Medway Estuary and Swale Shoreline Management Plan SMP

Appendix L –Water Framework Compliance

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Approved by
0	0	Internal draft	18.09.09	NP
0	1	Reflect RBMP re-publication 24.09.09	25.09.09	SH
2	0	Final incorporating Environment Agency comments	06.11.09	SH / NP
2	1	Incorporating responses to QRG comments	30.03.10	SH

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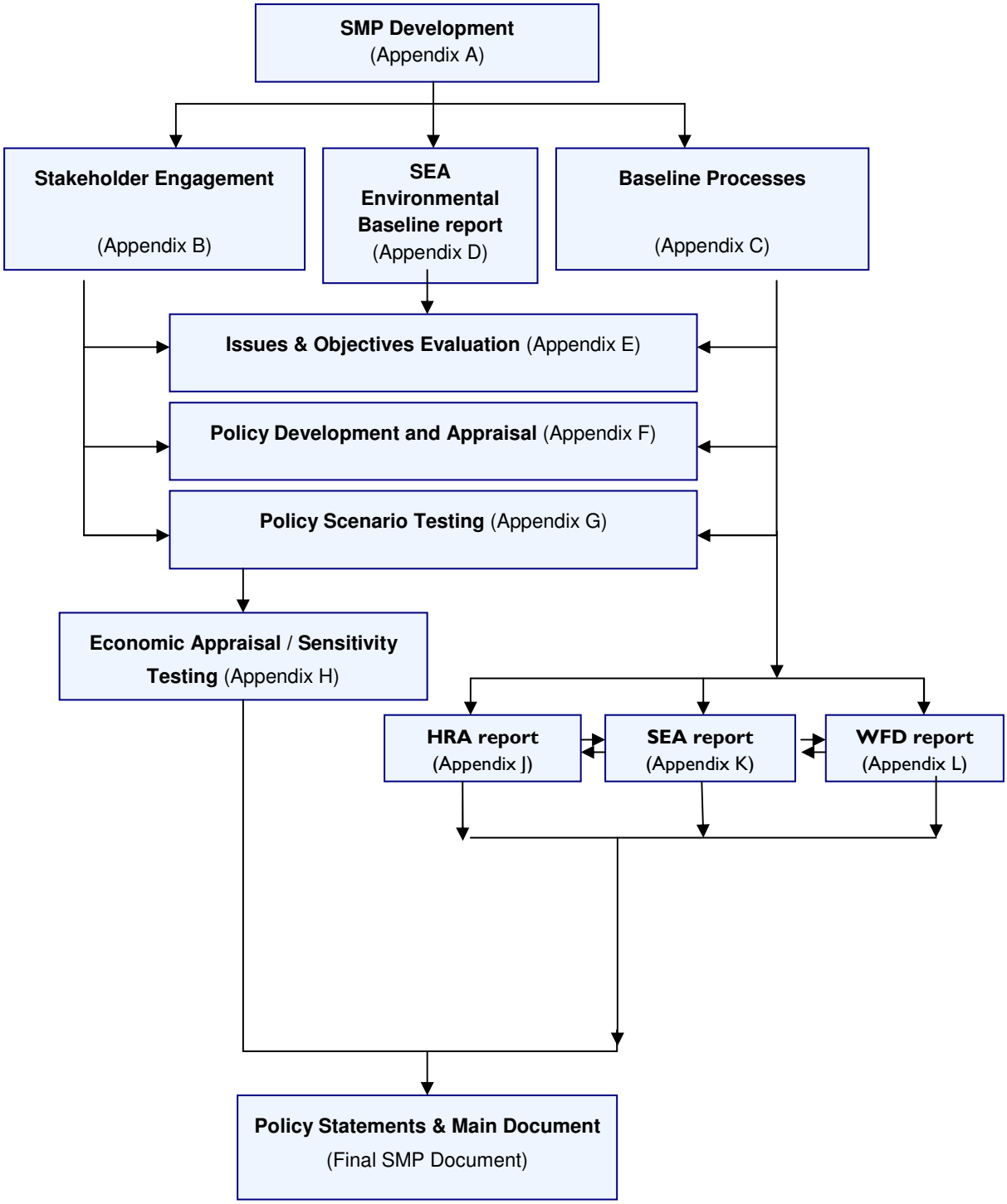
Appendix L: Water Framework Compliance

The Supporting Appendices

This appendix and the accompanying documents provide all of the information required to support the Shoreline Management Plan. This is to ensure that there is clarity in the decision-making process and that the rationale behind the policies being promoted is both transparent and auditable. The appendices are:

A: SMP Development	This reports the history of development of the SMP, describing more fully the plan and policy decision-making process.
B: Stakeholder Engagement	All communications from the stakeholder process are provided here, together with information arising from the consultation process.
C: Baseline Process Understanding	Includes baseline process report, defence assessment, NAI and WPM assessments and summarises data used in assessments.
D: SEA Environmental Baseline Report (Theme Review)	This report identifies and evaluates the environmental features (natural environment, landscape character, historic environment, land use, infrastructure and material assets, and population and human health).
E: Issues & Objective Evaluation	Provides information on the issues and objectives identified as part of the Plan development, including appraisal of their importance.
F: Initial Policy Appraisal & Scenario Development	Presents the consideration of generic policy options for each frontage, identifying possible acceptable policies, and their combination into 'scenarios' for testing.
G: Scenario Testing	Presents the policy assessment and appraisal of objective achievement towards definition of the Preferred Plan (as presented in the Shoreline Management Plan document).
H: Economic Appraisal and Sensitivity Testing	Presents the economic analysis undertaken in support of the Preferred Plan.
I: Metadatabase and Bibliographic database	All supporting information used to develop the SMP is referenced for future examination and retrieval.
J: Habitats Regulations Assessment	Presents an assessment of the effect the plan will have on European sites.
K: SEA Report	Presents the Strategic Environmental Assessment of the Plan.
L: Water Framework Compliance	Presents a retrospective Water Framework Directive Assessment.

Within each appendix cross-referencing highlights the documents where related appraisals are presented. The broad relationships between the appendices are as below:



Glossary

BQE	Biological Quality Element
FWB	Freshwater Body
GWB	Groundwater Body
HTL	Hold the Line
MR	Managed Realignment
NAI	No Active Intervention
ROPI	Reasons of Overriding Public Interest
RBD	River Basin District
RBMP	River Basin Management Plan
SPZ	Source Protection Zone
WFD	Water Framework Directive
TraC	Transitional or Coastal Water Body

L1 Introduction

L1.1 PURPOSE OF THE REPORT

The Water Framework Directive (WFD) came into force in 2000 and is the most substantial piece of European Union water legislation to date. As such the Directive will need to be taken into account in the planning of all new activities in the water environment.

The Environment Agency (the competent authority in England and Wales responsible for delivering the Directive) has issued guidance that explains how to build the environmental objectives of the WFD into Shoreline Management Plans[1]. The guidance describes the methodology for assessing the potential physical and hydromorphological changes and consequent ecological impacts of SMP policies.

This report uses the guidance to identify the compatibility of the **Medway Estuary and Swale Shoreline Management Plan 2** (SMP2) with the Directive's environmental objectives. The SMP2 was finalised in 2008 and hence this assessment is retrospective. As such, and in line with the guidance, the assessment aims (a) to identify if the proposed SMP2 policies are likely to result in any hydromorphological or physical changes which would result in a risk of failing the WFD's objectives for the water bodies in question, (b) in the cases where such risk exists, to assess the compliance of the proposed SMP2 policies with Article 4.7 of the Directive (see Section 2.4 for further explanation), and (b) if required, to identify any additional mitigation measures which should be included during on-going work to implement the SMP2 proposals.

L1.2 BACKGROUND

The WFD was transposed into English and Welsh law as the *Water Environment (Water Framework Directive) (England and Wales) Regulation, 2003*. Its purpose is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwaters.

The framework for delivering the WFD is through River Basin Management Plans (RBMP) produced one for each River Basin District (RBD). For the Medway Estuary and Swale SMP the relevant District is the Thames RBD.

For all water bodies in this district the Directive requires the setting of environmental objectives. These are based on the default objectives in Article 4 of the WFD, *viz*:

- Implement the necessary measures to prevent deterioration of the status of all bodies of surface water (Article 4.1(a)(i));
- 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 (Article 4.1(a)(ii));

[1] Environment Agency, 2009, Water Framework Directive: step by step process for assessing Shoreline Management Plans, 82_09

- 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 (Article 4.1(a)(iii));
- Progressively reduce pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous substances (Article 4.1(a)(iv));
- Prevent "deterioration in status" and prevent or limit input of pollutants to groundwater. (Article 4.1(b)(i)).

In order to achieve these environmental objectives, a set of action measures for each RBD has been proposed. These measures are proposed to maintain or return the existing environment to a position of at least "good" status (for water bodies which are not artificial or heavily modified) or potential (for artificial water bodies and heavily modified water bodies, AWBs and HMWBs) as defined by the WFD. These mitigation measures are included in each RBMP's "programme of measures".

L1.3 LIMITATIONS

This retrospective assessment was undertaken in September 2009, after the first round of public consultation on the draft Thames RBMP but before consultation responses had been included in the revised Plan (anticipated in December 2009). The information was taken from the revised draft Thames RBMP published in September 2009. Therefore, some of the information included in this report should be revisited in December 2009 or thereafter to ensure that the conclusions of this assessment remain relevant.

