	2	
		1.8 Dry heathland habitats*	N	16	2	2	2	2	2	1	2	2	2		2	1	2	2	0	0	2		1	1		2	1	2	2	
		1.9 Upland*	N	0	4	4	4	4	4	2	3	3	3		3	3	3	4	1	1	4		2	2		3	3	3	3	
		1.10 Coastal habitats*	N	9	6	6	5	5	4	2	3	3	3		3	2	3	3	0	0	5		2	2		3	2	3	3	
		1.11 Coastal habitats sensitive to abstraction*	Y	8	6	6	6	6	3	1	2	2	2		2	2	3	3	1	1	6		1	1		2	2	3	2	
		1.12 Estuarine and intertidal habitats	Y	9	8	8	8	8	5	2	3	3	3		3	2	4	5	2	2	8		2	2		3	2	4	3	
		1.13 Submerged marine habitats	Y	10	5	5	5	5	2	1	1	1	1		1	1	2	2	1	1	5		1	1		1	1	2	1	
		2.1 Vascular plants of aquatic habitats	Y	8	7	7	7	7	4	1	2	2	2		2	1	3	4	2	2	7		1	1		2	1	3	2	
		2.2 Vascular plants, lower plants and invertebrates, wet hal	Y	10	7	7	6	6	4	1	2	2	2		2	2	3	4	2	2	6		1	1		2	2	3	2	
		2.3 Vascular plants, grassland	N	3	3	3	3	3	2	1	2	2	2		2	1	2	2	0	0	3		1	1		2	1	2	2	
		2.4 * Liverworts – Western rustwort	Y	8	3	3	3	3	3	1	2	2	2		2	1	2	3	1	1	3		1	1		2	1	2	2	
		2.5 Anadromous fish	Y	8	10	10	10	10	6	2	3	3	3		3	2	4	5	2	2	10		2	2		3	2	4	3	
		2.6 Non-migratory fish and invertebrates of rivers	Y	9	9	9	10	10	6	2	3	3	3		3	2	4	5	2	2	10		2	2		3	2	4	3	
		2.7 Invertebrates of wooded habitats	N	5	2	2	2	2	2	1	2	2	2		2	1	2	2	0	0	2		1	1		2	1	2	2	
		2.8 Mammals wooded habitats	N	1	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3	
		2.9 Mammals of riverine habitats	Y	8	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3	
		2.10 Amphibia	Y	12	8	8	8	8	5	2	3	3	3		3	3	4	5	2	2	8		2	2		3	3	4	3	
		2.11 Coastal plants	N	0	5	5	5	5	4	1	2	2	2		2	2	2	4	2	2	5		1	1		2	2	2	2	
		2.12 Marine mammals	Y	8	4	4	5	5	2	2	2	2	2		2	2	3	2	0	0	5		2	2		2	2	3	2	
SPA (12)		3.1 Birds of uplands	N	9	5	5	5	5	4	2	3	3	3		3	3	3	4	1	1	5		2	2		3	3	3	3	
		3.2 Birds of woodland & scrub	N	6	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3	
		3.3 Birds of lowland heaths & brecks	N	13	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3	
		3.4 Birds of lowland wet grassland	Y	11	7	7	7	7	6	2	3	3	3		3	3	3	5	2	2	7		2	2		3	3	3	3	
		3.5 Birds of lowland dry grassland	N	4	3	3	3	3	3	2	3	3	3		3	2	3	3	0	0	3		2	2		3	2	3	3	
		3.6 Birds of lowland freshwaters & their margins	Y	14	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3	
		3.7 Farmland Birds	N	10	4	4	4	4	4	2	3	3	3		3	3	3	4	1	1	4		2	2		3	3	3	3	
		3.8 Birds of coastal habitats	Y	12	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3	
		3.9 Birds of estuarine habitats	Y	14	9	9	10	10	6	2	3	3	3		3	3	4	5	2	2	10		2	2		3	3	4	3	
		3.10 Birds of open sea and offshore rocks	Y	9	3	3	4	4	3	2	3	3	3		3	2	3	3	0	0	4		2	2		3	2	3	3	

Colour coding used to indicate risk, assuming higher risk is associated with a higher number of hazards.

