

Appendix K
Water Framework Directive Assessment
Essex and South Suffolk SMP2

Environment Agency

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Final Report
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Glossary update

AA	Appropriate Assessment
AtL	Advance the Line
AWB	Artificial Water Body
BQE	Biological Quality Element (s)
CFMP	Catchment Flood Management Plan
EU	European Union
FWB	Freshwater Body
GWB	Groundwater Body
HMWB	Heavily Modified Water Body
cHMWB	Candidate Heavily Modified Water Body
HtL	Hold the Line
MU	Management Unit
MR1	Managed Realignment (Allow local and limited intervention)
MR2	Managed Realignment (Breach of frontline defence after building landward defence)
NAI	No Active Intervention
RBD	River Basin District
PDZ	Policy Development Zone
RBMP	River Basin Management Plan
ROPI	Reasons of Overriding Public Interest
SMP2	Shoreline Management Plan (second version)
SPZ	Source Protection Zone
WFD	Water Framework Directive
TraC water bodies	Transitional and Coastal Water Bodies
WPM	With Present Management

1 INTRODUCTION

1.1 Purpose of Report

The Water Framework Directive (WFD; referred to in this report as the Directive) came into force in 2000 and is the most substantial piece of European Union (EU) water legislation to date. The Directive will need to be taken into account in the planning of all new activities in the water environment. Therefore, the Environment Agency (the competent authority in England and Wales responsible for delivering the Directive) has recommended that decisions setting policy, including large-scale plans such as Shoreline Management Plans (SMPs), take account of the requirements of the Directive.

This assessment has been undertaken according to the *Assessing Shoreline Management Plans against the Requirements of the Water Framework Directive*, which was recently developed for the Environment Agency (Environment Agency, 2009). The guidance describes the methodology for assessing the potential hydromorphological change and consequent ecological impact of SMP2 policies and ensuring that SMP2 policy setting takes account of the Directive.

1.2 Background

The EU Water Framework Directive was transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The requirements of the Directive need to be considered at all stages of the river and coastal planning and development process. For the purposes of large-scale plans, such as SMPs, the consideration of the requirements of the Directive when setting and selecting policies must be necessarily high level but set the framework for future delivery of smaller-scale strategies or schemes.

The Directive requires that Environmental Objectives be set for all surface and ground waters in each EU Member State. The default Environmental Objectives of relevance to the SMP2 are shown in **Table 1.1**.

Specific mitigation measures are set for each River Basin District (RBD) to achieve the Environmental Objectives of the Directive. These measures are to mitigate impacts that have been or are being caused by human activity, such as flood and coastal defence works. In other words, measures to enhance and restore the quality of the existing environment. These mitigation measures will be delivered through the River Basin Management Plan (RBMP) process and listed in a Programme of Measures within the RBMP. The RBMPs were finalised in December 2009.

The Essex and South Suffolk SMP2 Area falls within two RBDs; Anglian RBD and Thames RBD. Most of the SMP2 area lies within the Combined Essex catchment of the Anglian RBD, with the Orwell Transitional waterbody occurring in the East Suffolk catchment of the Anglian RBD and the Thames Lower Transitional in the South Essex catchment of the Thames RBD.

Table 1.1 Environmental Objectives in the Directive

Objectives (taken from Article 4 of the Directive)	Reference
Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water.	4.1(a)(i)
Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015.	4.1(a)(ii)
Member States shall protect and enhance all artificial and heavily modified Bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015.	4.1(a)(iii)
Progressively reduce pollution from priority substances and cease or phasing out emissions, discharges and losses of priority hazardous substances.	4.1(a)(iv)
Prevent Deterioration in Status and prevent or limit input of pollutants to groundwater	4.1(b)(i)

Source: Environment Agency (2009)

1.2.1 Preventing deterioration in Ecological Status or Potential

As stated in **Table 1.1**, a default Objective in all water bodies is to prevent deterioration in either the Ecological Status or, for Heavily Modified Water Bodies (HMWBs) or Artificial Water Bodies (AWBs), the Ecological Potential of the water body. Any activity which has the potential to have an impact on ecology (as defined by the biological, physico-chemical and hydromorphological Quality Elements listed in Annex V of the Directive) will need consideration in terms of whether it could cause deterioration in the Ecological Status or Potential of a water body. It is necessary therefore to consider the possible changes associated with each SMP2 policy for each water body within the SMP2 area so that a decision making audit is available should any later failure to meet the Environmental Objectives need to be defended and issues for consideration when implementing policy are highlighted.

1.2.2 Achieving objectives for EU protected sites

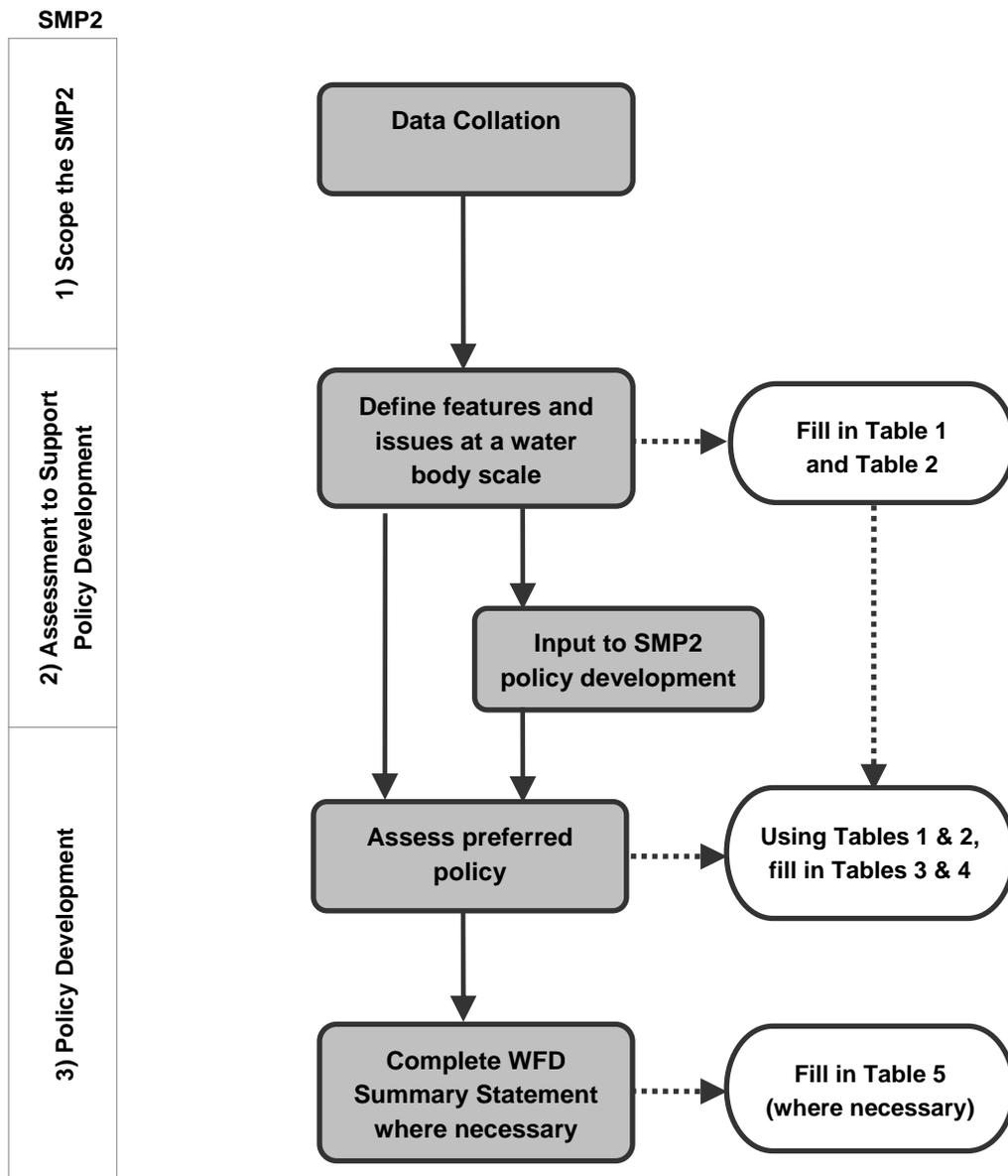
Where water bodies overlap with sites protected under EU legislation (e.g. the Birds or Habitats Directives, Shellfish Waters Directive), the Directive aims for compliance with existing standards or objectives for these sites. Therefore, where a site which is water-dependent in some way is protected via designation under another EU Directive and the Good Ecological Status (GES) or Good Ecological Potential (GEP) objectives set under the Water Framework Directive would be insufficient to meet the objectives of the other relevant environmental Directive, the more stringent targets would apply (i.e. the precautionary principle).

2

ASSESSMENT METHODOLOGY

The methodology devised for this assessment follows the Guidance for the assessment of SMPs under the Directive, which has been developed by the Environment Agency. The process has been broken down into a series of clearly defined steps, broadly following the tasks and activities described within the Defra guidance on producing SMPs, to provide a transparent and accountable assessment of the SMP2 policies (Defra, 2006). The WFD assessment process for SMPs is shown in **Figure 2.1** and these steps are described in detail in the sections below.

Figure 2.1 Water Framework Directive assessment process for SMPs



Source: Environment Agency (2009)

2.1 Scoping the SMP2 – Data Collation

All the Transitional and Coastal (TraC) water bodies present within the Essex and South Suffolk SMP2 area were identified and their ID numbers, designation and classification details obtained from the Environment Agency.

The generic Environmental Objectives set out below (based on Article 4.1 of the Directive and as described in **Table 1.1**) have been used for the assessment of the SMP2 in relation to the Directive.

- WFD1: No changes affecting high status sites.
- WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential.
- WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies.
- WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration of groundwater status.

The specific objectives for the water bodies within the Essex and South Suffolk SMP2 area were also identified from the Anglian and Thames RBMPs, which were obtained from the Environment Agency's website¹.

The Environment Agency web-based 'Flood Map'² was used to assess whether there are any landward freshwater bodies (FWBs) that have the potential to be influenced by SMP2 policies and should, therefore, be covered within this assessment. The names, ID numbers, designation and classification details for any such freshwater bodies were obtained from the Environment Agency.

Groundwater bodies (GWBs) that could potentially be impacted by SMP2 policies were also identified by reviewing the WFD compliance mapping for groundwater risk (known as River Basin Characterisation 2 (RBC2) and status assessment). Using the RBC2 mapping and the WFD status maps for saline intrusion obtained from the Environment Agency, the GWBs designated as being 'at risk', 'probably at risk' or at 'Poor Status' within the SMP2 area were identified. The locations of groundwater abstractions with Source Protection Zones (SPZs) within the SMP2 area were also obtained from the Environment Agency's website.

Any discrepancies between water body boundaries and SMP2 boundaries were examined and any locations where changes of the SMP2 boundary would be recommended to attain consistency with water body boundaries were identified. It was also determined at this stage whether there were any additional investigations that could be recommended for the next round of SMPs to inform the WFD assessment, such as studies to address the zone of influence in terms of Biological Quality Elements (BQE).

¹ The RBMPs are available at <http://www.environment-agency.gov.uk/research/planning/33106.aspx>

² The Environment Agency's Flood Map is available at http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&lang=_e&textonly=off&topic=floodmap

2.2 Description of the Essex and South Suffolk SMP2 Area

The Essex and South Suffolk SMP2 Area frontage has been split into ten Management Units (MU) as follows:

- MU A Stour and Orwell;
- MU B Hamford Water;
- MU C Tendring;
- MU D Colne Estuary;
- MU E Mersea Island;
- MU F Blackwater;
- MU G Dengie peninsula;
- MU H Couch and Roach;
- MU I Foulness; and
- MU J Southend-on-Sea.

Within each MU the coast has been further sub-divided into a series of 'Policy Development Zones' (PDZs). It is at the PDZ level that policies have been set.

2.3 Defining Features and Issues

For each MU the SMP2 report provides summaries of the preferred SMP2 policy and describes how this changes from the present management; these were used to identify how the SMP2 policies could affect the WFD features (i.e. BQE of each water body). The physical parameters that could potentially be affected by SMP2 policies and, where relevant, the BQEs present within each water body, were identified and are illustrated in **Assessment Table 1**.

The assessment is structured to focus on the water body within which the SMP2 policy sits (typically a TraC water body). Impacts on other water bodies (including inland freshwater bodies) are considered within the discussion of Objective WFD3, and impacts on groundwater bodies are discussed within Objective WFD4, i.e. additional water bodies that may be affected are not separately presented within Assessment Table 1, but are discussed in the context of objectives WFD3 and WFD4.

The key features and issues identified in **Assessment Table 1** were then transferred into **Assessment Table 2** and the water body classification and Environmental Objectives set out in **Section 2.1** were used to populate the final column of **Assessment Table 2**.

2.4 Assessment of the SMP2 Policy against the Environmental Objectives

The assessment of SMP2 policies against the Environmental Objectives was supported by a tabulated account based on the adaptation of the Policy Summary tables for each PDZ within the SMP2 report. Using the information on the water body features and issues defined in **Assessment Tables 1** and **2**, the potential impacts of the SMP2 policy for each PDZ was assessed in relation to aspects of the Directive and recorded in **Assessment Table 3**. For each PDZ, the potential changes to the relevant physical and hydromorphological parameters that might occur as a result of the SMP2 policy were identified.

The impacts of climate change on baseline processes were also taken into account when assessing all epochs. The assessment of deterioration with respect to the

Directive considered the impact of any changes to the surface water body features (BQE) that were identified in **Assessment Table 2**.

The assessment of SMP2 policies also included consideration of the potential for impact upon the landward freshwater bodies identified during the data collation phase as having the potential to be influenced by SMP2 policies (refer to **Section 2.1**). Landward freshwater bodies could potentially be impacted where the SMP2 policy for a PDZ is No Active Intervention (NAI) or Managed Realignment (MR) 2 as these policy options could result in saline inundation of freshwater habitats and, hence, could potentially impact upon the freshwater biology.

In addition, the assessment of the SMP2 policies in **Assessment Table 3** also included consideration of the potential for impact upon GWBs. Particular attention was paid to PDZs where the SMP2 policy is NAI or MR2, as these policies could potentially result in the saltwater – freshwater interface moving landward, which, coupled with abstraction pressures, could result in saltwater intrusion and deterioration of the GWB. For these PDZs, the extent of groundwater abstractions was identified through the use of Zone 3 (total catchment of the groundwater abstraction) of the SPZ. Where Zone 3 of an abstraction was found to extend to the coastline, or where it extended to the long term (100 years) predicted shoreline, it was considered that an SMP2 policy could potentially cause deterioration in the quality of the abstraction due to saline intrusion. Consideration was also given to the potential for SMP2 policies to lead to deterioration in Status or Potential of the TraC water bodies as a result of groundwater pollution.

The outcomes of the assessment for each PDZ were then checked against the Environmental Objectives (as set out in **Section 2.1**). For each PDZ, it was recorded in **Assessment Table 3** whether the SMP2 policy has the potential to meet or contribute to the potential failure of the Environmental Objectives. Following the assessment of SMP2 policies for each PDZ, a summary of the achievement (or otherwise) of the Environmental Objectives was completed at the water body scale (**Assessment Table 4**).