L1.4 PREVIOUS WFD ASSESSMENT

Prior to the development of the Environment Agency national guidance on the WFD assessment of SMPs, the Medway Estuary and Swale SMP2 was assessed by the Environment Agency to establish how complementary it was to the objectives of the then first draft Thames RBMP (see **Annex L1**: *Medway and Swale Estuary SMP Compliance With the Water Framework Directive*, Environment Agency, 2008)

That assessment is also reported in this report, but in summary it concluded that:

"….*Overall the policies of the SMP have a neutral or positive effect on the WFD measures; particularly in policy units where managed realignment is proposed in Epoch 1 or 2. This will help the RBMP implement its mitigation measures and assist in meeting the WFD objectives. There are no policies proposed by the SMP that have a detrimental effect on the RBMP's measures and their ability to meet the WFD objectives.*

Future reviews of the SMP will take into consideration any monitoring that will come out of the RBMP implementation and will consider new findings and measures identified in the next review of the RBMP. This will ensure that both plans assist each other in meeting their objectives….."

L2 Assessment Methodology

The methodology used in this assessment follows the Environment Agency's guidance which breaks the assessment down into a series of clearly defined steps, to provide a transparent and auditable account of the assessment of SMP2 policies. These steps are summarised below (section 2.1 to 2.4). For a full account of the process the reader should refer to the guidance.

L2.1 STEP 1: SCOPE THE SMP – DATA COLLATION

To make the assessment as comprehensive as possible, a data collation exercise was undertaken to identify all transitional and coastal (TraC) water bodies present in the SMP2 study area, highlighted in Figure 1. In addition, all river and lake water bodies were identified that may be influenced by SMP2 policies. These water bodies were identified through:

- Overlay of the Environment Agency's water body GIS layers with the SMP2 policy units GIS layer;
- Examination of the Environment Agency's Flood Map (available on the Environment Agency web site, www.environment-agency.gov.uk); and
- Identification of any tidal limiting structures on river water bodies from the Environment Agency's National Flood and Coastal Defence Database (NFCDD) and from Ordnance Survey mapping.
- For each relevant water body the following information was obtained / determined:
- WFD water body identification number;
- Water body classification details (including information on relevant Biological Quality Elements[(2)] and any designation as an artificial or heavily modified water body;
- The relevant WFD environmental objectives;
- Actions from the programme of measures in the Thames RBMP ([3]) relevant to the water bodies in the Medway Estuary and Swale SMP2 area.

These actions were repeated for groundwater bodies associated with the SMP2 area, with further emphasis given to (a) identifying any groundwater bodies considered to be at risk of failing the objectives of the WFD as a result of saline intrusion, and (b) comparing the locations of groundwater source protection zones (available on the Environment Agency web site, www.environment-agency.gov.uk) with possible future coastal / estuarine frontage alignments.

Finally, where there were discrepancies between water body boundaries and SMP2 unit boundaries, these were highlighted and recommendations were made, where appropriate, to change the SMP2 boundaries to attain consistency with water body boundaries.

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(2) The assessment of ecological status or potential of water bodies is carried out with the use of biological indicators from several groups of organisms – referred to in the WFD as "biological quality elements". For example: for inland surface waters (river and lake water bodies), the assessment might include consideration of factors relevant to phytoplankton, macrophytes, benthic and macro invertebrates and fish.

(3) Environment Agency River Basin Management Plan, Thames River Basin District, Document Submitted to the Secretary of State for Approval, September 2009

L2.2 STEP 2: DEFINE WFD FEATURES AND ISSUES

For each of the water bodies highlighted as relevant in step 1, an assessment was made of the potential impact of generic SMP polices (Hold the Line HTL, No Active Intervention NAI, Managed Realignment MR) on physical and hydromorphological characteristics of water bodies (be they tidal or riverine). This was used to identify for each pertinent water body the hydromorphological conditions which have the potential to be modified by SMP policies with consequent significant effect on a water body's biological quality elements. The conclusions of this are summarised in **Assessment Table 2.** That table also presents for each water body its classification, relevant actions proposed in the programme of measures for the Thames RBMP, and the relevant WFD environmental objectives from Article 4.1 of the WFD, identified from the following list:

- WFD1 - no changes affecting "high" status sites;
- WFD2 - no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/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.

L2.3 STEP 3: ASSESS PREFERRED SMP POLICIES AGAINST WFD ENVIRONMENTAL OBJECTIVES

In this stage of the assessment the potential changes in physical and hydromorphological processes that could result from the preferred SMP2 policies are assessed against the four WFD environmental objectives. For each SMP2 policy unit, the potential changes in relevant physical and hydromorphological processes were identified and recorded in **Assessment Table 3**.

The assessment did not consider only transitional water bodies, but also the potential impact on associated river water bodies and groundwater bodies, particularly relevant to frontages where the preferred policy was No Active Intervention (NAI) or Management Realignment (MR). These policies could potentially result in increased saline incursion, benthic habitat modification and other changes in river water bodies, and a risk of saline intrusion into groundwater bodies.

However, it should be noted that the WFD consideration of risks of saline intrusion of groundwater bodies relates in particular to the impact of water abstractions. If a coastal system changes due, for example, to managed realignment this is considered a return to more natural conditions. Under such circumstances, any consequent saline intrusion of the underlying groundwater would not result in a Poor Status classification.

Following this assessment the cumulative effects of all the SMP2 policies were assessed for each water body, and the outcome recorded in **Assessment Table 4.**

L2.4 STEP 4: COMPLETE WFD SUMMARY STATEMENT

Where it was concluded under Step 3 that any SMP2 policy presents a significant risk of failure to meet any of the four WFD environmental objectives, a Water Framework Directive Summary Statement was completed; **Assessment Table 5**. This table summarises the considerations made in SMP2 development that are pertinent to Article 4.7 of the WFD, specifically:

- Assess whether all appropriate mitigation measures for potential new modifications have been included in the preferred SMP2 policy;
- Present evidence that the preferred SMP2 policy is being promoted for reasons of over-riding public interest;
- Present evidence that no other SMP2 policy option would present an environmentally better, affordable, option for that policy unit;
- Demonstrate that the effect on water bodies outside the SMP2 study area have been considered and that the associated WFD objective 3 would not be compromised;
- Highlight any other overriding issues that should be considered.

L2.5 APPROACH TO PREVIOUS WFD ASSESSMENT

The previous WFD assessment work (see Annex L1: *Medway and Swale Estuary SMP Compliance With the Water Framework Directive*, Environment Agency, 2008) established the compatibility of the developing SMP with the objectives of the developing Thames RBMP. The methodology used is repeated here:

"….*During the classification exercise of HMWB for Flood Risk Management in Transitional and Coastal (TRAC) waters, all potential mitigation measures were evaluated, and the Medway and Swale Estuary SMP policies were included in the process to highlight if any of the mitigation measures proposed could be in disagreement with SMP policies. As a result of this process it was ensured there are no conflicts between the GEP mitigation measures and SMP policies.*

A final check was undertaken on completion of the SMP to ensure that the SMP's policies comply with the objectives of the RBMP and do not have any negative implication on the ability of the measures identified in the RBMP to be implemented……..Where appropriate, positive influences are identified, whereby the SMP contributes positively to the RBMP measures or objectives being met. Actions or measures proposed in the RBMP for waterbodies within the SMP area, were considered against the policies proposed for the SMP units. Each mitigation measure under each waterbody was assessed as being positively, negatively or neutrally affected by the SMP policies for that waterbody. This assessment is high level and based on qualitative information and professional judgement…."