1 = 1 hazard / qualifying feature sensitivity

10 = 10 hazard / qualifying feature sensitivities

Table A2 - Potential Hazards arising from Measures proposed within the Thames RBMP

	Type of Hazard																					
RBMP Measure	Acidification	Change in water levels or table	Changed water chemistry	Changes in flow or velocity regime	Changes in physical regime	Competition from non-native species	Disturbance (noise or visual)	Entrapment	Habitat loss	Killing/injury or removal of fish or other animals	Nutrient enrichment	PH	Physical damage	Predation	Reduced dilution capacity	Salinity	Siltation	Smothering	Surface water flooding changes	Thermal regime changes	Toxic Contamination	Turbidity
Managing pollution from waste water																						
Reduce diffuse pollution at source							✓		✓				✓									
Reduce point source pathways (i.e. control entry to water environment)							✓		✓				✓									
Mitigate/Remediate point source impacts on receptor							✓		✓				✓									
Reduce point source pollution at source																						
Manage pollution from towns, cities and transport																						
Reduce diffuse pollution pathways (i.e. control entry to water environment)							✓						✓						✓			
Mitigate/Remediate diffuse pollution impacts on receptor							✓		✓				✓									✓
Manage pollution from rural areas																						
Reduce diffuse pollution at source							✓		✓				✓									
Mitigate/Remediate diffuse pollution impacts on receptor							✓		✓				✓									✓
Improve the natural flow and level of water																						
Use alternative source/relocate abstraction or discharge		✓		✓			✓		✓				✓									
Control pattern/timing of abstraction		✓		✓																		
To improve modified habitat																						
Removal or easement of barriers to fish migration		✓		✓	✓	✓	✓		✓				✓			✓	✓					✓
Removal or modification of engineering structure		✓		✓	✓	✓	✓		✓				✓			✓	✓					✓
Improvement to condition of channel/bed and/or banks/shoreline		✓		✓	✓		✓		✓	✓			✓			✓	✓					✓
Improvement to condition of riparian zone and/or wetland habitats		✓		✓	✓		✓		✓	✓			✓			✓	✓					✓
Change to operations and maintenance		✓		✓	✓		✓		✓				✓									
Vegetation management							✓						✓									
To control or manage non native invasive/alien species																						
Prevent introduction																						
Early detection, monitoring and rapid response (to reduce the risk of establishment)							✓						✓									
Mitigation, control and eradication (to reduce extent)							✓						✓									
Building awareness and understanding (to slow the spread)																						
SCOPED OUT MEASURE OR HAZARD																						