Where it was identified that the Environmental Objectives would either not be met for one or more PDZ within a water body or that there would be potential for deterioration in a water body, then the need for a Water Framework Directive 'Summary Statement' was recorded in the final column of **Assessment Table 4**. The Summary Statements were then completed for each of those necessary water bodies in **Assessment Table 5**.

3 RESULTS

3.1 Scoping the SMP2 – Data Collation

3.1.1 Transitional and Coastal water bodies (TraC)

There are ten TraC water bodies within the Essex and South Suffolk SMP2 area (**Figures 3.1 to 3.8**). These include four coastal water bodies (Harwich Approaches, Essex Coast, Blackwater Outer, Thames Coastal North), and six transitional water bodies (Orwell, Stour, Hamford Water, Blackwater & Colne, Crouch, Thames Lower). The hydromorphological designation and Ecological Status / Potential for the water bodies are shown in **Table 3.1** below.

Table 3.1 Hydromorphological Designation and Ecological Status for TraC water bodies present in the Essex and South Suffolk SMP2 Area

Name of Water Body	Water body ID	Hydromorphological Designation	Reasons for Designation as HMWB	Current Overall Ecological Status / Potential	Ecological Status / Potential Objective
Coastal					
Harwich Approaches	GB650503190000	HMWB	Coastal Protection, Dredge Disposal, Navigation	Good	Good Potential by 2015
Essex	GB650503520001	HMWB	Coastal Protection, Flood Protection	Moderate	Good Potential by 2027
Blackwater Outer	GB650503200000	HMWB	Flood Protection	Good	Good Potential by 2015
Thames Coastal North	GB640603690000	HMWB	Flood Protection, Shell Fisheries	Moderate	Good Potential by 2027
Transitional					
Orwell	GB520503613601	HMWB	Flood Protection, Navigation	Moderate	Good Potential by 2027
Stour	GB520503613602	HMWB	Flood Protection, Navigation	Moderate	Good Potential by 2027
Hamford Water	GB520503713700	Not designated as A/HMWB	N/A	Moderate	Good Status by 2027
Blackwater & Colne	GB520503713900	HMWB	Coastal Protection, Flood Protection, Navigation	Moderate	Good Potential by 2027
Crouch	GB520503704100	Not designated as A/HMWB	N/A	Moderate	Good Status by 2027
Thames Lower	GB530603911401	HMWB	Flood Protection, Navigation	Moderate	Good Potential by 2027

HMWB = Heavily Modified Water body

As **Table 3.1** shows all TraC water bodies are classified as Heavily Modified apart from Hamford Water Transitional and Crouch Transitional. All HMWB currently at Moderate Status must reach GEP by 2027. The two water bodies currently at GEP (Harwich Approaches and Blackwater Outer) must remain at GEP and not deteriorate

3.1.2 Freshwater bodies (FWBs)

After consulting the Environment Agency's Flood Map and the Environment Agency's Anglian and Thames RBMP, several areas where the SMP2 policies could potentially impact upon landward FWBs were identified. Any river or lake water bodies present within these risk areas were identified. The FWBs that may be affected by the SMP2 policies are:

- Orwell Tidal FWB (GB105035040380);
- Holland and Hamford FWB (GB105037033970);
- Holland Brook FWB (GB105037077810); and
- Tendring Stream FWB (GB105037034180).

These impacts are discussed within **Assessment Table 1**, in the context of Objective WFD 3 – “No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies”. Specific impacts to other water bodies are not explored further within this assessment, but will be addressed at the scheme level.

3.1.3 Groundwater bodies (GWBs)

The Essex and South Suffolk SMP2 encompasses five GWBs. These GWBs are illustrated on **Figures 3.10** and **3.11** and listed below: (It should be noted that the references included in the groundwater figures comprise a short version of the ID listed below which are highlighted in bold type)

- **Felixstowe Peninsula Crag and Chalk Aquifer (GB40501G401800)**;
- **Waveney and East Suffolk Chalk and Crag (GB40501G400600)**;
- **North Essex Chalk (GB40501G400700)**;
- **Essex Gravels (GB40503G000400)**; and
- **Unproductive Strata (GB40504G999900)**.

Felixstowe Peninsula Crag and Chalk Aquifer (G4018)

The Felixstowe Peninsula Crag and Chalk Aquifer forms the northern boundary of the Essex and South Suffolk SMP2 and is adjacent to the River Orwell estuary. This GWB has been assessed by the Environment Agency as being 'At Risk' for saline intrusion under River Basin Characterisation (RBC) 2. However, its current chemical status is 'Good', but with low confidence.

Waveney and East Suffolk Chalk and Crag Aquifer (G4006)

This aquifer surrounds the Felixstowe Peninsula Chalk and Crag Aquifer, however, for this assessment the area of interest is to the south of the Chalk and Crag Aquifer, generally located to the south of the Orwell estuary. A relatively small proportion of this aquifer extends along the north of the Orwell estuary, near to Ipswich. It has been assessed by the Environment Agency as being 'At Risk' for saline intrusion under River Basin Characterisation (RBC) 2. However, like the Felixstowe Peninsula Crag and Chalk Aquifer, its current chemical status is 'Good', but with low confidence.

North Essex Chalk (G4007)

A very small area of outcrop of Chalk has been identified to the north of the River Stour. This outcrop is a subsection of the GWB located inland to the west of Sudbury. There are no abstractions in the area near to the coast (that is, no SPZs have been identified on What's in Your Backyard). Furthermore, there is no evidence of saline intrusion in this GWB and it has been assessed as being probably Not At Risk for saline intrusion under RBC2 and at Good status with high confidence under the WFD status assessment. On the basis of this evidence it is considered unlikely that the plans included in the SMP2 could result in deterioration of the aquifer.

Essex Gravels (G0004)

The remainder of the SMP2 comprises Essex Gravels. This GWB has been assessed by the Environment Agency as 'Not At Risk' from saline intrusion under RBC2. Under the Water Framework Directive status assessment, the GWB was determined to be 'Good' with high confidence for saline intrusion. There are no groundwater abstractions with SPZs in this GWB, which have the potential to be impacted by SMP2 policies. Furthermore, the Environment Agency has stated that the gravels do not have any boundary with saline water (pers. comms, Environment Agency, Anglian Region, 2009). Therefore, it is considered unlikely that any potential policies could result in failure to meet good groundwater status or result in a deterioration in groundwater status.

Unproductive Strata (G9999)

A large proportion of the SMP2 comprises unproductive strata. Although these strata may contain groundwater, it has been defined as unproductive as the groundwater flow is considered to be insignificant in terms of water supply or ecosystems support. As unproductive strata have not been assessed as part of WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status. Therefore, unproductive strata have not been considered further.

As two of the GWBs have been assessed as 'At Risk' from saline intrusion, Felixstowe Peninsula Crag and Chalk Aquifer, and Waveney and East Suffolk Chalk and Crag Aquifer, there is evidence to suggest that the SMP2 policies may cause deterioration in status.

3.1.4 Boundary issues

Discrepancies between the WFD water body boundaries and the SMP2 boundaries were examined. No examples were identified where boundary changes were required (**Figure 3.12**).

Figure 3.1 Overview of SMP2 Study Area and WFD TraC water bodies

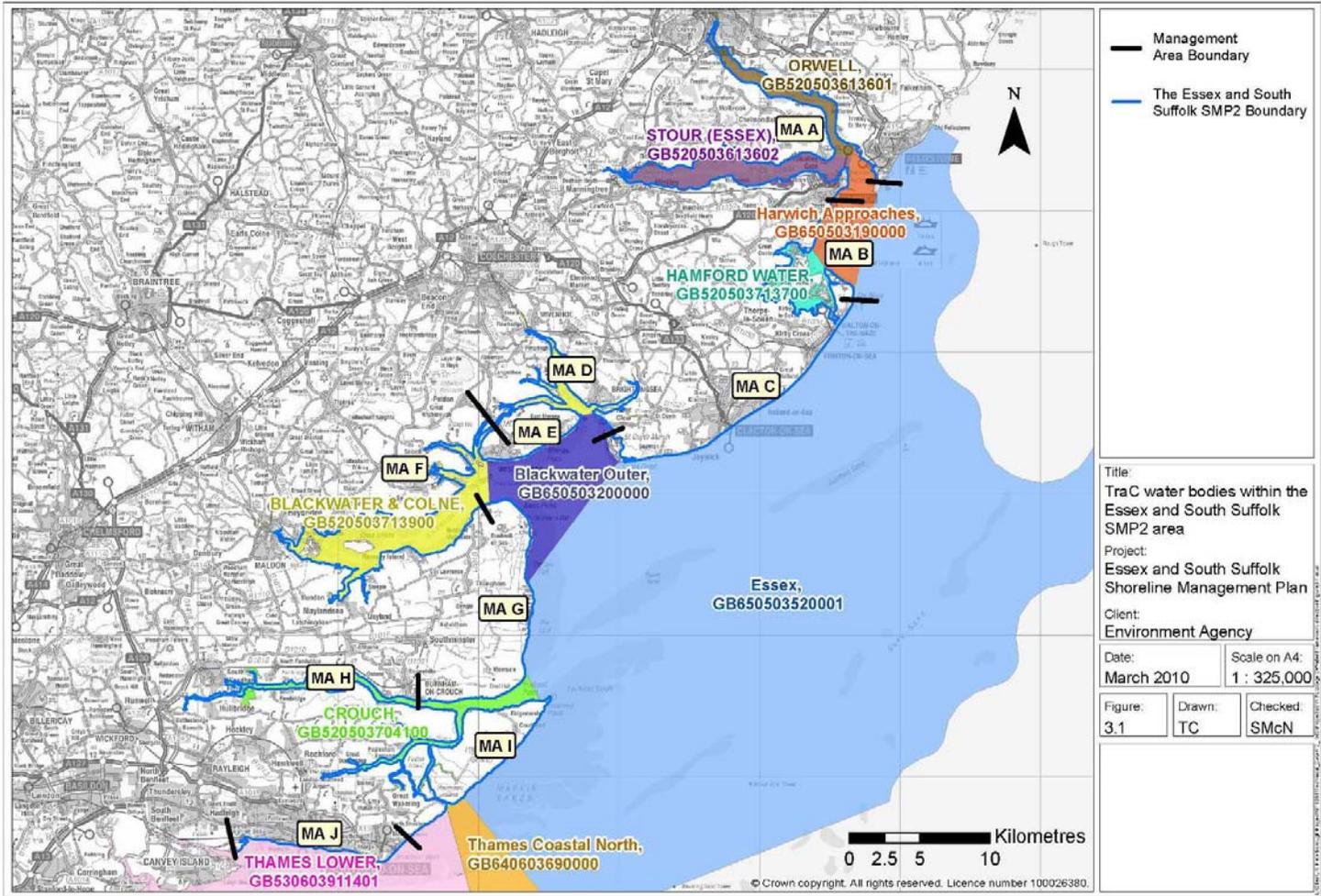


Figure 3.3: TraC water bodies within Management Unit B (Hamford Water)

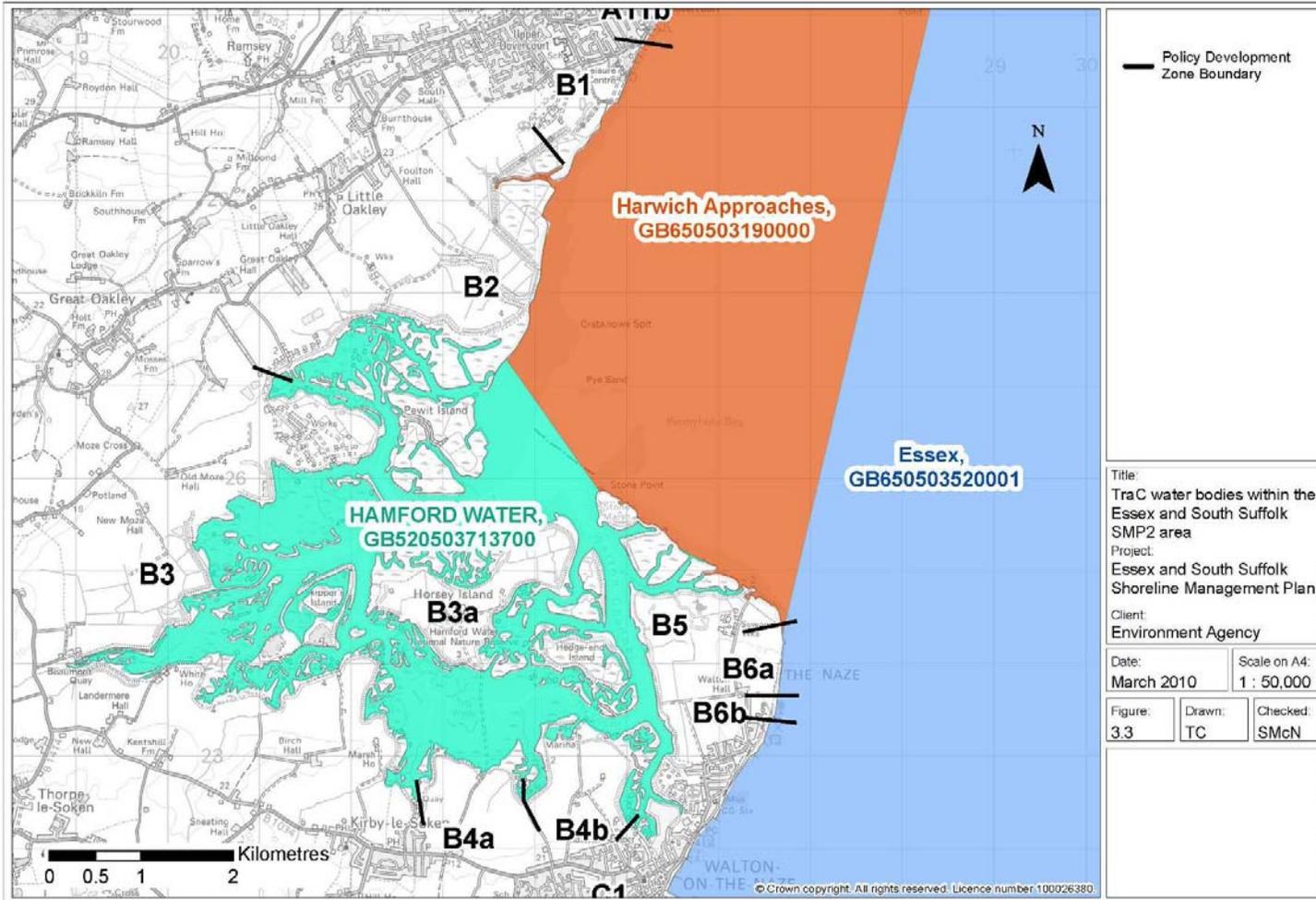


Figure 3.4: TraC water bodies within Management Unit C (Tendring)