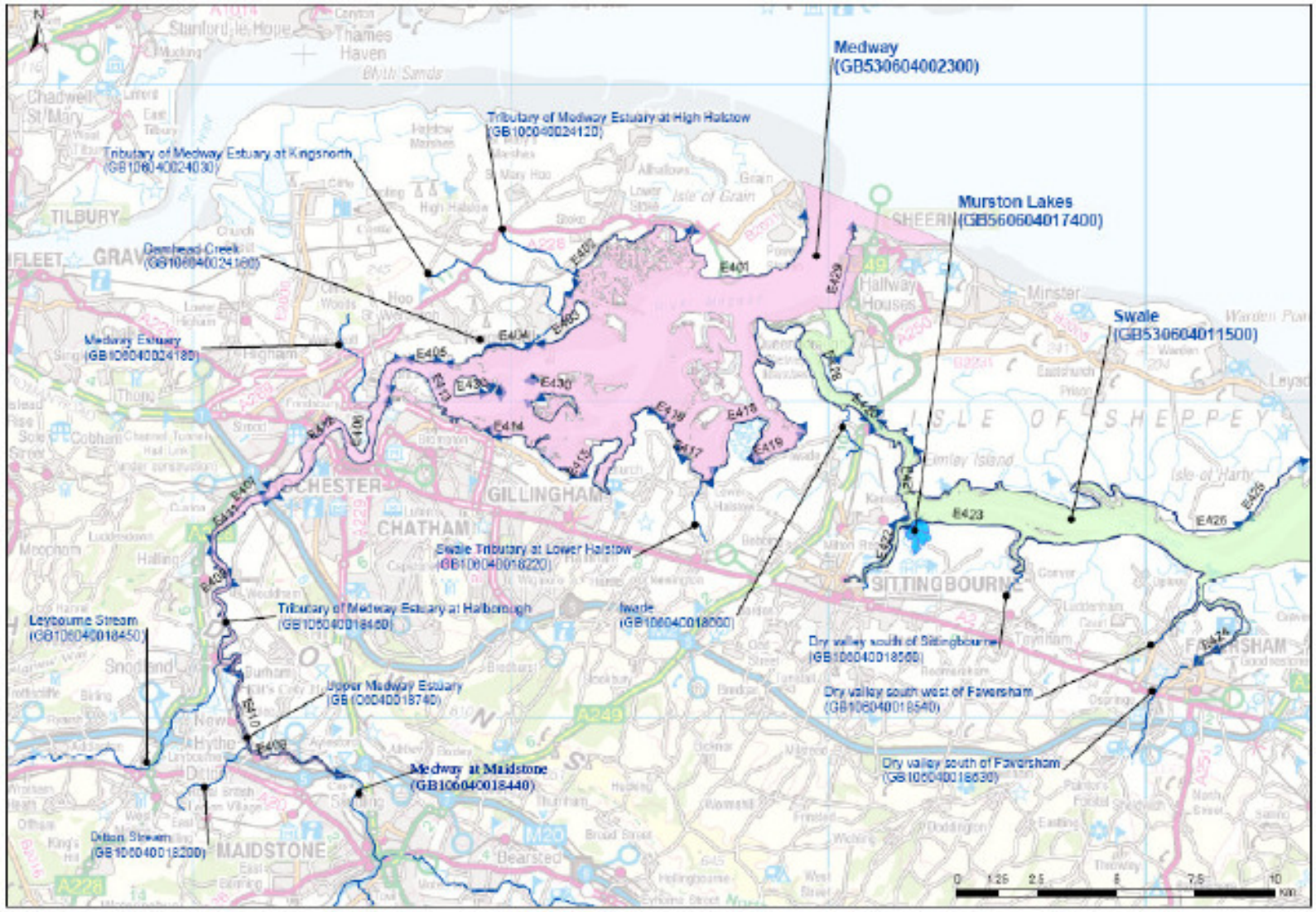

Figure 1 – Water Bodies Associated with the Medway Estuary and Swale SMP2

L3 Results

L3.1 STEP 1: SCOPING THE SMP – DATA COLLATION

L3.1.1 Transitional and Coastal Water Bodies

The two principal transitional / coastal (TrAC) water bodies within the Medway Estuary and Swale SMP2 area are the Medway and the Swale. There is also a series of saline lagoons, Murston Lakes, constituting a third TrAC water body adjacent to the Swale (Figure 1). Further details on these water bodies and on their sensitive biological quality elements are presented in **Assessment Table 2.**

L3.1.2 River and Lake Water Bodies

A number of river water bodies may potentially be affected by SMP2 policies, based on their proximity to and links with the Medway or Swale TrAC water bodies. These water bodies and the potential for adverse effects on their biological quality elements are identified in **Assessment Table 2**. There are no lake water bodies likely to be affected by SMP2 policies.

L3.1.3 Groundwater Bodies

The groundwater bodies (GWBs) underlying the SMP2 study area and the hinterland associated with the SMP2 frontages are summarised in **Assessment Table 2**. An additional groundwater body (GB40504G999900) which underlies several of the more northerly policy units in the SPM2 is described in the Thames River Basin Management Plan as non-productive strata (formerly termed “non-aquifer”). None of the other GWBs are listed as at risk or potentially at risk from saline intrusion as a result of abstraction.

L3.1.4 Boundary Issues

A comparison of the Medway Estuary and Swale SMP2 study boundary and the Thames River Basin Management Plan and water body identification has identified only one boundary discrepancy which might warrant revision of the SMP2. Policy unit E4 29 overlaps both the Medway and the Swale TrAC water bodies, and has differing consequences for them because the Swale is much more constrained than the Medway, and therefore whilst there may be significant hydromorphological effects in the Swale these are unlikely in the Medway. Separation of this policy unit into E29a (Swale) and E29b (Medway) might be warranted.

L3.2 STEP 2: DEFINE WFD FEATURES AND ISSUES

Assessment Table 2 identifies the biological quality elements that could potentially be affected by hydromorphological and physical features in each of the TraC water bodies and river water bodies associated with the SMP2 study area. Where relevant, additional comment is also made on local issues, such as shellfishery or fishery areas, within these water bodies. **Assessment Table 2** also presents the water body classifications and relevant WFD environmental objectives (i.e. WFD1, WFD2, WFD3, WFD4).

L3.2.1 Transitional and Coastal Water Bodies

The Medway estuary shows a diverse form, being wide in the northern part of the study area but much more constrained along the channel between Rochester and Maidstone, where the upper tidal limit is defined by Allington Lock. In addition to the WFD environmental objectives, there are some specific fishery interests in the Medway.

The Swale is generally constrained between the Kent coast and the Isle of Sheppey. It is a transitional channel with no forming river water body. Generally the Swale frontage is less developed than the more constrained reaches of the Medway. The susceptibility to changes in hydromorphological processes is significantly different as a result. In addition to the WFD environmental objectives, there are some specific shellfishery interests in the Swale.

The Murston Lakes transitional water body comprises a series of man made lakes classified in the Thames RBMP as saline lagoon (but also as an angling lake). The water body is located adjacent to the Swale, with tidal connection to the Swale via an outfall pipe from the northern corner of the main lake into Milton Creek.

L3.2.2 River and Lake Water Bodies

There are some 14 river water bodies which drain into either the Medway or the Swale TrAC water body. They include both unmodified water bodies and candidate HMWBs. Considering their ecological status / potential, several of these water bodies have not yet been assessed. Of the remainder most are considered to be at moderate status / potential whilst one is at bad potential. The reasons for less than good status are varied, but there are no specific indications implicating flood or coastal erosion protection measures as being contributory. However, it is noted that a number of the smaller water bodies have tidal flaps which, presumably, prevent (significant) tidal incursion, as a flood protection measure. More significantly, the Medway at Maidstone has its upper tidal limit defined by Allington Lock. Arguably, these structures present a hydromorphological pressure which prevents natural functioning of the naturally tidal reaches of these water bodies. However, the Environment Agency considers these assets as part of its fluvial (rather than coastal) flood risk management strategies, i.e. they are not considered in the SMP2 process.

L3.2.3 Groundwater Bodies

That part of north Kent around the SMP2 area is underlain by a series of primarily chalk aquifers running approximately east-west. The majority of the coastline itself overlies non-productive strata, and the remaining aquifers are all classified as “not at risk” of saline intrusion.

L3.3 STEP 3: ASSESS PREFERRED SMP POLICIES AGAINST WFD ENVIRONMENTAL OBJECTIVES

The potential impacts of SMP policies on WFD environmental objectives have been evaluated and are summarised in **Assessment Table 3**. The potential to meet or fail each of the relevant WFD environmental objectives has been assessed in terms of the effect of the proposed SMP2 policy on the relevant physical and hydromorphological parameters. The relationship between these parameters and the biological quality elements has already been determined in **Assessment Table 2**. The impact of climate change on baseline processes has been taken into account at this stage.

L3.3.1 Environmental Objective WFD 1

There are no confirmed “high status” water bodies in the SMP2 study area. A number of the river water bodies have not yet been assessed under the River Basin Management Plan, however, and for these WFD1 may potentially be relevant. As determined in Assessment Table 3, none of these “not yet classified” water bodies is likely to see any deterioration in status as a result of the SMP2 policy that applies to the associated frontage.

L3.3.2 Environmental Objective WFD 2

TrAC Water Bodies

The majority of SMP2 policy units in the Medway Estuary and Swale do not present a significant risk of deterioration in ecological status or potential of the associated Medway, Swale or Murston Lakes transitional water bodies, nor do they present a risk of attaining Good Potential in these water bodies in the future. Indeed, where the SMP2 policy is to implement (some) managed realignment this is also in line with the mitigation measures identified in the RBMP as necessary to allow the modified water bodies to achieve Good Potential (see Assessment Table 2 for details on these mitigation measures). Although these mitigation measures have not been screened in the RBMP development process for technical feasibility or disproportionate cost, they do present aspirations and the SMP2 policies for managed realignment present opportunities to contribute to these in each case. Therefore, these SMP policies do not threaten WFD2.

The exceptions are where a Hold the Line policy is preferred in constrained reaches of the upper Medway estuary (E4 01, E4 03, E4 06, E4 07, E4 12, E4 13) and at the western end of the Swale (E4 21, E4 29). In these instances, some coastal squeeze and / or accelerated erosion is likely, particularly in longer term epochs, with the potential to contribute to a **failure to meet WFD environmental objective 2**.

Each of these policy units has therefore been examined further to establish the justification for HTL (see **Assessment Table 4**):

- The SMP2 makes generic comments about mitigation measures but does not include specific and detailed mitigation measures for each policy unit as no outline designs have yet been proposed; some comments on mitigation are made in this report, but should be updated when the final Thames RBMP becomes available;
- The SMP2 has demonstrated overriding public interest in each case;
- In no policy unit is there an environmentally better option which would meet the required public interest;
- None of the policies would have significant effect on any internationally designated nature conservation site, designated fishery / shellfishery, or other water body (as needs to be assessed under Articles 4.8 of the WFD[4]).

The SMP2 has also considered the overall effect of all preferred policies on the transitional water bodies, and the losses of intertidal habitat in these more constrained zones are more than offset by the gains at MR (and NAI) sites in particular in the middle of the estuary.

Thus, where there are SMP2 policies which present a risk of not meeting WFD2, they are all considered to meet the criteria laid down in Article 4.7 of the WFD (see Section 2.4 for details) and thus to be in accordance with the Directive's objectives.

River Water Bodies

In the majority of cases the river water bodies which drain into the Medway or Swale are located within hold the line (HTL) policy frontages, and consequently there will be no net effect on river water body status / potential.

(4) Article 4.8 requires assessment of whether the proposed action will present a risk to the objectives of other water bodies, e.g. those adjacent to the one in which a scheme is being implemented, and assessment to ensure compliance with other community legislation, e.g. the Habitats Directive.

For two river water bodies (Damhead Creek at E4 04 and Tributary of Medway Estuary at Holborough at E4 08), a managed realignment (MR) policy applies to the land which is drained by them. These water courses themselves are minor, but their associated standing waters, drains, grazing marsh etc may be significant. In both cases, the MR policy will result in future changes in these habitats due to tidal flooding. Through discussion with Natural England and other consultees during SMP2 policy development it has been concluded that the move towards a more natural coastline (thus benefitting the relevant TrAC water bodies) is more sustainable than a HTL policy which would defend the freshwater habitats. Thus, these policies are considered overall to contribute to the WFD's environmental objectives, accepting a change in river water bodies' as part of more natural development of the coastline.