Table A3 – European site features against Hazards for the Thames RBD

	Hazard Types																					
European site features (grouped) in the Thames RBD	Acidification	Change in water levels or table	Changed water chemistry	Changes in flow or velocity regime	Changes in physical regime	Competition from non-native species	Disturbance (noise or visual)	Entrapment	Habitat loss	Killing/injury or removal of fish or other animals	Nutrient enrichment	PH	Physical damage	Predation	Reduced dilution capacity	Salinity	Siltation	Smothering	Surface water flooding changes	Thermal regime changes	Toxic contamination	Turbidity
1.1 Fens and wet habitats not acidification sensitive		■	■	■		■	■		■		■	■	■		■							■
1.2 Bogs and wet habitats, acidification sensitive	■	■	■	■			■		■		■	■	■		■		■					
1.3 Riverine habitats	■	■	■	■	■	■	■	■	■		■	■	■		■	■	■			■	■	■
1.4 Standing Waters acidification sensitive	■	■	■	■					■		■	■	■		■	■	■			■	■	■
1.5 Standing waters not acidification sensitive		■	■	■					■		■		■		■	■	■			■	■	■
1.6 Dry woodlands	■					■			■		■		■					■	■		■	
1.7 Dry Grassland						■			■		■		■					■			■	
1.8 Dry heathland habitats	■								■		■	■	■					■			■	
1.10 Coastal habitats					■	■	■	■	■		■		■			■		■			■	
1.11 Coastal habitats sensitive to abstraction		■	■						■		■	■	■		■	■	■	■	■		■	■
1.12 Estuarine and intertidal habitats		■	■	■			■		■		■		■		■	■	■	■		■	■	■
1.13 Submerged marine habitats			■	■							■		■		■	■	■			■	■	■
2.1 Vascular plants of aquatic habitats	■	■	■	■					■		■		■		■	■	■			■	■	■
2.2 Vascular plants, lower plants and invertebrates, wet habitats	■	■	■	■		■			■		■		■		■						■	■
2.3 Vascular plants, grassland	■								■		■		■				■	■			■	
2.4 Mosses and Liverworts	■	■							■		■		■					■			■	
2.5 Anadromous fish	■	■	■	■	■	■	■	■	■	■	■		■		■	■	■			■	■	■
2.6 Non-migratory fish and invertebrates of rivers	■	■	■	■	■		■	■	■	■	■		■		■	■	■			■	■	■
2.7 Invertebrates of wooded habitats									■				■					■			■	
2.8 Mammals of wooded habitats	■						■		■		■		■					■			■	
2.9 Mammals of riverine habitats	■	■	■	■	■		■	■	■		■		■		■	■	■			■	■	■
2.10 Amphibia	■	■	■	■			■		■		■		■			■	■	■		■	■	■
2.12 Marine mammals							■				■				■	■	■	■		■	■	■
3.1 Birds of uplands	■	■	■				■		■		■		■	■	■	■	■	■	■	■	■	■
3.2 Birds of woodland & scrub	■						■		■		■		■	■	■	■	■	■	■	■	■	■
3.3 Birds of of lowland heaths & brecks	■						■		■		■		■	■	■	■	■	■	■	■	■	■
3.4 Birds of lowland wet grassland		■	■	■	■	■	■		■		■		■	■	■	■	■		■	■	■	■
3.5 Birds of of lowland dry grassland						■	■		■		■		■	■	■	■	■	■	■	■	■	■
3.6 Birds of lowland freshwaters & their margins	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■
3.7 Farmland Birds		■					■		■		■		■	■	■	■	■	■		■	■	■
3.8 Birds of coastal habitats		■		■	■		■	■	■	■	■		■	■	■	■	■	■	■	■	■	■
3.9 Birds of estuarine habitats		■		■	■		■	■	■	■	■		■	■	■	■	■	■	■	■	■	■
3.10 Birds of open sea and offshore rocks							■	■	■	■			■		■						■	

The top row in the table represents hazard types; the table relates these to habitats or species in a group that may be significantly affected, with shaded squares in the table indicating that one or more of the habitats or species in a group may be affected by that hazard.