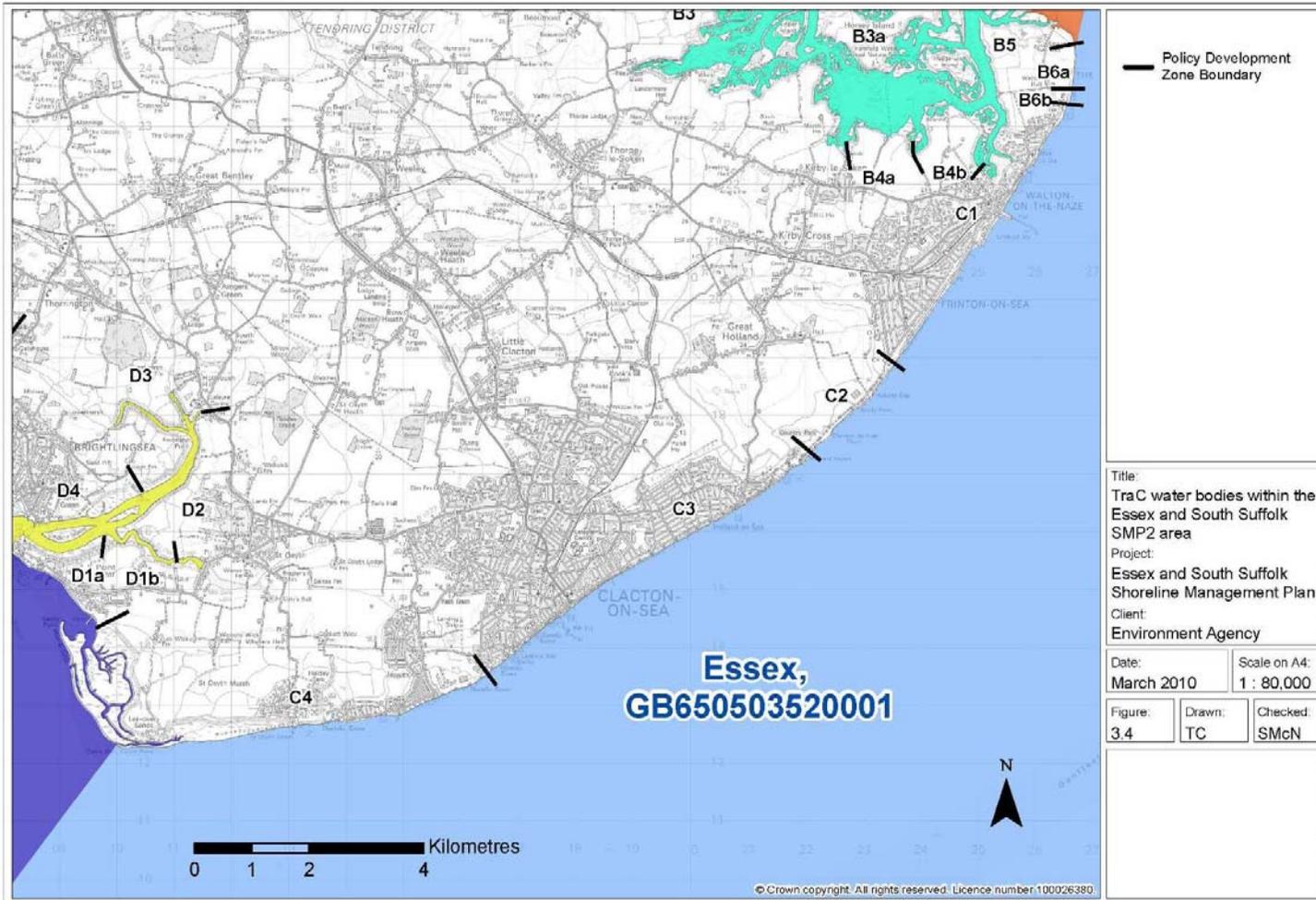


Figure 3.5: TraC water bodies within Management Unit D (Colne Estuary)

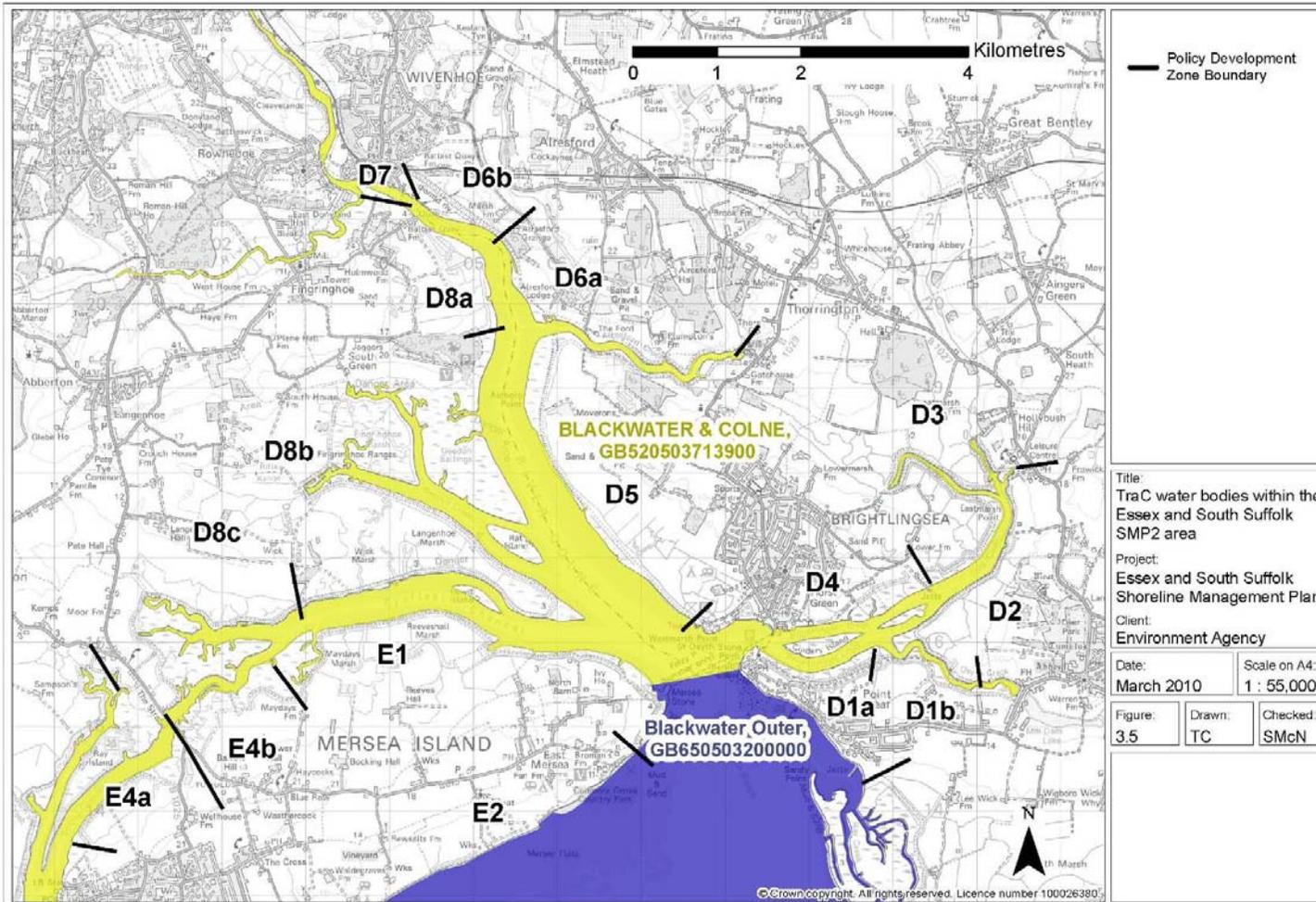


Figure 3.6: TraC water bodies within Management Unit E (Mersea Island)

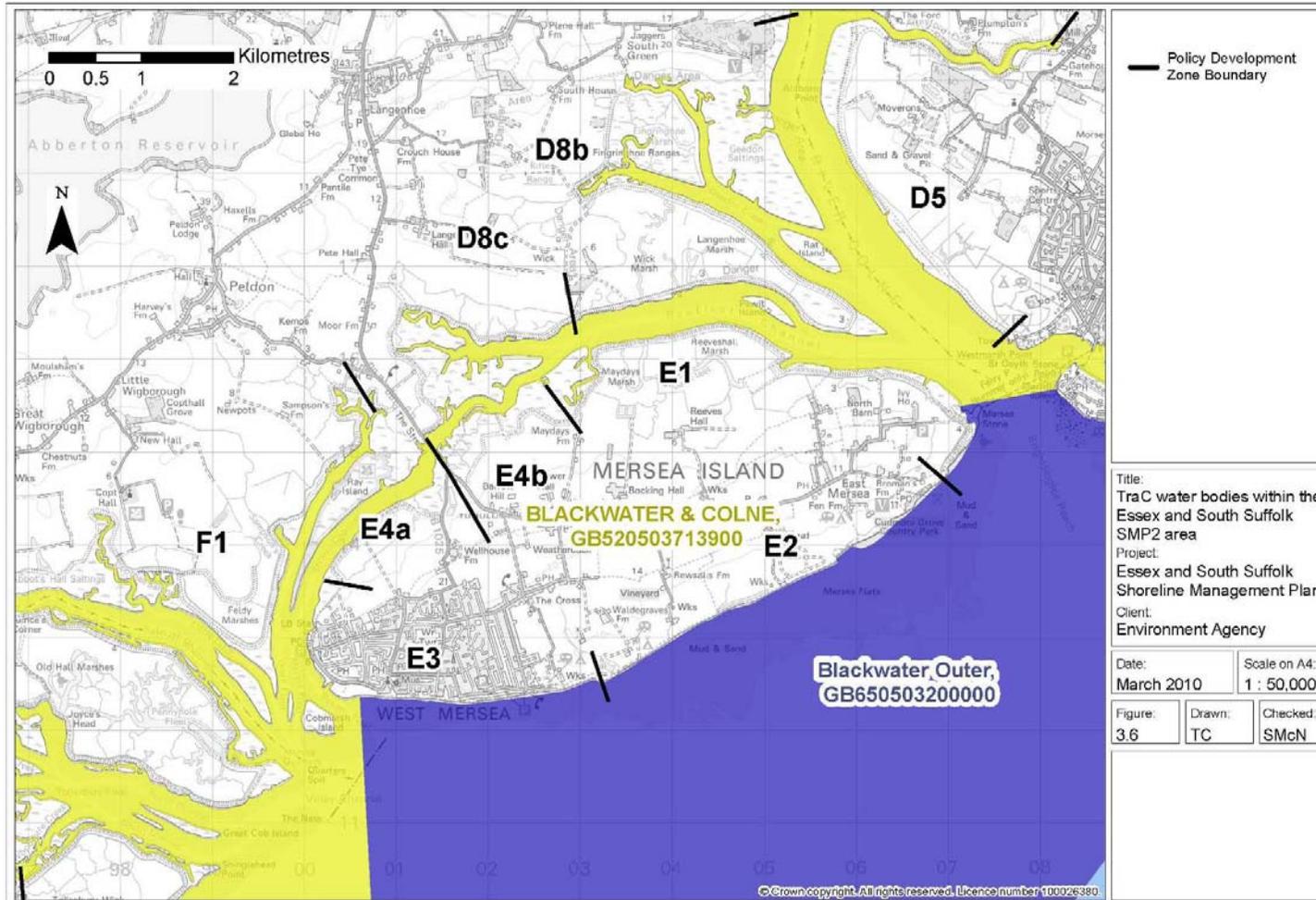


Figure 3.7: TraC water bodies within Management Unit F (Blackwater)

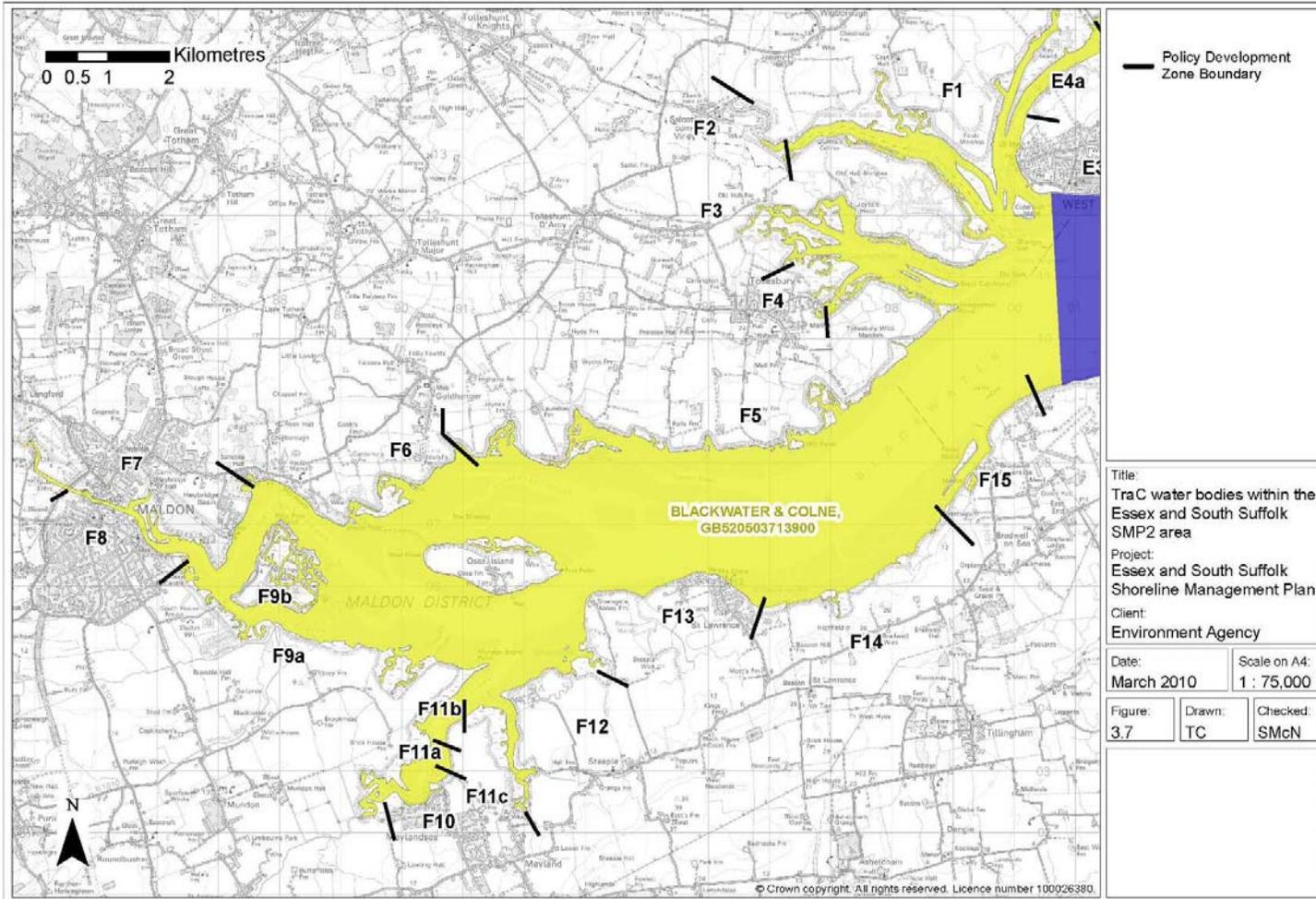


Figure 3.8 TraC water bodies within Management Unit G (Dengie peninsula)