The Iwade at E4 20 is also located within a frontage where MR policy applies. There may be hydromorphological and physical changes at the tidal interface, but this will be most likely to result in a longitudinal redistribution of key biological quality elements, rather than their loss or decline, as a result of more natural development of the coastline. Therefore, the consequences will be an improvement in, rather than deterioration, in ecological potential.

L3.3.3 Environmental Objective WFD 3

None of the SMP2 policies are considered to present the potential to contribute to a failure in WFD3, i.e. to cause changes which would permanently prevent the environmental objectives of other water bodies being met.

L3.3.4 Environmental Objective WFD 4

MR and NAI policies could result in a change in the land areas that are tidally inundated. Although the actual areas of tidal inundation have not been mapped as part of the SMP2, a number of the relevant policy units apparently overlie a groundwater outer source protection zone (SPZ 3).

However, each of the three groundwater bodies involved has been considered "not at risk" of saline intrusion as a result of abstraction, and each groundwater body is already overlain by tidal waters. Thus the consequences of the MR and NAI policies are considered to be insignificant and to present no risk of deterioration in groundwater body status.

L3.4 STEP 4: COMPLETE WFD SUMMARY STATEMENT

A summary of water bodies achievement (or otherwise) of the WFD environmental objective is presented in **Assessment Table 4**. Where any WFD environmental objective is at risk of not being met *for any SMP2 policy unit*, a WFD summary statement is complete in **Assessment Table 5**.

L3.5 RESULTS OF PREVIOUS WFD ASSESSMENT

The previous WFD assessment work (see Annex L1: *Medway and Swale Estuary SMP Compliance With the Water Framework Directive*, Environment Agency, 2008) established the compatibility of the developing SMP with the objectives of the developing Thames RBMP. Tables 3.1 to 3.5 report the outcome of that assessment.

In summary, it concluded that:

"….*Overall the policies of the SMP have a neutral or positive effect on the WFD measures; particularly in policy units where managed realignment is proposed in Epoch 1 or 2. This will help the RBMP implement its mitigation measures and assist in meeting the WFD objectives. There are no policies*

proposed by the SMP that have a detrimental effect on the RBMP's measures and their ability to meet the WFD objectives……"

It is important to note that the 2008 assessment was based on the developing RBMP, and some of the statements therein and in Tables 3.1 to 3.(e.g. related to water body status, or proposed mitigation measures) may be different to those in the 2009 draft final RBMP used for the retrospective assessment described in Sections 3.1 to 3.4.

Table 3.1- Assessment of the SMP Policies Against the RBMP Objectives and Actions Relating to the Waterbodies Within the SMP Area - Medway

Waterbody: Medway GB530604002300 HMWB: Yes SMP policy units: E1-20, E28-29			
Pressure	**Mitigation Measure**	**Effect of SMP on Mitigation Measure**	**Comments**
Shoreline reinforcement /bank reinforcement	Removal of hard engineering structures (e.g. naturalisation) or replacement with soft engineering solution	Positive	8 policy units include some managed realignment in Epoch 1, and a further 4 in Epoch 2. This is expected to present opportunities to replace hard structures with softer solutions in retreated positions.
	Managed realignment of flood defence	Positive	8 policy units include some managed realignment in Epoch 1, and a further 4 in Epoch 2.
	Restore/create/enhance aquatic and marginal habitats	Positive	Managed realignment policies will provide opportunity to enhance habitats. There are also 3 policy units with a policy of no active intervention which may also result in habitat enhancement.
	Indirect/offsite mitigation (offsetting measures)	Neutral	
Impoundment (locks sluices and tidal barrages)	Removal of obsolete structure	Neutral	
	Operational and structural changes to locks, sluices and tidal barrages	Neutral	
	Indirect/offsite mitigation (offsetting measures)	Neutral	

Table 3.2 - Assessment of the SMP Policies Against the RBMP Objectives and Actions Relating to the Waterbodies Within the SMP Area – Swale

Waterbody: Swale GB530604011500 **HMWB: Yes** **SMP policy units: E21-27**			
Pressure	**Mitigation Measure**	**Effect of SMP on Mitigation Measure**	**Comments**
Shoreline reinforcement/ bank reinforcement	Removal of hard engineering structures (e.g. naturalisation) or replacement with soft engineering solution	Positive	The SMP identifies 2 units where managed realignment is possible in Epoch 1, and 2 units in Epoch 2. This is expected to present opportunities to replace hard structures with softer solutions in retreated positions.
	Bank rehabilitation/reprofiling	Positive	Opportunities are likely to arise in association with realignment policies
	Managed realignment of flood defence	Positive	The SMP identifies 2 units where managed realignment is possible in Epoch 1, and 2 units in Epoch 2.
	Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone	Positive	Opportunities are likely to arise in association with realignment policies

Table 3.3 - Assessment of the SMP Policies Against the RBMP Objectives and Actions Relating to the Waterbodies Within the SMP Area - South Faversham

Waterbody: Inland Water Body (River) GB106040018530 S. Faversham **HMWB: Yes** **SMP policy units:E23/24**			
Pressure	**Mitigation Measure**	**Effect of SMP on Mitigation Measure**	**Comments**
Channel Alteration (realignment/reprofiling/ regrading), causing loss of morphological diversity and habitat	Increase in channel morphological diversity, e.g. install instream features; 2 stage channels	Neutral in years 0-20 and positive from year 20	HTL in Epoch 1 will have no effect but there is potential for a future positive effect from managed realignment in Epoch 2.
	Retain marginal aquatic and riparian habitats (channel alteration)	Neutral in years 0-20 and positive from year 20	HTL in Epoch 1 will have no effect but there is potential for a future positive effect from managed realignment in Epoch 2.
Channel alteration (culverts), causing loss of morphological diversity and habitat	Alteration of channel bed (within culvert)	Neutral	
Bank and bed	Structures or other	Neutral	

Waterbody: Inland Water Body (River) GB106040018530 S. Faversham HMWB: Yes SMP policy units:E23/24			
Pressure	**Mitigation Measure**	**Effect of SMP on Mitigation Measure**	**Comments**
reinforcement in channel structures (dams, sluices etc), causing interference with fish movements	mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works		
	Operational and structural changes to locks, sluices, weirs, beach control	Neutral	
Bank and bed reinforcement in channel structures (hard protection) causing loss of riparian zone/connectivity	Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone	Neutral in years 0-20 and positive from year 20	HTL in Epoch 1 will have no effect but there is potential for a future positive effect from managed realignment in Epoch 2.
Operations and maintenance – vegetation control causing physical disturbance	Selective vegetation control technique	Neutral	
	Appropriate vegetation control technique	Neutral	
	Appropriate timing (vegetation control)	Neutral	
	Appropriate techniques (invasive species)	Neutral	
Operations and maintenance- removal of urban trash and woody debris causing loss of aquatic habitats	Appropriate channel maintenance strategies and techniques- minimise disturbance to channel bed and margins	Neutral	
Urbanisation, causing changes to vegetation, hydrology and sediment supply	Educate landowners on sensitive management practices (urbanisation)	Neutral	

Table 3.4 - Assessment of the SMP Policies Against the RBMP Objectives and Actions Relating to the Waterbodies Within the SMP Area – Iwade

Waterbody: Inland Water Body GB106040018600 Iwade HMWB: Yes SMP policy unit:E20			
Pressure	**Mitigation Measure**	**Effect of SMP on Mitigation Measure**	**Comments**
Channel alteration (realignment/reprofiling/ regarding, causing loss of morphological diversity and habitat	Increase in-channel morphological diversity	Positive	Managed realignment from year 0 will provide potential for enhancement of diversity
	Retain marginal aquatic and riparian habitats (channel alteration)	Positive	Managed realignment policy provide opportunity to improve marginal aquatic and riparian habitats
Channel alteration	Re-opening existing	Neutral	

Waterbody: Inland Water Body GB106040018600 Iwade HMWB: Yes SMP policy unit:E20			
Pressure	**Mitigation Measure**	**Effect of SMP on Mitigation Measure**	**Comments**
(culverts), causing continuity problems	culverts		
	Alteration of channel bed (within culvert)	Neutral	
Floodplain modification (flood banks and walls), causing loss of riparian zone etc	Flood bunds (earth banks, in place of floodwalls)	Positive	Managed realignment policy provides opportunity to replace defences with softer structures (e.g. flood bunds) in retreated position.
	Set bank embankments	Positive	Managed realignment provides opportunity to set back embankments
	Improve floodplain connectivity	Positive	Managed realignment will assist this measure
Bank and bed reinforcement/in channel structures (dams, sluices, weirs etc), causing loss of biological continuity and interference with fish movement	Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works	Neutral	
	Operational and structural changes to locks, sluices, weirs, beach control	Neutral	
Operations and maintenance- vegetation control, causing physical disturbance	Selective vegetation control technique	Neutral	
	Appropriate vegetation control technique	Neutral	
	Appropriate timing (vegetation control)	Neutral	
	Appropriate techniques (invasive species)	Neutral	
Operations and maintenance – removal of urban trash and woody debris, causing loss of aquatic habitats	Appropriate channel maintenance strategies and techniques- minimise disturbance to channel bed and margins	Neutral	

Table 3.5 - Assessment of the SMP Policies Against the RBMP Objectives and Actions Relating to the Waterbodies Within the SMP Area – Groundwater

Waterbody: Groundwater bodies			
Groundwater Body	**Groundwater Interactions with Tidal Waters**	**Effect of SMP on Groundwater Body**	**Comments**
GB40504G999900 Unproductive strata	The areas of clay have not been classified as Groundwater Bodies and are all considered “Unproductive Strata”. Local scale interactions with the soil zone and saline water are	Neutral	