Appendix 2 – Project level control and mitigation for SWMI required measures

Measure Type	Potential hazards*	Legal/consenting processes	Specific mitigation/mitigation approaches for implementation of measures
Physical modifications (to improve habitats)	• Change in water levels or table • Changes in flow or velocity regime • Changes in physical regime • Competition from non-native species • Disturbance (noise or visual) • Habitat loss • Killing/injury or removal of fish or other animals • Physical damage • Salinity • Siltation • Turbidity.	• Planning permission from local planning authority under the Town & Country Planning Act. • The Town and Country Planning (General Permitted Development) Order 1995 (as amended). • Flood Defence Consent from the Environment Agency for work on or near a main river, flood or sea defences (Water Resources Act 1991, Flood and Water Management Act 2010). • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. • Ordinary Watercourse Consent from either lead local flood authority or Internal Drainage Board (IDB) for work on or near all other watercourses that aren't main rivers. • Marine Licence from the Marine Management Organisation (MMO) for works below the mean high water spring tidal limit. • For each of the above consenting processes, there is a requirement for HRA where designated European sites are potentially affected.	• Consideration of existing habitats and use, and appropriate survey as necessary. Appraisal of projects for potential impacts on European sites, supported by appropriate levels of survey, investigation and impact assessment. • Avoidance of working on, or in proximity to sensitive habitats, wherever possible. • Use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities. • Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected). • Seek early advice and approval from Natural England where works in proximity to designated European sites, including scope of HRA/appraisal required, any supporting survey if necessary, building of mitigation in to the design, sensitive timings and construction methods of working. • Consider location and extent of activity, sensitive timing and methods of construction to minimise effects on designated habitats and species. • Seek assent from Natural England in advance of works within or affecting SSSIs (which underpin European sites). • Consider potential functioning role of habitat improvements in relation to relevant qualifying features of European sites in proximity/potentially affected, to avoid conflict and, where appropriate, incorporate habitat improvements complementary to site conservation objectives. • Appropriate methods of working including pollution prevention and control measures. • Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, pressures and threats and site features affected, particularly those related to physical modification; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project/activity may help co-deliver any of the remedial measures/actions identified in the SIP/s.

Measure Type	Potential hazards*	Legal/consenting processes	Specific mitigation/mitigation approaches for implementation of measures
Managing pollution from waste water	• Disturbance (noise or visual) • Habitat loss • Physical damage.	• Planning permission from local planning authority under the Town & Country Planning Act. • The Town and Country Planning (General Permitted Development) Order 1995 (as amended). • Water Resources Act 1991. • Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010.	• Consider appropriate methods of working including pollution prevention and control measures. • Avoidance of working on, or in proximity to sensitive habitats, wherever possible. • Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected). • Use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities. • Seek early advice and approval from Natural England (assent from Natural England in advance of works within or affecting SSSIs) where works in proximity to designated European sites, including scope of HRA/appraisal required, any supporting survey if necessary, building of mitigation in to the design, sensitive timings and construction methods of working. • Review the relevant Site Improvement Plan/s for European Site/s potentially affected; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project/activity may help co-deliver any of the water quality related remedial measures/actions identified in the SIP.
Manage pollution from towns, cities and transport	• Disturbance (noise or visual) • Habitat loss • Physical damage • Surface water flooding changes • Turbidity.	• Planning permission from local planning authority under the Town & Country Planning Act. • The Town and Country Planning (General Permitted Development) Order 1995 (as amended). • Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010.	• Guidance within ‘Port development and dredging in Natura 2000 estuaries and coastal zones’ (European Commission guidance). • Guidance within ‘Design Manual for Roads and Bridges’, volume 11 environmental assessment, section 4. • Consider appropriate methods of working including pollution prevention and control measures. • Avoidance of working on, or in proximity to sensitive habitats, wherever possible. • Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected). • Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, pressures and threats related to water quality, and site features affected; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project/activity may help co-deliver any of the water quality related measures/actions proposed in the SIP to remedy these issues.