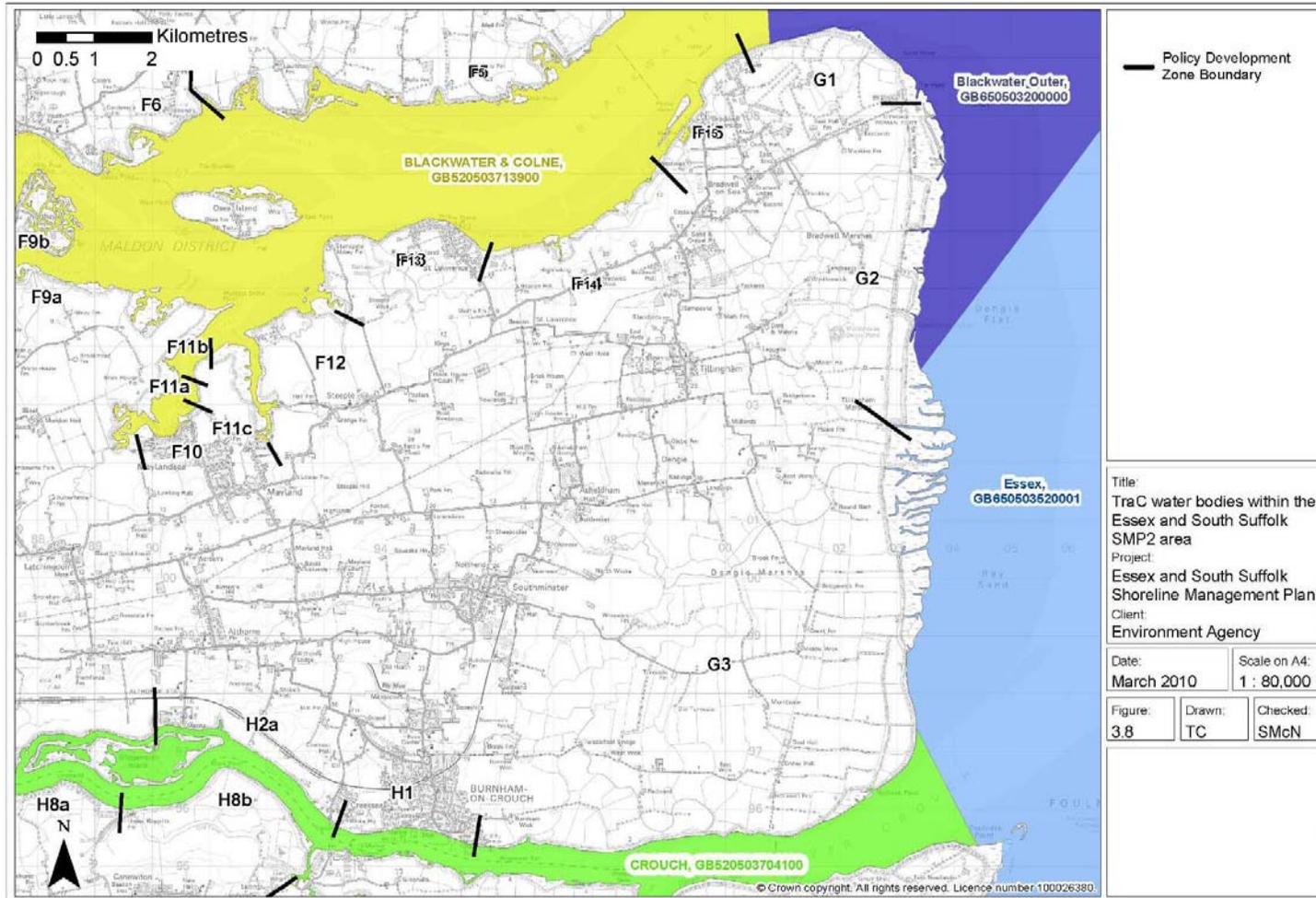


Figure 3.9 TraC water bodies within Management Units H, I and J (Crouch and Roach, Foulness and Southend-on-Sea respectively)

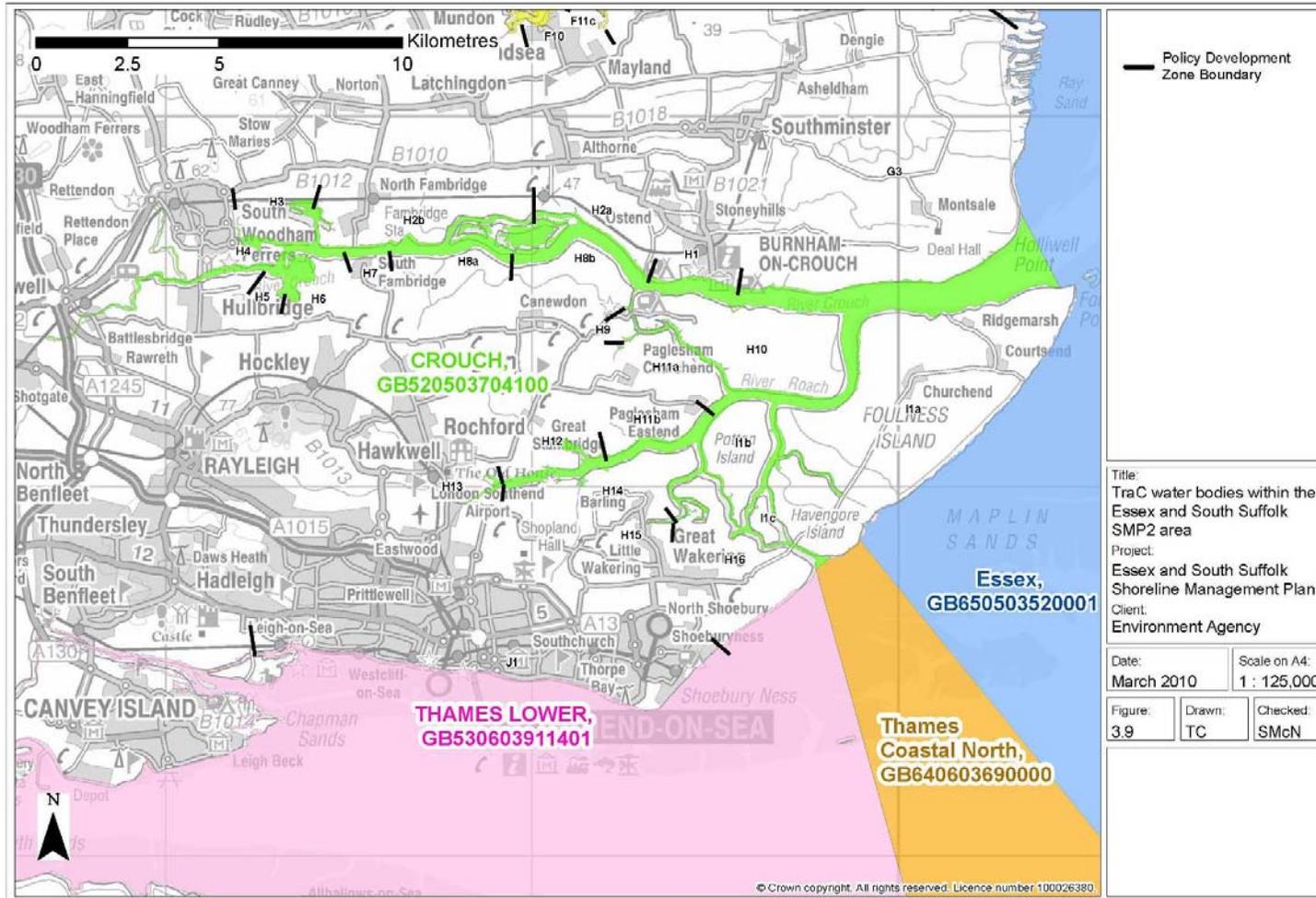


Figure 3.10: Groundwater bodies present within the SMP2 Study area (see Section 3.1.3)

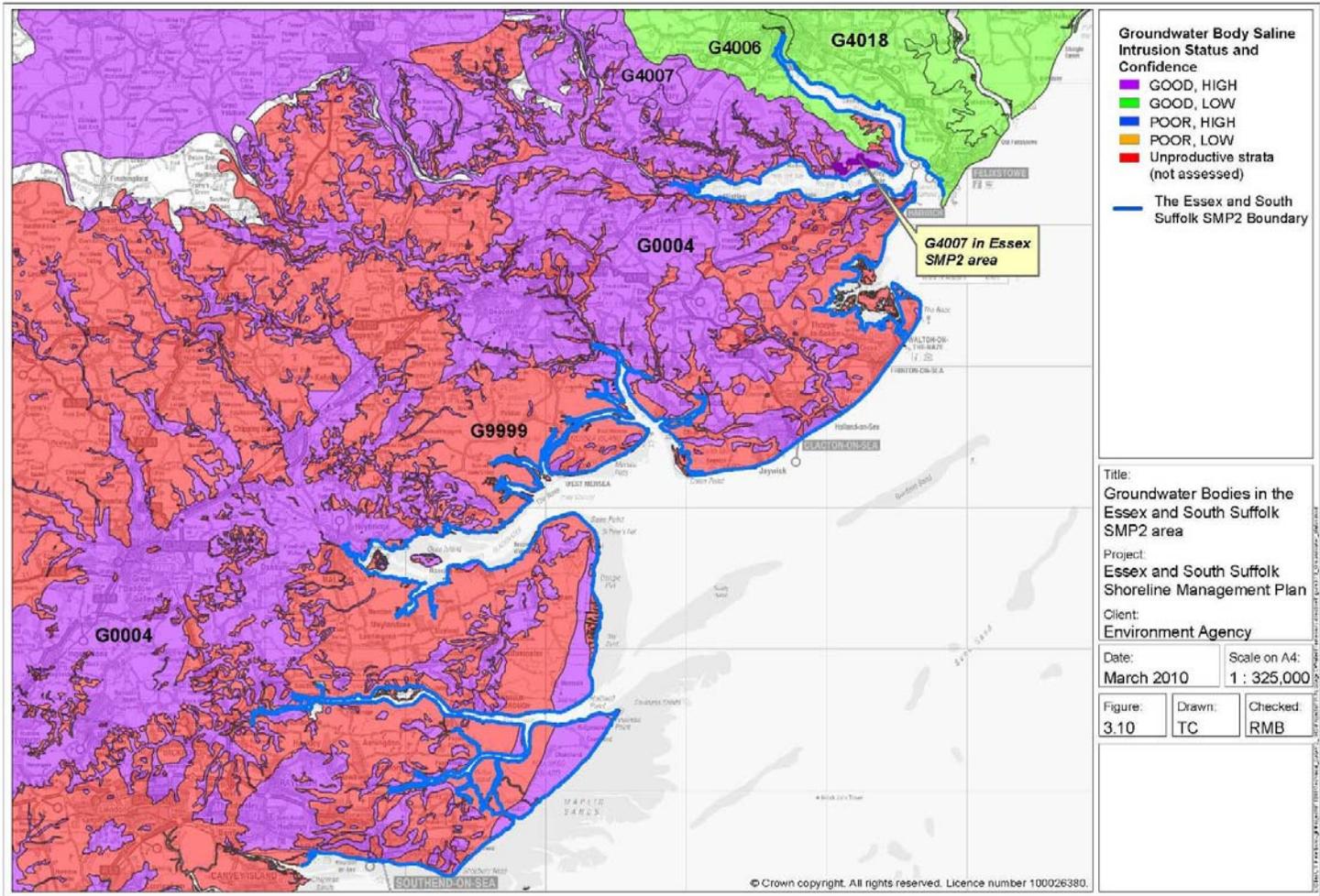


Figure 3.11 Groundwater body risk category (see Section 3.1.3)