Waterbody: Groundwater bodies			
Groundwater Body	**Groundwater Interactions with Tidal Waters**	**Effect of SMP on Groundwater Body**	**Comments**
	likely but this will not alter any Water Framework Directive classifications for groundwater bodies for quality or for resources.		
GB40602G500200 North Kent Tertiaries	The implications on groundwater quality of changes along the coast on the risk by saline intrusion for Groundwater Body GB40602G500200 have not been assessed to date as there are no groundwater quality monitoring points. It has therefore been Classified as Good Status by default for the saline intrusion tests. Changes associated with inundation due to sea level rise or managed retreat options alone are considered as "allowing / returning to" natural conditions so will not result in a change in the status.	Neutral	Managed retreat options in E15, 17, 18 and 20 in years 0-20 will be considered 'returning to natural conditions'.
GB40601G501700 North Kent Swale Chalk	The majority of Groundwater body GB40601G501700, as it is depicted for the first round of the WFD River Basin Management Plan, is not at risk from saline intrusion or impact as it lies inland. Only a small section to the west borders the coastline / estuary. For this small section further changes associated with inundation due to sea level rise or managed retreat options alone are considered as "allowing / returning to" natural conditions so will not result in a change in the status.	Neutral	There will be no change as the SMP policy for the coastal stretch of this groundwater body is hold the line.
Not yet named – but an extension to GB40601G501700 (North Kent Swale chalk) which extends beneath GB40602G500200 (North Kent Tertiaries) to the coast. To be considered in the second planning cycle of the WFD RBMP (2015-2021).	The Groundwater Bodies were only considered in plan view, 2 dimensions, for the first round of the WFD. It is recognised that GB40601G501700 North Kent Swale Chalk extends beneath GB40602G500200 the North Kent Tertiaries all the way to the coast and beneath the estuary. This will be considered in future rounds. The Chalk groundwater does interact with the saline water in the estuary when groundwater abstractions inland are operated. This has not been assessed for WFD purposes as it was not classified as a Groundwater Body, but it is known to be influenced. Likewise, in 2007/8 one of the major industrial abstractions ceased operating leading to a rise in groundwater levels beneath Sittingbourne. The groundwater quality also changed slightly, becoming less saline. It is expected that this situation	Neutral – provided mitigation implemented as detailed in comments column	At present this area is due for "hold the line" so it will be important that the schemes allow the movement of groundwater out to the estuary (rather than building up behind flood walls). To be considered in implementation stages of the SMP and

Waterbody: Groundwater bodies			
Groundwater Body	**Groundwater Interactions with Tidal Waters**	**Effect of SMP on Groundwater Body**	**Comments**
	will give rise to greater volumes of fresh water discharging to the estuary in future years. As the groundwater is higher the frequency of flow events in the inland bournes is likely to increase. It will be important to allow for this in the design of future shoreline management options.		future SMP reviews.
GB40601G500300 North Kent Medway Chalk	The area covered by the SMP adjacent to the North Kent Medway Chalk GWB is purely along the banks of the River Medway. The interaction of the groundwater and surface water is variable along the length. At present this GWB is classified as Good Status for the saline intrusion test carried out for groundwater quality. Theoretically some borehole abstractions may be impacted if sea levels rise or abstraction rates increase and this will be assessed in future River Basin Management Plan cycles (where climate change will be taken into consideration). In the meantime, changes associated with inundation due to sea level rise or managed retreat options alone are considered as "allowing / returning to" natural conditions so will not result in a change in the status.	Neutral	There is a mixture of Hold the Line and Managed realignment policies within this groundwater body. Managed realignment is proposed for E8 and E11 in years 0-20. This will be considered 'returning to natural conditions'.
GB40601G500400 Kent Greensand Middle	The tidal Medway crosses a section of the GB40601G500400 Kent Greensand Middle groundwater body. The groundwater quality tests for saline intrusion carried out for the WFD did not show any adverse impact at abstraction points or any deteriorating trend that could be fully attributed to impact from the tidal stretches (There are other local influences such as salt storage). Interaction with the groundwater is known to occur (visible in natural fractures in the rock) in parts and will be assessed in the future.	Neutral	SMP policy in E9 is Hold the line so there will be no change on the current situation.

L4 Discussion and Conclusions

There are no "high" status water bodies in the SMP2 study area, and therefore **WFD environmental objective 1 does not apply**.

The majority of SMP2 policy units in the Medway Estuary and Swale do not present a notable risk of deterioration in ecological status or potential of the associated Medway, Swale or Murston Lakes transitional water bodies, and also support the likely mitigation measures identified in the RBMP as required to achieve at least good potential in modified water bodies. Therefore **WFD environmental objective 2 will be met by the SMP2**. The **exceptions** are where a Hold the Line policy is preferred in constrained reaches of the upper Medway estuary (E4 01, E4 03, E4 06, E4 07, E4 12, E4 13) and at the western end of the Swale (E4 21, E4 29). In these instances, some coastal squeeze and / or accelerated erosion is likely, particularly in longer term epochs. However, **the preferred policies pass all WFD Article 4.7 tests** (although some mitigation measures need to be expanded upon as the proposed SMP2 policies are progressed into projects / schemes) and collectively the policies are considered to promote the environmental objectives of both the Medway and the Swale at a whole water body scale.

Of the river water bodies associated with the study area, the majority are located in Hold the Line policy areas and/or are constrained by tidal sluice, flaps or other structures which will prevent any change in their longitudinal freshwater-saltwater profile. (The continued management of such tidal control structures is beyond the remit of the SMP2; rather these are the subject of fluvial risk management studies.) In such cases, no effect on status / potential will result.

Two river water bodies (Damhead Creek in E4 04, and Tributary of Medway Estuary at Holborough in E4 08) drain coastal hinterland which is targeted in the SMP2 for Managed Realignment. These water bodies are both networks of drainage channels and standing water, rather than main rivers. Thus, the consequences of the preferred SMP2 policy are related to changes from freshwater to intertidal habitat, and in both cases the MR policy has been deemed to support more natural development of the coastline and therefore is not likely to lead to deterioration in water body status / potential. The Iwade is located in a frontage proposed for MR, but any consequent movement in the freshwater-saltwater interface is likely to displace but not remove the freshwater biological quality elements, and again this is allowing more natural coastal processes to develop.

As indicated in Assessment Table 3 for each of the policy units in turn, those SMP2 policies which will modify estuarine processes will only do so in localised areas, primarily within the more constrained reaches of the Medway and the Swale. There are no expected changes in estuarine processes further seaward in the Thames Estuary. Considering this jointly with the assessment of river water bodies above, **WFD environmental objective 3 will be met.** The net increase in intertidal areas associated with the collective SMP2 policies is seen by the Environment Agency and Natural England as a contribution to the interests of the internationally designated nature conservation sites in the area, and thus support the wider interests of Protected Areas associated with the Habitats and Birds Directives.

None of the MR or No Active Intervention policies will result in saltwater overlying a groundwater SPZ which is not already overlain by a transitional water body. Furthermore, none of the groundwater bodies are considered to be at risk of saline intrusion as a result of abstraction, which could make it more vulnerable to further saline risk. Thus, any change in groundwater quality as a result of

movement of the coastline is considered a return to more natural conditions without any adverse effects on underlying groundwater bodies. Therefore, **WFD environmental objective 4 will be met**.

It is suggested that SMP2 policy unit E4 29 might be split into separate policy units for the Medway water body portion and the Swale water body portion of the frontage, since the consequences of the proposed policy will be different for the two water bodies.

The SMP2 presents opportunities to deliver good ecological potential or good ecological status in the Medway and Swale transitional water bodies in particular through contribution to the following RBMP proposed mitigation measures:

- Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works (Medway);
- Indirect / offsite mitigation (offsetting measures) (Medway);
- Operational and structural changes to locks, sluices, weirs, beach control (Medway);
- Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone (both water bodies);
- Managed realignment of flood defence (both water bodies);
- Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution (both water bodies);
- Remove obsolete structure (Medway);
- Bank rehabilitation / reprofiling (Swale).

The policy areas that are most likely to contribute to achievement of Good Potential in the Medway and Swale are summarised below. Similar opportunities may exist in some of the river water bodies, although these are likely to be very restricted to their seaward limits.

Table 4.1 – SMP2 Policies Which Will Contribute to Water Framework Directive Hydromorphological Objectives

Water body	SMP2 Policy Unit (and Indicative NGR)	Policy Contribution to WFD Objectives
Medway GB530604002300	E4 02 - Colemouth Creek to Bee Ness Jetty – TQ837746 E4 04 - Kingsnorth Power Station to Cockham Wood - – TQ795716 E4 08 - North Halling to Snodland - – TQ705637 E4 10 - Allington Lock to North Wouldham – TQ715610 E4 11 - Wouldham Marshes – TQ711660 E4 14 - The Strand to West Motney Hill – TQ810683 E4 15 - Motney Hill to Ham Green – TQ829677 E4 17 - East of Upchurch to East Lower Halstow – TQ856679 E4 18 - Barksore Marshes – TQ873693 E4 20 - Chetney Marshes – TQ893723	Managed realignment (and associated opportunities for developing a more naturally functioning shoreline and intertidal zone)

Water body	SMP2 Policy Unit (and Indicative NGR)	Policy Contribution to WFD Objectives
Swale GB530604011500	E4 20 - Chetney Marshes - TQ893723 E4 23 - Murston Pits to Faversham – TQ984654 E4 25 - Shell Ness to Sayes Court – TR040672 E4 26 - Sayes Court to North Elmley Island – TQ976665 E4 27 - North Elmley Island to Kingsferry Bridge – TQ924686 E4 28 - Kingsferry Bridge to Rushenden – TQ902702	Managed realignment (and associated opportunities for developing a more naturally functioning shoreline and intertidal zone)