Measure Type	Potential hazards*	Legal/consenting processes	Specific mitigation/mitigation approaches for implementation of measures
Changes to natural flow and levels of water	• Change in water levels or table • Changes in flow or velocity regime • Changes in physical regime • Disturbance (noise or visual) • Habitat loss • Killing/injury or removal of fish or other animals • Physical damage • Salinity • Siltation • Turbidity.	• Flood Defence Consent from the Environment Agency for work on or near a main river, flood or sea defences. • Ordinary Watercourse Consent from either lead local flood authority or Internal Drainage Board (IDB) for work on or near all other watercourses that aren't main rivers. • Marine Licence from the Marine Management Organisation (MMO) for works below the mean high water spring tidal limit. • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. • Abstraction licence from the Environment Agency (Water Resources Act 1991 (as amended by Water Act 2003), Environment Act 1995, Water Resources (Abstraction and Impounding) Regulations 2006).. • Impoundment licence from the Environment Agency (as for abstraction licence). • Drought Permits and Orders (Water Resources Act 1991, Environment Act 1995). • Environmental Permit under the Environmental Permitting Regulations (England and Wales) 2010.	• Consideration of existing site qualifying features - habitats and species potentially affected, and their sensitivity to changes in water levels or water table, changes in flow or velocity regime and subsequent potential changes in geomorphology/physical regime. • Consider use of screening to minimise visual and noise disturbance to sensitive species from construction plant, workers and activities. • Consider appropriate methods of working including pollution prevention and control measures. • Timing of works to avoid ecologically sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected). • Timing of abstractions/flow changes to avoid ecologically sensitive periods for water dependent European sites and features; optimise proposed changes to target relevant qualifying features, particularly those identified in SIPs where water levels/flows identified as the priority pressures/threats. • Consider potential secondary water quality effects to changes to flow/water levels, such as potential WQ changes, increased/decreased siltation/turbidity, and sensitivity of features to changes, to inform appraisal of projects and influence their design, if appropriate. • Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, pressures and threats related to water quality/quantity, physical regime and site features affected; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the project/activity may help co-deliver any of the measures/actions proposed in the SIP to remedy these issues.
Managing invasive non-native species	• Disturbance (noise or visual) • Physical damage.	• Operations affecting SSSI's require assent from Natural England (Wildlife and Countryside Act 1981). • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999. • The Wildlife and Countryside Act 1981. • Environmental Protection Act 1990. • The Salmon and Freshwater Fisheries Act 1975.	• Timing of management activity to avoid sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected). • Appropriate methods and monitoring to reduce risk of unintentional spread of invasive non-native species, during management/control activities. • Seek early advice/approval from Natural England (assent in advance of works within/affecting SSSIs) where management activities planned in proximity to designated European sites, including sensitive timings and methods of management.

Measure Type	Potential hazards*	Legal/consenting processes	Specific mitigation/mitigation approaches for implementation of measures
			• Consider location and extent of management activity, sensitive timing and methods of management to minimise effects on designated habitats and species. • Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, particularly any related to invasive non-native species; consider whether any proposed actions or methods of working may exacerbate these issues, and whether the management activity can help co-deliver any of the measures/actions proposed in the SIP to remedy these issues.
Manage pollution from rural areas	• Disturbance (noise or visual) • Habitat loss • Physical damage • Surface water flooding changes • Turbidity.	• Operations affecting SSSI's require assent from Natural England (Wildlife and Countryside Act 1981). • Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999.	• Consider guidance contained within 'Farming for Natura 2000' - Guidance on how to support Natura 2000 farming systems to achieve conservation objectives (European Commission 2014). • Consider timing of management activity to avoid sensitive periods, such as breeding or migratory passage periods (may vary depending on the European sites and qualifying features affected). • Any changes to land management practices to address diffuse pollution in rural areas within or affecting SSSIs (which underpin European Site designations) should involve consultation with Natural England to ensure no potential for adverse effects, checked against the list of operations likely to damage the SSSI and inform changes to SSSI management agreements, where appropriate. • Review the relevant Site Improvement Plan/s for European Site/s potentially affected to establish priority issues, particularly any related to water quality/diffuse pollution; consider whether any proposed actions or methods of working may exacerbate these issues, or whether the management activity can help co-deliver any of the measures/actions proposed in the SIP to remedy these issues.

* Hazards are based on those used in Environment Agency's Habitats Directive Handbook; further detailed description is provided in Appendix 3.