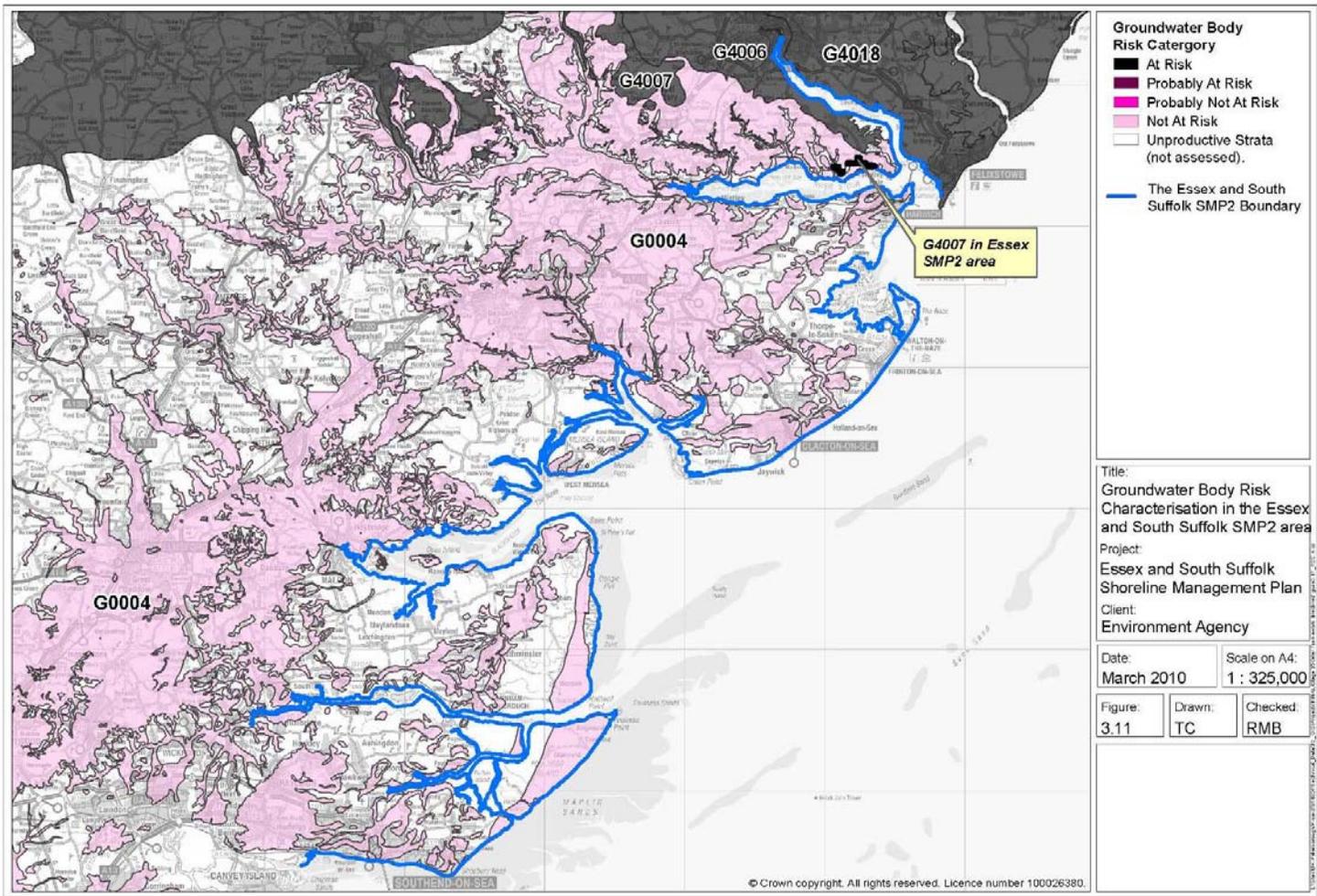
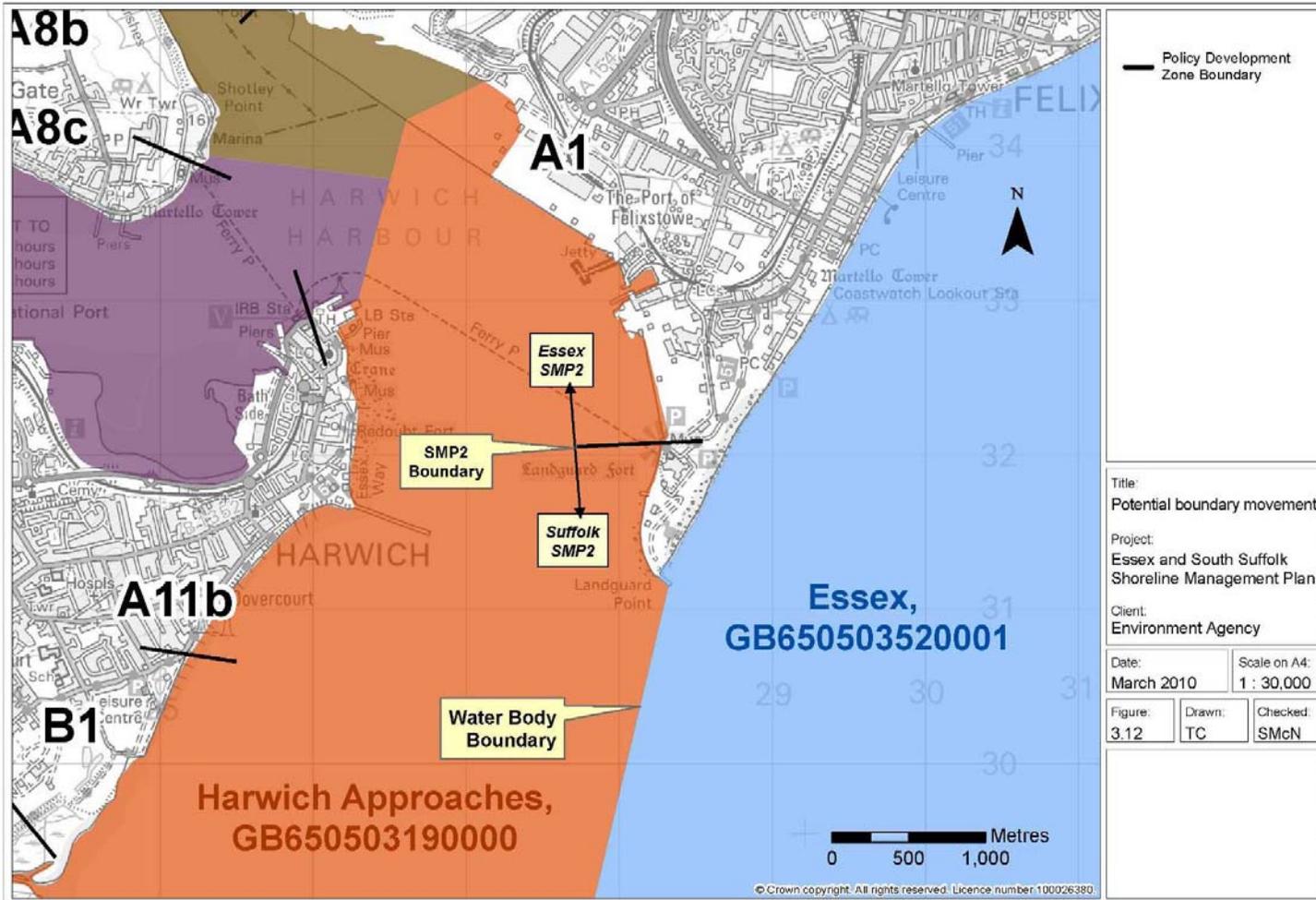


Figure 3.12: Potential Boundary Changes



3.2 Defining Features and Issues

For the TraC water bodies in the Essex and South Suffolk SMP2 area, the hydromorphological parameters that could potentially be affected by SMP2 policies and the BQEs that are dependent upon these are shown in **Assessment Table 1**. The key features and issues for each water body in the SMP2 area are then summarised in **Assessment Table 2**, together with the classification and Environmental Objectives for each TraC water body. The features and issues vary along the coast and range from undefended marshland, natural dune systems, realignment with the creation of intertidal habitat through to the need to maintain hard defences.

There are no High Status water bodies in the Essex and South Suffolk SMP2.

Assessment Table 1 BQE within TraC water bodies that could be affected by changes to hydromorphology as a result of relevant Essex and South Suffolk SMP2 policies

✓ = Applies to water body ? = Might apply and hence included

Feature	Issues	Water Body									
		Coastal				Transitional					
		Harwich Approaches	Essex	Blackwater Outer	Thames Coastal North	Orwell	Stour	Hamford Water	Blackwater and Colne	Crouch	Thames Lower
Biological Quality Element (BQE)	Potential for change in physical or hydromorphological parameter										
	Phytoplankton										
	Residence time										
	Water depth										
	Thermal regime										
	Turbidity										
Macroalgae	Episodicity (at low end of velocity spectrum)										
	Salinity							✓			
	Abrasion (associated to velocity)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Angiosperms	Inundations (tidal regime)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Sediment loading	✓	✓			✓	✓	✓	✓	✓	✓
	Land elevation		✓			✓	✓	✓	✓	✓	✓
	Salinity										
	Abrasion (associated to velocity)		✓			✓	✓	✓	✓	✓	✓
Benthic/macro invertebrates	Beach water table (TraC)		✓			✓	✓	✓	✓	✓	✓
	Light										

Feature	Issues	Water Body									
		Coastal				Transitional					
Biological Quality Element (BQE)	Potential for change in physical or hydromorphological parameter	Harwich Approaches	Essex	Blackwater Outer	Thames Coastal North	Orwell	Stour	Hamford Water	Blackwater and Colne	Crouch	Thames Lower
	Groundwater connectivity		✓			✓	✓	✓	✓	✓	✓
	Availability of leaf litter/organic debris										
	Connectivity with riparian zone										
Fish	Heterogeneity of habitat (substrate, provision of shelter)					✓	✓	✓	✓	✓	✓
	Continuity for migration routes					✓	✓	✓	✓	✓	✓
	Substrate conditions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Presence of macrophytes										
	Accessibility to nursery areas (elevation of Saltmarsh, connectivity with shoreline/riparian zone)	✓	✓	✓		✓	✓	✓	✓	✓	✓

Assessment Table 2 Water Framework Directive Features and Issues for TraC water bodies in the Essex and South Suffolk SMP2 (colour shading corresponds to the shaded water bodies in Figures 3.1 to 3.8)

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Policy Development Zones)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
Orwell PDZs A2- A8b	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies. For example, changes to control structures or defences may result in changes in wave and current dynamics and subsequent changes in abrasion patterns. Furoid macroalgae is present in association with hard substrata (mainly sea defences) along much of the water body frontage.	<p>Classification: Moderate Status (candidate (c) HMWB)</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	<p>There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms.</p> <p>Angiosperms in this water body are associated with saltmarsh and seagrass habitat. The former is distributed sporadically in the middle and upper reaches. Sea grass beds are present near the mouth of the estuary. Advance the Line (AtL) or Hold the Line (HtL) policies have the potential to cause loss of angiosperm habitat either directly through removal (i.e. AtL) or indirectly through sea level rise and coastal squeeze.</p>	

	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat. HtL policies in this water body could result in the loss of mudflat habitat important for sustaining invertebrate communities. Similarly AtL could result in the loss of subtidal mudflat habitat under the footprint of the reclaimed area.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas.	
Stour PDZs A8c - A11a	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies. For example, changes to natural control points, control structures or defences may result in changes in wave and current dynamics and subsequent changes in abrasion patterns.	<p>Classification: Moderate Status (cHMWB)</p> <ul style="list-style-type: none"> • WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. • WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. • WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	<p>There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms.</p> <p>Angiosperms in this water body are mainly associated with sporadic patches of saltmarsh with some seagrass present at the mouth of the estuary.</p>	
	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas.	

Harwich Approaches PDZs A1, A11b, B1	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies.	<p>Classification: Good Potential (cHMWB)</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms particularly saltmarsh present at the northern tip of The Naze and along the coast just north of Hamford Water.	
	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas. These parameters could potentially be affected by changes to control structures, natural controls or defences leading to changes in wave and sediment dynamics.	
Hamford Water PDZs B2- B5	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies. For example, changes to natural control points, control structures or defences may result in changes in wave and current dynamics and subsequent changes in abrasion patterns.	<p>Classification: Moderate status (not designated)</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	SMP2 policies have the potential to impact angiosperms through changes to tidal inundations, sediment loading, land elevation and abrasion (associated to velocity). Saltmarsh within this water body is distributed widely between the network of small creeks and bays.	
	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat.	

	Fish	Potential impacts on fish due to changes in substrate conditions, heterogeneity of habitats and/or accessibility to nursery areas.	<ul style="list-style-type: none"> Proposed Status Objective (from the RBMP for the Anglian RBD): Good Status by 2027.
Essex PDZs B6a – C4	Macroalgae	There are areas of both natural and artificial hard control points within this large coastal water body and SMP2 policies have the potential to result in changes to wave and current patterns. This could, in turn, result in changes to abrasion (associated to velocity) and potentially impact upon macroalgae.	<p>Classification: Moderate Status (cHMWB).</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms. Angiosperms within this water body are mainly confined to those associated with saltmarsh present along the Dengie peninsula and the seaward side of Foulness island.	
	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas	
Blackwater Outer PDZs D1a, E2, E3, G1 and G2	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies.	<p>Classification: Good Potential (cHMWB).</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water GES or GEP or result in a deterioration of surface water Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms. Saltmarsh is present along the seaward edge of Mersea Island and the mouth of the Colne estuary.	

	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat.	<ul style="list-style-type: none"> WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas	
Blackwater & Colne PDZs D1b – D8c, E1, E4a, E4b, F1 – F15	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies.	<p>Classification: Moderate Status (cHMWB).</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms that are present in the Blackwater and Colne estuaries.	
	Benthic/macro invertebrates	SMP2 policies have the potential to impact upon invertebrates through erosion of intertidal and subtidal habitat.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas	
Crouch PDZs H1- H10, I1a - I1c	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies. For example, changes to control structures or defences may result in changes in wave and current dynamics and subsequent changes in abrasion patterns.	<p>Classification: Moderate Status (not designated).</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated to velocity) which may impact upon angiosperms	
	Benthic/macro invertebrates	SMP2 policies have the potential to cause changes in the beach water table and/or the groundwater connectivity upon which invertebrates are dependent.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas.	

Thames Coastal	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies	<p>Classification: Moderate Status (cHMWB).</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms. Angiosperms associated with saltmarsh are present at Havengore Island.	
	Benthic/macro invertebrates	SMP2 policies have the potential to cause changes in the beach water table and/or the groundwater connectivity upon which invertebrates are dependent.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas	
Thames Lower PDZ J1	Macroalgae	There are areas of both natural and artificial hard control points within this large coastal water body and SMP2 policies have the potential to result in changes to wave and current patterns. This could, in turn, result in changes to abrasion (associated to velocity) and potentially impact upon macroalgae.	<p>Classification: Moderate Status (cHMWB).</p> <ul style="list-style-type: none"> WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated with velocity) which may impact upon angiosperms. Angiosperms associated with sporadic patches of saltmarsh along Shoeburyness.	
	Benthic/macro invertebrates	SMP2 policies have the potential to cause changes in the beach water table and/or the groundwater connectivity upon which invertebrates are dependent.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas	

3.3 Assessment of the SMP2 Policy against the Environmental Objectives

Assessment Table 3 below expands on the assessment of the SMP2 policies, indicating whether there is potential for environmental objectives to be compromised at a PDZ scale. Further to the PDZ scale assessment, an assessment of the effect of potential failure at the water body scale is made in **Assessment Table 4**. Both **Assessment Tables 3** and **4** identify potential for failure and consequently track the decisions that have been made within the SMP2 to meet conditions required to defend any later failure. The process enables key potential areas of concern to be flagged up and considered later at the strategy or scheme level.

The potential for the policies to affect freshwater bodies (both designated as FWBs or not) should highlight the possible issues in defending those FWBs from tidal inundation and flooding through sea level rise.

Assessment Table 3 WFD Assessment of SMP2 Policy for the Essex and South Suffolk SMP2 (colour shading corresponds to the shaded water bodies in Figures 3.1 to 3.9)