WFD Assessment Table 2 – Water Body Classifications

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
TrAC Water Bodies				
Medway GB530604002300 **(E4 01, E4 02, E4 03, E4 04, E4 05, E4 06, E4 07, E4 08, E4 09, E4 10, E4 11, E4 12, E4 13, E4 14, E4 15, E4 16, E4 17, E4 18, E4 19, E4 20, E4 29, E4 30)**	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated with velocity) The Medway has opportunistic macroalgae growth in the sheltered soft sediment areas, bordering between "natural" and "excessive". A reduction in the amount of opportunistic macroalgae would be considered as an improvement in Water Body condition	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below. (Measures related to maritime navigation and associated channel maintenance / dredging etc are excluded here): • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Indirect / offsite mitigation (offsetting measures) • Operational and structural changes to locks, sluices, weirs, beach control, • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone • Managed realignment of flood defence • Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution • Remove obsolete structure
	Angiosperms	Potential changes to angiosperms through changes in: land elevation; inundations (tidal regime); abrasion (associated with increased velocities); and potentially sediment loading		
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the beach water table (potentially constraining vertical distribution up the beach)		
	Fish	Potential changes to fish through: heterogeneity of habitat (changes in substrate, provision of shelter); continuity for migration routes; substrate conditions; accessibility to nursery areas (elevation of saltmarshes, connectivity with shoreline). There are bass nursery areas at Grain Power Station outfall (relevant to E4 01 and E4 29) and at Kingsnorth Power Station outfall (relevant to E4 03).		
Swale GB530604011500 **(E4 20, E4 21, E4 22, E4 23, E4 24, E4 25, E4 26, E4 27, E4 28, E4 29)**	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated with velocity) The Swale has some areas of opportunistic macroalgae growth in sheltered soft sediment areas, bordering between "natural" and "excessive". A reduction in the amount of opportunistic macroalgae would be considered as an improvement in Water Body condition	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below: • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone • Managed realignment of flood defence • Bank rehabilitation / reprofiling • Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution
	Angiosperms	Potential changes to angiosperms through changes in: land elevation; inundations (tidal regime); abrasion (associated with increased velocities); and potentially sediment loading		
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the beach water table (potentially constraining vertical distribution up the beach) There are protected shellfisheries (oyster and mussel) at Swale East and Swale Central (relevant to E4 23, E2 24, E4 25 and E4 26).		
	Fish	Potential changes to fish through: heterogeneity of habitat (changes in substrate, provision of shelter); continuity for migration routes; substrate conditions; accessibility to nursery areas (elevation of saltmarshes, connectivity with shoreline)		
Murston Lakes GB560604017400 **(E4 23)**	Angiosperms	Potential changes to angiosperms through changes in: inundations (tidal regime); and salinity	**Classification: Good Potential (AWB)** **Predicted ecological quality 2015: Good Potential** Environmental objectives:	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies):
	Fish	Potential changes to fish through changes in: substrate conditions;		

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
		[salinity]	• 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.	Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Murston Lakes.
River Water Bodies				
Tributary of Medway Estuary at High Halstow GB106040024120 **(E4 02)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Status** **Predicted ecological quality 2015: Moderate Status** Environmental objectives: • (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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies): Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Tributary of Medway Estuary at High Halstow.
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Tributary of Medway Estuary at Kingsnorth GB106040024030 **(E4 03)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Status** **Predicted ecological quality 2015: Moderate Status** Environmental objectives: • (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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies): Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Tributary of Medway Estuary at Kingsnorth.
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Damhead Creek GB106040024160 **(E4 03, E4 04)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Status** **Predicted ecological quality 2015: Moderate Status** Environmental objectives: • (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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies): Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Damhead Creek.
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Medway Estuary GB106040024180 **(E4 06)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Status** **Predicted ecological quality 2015: Moderate Status** Environmental objectives:	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies):
	Benthic /	Potential changes to benthic / macro invertebrates through changes		

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
	macro invertebrates	in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river	• (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.	Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Medway Estuary.
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Tributary of Medway Estuary at Holborough GB106040018460 **(E4 08)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below. (Measures not related to water body hydromorphology are excluded): • Sediment management strategies (develop and revise) Retain marginal aquatic and riparian habitats (channel alteration) • Operational and structural changes to locks, sluices, weirs, beach control, etc • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Increase in-channel morphological diversity • Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Leybourne Stream GB106040018450 **(E4 08)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Status** **Predicted ecological quality 2015: Moderate Status** Environmental objectives: Task 1.1 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. Task 2.1 WFD3: No changes which will permanently prevent or compromise the environmental objectives being met in other water bodies.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies): Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Leybourne Stream.
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Upper Medway Estuary GB106040018740 **(E4 09)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below. (Measures not related to water body hydromorphology are excluded): • Retain marginal aquatic and riparian habitats (channel alteration)
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration		

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
		routes; substrate conditions; accessibility of nursery areas	• WFD3: No changes which will permanently prevent or compromise the environmental objectives being met in other water bodies.	• Operational and structural changes to locks, sluices, weirs, beach control, etc • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Increase in-channel morphological diversity • Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution
Ditton Stream GB106040018200 **(E4 09)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate potential** Environmental objectives: • 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 • WFD3: No changes which will permanently prevent or compromise the environmental objectives being met in other water bodies' Status or Potential.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies) are indicated below. (Measures not related to water body hydromorphology are excluded): • Retain marginal aquatic and riparian habitats (channel alteration) • Appropriate techniques (invasive species) • Operational and structural changes to locks, sluices, weirs, beach control, etc • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Increase in-channel morphological diversity • Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Medway at Maidstone GB106040018440 **(E4 09, E4 10)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below. (Measures not related to water body hydromorphology are excluded): • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
				• Operational and structural changes to locks, sluices, weirs, beach control, etc • Reduce sediment resuspension • Increase in-channel morphological diversity • Retain marginal aquatic and riparian habitats (channel alteration)
Swale Tributary at Lower Halstow GB106040018220 **(E4 17)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below. (Measures not related to water body hydromorphology are excluded): • Appropriate channel maintenance strategies and techniques - minimise disturbance to channel bed and margins • Retain marginal aquatic and riparian habitats (channel alteration) • Operational and structural changes to locks, sluices, weirs, beach control, etc • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Increase in-channel morphological diversity
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Iwade GB106040018600 **(E4 20)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Potential (HMWB)** **Predicted ecological quality 2015: Moderate Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP are indicated below. (Measures not related to water body hydromorphology are excluded): • Appropriate channel maintenance strategies and techniques - minimise disturbance to channel bed and margins • Retain marginal aquatic and riparian habitats (channel alteration) • Operational and structural changes to locks, sluices, weirs, beach control, etc • Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works. • Improve floodplain connectivity • Set-back embankments
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
				• Flood bunds (earth banks, in place of floodwalls) • Alteration of channel bed (within culvert) • Re-opening existing culverts • Increase in-channel morphological diversity
Dry Valley South of Sittingbourne GB106040018550 **(E4 22, E4 23)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Good potential (HMWB)** **Predicted ecological quality 2015: Good Potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies): Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Dry Valley South of Sittingbourne.
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Dry Valley South West of Faversham GB106040018540 **(E4 23)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate Status** **Predicted ecological quality 2015: Moderate Status** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies (specifically for river and lake water bodies): Develop strategic plans to improve ecology through habitat creation and enhancements (Medway catchment). No programme of measures specific to Dry Valley South West of Faversham.
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		
Dry Valley South of Faversham GB106040018530 **(E4 23, E4 24)**	Macrophytes	Potential changes to macrophytes through changes in: light quality/quantity; episodicity of flows and inundation; and turbidity; all of which could affect longitudinal position	**Classification: Moderate potential (HMWB)** **Predicted ecological quality 2015: Moderate potential** Environmental objectives: • 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.	Programme of Measures from the RBMP that could be considered in SMP development or in schemes resulting from SMP policies are indicated below. (Measures not related to water body hydromorphology are excluded): • Appropriate channel maintenance strategies and techniques - minimise disturbance to channel • bed and margins • Retain marginal aquatic and riparian habitats (channel alteration) • Operational and structural changes to locks, sluices, weirs, beach control, etc • Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and • riparian zone • Structures or other mechanisms in place and managed to enable fish to access waters upstream
	Benthic / macro invertebrates	Potential changes to benthic / macro invertebrates through changes in the position of the saline-freshwater interface (and associated conditions of light, turbidity and salinity) within the river		
	Fish	Potential changes to fish through changes in: continuity of migration routes; substrate conditions; accessibility of nursery areas		

Feature		Issue	Water body classification and environmental objectives	Opportunity to deliver mitigation measures from the Programme of Measures &/or recommendations on preferred policy
Water body (including policy units that affect it)	**Biological Quality Element**	**Potential for change in hydro-morphological or physical parameter**		
				• and downstream of the impounding works. • Alteration of channel bed (within culvert) • Increase in-channel morphological diversity
Groundwater Bodies				
North Kent Medway Chalk GB40601G500300 **(E4 06, E4 07, E4 08, E4 10, E4 11, E4 12, E4 13)**		Policy units E4 06, E4 07, E4 11 and E4 12 (all part of the estuarine / tidal River Medway) overlap a Source Protection Zone 3 associated with abstractions from this groundwater body. This groundwater body is not considered at risk of saline intrusion due to abstraction.	**Classification: Good status for saline intrusion** Environmental objectives: • WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The Programme of Measures from the RBMP has **no proposals for ground water bodies** that could be considered in SMP development or in schemes resulting from SMP policies
Kent Greensand Middle GB40601G500400 **(E4 09, E4 10)**		Both of these policy units (part of the tidal River Medway) overlap a Source Protection Zone 3. This groundwater body is not considered at risk of saline intrusion due to abstraction.	**Classification: Good status for saline intrusion** However, a summer peak of chloride in the public water supply at Forstal, near Aylesford is unexplained but may be due to interaction with the saline river system via the Greensand aquifer units. As a result saline intrusion is being considered and assessed. Environmental objectives: • WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The Programme of Measures from the RBMP has **no proposals for ground water bodies** that could be considered in SMP development or in schemes resulting from SMP policies
North Kent Swale Chalk GB40601G501700 **(E4 13, E4 14, E4 22, E4 24)**		Of the 4 SMP policy units which overlap this groundwater body to any degree, only one (E4 22) is associated with a Source Protection Zone, with the landward end of the tidal Milton Creek overlapping SPZ 3 only. This groundwater body is not considered at risk of saline intrusion due to abstraction.	**Classification: Good status for saline intrusion** Environmental objectives: • WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The Programme of Measures from the RBMP has **no proposals for ground water bodies** that could be considered in SMP development or in schemes resulting from SMP policies
North Kent Tertiaries GB40602G500200 **(E4 15, E4 16, E4 17, E4 18, E4 19, E4 20, E4 21, E4 22, E4 23)**		None of these SMP policy units overlap a Source Protection Zone associated with this groundwater body. (The SPZ overlapped by E4 22 is associated with the North Kent Swale Chalk.)	**Classification: Good status for saline intrusion** Environmental objectives: • WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The Programme of Measures from the RBMP has **no proposals for ground water bodies** that could be considered in SMP development or in schemes resulting from SMP policies