Appendix 3 - Descriptions of Hazards used within the HRA*

Acidification
Could the action lead to activities that result in releases of sulphur dioxide, oxides of nitrogen and ammonia that cause acidification?
Change in water levels or table
Could the action lead to changes in the water levels or water table?
Changed water chemistry
Could the action lead to significant changes in water chemistry (BOD, COD, organic and inorganic pollutants) in the short and long term?
Changes in flow or velocity regime
Could the action lead to changes in the flow or velocity regime of a water body? Could the action lead to greater river or tidal flows under normal or extreme events?
Changes in physical regime
Could the action alter physical processes that will alter the present characteristics of a site – e.g. coastal processes, fluvial and geomorphologic processes, erosion processes? This includes the pattern of sediment movement, erosion and deposition, bathymetry and hydrodynamic processes, which can result in direct loss of habitat and indirect effects on dependent species and habitats. Such changes can be caused by dredging activities or from construction activities.
Competition from non-native species
Could the action result in increased competition from non-native species? The introduction of non-native animals and plants may have a range of effects, from undetectable to changes in a community composition to the complete loss of native communities. The effects are highly unpredictable, but can be very serious.
Disturbance (noise or visual)
Could the action lead to increased noise or visual disturbance at the European site from direct or indirect, continuous or intermittent effects? Disturbance from construction, operational activities, recreation, land management activities etc may cause sensitive birds and mammals to deviate from their normal, preferred behaviour. It is difficult to make generalisations about the likely effects of disturbance because a wide range of factors are involved and different species react differently. It is likely that the effects will depend on the type and timing of disturbance and the proximity of the sources to the sensitive populations.
Entrapment
Could the action lead to impingement or entrapment of fish or other species.
Habitat loss
Could the action lead to new structures whose footprint will impinge on the European site? Could the action lead to land use change that will impinge on the European site? Could the action lead to ongoing processes which will exacerbate habitat loss (e.g. coastal squeeze)?
Killing/injury or removal of fish or other animals
Could the action cause the killing/injury or removal of fish or other animals?
Nutrient enrichment
Could the action lead to nutrient enrichment? An addition of nutrients can lead to changes in vegetation, directly affecting protected habitats and species of flora, or protected species dependent upon the vegetation.
pH
Could the action lead to changes in pH of a water body?

Physical damage
Could the action lead to temporary works of such a nature that will cause long-term damage to the existing habitat? Could the action lead to recurring operations and maintenance that will lead to disturbance?
Predation
Could the action encourage predators?
Reduced dilution capacity
Could the action lead to reduced dilution capacity of a water body?
Salinity
Could the action lead to a change in the salinity of a water body or other habitat? Changes in salinity of the water may affect the toxicity of other substances. It may also have a direct effect on the distribution of species across the site and the composition of biological communities. Change is of concern in coastal or estuarine waters where the zone of transition from freshwater to brackish or saltwater may be critical to the interest feature.
Siltation
Could the action lead to increased physical damage caused by the deposit of suspended solids from water? Siltation can cover food for birds and kill macro-invertebrates or render them inaccessible. It may also affect the feeding behaviour of birds and other animals that detect prey by sight. An increase in suspended sediment can affect filter-feeding organisms, through clogging and damage to feeding and breathing equipment. Young fish can also be damaged if sediment becomes trapped in the gills. Fine sediments can smother the gravel beds used by salmon for spawning.
Smothering
Could the action lead to physical damage caused by the deposit of solid material from the air?
Surface water flooding changes
Could the plan lead to a significant reduction or increase in the frequency of surface water flooding (fluvial, pluvial and tidal)? Consideration should be given to the potential to flood throughout the year, to greater depths, reduced frequency may lead to drying out or changes to sediment supply etc; and supply of water to seasonally ephemeral water bodies.
Thermal regime changes
Could the plan lead to a mean temperature change of more than 0.2°C in a water body?
Toxic contamination
Could the action lead to releases of substances that could be harmful to flora and fauna?
Turbidity
Could the plan lead to an increase in suspended sediments? Increased turbidity associated with suspended solids results in reduced light penetration, which may affect photosynthesis. This may affect invertebrates directly and species higher up the food chain indirectly e.g. birds. Turbidity can be a direct effect of activities such as agitation dredging or over-pumping, or an indirect effect e.g. through the removal of vegetation protecting a bed or bank.