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?				
							WFD1	WFD2	WFD3	WFD4	
Orwell and Stour	A1	Felixstowe Port	AtL	HtL	HtL	Defence polices in this Management Unit have the potential to affect three TraC water bodies; Orwell Transitional, Stour Transitional and Harwich Approaches Coastal. All of these water bodies are designated HMWB. Of these HMWB only Harwich Approaches Coastal is currently at GEP.	N/A	✓	✓	✓	
							N/A	✓	✓	✓	
	A2	Trimley Marsh	HtL	MR2	HtL	BQE present in this MU include those typical of a sheltered estuarine environment, namely angiosperms associated with intertidal saltmarsh and invertebrates associated with intertidal mudflat and subtidal muddy sand. In the more exposed reaches of the Management Unit fucoid macroalgae associated with coarse sediment can also be found. Mudflats in the lower reaches of both estuaries support <i>Enteromorpha</i> , <i>Zostera</i> and <i>Salicornia</i> . Small areas of vegetated shingle are also present in the lower reaches. Therefore, in PDZs where the SMP2 policy is to HtL or AtL, there is potential for impact on these BQE through direct habitat loss (i.e. AtL) or indirect loss through sea level rise and coastal squeeze.	N/A	✓	x	✓	
	A3a	Loom Pit Lake	HtL	MR2	NAI		N/A	✓	✓	✓	
	A3b	Levington Creek	HtL	HtL	HtL		N/A	✓	✓	✓	
	A4a	Northern Orwell East	MR1	MR1	MR1		N/A	✓	✓	✓	
	A4b	Northern Orwell West	NAI	NAI	NAI		N/A	✓	✓	✓	
	A5	Ipswich	HtL	HtL	HtL		N/A	✓	✓	✓	
	A6	Wherstead	MR1	MR1	MR1		N/A	✓	✓	✓	
	A7a	Southern Orwell West	NAI	NAI	NAI		As reported in the Anglian RBMP, BQE in the Orwell and Stour Transitional waterbodies have been classified as follows: Fish (Good), Invertebrates (Moderate) and Macroalgae (High). The only BQE classified for the Harwich Coastal Approaches water body is invertebrates (Good).	N/A	✓	✓	✓
	A7b	Southern Orwell East	MR1	MR1	MR1		N/A	✓	✓	✓	
	A8a	Shotley Marshes West	MR2	HtL	HtL		Currently between 43 – 53% of the total length of the Stour and Orwell are defended, respectively. The defences predominantly consist of embankments and revetments, but also with some stretches of concrete wall, sheet piling and flood gates. The Stour and Orwell estuary system is	N/A	✓	x	✓
	A8b	Shotley Marshes	HtL	MR2	HtL			N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
		East				<p>confined by geology and/or flood defences which limit the landward development of intertidal areas and the waves and tidal flows promote erosion of the seaward edge of the intertidal areas. The hydrodynamic pressures and erosion are particularly prominent at the mouth of the estuaries which is highly exposed to the north-easterly waves and waves generated by shipping activity.</p> <p>The overall intent for Essex and South Suffolk SMP2 polices for this MU is to support and enhance the natural development of the estuaries, while continuing to defend all existing dwellings and infrastructure, and facilitating adaptation or limited local intervention where needed. For most of the shoreline, the current management approach will be continued: holding the current alignment where there are defences, and continuing a NAI approach for high ground frontages.</p> <p>AtL and HtL policy at A1, A3b and A5 has the potential to result in loss of intertidal and subtidal mudflat habitat in the Orwell Transitional water body. BQE dependant on this habitat includes invertebrates and fish. However MR2 policy in A2, A3a, A8a and A8b will create a more sustainable coastline and will support a more natural system. Habitats likely to develop include saltmarsh and mudflat which support invertebrates, angiosperms and fish. Small localised defences are proposed under MR1 policy for A4a, A6, A7b and A9c and A9e which will not lead to habitat creation. These areas will require new defences and BQE present at these locations could be affected, however given the amount of MR2 proposed for the Orwell Transitional water body, SMP2 polices within this water body are considered unlikely to result in deterioration in ecological potential.</p>	N/A	✓	✓	✓
	A8c	Shotley Gate	MR1	MR1	MR1		N/A	x	✓	✓
	A9a,d,f	Northern Stour – flood defence	HtL	HtL	HtL		N/A	x	✓	✓
	A9b	Northern Stour – not erosional	NAI	NAI	NAI		N/A	✓	✓	✓
	A9c,e	Northern Stour – erosional	MR1	MR1	MR1		N/A	x	✓	✓
	A10a,c,e	Southern Stour – flood defence	HtL	HtL	HtL		N/A	x	✓	✓
	A10b,g	Southern Stour – not erosional	NAI	NAI	NAI		N/A	✓	✓	✓
	A10d,f	Southern Stour – erosional	MR1	MR1	MR1		N/A	x	✓	✓
	A11a	Harwich Harbour	AtL	HtL	HtL		N/A	x	✓	✓
	A11b	Harwich Town	HtL	HtL	HtL		N/A	x	✓	✓
						N/A	✓	✓	✓	

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						<p>Preferred SMP2 policies to HtL at some PDZs within the Stour Transitional water body (e.g. A9 a, d, f and A10 a,c,e) may result in the net loss of intertidal habitat. There is little room for realignment within this water body due to topographical and geological constraints and confined features such as Harwich Port. HtL policies within this water body may therefore have the potential to result in a deterioration in ecological potential through impacts on invertebrates, angiosperms and fish BQE. In addition AtL at A11a (Harwich Harbour) will result in the loss of intertidal and subtidal mud habitat. Currently this water body is not at GEP. As present management will continue along most of this water body appropriate mitigation measures could be implemented as discussed in Assessment Table 5.</p> <p>HtL policy for A11b within the Harwich Approaches Coastal water body will continue with the defence system of beach groynes. This will maintain the beach profile and retain the function of the intertidal sand beach which may be important for BQE such as invertebrates. Harwich Approaches is presently at GEP. If an HMWB is at GEP the WFD classification process has found that all necessary mitigation measures within that water body are currently being implemented. As the intent of the SMP2 is to continue with present management, no potential deterioration in potential can be identified as it is assumed that current mitigation measures will prevent this. Therefore deterioration in ecological potential is not expected for this water body.</p> <p>MR in A2 will result in the inundation of the Orwell Tidal FWB (GB105035040390) which could potentially result in deterioration in ecological potential for that river water body.</p>				

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						<p>MR in A8a will result in the inundation of the Orwell Tidal FWB (GB105035040380) which could potentially result in deterioration in ecological potential for that river water body.</p> <p>This MU occurs within the Felixstowe Peninsula Crag and Chalk Aquifer GWB (GB40501G401800) and the Waveney and East Suffolk Chalk Crag GWB (GB40501G400600). There is one groundwater abstraction with a SPZ in the Felixstowe GWB. However, given that the location of the abstraction is a significant distance from the coast it is considered unlikely that this abstraction would be impacted by policies within the SMP2. As discussed in Section 3.1.3 it is considered unlikely that MR policies will result in deterioration in status of the Waveney GWB.</p>				
Hamford Water	B1	South Dovercourt	HtL	HtL	HtL	SMP2 policies in this MU have the potential to affect three TraC water bodies; Harwich Approaches Coastal, Hamford Water Transitional and Essex Coastal. The only water body not designated as Heavily Modified is Hamford Water. Of the HMWBs only Harwich Approaches Coastal is currently at GEP.	N/A	✓	✓	✓
	B2	Little Oakley	HtL	MR2	HtL		N/A	✓	✓	✓
	B3	Oakley Creek to Kirby-le-Soken	HtL	HtL	HtL	BQE present in this MU include angiosperms associated with saltmarsh present along the exposed coastline at Dovercourt in Harwich Coastal water body and extensive saltmarsh habitat within Hamford Water Transitional. Angiosperms associated with sand dune habitat are also present at Crabknowle and Stone Point. As reported in the Anglian RBMP BQE identified in Harwich Approaches Coastal water body includes invertebrates which are at Good Status. BQE associated with Hamford Water Transitional include invertebrates (moderate status) and BQE classified for Essex Coast include invertebrates (good) and phytoplankton (high).	N/A	✓	✓	✓
	B3a	Horsey Island	HtL	HtL	MR2		N/A	✓	✓	✓
	B4a	Kirby-le-Soken to Coles Creek	MR2	HtL	HtL		N/A	✓	✓	✓
	B4b	Coles Creek to the Martello Tower	HtL	HtL	HtL		N/A	✓	✓	✓
	B5	Walton Channel	HtL	HtL	MR2		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
	B6a	Naze Cliffs North	NAI	NAI	NAI	<p>Presently Hamford Water is not designated as a HMWB although approximately 33km of defences protect the hinterland of Hamford Water. They mostly consist of clay embankments revetments and walls. There has been a barrage breakwater of sunken barges put in place in the northeast of Horsey Island, and over 500,000m³ of dredged material from Harwich Harbour has been placed here, and at Foulton Hall and Stone Point, to reverse saltmarsh loss.</p> <p>The Naze constitutes an intermittent and decreasing sediment source. Erosion of intertidal areas takes place at the mouth of the estuary with accretion at inner creeks.</p> <p>The overall intent for this MU is to sustain and support the viability of communities, tourism and commercial activities while creating new intertidal habitats and focusing flood risk management on frontages where it is most needed. The policy to achieve this intent is to maintain flood defence to the majority of the defended land, including all dwellings and key infrastructure at risk of flooding, combined with a gradual increase of natural processes by realigning defences that are under pressure.</p> <p>SMP2 policies within Harwich Approaches Coastal water body aim to HtL at B1 and MR in B2. MR2 in B2 will create saltmarsh and mudflat habitat important for sustaining BQE identified in Assessment Table 1. As Harwich Approaches Coastal water body is presently at GEP no potential deterioration in potential can be identified as it is assumed that current mitigation measures will prevent this from deteriorating. A HtL policy for all frontages within Hamford Water transitional water body (B2 to B5) will lead to a loss of the majority of intertidal habitat present there over the three epochs.</p>	N/A	✓	✓	✓
	B6b	Naze Cliffs South	MR1	MR1	MR1		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						<p>However as MR2 is proposed in B2, B3a, B4a, and B5 the creation of new intertidal habitat supporting angiosperm, invertebrate and fish BQE means that deterioration in the overall ecological potential of the water body is considered unlikely.</p> <p>HtL SMP2 policy in the Essex Coast water body has the potential to cause a deterioration in potential as habitat lost through coastal squeeze and sea level rise will not be countered by MR policies that are present in this water body.</p> <p>There are no issues identified with groundwater in regard to MR SMP2 policies for this MU. The groundwater within this MU is defined as unproductive. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.</p> <p>No FWB or GWB will be affected by the SMP2 policies for this MU.</p>				
Tendring	C1	Walton-on-the-Naze and Frinton-on-Sea	HtL	HtL	HtL	SMP2 policies in this MU have the potential to affect two TraC water bodies; Essex Coastal and Blackwater Outer. Both of these water bodies are coastal and designated as heavily modified. Blackwater Outer Coastal is currently at GEP. BQE present in this MU include angiosperms associated with shingle ridges between Jaywick and Sandy Point and angiosperms associated with saltmarsh habitat found to the west of Seawick. There is only a very narrow inter-tidal zone, containing sands with some shingle along the upper profile.	N/A	✓	✓	✓
	C2	Holland Haven	HtL+	HtL+	MR2+		N/A	✓	x	✓
	C3	Clacton-on-Sea	HtL	HtL	HtL		N/A	✓	✓	✓
	C4	Seawick, Jaywick	HtL	HtL	MR2		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
		and Osyth Marsh				<p>This MU is heavily defended. The defences consist of concrete seawalls and revetments as well as clay embankments and sections of rock armour and groyne fields. Fish-tail groynes have been constructed at Jaywick to locally retain beach sediment, and beach recharge is part of coastal defence scheme. Beach erosion of the narrow beach is the dominant process throughout the frontage.</p> <p>This MU is characterised by an eroding coastline due to the lack of sediment supply from the north. Present management along C1 and C2 will continue to maintain the beach profile. It is uncertain whether BQE would benefit from management in this way especially through beach nourishment schemes. However, provided that MR is undertaken at C2 and C4, the creation of new intertidal habitat should benefit BQE present in the Essex Coastal water body and hence deterioration in the overall ecological potential of this water body is considered unlikely.</p> <p>As Blackwater Outer Coastal water body is presently at GEP no deterioration in ecological potential can be identified as GEP indicates that all necessary mitigation measures are currently being implemented and it is assumed that current mitigation measures will prevent any deterioration of the water body.</p> <p>MR in C2 will result in the inundation of the Holland and Hamford FWB (GB105037033970) and Holland Brook FWB (GB105037077810) which could potentially result in deterioration in ecological potential for these HMWB.</p>	N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.				
Colne Estuary	D1a	Stone Point	HtL	HtL	HtL	SMP2 policies in this MU have the potential to affect two TraC water bodies; Blackwater Outer Coastal and Blackwater & Colne Transitional. Both of these water bodies are HMWB. Blackwater Outer Coastal is currently at GEP.	N/A	✓	✓	✓
	D1b	Point Clear to St Osyth Creek	HtL	MR2	HtL		N/A	✓	✓	✓
	D2	Along the southern bank of Flag Creek	HtL	MR2	HtL	BQE found in this MU are mainly associated with intertidal mudflats, namely invertebrates. Angiosperm distribution within the Blackwater and Colne Transitional is limited to isolated strips of saltmarsh and shingle ridges.	N/A	✓	✓	✓
	D3	Flag Creek to northern bank to Brightlingsea	HtL	MR2	HtL	The Colne estuary is almost entirely constrained by flood defences, comprising of 52km of defences. The Colne estuary system is confined by geology and/or flood defences which limit the landward development of intertidal areas. The hydrodynamic pressures (tidal flows and waves) and erosion are particularly prominent at the mid section of the estuary where the channel is widening. Hence the defences are under pressure. There is erosion throughout the main sections of the River Colne, Brightlingsea creek and Pyefleet Channel and accretion at the inner sections, including Geedon creek.	N/A	✓	✓	✓
	D4	Brightlingsea	HtL	HtL	HtL		N/A	✓	✓	✓
	D5	Westmarsh Point to where the frontage meets the B1029	HtL	MR2	HtL		N/A	✓	✓	✓
	D6a	South of	HtL	HtL	HtL		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
		Wivenhoe				<p>This MU has an extensive MR program of SMP2 policies. Overall, the MR planned within this water body should ensure that the ecological functioning of the system is maintained despite localised losses where HtL is the preferred policy. Therefore preferred policies within this SMP2 are considered unlikely to result in deterioration in ecological potential for the Blackwater and Colne Transitional water body and Blackwater Outer Coastal water body.</p> <p>MR in D5 will result in the inundation of Tendring Stream FWB (GB105037034180) which could potentially result in deterioration in ecological potential for those water bodies due to impacts of saline inundation on freshwater BQE.</p> <p>MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.</p>				
	D6b	B1029 to Wivenhoe	HtL	MR2	HtL		N/A	✓	✓	✓
	D7	Colne Barrier	HtL	HtL	HtL		N/A	✓	✓	✓
	D8a	Inner Colne west bank	HtL	MR2	NAI		N/A	✓	✓	✓
	D8b	Fingringhoe & Lagenhoe	HtL	HtL	HtL		N/A	✓	✓	✓
	D8c	Langenhoe Hall Marsh	HtL	HtL	HtL		N/A	✓	✓	✓
Mersea Island	E1	Landward Frontage	HtL	HtL	HtL	SMP2 policies in this MU have the potential to affect two TraC water bodies; Blackwater Outer and Blackwater & Colne Transitional. Both of these water bodies are HMWBs. Blackwater Outer Coastal is currently at GEP.	N/A	✓	✓	✓
	E2	North Barn & West Mersea	HtL	MR2	HtL		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
	E3	West Mersea	HtL+	HtL+	HtL+	<p>BQE found in this MU are mainly associated with intertidal mudflats, namely invertebrates. Angiosperm distribution within the Blackwater and Colne Transitional is limited to isolated strips of saltmarsh and shingle ridges.</p> <p>On the north side of Mersea Island, defences consist of a clay embankment and are maintained by the Environment Agency. To the seaward side of the island the defences are privately maintained and consist of a mixture of banks, revetments and groynes. There is a general trend for erosion across the seaward facing frontage. Erosion rates along the foreshore are expected to accelerate.</p> <p>MR policy in PDZs E2 and E4a will increase intertidal habitat within both water bodies, which will be beneficial to the BQE identified in Assessment Table 1. Overall the preferred policies for this management area are considered unlikely to result in deterioration in ecological potential for both TraC water bodies.</p> <p>No FWBs will be affected by MR SMP2 policies in this MU.</p> <p>MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.</p>	N/A	✓	✓	✓
	E4a	North Mersea (Strood Channel)	HtL+	MR2+	HtL+		N/A	✓	✓	✓
	E4b	Pyefleet Inner Channel	HtL	HtL	HtL		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
Blackwater	F1	Strood to Salcott-cum-Virley	HtL	HtL	HtL	<p>SMP2 polices in this MU have the potential to affect the Blackwater & Colne Transitional water body which is heavily modified.</p> <p>BQE present in this MU include angiosperms associated with large areas of saltmarsh and invertebrates associated with intertidal mudflats. Angiosperms associated with shingle habitat are also present.</p> <p>Almost the entire length of the Blackwater estuary is constrained by flood defences. This totals 102km and these are, for the most part, maintained by the Environment Agency. The defences are predominantly clay embankments protected by a revetment</p> <p>The overall intent of management for this MU is to sustain and support the viability of communities, tourism and commercial activities while creating new intertidal habitats and focusing flood and erosion risk management on frontages where it is most needed. A gradual increase of natural processes by realigning defences that are under pressure is therefore a key driver for this MU.</p> <p>There will be some loss of intertidal habitat where SMP2 polices are HTL through rising sea levels and coastal squeeze but the overall ecological functioning of the system should be maintained where MR2 is proposed. Therefore it is considered unlikely that there will be deterioration in ecological potential for the Blackwater & Colne Transitional water body as a result of SMP2 policies.</p> <p>No FWBs will be affected by MR SMP2 polices in this MU.</p>	N/A	✓	✓	✓
	F2	Salcott Creek	HtL	HtL	HtL		N/A	✓	✓	✓
	F3	South bank of the Salcott Channel to Tollesbury Fleet	HtL	HtL	MR2		N/A	✓	✓	✓
	F4	Tollesbury	HtL	HtL	HtL		N/A	✓	✓	✓
	F5	Tollesbury Wick Marshes to Goldhanger	HtL	HtL	MR2		N/A	✓	✓	✓
	F6	Goldhanger to Heybridge	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	F7	Heybridge Basin	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	F8	Maldon Inner Estuary	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	F9a	South Maldon	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	F9b	Northey Island	HtL	HtL	HtL		N/A	✓	✓	✓
	F10	Maylandsea	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	F11a	Mayland Creek West	HtL	HtL	HtL		N/A	✓	✓	✓
F11b	Mayland Creek	NAI	NAI	NAI	N/A	✓	✓	✓		