WFD Assessment Table 3 - Assessment of SMP Policy Against the WFD Environmental Objectives

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
E4 01	**Grain Tower to Colemouth Creek**	HTL	HTL	HTL	**TrAC – Medway** **River – Trib of Medway Estuary at High Halstow** This frontage is located on the eastern extremity of the Isle of Grain. A small narrow shingle beach is located in the north of Grain Tower, fronted by wide tidal mudflats; elsewhere intertidal habitat to the east and south of the frontage is internationally designated. The majority of the shoreline is dominated by nationally important industry (e.g. Grain Power Station and Thamesport Container Terminal). The plan in the long term is to protect these major commercial and industrial assets and associated infrastructure and avoid any potential contamination risks. In the short term under this policy, mudflats to the south of the frontage are predicted to remain stable whilst intertidal habitats in the more confined channel locations to the east will continue to be subject to erosion. In the middle and long term epochs, some intervention to upgrade defences is likely and some localised coastal squeeze effects will be likely. This may impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion and sediment loading / substrate conditions. Therefore, some deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. Were the commercial and industrial assets to cease operation and the Power Station to be decommissioned then the policy for this unit should be revisited, as MR to widen the Medway estuary mouth would benefit future estuary management.	n/a	X Medway	✓	n/a
E4 02	**Colemouth Creek to Bee Ness Jetty**	MR with local HTL	MR with local HTL	MR with local HTL	**TrAC – Medway** Nationally important infrastructure associated with industry on the Isle of Grain (E4 01) is located close to the shoreline along the length of this frontage. The estuary is wider than the ideal form in this location and consequently a large area of saltmarsh (Stoke Saltings) continues to develop in E4 02. The intertidal area and some sections of freshwater habitat bounding this unit are internationally designated for their ecological importance. The growth of intertidal habitat in this policy unit is very important in maintaining the internationally designated habitat. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide appropriate flood and erosion defence to the nationally important infrastructure crossing the floodplain and most of the defended hinterland. This section of shoreline provides a resource of growing intertidal habitat and is an ideal location for environmental enhancements and habitat creation through localised MR, although no specific realignment positions have been identified for the SMP. MR in unit E4 02 will increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site), but with a concomitant loss in grazing marsh and standing freshwater habitats, although the latter could be mitigated by recreation elsewhere at the site. Thus the net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. MR will promote natural shoreline, and thus Water Body, development wherever possible. HTL is required to protect key infrastructure (railway line), and is anyway associated with an area where the hinterland between the defended shoreline and naturally high ground is narrow, such that any gains from MR would be limited. Thus, deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy, and the policy should contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2. _____ A tributary enters the Medway at High Halstow. It is expected that a local HTL policy will apply at its interface with the estuary, which will not result in any changes, especially as the tributary discharges through a tidal sluice (indicated by NFCDD). Therefore, deterioration in Ecological Status / Potential of this river water body, and a risk of failing to meet Good Potential in the future, are both considered unlikely.	n/a	✓	✓	n/a
E4 03	**Kingsnorth Power Station**	HTL	HTL	HTL	**TrAC – Medway**	n/a	X Medway	✓	n/a

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					River – Trib of Medway Estuary at Kingsnorth, Damhead Creek The nationally important Kingsnorth Power Station and associated infrastructure dominating this frontage is protected by revetted embankments along the majority of the frontage. Jetties from the Power Station stretch out into the estuary and extend over a number of small islands. Permission has been granted for a larger Power Station to be built in this location. The wide intertidal mudflats and saltmarsh along the frontage, including Oakham Marsh Island are internationally designated. The plan in the long term is to protect this major asset and avoid any potential contamination risks. Were the station to cease operation and be decommissioned, the policy for this unit should be revisited. The preferred plan also reduces flooding risk to adjacent low lying areas. In the short term under this policy, sediment supply within the estuary is expected to meet demand, and intertidal mudflat and saltmarsh evolution is predicted to continue in the majority of E4 03, but with some areas of erosion. In the mid term it is likely that defences will require additional maintenance and potentially upgrading in response to sea level rise, but intertidal areas are predicted to continue to evolve as per the previous epoch. However, in the long term there will be an increased potential for erosion of intertidal areas with sea level rise, due to coastal squeeze as natural sediment supply decreases. Thus the proposed policy is unlikely to result in localised deterioration of Ecological Potential in the short and mid term epochs (i.e. to year 2055) but thereafter there may be impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion and sediment loading / substrate conditions. Therefore, some localised deterioration in Ecological Potential is considered possible as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very minor part of the Medway coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement. A tributary at High Halstow and the river water body known as Damhead Creek both enter the Medway via the tidal Damhead Creek. The HTL policy will not result in any changes (and the Damhead Creek water body discharges through a sluice indicated by OS mapping). Therefore, deterioration in Ecological Status of these river water bodies is considered unlikely, and policy will not prevent the future attainment of High Status if appropriate measures are implemented under the RBMP.				
E4 04	**Kingsnorth Power Station to Cockham Wood**	MR with local HTL	MR with local HTL	MR with local HTL	**TrAC – Medway** **River – Damhead Creek** Wide intertidal mudflats and saltmarsh of international importance extend along the frontage, whilst the majority of the hinterland comprises low-lying undeveloped coastal grazing marsh and agricultural land, some of which is nationally and internationally designated for its ecological value. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood defence to the Kingsnorth Power Station, Hoo Marina, residential communities and some areas of backing low-lying land. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancements and habitat creation through localised MR, although no specific realignment positions have been identified for the SMP. MR in unit E4 04 will increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site), but with a concomitant loss in grazing marsh and standing freshwater habitats, although the latter could be mitigated by recreation elsewhere at the site. Thus the net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. MR will promote natural shoreline, and thus Water Body, development wherever possible. HTL is required to protect newly reinstated freshwater habitat and key infrastructure around Hoo Marina Park. This area has rising land behind it (such that any gains from MR would be limited) and more significantly faces Hoo Ness Island (E4 30) which provides a significant degree of protection from erosion, reducing any such risk associated with HTL policy here. Thus, the long term SMP2 policies support the natural development of the coastline. Deterioration in Ecological Potential of the Medway is considered unlikely as a result of this SMP2 policy, and the policy should contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2.	n/a	✓	✓	n/a

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					Land drained by the Damhead Creek river water body lies behind the frontage at E4 04. Comment is made above in relation to the effects of MR on the loss of freshwater habitats associated with this area, and no separate assessment is made here of the effects on Damhead Creek itself.				
E4 05	**Cockham Wood**	NAI	NAI	NAI	**TrAC – Medway** This unit is currently undefended. A NAI policy will allow continuing active erosion of the river cliff (a geological SSSI). The SMP2 policy thus supports natural development of the coastline at Cockham Wood, which is in line with the objectives of the WFD. Deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy, and the policy will not prevent future attainment of Good Potential.	n/a	✓	✓	n/a
E4 06	**Lower Upnor to Medway Bridge**	HTL	HTL	HTL	**TrAC – Medway** **River – Medway Estuary** A dense urban area extends to the shoreline along the majority of the unit, consisting of the residential areas of Lower Upnor, Frindsbury and Strood, the commercial and industrial area of the Medway City Estate and regionally important strategic links. Strood has been identified as a key regeneration area under the Medway Waterfront Renaissance Strategy. The eastern section of frontage, however, is less densely urbanised and is made up of smaller residential areas interspersed with recreational and nationally important heritage features. The long term plan is to continue protecting the developments including the residential, commercial, industrial and heritage assets from flooding and erosion. In the short term under this policy, intertidal areas are likely to be stable in this area, and there is expected to be very little change in estuary processes or associated Water Body conditions. In the later epochs, intervention to upgrade defences will be required. The constrained channel, intertidal areas and defences will become increasingly subject to erosion due to increased tidal prism and sea water levels and increased fluvial flows associated with climate change. This may impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion, sediment loading / substrate conditions and heterogeneity of habitat. Therefore, some localised deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very minor part of the Medway coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement. _____ A river water body called "Medway Estuary" enters the Medway via a culvert and flapped outfall (indicated by NFCDD) into Whitewall Creek near Frindsbury. The HTL policy will not result in any changes. Therefore, deterioration in Ecological Status of this river water body is considered unlikely and the SMP2 policy will not prevent future attainment of Good Status if appropriate measures are implemented under the RBMP. The estuarine / tidal River Medway currently overlaps groundwater SPZ 3 and this will not change with the SMP2 policy; therefore no impact on groundwater body quality is expected.	n/a	X Medway	✓	✓
E4 07	**Medway Bridge to North Halling**	HTL	HTL	HTL	**TrAC – Medway** The railway line, located close to the shoreline, follows the line of the frontage between Medway Bridge and North Halling and separates the residential communities of Cuxton and North Halling from the narrow Medway channel. The floodplain is restricted due to the presence of the railway line. The long term plan is to continue protecting the built assets and infrastructure from flooding and erosion. Intervention to upgrade defences will be required. In the short term under this policy, intertidal areas are likely to be stable in this area, with no concomitant changes in Water Body conditions**.** In the later epochs, as sea levels rise and fluvial flows increase with climate change, the channel may deepen and erosion may become more prevalent, especially on the outside of meanders (at North Halling) and confined areas. Some localised coastal squeeze impacts will be experienced. This may impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion, sediment loading / substrate conditions and heterogeneity of habitat. Therefore, some localised deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very minor part of the Medway coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement.	n/a	X Medway	✓	✓