* The hazards and their descriptions that have been used in the HRA are based on those used in Environment Agency's Habitats Directive Handbook.

Appendix 4 – European sites within the Thames RBD

Site ID	Name of Site	SPA, SAC, Ramsar	Area (ha)*
UK9012181	Ashdown Forest	SPA	3207
UK0030080	Ashdown Forest [#]	SAC	2729
UK0030082	Aston Rowant	SAC	126
UK11006	Benfleet and Southend Marshes	Ramsar	2284
UK9009171	Benfleet and Southend Marshes [#]	SPA	2284
UK0013697	Blean Complex	SAC	523
UK0030034	Burnham Beeches	SAC	384
UK0012724	Chilterns Beechwoods	SAC	1286
UK9012131	Common's (Wealden Heaths Phase 1)	SPA	1880
UK0012889	Cothill Fen [#]	SAC	43
UK0012723	East Hampshire Hangers	SAC	572
UK0012720	Epping Forest	SAC	1631
UK0013690	Essex Estuaries [#]	SAC	46110
UK11026	Foulness (Mid-Essex Coast Phase 5)	Ramsar	10942
UK9009246	Foulness (Mid-Essex Coast Phase 5) [#]	SPA	10942
UK0030162	Hackpen Hill	SAC	36
UK0030164	Hartslock Wood	SAC	34
UK0030044	Kennet and Lambourn Floodplain [#]	SAC	115
UK0030175	Kennet Valley Alderwoods [#]	SAC	58
UK11034	Lee Valley	Ramsar	451
UK9012111	Lee Valley [#]	SPA	451
UK0030184	Little Wittenham [#]	SAC	69
UK0030371	Margate and Long Sands	cSAC	64914
UK9012031	Medway Estuary [#]	SPA	4686
UK11040	Medway Estuary and Marshes	Ramsar	4698
UK0012804	Mole Gap to Reigate Escarpment	SAC	892
UK0030225	North Downs Woodlands [#]	SAC	289
UK0016372	North Meadow and Clattinger Farm [#]	SAC	105
UK9020309	Outer Thames Estuary [#]	SPA	397268
UK0012845	Oxford Meadows [#]	SAC	267
UK0030237	Peter's Pit	SAC	29
UK0012552	Pewsey Downs	SAC	154
UK0012833	Queendown Warren	SAC	14
UK0030246	Richmond Park [#]	SAC	847
UK0030257	River Lambourn [#]	SAC	29
UK0030375	Shortheath Common [#]	SAC	59
UK11065	South West London Waterbodies	Ramsar	830
UK9012171	South West London Waterbodies [#]	SPA	830
UK9012141	Thames Basin Heaths	SPA	8311
UK11069	Thames Estuary and Marshes	Ramsar	5589
UK9012021	Thames Estuary and Marshes [#]	SPA	4802
UK11071	The Swale	Ramsar	6515
UK9012011	The Swale [#]	SPA	6515
UK11074	Thursley and Ockley Bog	Ramsar	265
UK0012793	Thursley, Ash, Pirbright and Chobham	SAC	5154
UK9012132	Wealden Heaths Phase 2	SPA	2057
UK0030301	Wimbledon Common	SAC	351
UK0012586	Windsor Forest and Great Park [#]	SAC	1686
UK0030304	Woolmer Forest	SAC	670
UK0013696	Wormley Hoddesdonpark Woods	SAC	336

[#] *Denotes if the site is a WFD: Natura 2000 protected area site.*

**Area denoted is for the entire designated area rather than the area within the RBD boundary*.

Would you like to find out more about us or about your environment?

Then call us on
03708 506 506 (Monday to Friday, 8am to 6pm)

email
enquiries@environment-agency.gov.uk

or visit our website
www.gov.uk/environment-agency

incident hotline 0800 807060 (24 hours)
floodline 0345 988 1188 (24 hours)

Find out about call charges: www.gov.uk/call-charges

Environment first: Are you viewing this on screen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don't forget to reuse and recycle if possible.