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
	F11c	Mayland Creek East	HtL	HtL	HtL	MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.	N/A	✓	✓	✓
	F12	Steeple	HtL	HtL	MR2		N/A	✓	✓	✓
	F13	St. Lawrence	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	F14	St. Lawrence Creek to Bradwell-on-Sea	MR2+	HtL+	HtL+		N/A	✓	✓	✓
	F15	Bradwell Creek	HtL	HtL	HtL		N/A	✓	✓	✓
	Dengie Peninsula	G1	Bradwell-on-Sea	HtL	HtL		HtL	SMP2 policies in this MU have the potential to affect four TraC water bodies; Blackwater & Colne Transitional, Blackwater Outer, Essex Coastal and Crouch Transitional. Only the Crouch Transitional is not designated Heavily modified. BQE present in this MU include invertebrates associated with extensive mudflats present in the Blackwater estuary and angiosperms associated with saltmarsh habitat. Angiosperms associated with rare open coast saltmarsh is present along the peninsula which is indicative of the low wave energies experienced there due to the sheltering affect of large subtidal sandbanks. This frontage is defended by a continuous flood embankment which protects extensive reclaimed marshland. The embankments are primarily composed by clay underlying concrete and rock revetments. The large extent of saltmarsh and mudflats provide an important role in coastal defence.	N/A	✓
G2		Bradwell Marshes	HtL	HtL	HtL	N/A	✓		✓	✓
G3		Dengie Marshes	HtL	HtL	HtL	N/A	✓		✓	✓
						N/A	✓		✓	✓
						N/A	✓		✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						<p>The section of coastline in PDZ G1 is currently eroding and HtL policy could result in the loss of habitat through sea level rise and coastal squeeze. However Blackwater Outer is presently at GEP and as this defence unit will continue with present management deterioration in ecological potential is unlikely. Deterioration in ecological potential is also unlikely for G1 in the Blackwater & Colne water body due to the MR2 that is proposed in other PDZ that occur within that water body.</p> <p>The section of coastline in PDZs G2 and G3 along the Dengie peninsula is accreting under the present HTL policy. Therefore adopting HTL policy for this PDZ should not result in deterioration in ecological potential within the Blackwater Outer and Essex Coastal and Crouch water bodies.</p> <p>No FWBs will be affected by MR SMP2 policies in this MU.</p> <p>MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.</p>				
Crouch and Roach	H1	Burnham on Crouch	HtL	HtL	HtL	SMP2 policies in this MU have the potential to affect three TraC water bodies; Crouch Transitional, Thames Coastal and Thames Lower. Only the Crouch Transitional water body is not designated as heavily modified.	N/A	✓	✓	✓
	H2a	From Burnham on Crouch to	HtL	MR2	HtL		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
		Bridgemarsh				BQE present in this MU include invertebrates associated with large areas of mudflat and angiosperms associated with saltmarsh habitat.				
	H2b	Bridge Marsh to North Fambridge	HtL	HtL	MR2	The total length of the defences within this unit is approximately 168km resulting in the estuary frontage being almost entirely defended. The defences consist mostly of clay embankments, often protected by a revetment on rural frontages with hard defences to the urban frontage. The overall intent of management for the Crouch and Roach MU is to sustain and support the viability of communities, tourism and commercial activities while creating new intertidal habitats and focusing flood and erosion risk management on frontages where it is most needed. The policy to achieve this intent is to maintain flood and erosion defence to all dwellings, key infrastructure and tourism facilities at risk of flooding and erosion, combined with a gradual increase of natural processes by realigning some of the defences that are under pressure. There will be some loss of intertidal habitat where the SMP2 policy is to HtL due to rising sea levels and coastal squeeze, but the overall ecological functioning of the system should be maintained where MR2 is proposed. Therefore it is considered unlikely that there will be deterioration in ecological status for the Crouch Transitional water body. Similarly given the size of the H16 frontage relative to Thames North Coastal and Thames Lower Transitional there is unlikely to be deterioration in ecological potential for these HMWBs. No FWBs will be affected by MR or NAI SMP2 polices in this MU.	N/A	✓	✓	✓
	H3	North Fambridge and South Woodham Ferrers	HtL	HtL	HtL		N/A	✓	✓	✓
	H4	South Woodham Ferrers, Battlesbridge and Hullbridge	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	H5	Eastwards of Brandy Hole	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	H6	Landward of Brandy Hole Reach	HtL	HtL	HtL		N/A	✓	✓	✓
	H7	South Fambridge	HtL	HtL	HtL		N/A	✓	✓	✓
	H8a	South bank of Longpole, Shortpole and Raypitts Reaches (Canewdon West)	HtL	HtL	HtL		N/A	✓	✓	✓
	H8b	Canewdon	HtL	MR2	HtL		N/A	✓	✓	✓
	H9	Paglesham Creek	NAI	NAI	NAI		N/A	✓	✓	✓
	H10	Wallasea	MR2	HtL	HtL		N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
	H11a	Paglesham Churchend	HtL	MR2	HTL	MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.	N/A	✓	✓	✓
	H11b	Paglesham Eastend	HtL	HtL	MR2		N/A	✓	✓	✓
	H12	Stambridge	HtL	HtL	HtL		N/A	✓	✓	✓
	H13	Rochford	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	H14	Barling Marsh	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	H15	Little Wakering	HtL+	HtL+	HtL+		N/A	✓	✓	✓
	H16	Great Wakering	HtL+	HtL+	HtL+		N/A	✓	✓	✓
								N/A	✓	✓
Foulness	l1a	Foulness	HtL	HtL	HtL	SMP2 policies in this MU have the potential to affect three TraC water bodies; Crouch Transitional, Thames Coastal and Essex Coast. Only the Crouch Transitional water body is not designated as heavily modified.	N/A	✓	✓	✓
							N/A	✓	✓	✓
	l1b	Potton	HtL	HtL	HtL	BQE present in this MU include invertebrates associated with large areas of mudflat at Maplin Sands and angiosperms associated with saltmarsh habitat found between Northern Corner and Foulness Point and shingle habitat found at Shoebury.	N/A	x	✓	✓
							N/A	✓	✓	✓
l1c	Rushley	HtL	HtL	MR2	Most of the MU is currently defended by earth embankments underlying concrete revetments and concrete cladding. There has been an overall horizontal accretion of mudflats over the last 50 years.	N/A	✓	✓	✓	

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						<p>The Foulness eastern frontages comprises of tidal flats, with extensive areas of mudflat. This frontage is very exposed and under pressure due to waves and processes. The northern and the western frontages of Foulness are governed by the Crouch and Roach estuarine processes. A considerable length of the Foulness defence line within those estuaries is being strongly undermined due to increase in tidal volumes. Potton and Rushley Island, considered as PDZ of this management unit, are also within the Crouch and Roach system and the defences are also being undermined.</p> <p>The HtL policy within this MU for frontages within the Crouch Transitional water body is considered unlikely to result in the water body deteriorating in ecological status given the scale of MR that is proposed for the water body (in PDZ11c) and that present accretion rates are likely to continue . The HtL policy in frontages within the Essex Coast water body will likely not result in deterioration in potential given the MR2 proposed in other MU.</p> <p>HtL in the Thames Coastal water body has the potential to cause a deterioration in potential as habitat lost through coastal squeeze and sea level rise will not be countered by MR2 polices that are present in this water body.</p> <p>No FWBs will be affected by MR or NAI SMP2 polices in this MU.</p>				

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.				
Southend-on-Sea	J1	Southend-on-Sea	HtL+	HtL+	HtL+	<p>SMP2 policies in this MU have the potential to affect the Thames Lower Transitional water body which is designated as heavily modified.</p> <p>BQE present in this MU include those associated with mud and fine sand foreshore.</p> <p>This frontage is currently defended by 4.3km of vertical high walls mainly from brick and masonry or concrete. In addition, there are groynes which provide coastal protection. The predominant process at this frontage is beach erosion which is largely counteracted by beach recharge and coastal protection.</p> <p>Under a HtL policy, there would be no cliff retreat throughout the Southend-on-Sea frontage. However there are issues with cliff stability in this PDZ and undermining of the cliff face may occur independently of SMP2 defence policies. The position of the shoreline will be held largely at the same position, however, there would be local changes to the foreshore with likely accretion of sands updrift of the groynes and conversely there could also be some localised erosion downdrift.</p>	N/A	✓	✓	✓

Management Unit	PDZ	Name	2025	2055	2105	WFD Assessment of Deterioration	Environmental Objectives met?			
							WFD1	WFD2	WFD3	WFD4
						<p>Beach erosion/accretion rates are expected to remain unchanged. The development of the intertidal flats is not constrained by the defences.</p> <p>Within this water body, a policy of MR is unfeasible due to the residential and commercial properties in the area. However, as the shoreline under a HtL policy will remain largely unchanged over the course of the SMP2, deterioration in ecological potential is considered unlikely.</p> <p>No FWBs will be affected by MR or NAI SMP2 policies in this MU.</p> <p>MR SMP2 policies in this MU have the potential to affect two GWB; Essex Gravels (GB40503G000400) and Unproductive strata. Essex GWB has been assessed by the Environment Agency as 'Not at Risk' from saline intrusion and therefore it is considered unlikely that SMP2 MR policies could result in deterioration of the aquifer. Unproductive strata have not been assessed as part of the WFD groundwater status assessment, it is considered that potential changes through SMP2 policies will not result in the failure to meet good groundwater status, or in fact result in a deterioration of groundwater status.</p>				

Key:		Orwell		Hamford Water		Essex		Thames Lower
		Stour		Blackwater Outer		Crouch		
		Harwich Approaches		Blackwater and Colne		Thames Coastal		

3.3.1 Environmental Objective WFD1

WFD1 is only applicable to High Status water bodies. There are no High Status water bodies in the Essex and South Suffolk SMP2 area. However Hamford Water Transitional and Crouch Transitional water bodies have not been assigned a Hydromorphological Designation so in theory they could be designated High Status. However as these water bodies appear to be heavily modified it is unlikely that they will not be designated HMWB in the future.

3.3.2 Environmental Objective WFD2

As discussed in **Assessment Table 3** two TraC water bodies have the potential to fail environmental objective WFD2 (no changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential). The water bodies are the Stour Transitional and the Thames Coastal North. Most of the SMP2 policies for the PDZs within the Stour Transitional are either HtL or MR1 and under predicted rising sea levels and coastal squeeze may result in the loss of intertidal habitat. As MR2 is not possible in this water body due to topographical and geological constraints habitat lost under SMP2 policies will not be countered by habitat gain under MR2 policies and hence a deterioration in ecological potential may occur.

Thames Coastal North water body also has the potential to fail environmental objective WFD2. HtL policy within PDZ I1a may result in the loss of saltmarsh adjacent to Havengore Island. As there are no MR2 policies proposed in this water body there may be an overall loss of intertidal saltmarsh and mudflat habitat which could affect BQE and hence lead to deterioration in ecological potential.

For all the other TraC water bodies in the Essex and South Suffolk SMP2 area it was concluded that given the amount of MR2 proposed, habitat lost through HtL or AtL policies will largely be countered by habitat gain through MR2 policies.

3.3.3 Environmental Objective WFD3

A number of preferred policies have the potential to result in deterioration in Ecological Potential for a number of FWBs. FWBs that may be affected by the policies include the following:

- Orwell Tidal (GB105035040390);
- Orwell Tidal (GB105035040380);
- Holland and Hamford (GB105037033970); and
- Holland Brook (GB105037077810).

The Orwell Tidal FWB's have the potential to be affected by MR2 policies in PDZs A2 and A8a within the Orwell Transitional water body. Holland and Hamford and Holland Brook FWB's have the potential to be affected by PDZ policies in C2 in the Essex Coast coastal water body.

3.3.4 Environmental Objective WFD4

As per the Guidance for Assessment of SMPs under WFD, the policy which has the potential to cause deterioration in groundwater status is MR2. If landwards, MR2 has the potential to result in the saltwater – freshwater interface moving landwards, which coupled with abstraction pressures, could result in saltwater intrusion and status deterioration of the GWB. An assessment of the impact to groundwater status can be made on the basis that coastal erosion may occur if they are introduced.

In order to assess the impact to groundwater status, the locations of groundwater abstractions with SPZs within the two 'At Risk' GWBs (See **Section 3.1.3**) were obtained from the Environment Agency's website (<http://maps.environment-agency.gov.uk/wiyby>). The two at risk GWBs were identified as (see **Figures 3.10 & 3.11**):

- Felixstowe Peninsula Crag and Chalk Aquifer (G4018)
- Waveney and East Suffolk Chalk and Crag Aquifer (G4006)

A discussion on the potential to fail WFD4 is provided below for each GWB.

Felixstowe Peninsula Crag and Chalk Aquifer (G4018)

There is currently one groundwater abstraction with a SPZ within this GWB. However, given that the location of the abstraction (estimated from the Zone 1 of the SPZ) is a significant distance from the coast and the Zone 2 of the SPZ (which represents a 400 day travel time for groundwater flow) does not extend to the coast, it is considered unlikely that this abstraction would be impacted by policies within the SMP2.

Waveney and East Suffolk Chalk and Crag Aquifer (G4006)

There are currently three groundwater abstractions with SPZs located within this GWB. The abstractions are located near to PDZs A5 and A6 within the aquifer. In this area the Chalk aquifer is unconfined / semi-confined (Environment Agency, pers. comms, Anglian Region, EA, 2009), therefore, if the SMP2 policies in this area comprise MR2 or Retreat the Line (RtL), there is the potential for a deterioration in groundwater status. As the PDZ policies for A5 comprise HtL for all epochs, it is considered that there will be no deterioration in status as a result of policies in this PDZ. The policies for PDZ A6 comprise MR1 for all epochs and as such the potential for deterioration in the status of this groundwater body has been assessed further. The policy of MR1 is proposed along PDZ A6 as this area comprises higher ground and is currently eroding.

Further assessment has been undertaken to assess the likelihood of deterioration in status as a result of MR1 in PDZ A6. This has been done following the methodology set out in Guidance for Assessments of SMPs under WFD (Environment Agency, 2009). Looking at the SPZs, it was noted that limited extent of the total catchment of the SPZ extends into the A6 PDZ compared to the entire catchment of the abstraction. On this basis, it is considered that there is no risk of causing an increase in salinity in the nearby abstractions. As such, it is unlikely that the policy of MR1 will result in deterioration in status of this groundwater body (G4006 Waveney and East Suffolk Chalk and Crag Aquifer).

3.3.5 Water Framework Directive Summary Statements

A water body by water body summary of achievement (or otherwise) of the Environmental Objectives for the SMP2 policies is shown in **Assessment Table 4**. This table indicates that completion of a Water Framework Directive Summary Statement was necessary for four water bodies. These Water Framework Directive Summary Statements can be found in **Assessment Tables 5a – 5d**.

Assessment Table 4: Summary of achievement of WFD Environmental Objectives for each water body in the Essex and South Suffolk SMP2 area (colour shading equivocates to the shaded water bodies in Figures 3.1 to 3.6)

Water body	Environmental Objectives met?				WFD Summary Statement required?
	WFD1	WFD2	WFD3	WFD4	
Orwell	N/A	✓	x	✓	Yes – Environmental Objective WFD3 may not be met in some PDZs in this water body under SMP2 policies.
Stour	N/A	x	✓	✓	Yes – Environmental Objective WFD2, may not be met in some PDZs in this water body under SMP2 policies.
Harwich Approaches	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP2 policies
Hamford Water	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP2 policies
Essex	N/A	✓	x	✓	Yes – Environmental Objective WFD3, may not be met in some PDZs in this water body under SMP2 policies.
Blackwater Outer	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP2 policies
Blackwater & Colne	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP2 policies
Crouch	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP2 policies
Thames Coastal North	N/A	x	✓	✓	Yes – Environmental Objective WFD2, may not be met in some PDZs in this water body under SMP2 policies.
Thames Lower	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP2 policies.

Assessment Table 5a: Orwell Transitional Water body

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
<p>Orwell Transitional</p>	<p>Provide a summary of the policies which may cause this water body to fail one or more objectives.</p>	<p>As Assessment Table 3 shows SMP2 polices within PDZs A2 and A8a have the potential to fail WFD3 (No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies). Realignment of the defences may result in saline inundation of these FWB thereby affecting freshwater BQE that may be present there. The FWB in question are:</p> <ul style="list-style-type: none"> • Orwell Tidal (GB105035040390); and • Orwell Tidal (GB105035040380).
	<p>Have all practicable mitigation measures been incorporated into the preferred SMP2 policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.</p>	<p>An assessment of the likelihood of the preferred defence policies contributing to the failure of the FWB should be undertaken. MR2 at PDZ A2 will mean the loss of the Orwell FWB (390). However as this water body runs immediately behind the defences at Trimley Marshes it may already experience saline inundation and freshwater BQE may already be compromised. Further investigation with the Environment Agency is recommended.</p> <p>An assessment of the likelihood of the preferred defence policies contributing to the failure of the FWB should be undertaken. MR2 at PDZ A8a will mean that part of the Orwell FWB (380) will be lost. However as this water body runs immediately behind the defences at A8a it may already experience saline inundation and freshwater BQE may already be compromised. Further investigation with the Environment Agency is recommended.</p>

	<p>Can it be shown that the reasons for selecting the preferred SMP2 policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP2 policies to human health, to the maintenance of health and safety or to sustainable development?</p>	<p>Selection of MR2 in A2 and A8a is required to move to a more sustainable natural estuarine shape. Loss of intertidal habitat through sea level rise and coastal squeeze is predicted to occur within this water body. Increasing intertidal habitat through a MR2 policy is required to ensure that there is no deterioration in ecological potential in this TraC water body and can therefore be considered to be in line with sustainable development.</p>
	<p>Have other significantly better options for the SMP2 policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?</p>	<p>As set out in Chapter 4.2 of the SMP2 report there are no significantly better environmental options for PDZs A2 and A8b. A HTL and ATL policy would result in the loss of intertidal habitat in the Orwell TraC water body. A policy of MR2 will allow the Orwell TraC water body to maintain habitat suitable for estuarine BQE.</p> <p>As the Economic analysis shows in Appendix H a MR2 policy is economically more viable than maintaining a HTL policy.</p>
	<p>Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?</p>	<p>Within this water body the following designated sites are present:</p> <ul style="list-style-type: none"> • Stour and Orwell Estuaries SPA and Ramsar site; • Stour Estuary SSSI; and • Orwell Estuary SSSI. <p>As reported in the SEA and AA the preferred SMP2 policies within this management unit should not affect the sites ability to meet their environmental objectives. Proposed realignments in this MU should ensure that the overall ecological functioning of the estuaries is maintained.</p>

Assessment Table 5b Stour Transitional water body

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
<p>Stour Transitional</p>	<p>Provide a summary of the policies which may cause this water body to fail one or more objectives.</p>	<p>SMP2 policies which have the potential to cause this water body to fail one or more objectives include HTL policies for A9adf, A10ace, A11b; ATL policies for A11a; and MR1 policies for A8c, A9ce and A10df</p> <p>A combination of high ground and geological constraints mean that MR2 opportunities are limited to Shotley Marshes in A8b. This also means that BQE affected through HTL policy may also contribute to the failure of the water body to meet its environmental objectives as habitat lost through coastal squeeze will not be replaced through MR2 habitat creation policies. ATL at Harwich Harbour (A11a) may also result in the loss of intertidal and subtidal BQE.</p>
	<p>Have all practicable mitigation measures been incorporated into the preferred SMP2 policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.</p>	<p>Mitigation measures incorporated into SMP2 policies include the following:</p> <p>Realignment to create new intertidal habitat is proposed in A8b and A9ce. The landward realignment will create intertidal habitat which will support BQE such as invertebrates, angiosperms and fish.</p> <p>At the scheme level site specific mitigation measures should be implemented with reference to the Environment Agency’s Estuary Edges for Structurally Engineered Designs.</p>
	<p>Can it be shown that the reasons for selecting the preferred SMP2 policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP2 policies to human health, to the maintenance of health and safety or to sustainable development?</p>	<p>The policies selected within this water body are required to protect various property dwellings and key infrastructure such as rails and roads and can therefore be considered to be in the overriding interest of the public.</p>

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
	Have other significantly better options for the SMP2 policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	As set out in Chapter 4.2 of the SMP2 report there are no significantly better environmental options for this water body. ATL would result in the loss of habitat and a MR2 policy is not practicable given the topographical and geological constraints.
	Can it be demonstrated that the preferred SMP2 policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?	No landward freshwater or groundwater bodies will be affected by the preferred SMP2 policies in this water body.
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment (AA))?	<p>Within this water body the following designated sites are present:</p> <ul style="list-style-type: none"> • Stour and Orwell Estuaries SPA and Ramsar site; • Stour Estuary SSSI; and • Orwell Estuary SSSI. <p>As reported in the Strategic Environmental Assessment (SEA) and AA the preferred SMP2 policies within this management unit should not affect the sites ability to meet their environmental objectives. Proposed realignments in the Orwell and Stour MU should ensure that the overall ecological functioning of the estuaries is maintained.</p>

Assessment Table 5c: Essex Coast Coastal water body

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
<p>Essex Coast</p>	<p>Provide a summary of the policies which may cause this water body to fail one or more objectives.</p>	<p>As Assessment Table 3 shows SMP2 policies within PDZ C2 (Holland Haven) have the potential to fail WFD3 (No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies). Realignment of the defences may result in saline inundation of the following FWB:</p> <ul style="list-style-type: none"> • Holland and Hamford FWB(GB105037033970); and • Holland Brook FWB (GB105037077810).
	<p>Have all practicable mitigation measures been incorporated into the preferred SMP2 policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.</p>	<p>An assessment of the likelihood of the preferred SMP2 policies contributing to the failure of the FWB should be undertaken. MR2 at PDZ C2 will mean that the Holland & Hamford and Holland Brook will be affected by a MR2 policy. However as these water bodies run immediately behind the defences at Holland-on-sea they may already experience saline inundation and freshwater BQE may already be compromised. Further investigation with the Environment Agency is recommended.</p>
	<p>Can it be shown that the reasons for selecting the preferred SMP2 policies are ROPI and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP2 policies to human health, to the maintenance of health and safety or to sustainable development?</p>	<p>Selection of MR2 in C2 is required to move to a more sustainable natural coastline. Loss of intertidal habitat through sea level rise and coastal squeeze is predicted to occur within this water body. Increasing intertidal habitat through a MR2 policy is required to ensure that there is no deterioration in ecological potential in this TraC water body and can therefore be considered to be in line with sustainable development.</p>
	<p>Have other significantly better options for the SMP2 policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?</p>	<p>As set out in Chapter 4.4 of the SMP2 report there are no significantly better environmental options for this water body. AtL would result in the loss of habitat and a HtL policy would result in the loss of intertidal habitat.</p>

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?	There are no designated sites that are adjacent to this PDZ.

Assessment Table 5d: Thames Coastal North Coastal water body

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
Thames Coastal North	Provide a summary of the policies which may cause this water body to fail one or more objectives.	SMP2 polices which have the potential to cause this water body to fail one or more objectives include those associated with an HtL policy at PDZ I1a (Foulness). HtL policy in this PDZ may result in the loss of intertidal habitat through sea level rise and coastal squeeze.
	Have all practicable mitigation measures been incorporated into the preferred SMP2 policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	At the scheme level site specific mitigation measures should be implemented with reference to the Environment Agency's Estuary Edges for Structurally Engineered Designs.
	Can it be shown that the reasons for selecting the preferred SMP2 policies are ROPI and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP2 policies to human health, to the maintenance of health and safety or to sustainable development?	The polices selected within this water body are required to protect Ministry Of Defence (MOD) firing ranges and can therefore be considered to be in the overriding public interest.
	Have other significantly better options for the SMP2 policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	As set out in Chapter 4.10 of the SMP2 report there are no significantly better environmental options for this water body. AtL would result in the loss of habitat and a MR2 policy is not practicable given the constraints imposed by the MOD firing ranges.
	Can it be demonstrated that the preferred SMP2 policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?	No landward freshwater or groundwater bodies will be affected by the preferred SMP2 polices in this water body.

Water body	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP2
	<p>Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?</p>	<p>Within this water body the following designated sites are present:</p> <ul style="list-style-type: none"> • Foulness SPA and Ramsar site; • Essex estuaries SAC; and • Foulness SSSI. <p>As reported in the SEA and AA the preferred SMP2 policies where these designated sites occur should not be affected due to MR2 policies proposed elsewhere.</p>

4. DISCUSSION AND CONCLUSIONS

It is the overall intention of the Essex and South Suffolk SMP2 to allow the coastline to function and behave in a more natural sustainable way. Therefore, where possible, SMP2 policies of NAI and MR2 have been adopted to allow the coastline to adapt to the prevailing coastal processes that are experienced along this stretch of coastline in order to reach equilibrium. HtL SMP2 policies aim to protect key residential and commercial areas from flooding with associated benefits to the economy and public safety. HtL policies have also been selected in PDZs which are key control points that influence the development of the coast. Therefore when considering whether SMP2 policies have the potential to result in deterioration in ecological potential this assessment has taken into consideration the overall impact of the preferred policies on the functioning of the relevant water body and its ability to support BQE as identified in **Assessment Table 1**.

For most of the PDZs it is considered unlikely that the policies within the Essex and South Suffolk SMP2 will affect the current or target Ecological Status or Potential of water bodies and, hence, the policies meet the Environmental Objectives. However, there are some PDZs where the SMP2 policies have the potential to contribute to failure of Environmental Objectives (as identified by 'x' under the 'Environmental Objectives met?' column in **Assessment Table 3**). A Water Framework Directive Summary Statement has been completed for those water bodies where there is potential for failure. The Summary Statement outlines the reasons behind selecting the preferred SMP2 policy and any mitigation measures that have been incorporated into the policies.

There are no High Status water bodies present in the Essex and South Suffolk SMP2 area. Therefore the SMP2 is in compliance with Environmental Objective WFD1 (no changes affecting high status sites).

The potential of the SMP2 not to meet Environmental Objective WFD2 is applicable to two water bodies; Stour Transitional and Thames Coastal North Coastal water body. The adoption of the preferred SMP2 policies within the Stour Transitional water body may lead to the loss of intertidal habitat over the SMP2 period. Unlike the other water bodies in the Essex and South Suffolk SMP2 there are not many opportunities to realign coastal defences to create new habitat capable of supporting BQE. Therefore habitat lost in this water body is unlikely to be replaced. However as detailed in **Assessment Tables 3** and **5** due to topographical and geological constraints MR2 opportunities in this water body are limited. It has been shown that the preferred policies are in the overriding public interest and can be defended under Article 4.7 of the directive. Similarly HtL policy in PDZ I1a at Foulness could lead to the Thames Coastal North coastal water body not meeting WFD2. This coastal water body has a relatively short intertidal area and MR2 opportunities are limited. However as the preferred SMP2 policy of HtL is to protect MOD firing ranges it can be considered to be in the overriding public interest and defended under Article 4.7.

There is potential for the SMP2 to not meet Environmental Objective WFD3 for four FWB. These are:

- Orwell Tidal (GB105035040390);
- Orwell Tidal (GB105035040380);
- Holland and Hamford FWB(GB105037033970); and
- Holland Brook FWB (GB105037077810).

These water bodies have the potential to be affected by a MR2 policy due to direct loss through coastal erosion and increased risk of saline inundation by overtopping. However due to the FWB proximity to the coast they may already experience periodic saline inundations and their status as FWB should be reviewed. Also it is likely that these FWB were previously hydrologically linked to the coastal water bodies which they discharge into. Therefore it could be argued that the preferred policy is restoring the water bodies to their previous function. The impact of the preferred defence policies on these water bodies should be considered in more detail at a Strategy level.

It was also determined that MR policies are not likely to affect the status of GWB that are present in the SMP2 area. Therefore the SMP2 is compliant with Environmental Objective 4.

In areas where HtL, MR1 or AtL are the preferred policies it is recommended that the Environment Agency's Estuary Edges: Ecological Design Guidance is referred to in the design of defences at a scheme level.

5 REFERENCES

Defra (2006) Shoreline management plan guidance Volume 2: Procedures. Department for Environment, Food and Rural Affairs, March 2006, 77pp.

Environment Agency (2009) Assessing Shoreline Management Plans against the Requirements of the Water Framework Directive. January 2009.