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					The estuarine / tidal River Medway currently overlaps groundwater SPZ 3 and this will not change with the SMP2 policy; therefore no impact on groundwater body quality is expected.				
E4 08	**North Halling to Snodland**	MR with local HTL	MR with local HTL	MR with local HTL	**TrAC – Medway** **River – Leybourne Stream, Tributary of Medway Estuary at Holborough** The meandering narrow Medway channel is bordered by the residential communities of Halling and Snodland and pockets of freshwater habitat. The floodplain is restricted by a railway line, which is set-back from the meandering river bank. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood defence to Halling and Snodland and flood risk areas. This section of shoreline provides an opportunity for environmental enhancements and habitat creation through localised MR, although no specific realignment positions have been identified for the SMP. There is also a requirement to investigate potential contamination issues before MR can be implemented. The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. Although some defended reaches will remain with HTL policy, these account for the lesser part of the frontage associated with urban areas and the railway, where rising ground would anyway limit the available migration of the shoreline. In the short term intertidal areas will remain stable as sediment supply is expected to meet demand, and there will be no concomitant changes in Water Body conditions. In the medium to long term epochs, defences will require further maintenance and potentially upgrading as sea levels rise and fluvial flows increase with climate change. Consequently, the channel may deepen and erosion may become more prevalent, especially on the outside of meanders (at Halling and Snodland) and within confined areas. MR in adjacent areas may help to accommodate flood waters, reducing this pressure. Environmental transitions will be prominent during the medium term epoch as brackish and intertidal habitats replace some of the freshwater interests. It is expected that in the long term epoch created habitat will become well-established and may continue to reduce pressures associated with intertidal erosion in confined sections of the frontage. Thus, the short and long term SMP2 policies support the long term natural development of the coastline and thus of the Water Body's hydromorphological condition. Deterioration in Ecological Potential of the Medway is considered unlikely as a result of this SMP2 policy, and the policy should contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2. _____ Leybourne Stream enters the Medway via an adjustable tidal weir (indicated by NFCDD) within this unit within a reach that has an HTL policy, and thus will not be affected by the SMP policy. Therefore, deterioration in Ecological Status of this river water body is considered unlikely, and the SMP2 policy should not prevent achievement of Good Status in the future if appropriate mitigation measures are implemented under the RBMP. A further tributary at Holborough drains land which lies behind the frontage at E4 08, whilst the tributary itself is very short. Comment is made above in relation to the effects of MR on the loss of freshwater habitats associated with this area, and no separate assessment is made here of the effects on the river water body itself.	n/a	✓	✓	n/a
E4 09	**Snodland to Allington Lock**	HTL	MR with local HTL	MR with local HTL	**TrAC - Medway** **River – Ditton Stream, Upper Medway Estuary, Medway at Maidstone** The hinterland is characterised by an area of nationally designated low-lying freshwater lakes (Leybourne Lakes) south of Snodland and urban communities along the remaining frontage towards Allington Lock. The railway line extends along the whole of the frontage, and is located close to the shoreline near to historic Aylesford. The estuary channel is fluvial in form and narrows considerably as it meanders south to Allington Lock. In the short to medium term the plan is to continue protecting the freshwater habitats, built assets and flood risk areas. During this time studies will be undertaken to investigate and define the exact standard and alignment of the MR in the long term, including investigation	n/a	✓	✓	✓

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					of potential contamination issues. Intertidal areas will remain stable as sediment supply is expected to meet demand in the Medway estuary throughout this epoch. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish habitat in some locations, whilst continuing to provide flood defence to remaining urban and environmental assets and flood risk areas. The aim of this policy is to enable more flexible and sustainable flood and erosion risk management within the estuary by working towards achieving a more naturally functioning estuary. This will create important brackish and saline habitats whilst at the same time creating a shoreline that has reduced defence maintenance costs. However, the majority of the frontage will remain defended, as it is associated primarily with urban and industrial areas. In the medium to long term epochs, retained defences will require maintenance and potentially upgrading as sea levels rise and fluvial flows increase due to climate change. Consequently, the channel may deepen locally and erosion may become more prevalent, especially on the outside of meanders and in confined areas. Managed realignment in adjacent areas may help to accommodate flood waters and alleviate this pressure. Thus, the short term policy supports the conservation objectives for the associated freshwater SSSI, whilst policies in the longer term will allow more natural development of the estuary banks, and thus the Water Body's hydromorphological conditions, in some reaches. Although other areas that will remain defended could result in accelerated local erosion and risks to biological quality elements there, it is anticipated that this will be offset by the habitat gains elsewhere in E4 09. Thus, overall, deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy. The policy unit's frontage constitutes only a very minor part of the Medway coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement. --- Two river water bodies, Ditton Stream (HMWB) and "Upper Medway Estuary" (which drains a reservoir), enter the Medway within this unit within a reach that has an HTL policy, and thus will not be affected by the SMP policy. At the upper end of the transitional Medway water body it gives way to the river water body Medway at Maidstone (also HMWB), with the tidal limit constrained by Allington Lock. The SMP2 policies will have no effect on this river water body. Therefore, deterioration in Ecological Potential of these river water bodies is considered unlikely, and the SMP2 policy should not prevent either Water Body from attaining Good Potential in the future if appropriate mitigation measures are implemented under the RBMP. --- This part of the tidal River Medway currently overlaps groundwater SPZ 3, and the SMP2 policy will not significantly change this situation. Therefore it is unlikely that the SMP2 policy will have any impact on groundwater body quality.				
E4 10	**Allington Lock to North Wouldham**	HTL	MR with local HTL	MR with local HTL	**TrAC - Medway** **River – Medway at Maidstone** The frontage comprises the urban areas of historic Aylesford and Millhall to the south and areas of agricultural land and freshwater habitats interspersed with small settlements towards the north. The estuary channel is narrow and fluvial in form along the whole frontage. In the short to medium term the plan is to continue protecting the environmental habitats, agricultural land, built assets and flood risk areas. This will allow further studies to consider the viability of multiple areas of managed realignment along the frontage and to define the exact standard and alignment of defences for this frontage. Intertidal areas will remain stable as sediment supply is expected to meet demand in the Medway estuary throughout this epoch. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish habitat in some locations (at Wouldham Marshes and to the north of Burham Marshes), whilst continuing to provide flood defence to remaining urban and environmental assets and flood risk areas. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through localised MR, although no specific realignment positions have been identified for the SMP. The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and	n/a	✓	✓	✓

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. However, the majority of the frontage will remain defended due to the prevalence of industrial and urban development. In the medium to long term epochs, retained defences will require maintenance and potentially upgrading as sea levels rise and fluvial flows increase due to climate change. Consequently, the channel may deepen locally and erosion may become more prevalent, especially on the outside of meanders and in confined areas. Managed realignment in adjacent areas may help to accommodate flood waters and alleviate this pressure. Thus, the policy will allow more natural long term development of the estuary banks and Water Body hydromorphological conditions in some reaches. Although other areas that will remain defended could result in accelerated local erosion and risks to biological quality elements there, it is anticipated that this will be offset by the habitat gains elsewhere in E4 10. Thus, overall, deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy, and the policy should contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2. --- At the upper end of the transitional Medway water body it gives way to the river water body Medway at Maidstone (also HMWB), with the tidal limit constrained by Allington Lock. The SMP2 policies will have no effect on this river water body. Therefore, deterioration in Ecological Potential of this river water body is considered unlikely, and the policy will not present a rick of failing to achieve Good Potential in the future. --- This part of the tidal River Medway currently overlaps groundwater SPZ 3. The public water supply at Forstal, near Aylesford, is showing a summer peak of chloride which, although unexplained, is likely to be due to interaction with the saline river system via the Greensand aquifer units. The SMP2 policy is unlikely to make any fundamental changes. Therefore it is unlikely that the SMP2 policy will have any impact on groundwater body quality. However, the rapid flow of saline water through the aquifer should be noted when undertaking associated designs to implement the SMP2 policy. may flag up the need for special considerations for design and engineering with respect to methods and materials in the area too.				
E4 11	**Wouldham Marshes**	MR	MR	MR	**TrAC – Medway** The SMP2 policy allows for a more natural long-term development of the coastline at Wouldham Marshes compared to the present and it is considered unlikely that the policy will result in deterioration of Ecological Potential, whilst the policy should contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2. --- The estuarine / tidal River Medway currently overlaps groundwater SPZ 3. Although MR will increase the total area of land tidally inundated by saline water within unit E4 11, this is not likely to be significant when considering the existing overlap by units E4 06, E4 07 E4 11 and E4 12; therefore no impact on groundwater body quality is expected as a result of this SMP2 policy.	n/a	✓	✓	✓
E4 12	**Medway Bridge to West St Mary's Island**	HTL	HTL	HTL	**TrAC – Medway** This frontage is dominated by the dense urban areas of Rochester and Chatham that extend to the shoreline. The residential and commercial frontages are interspersed with a number of river crossings and strategic links between the Medway Towns and Frindsbury and Strood. The frontage is of considerable commercial importance (in particular Medway Port) and is of significant international heritage importance (e.g. Chatham Historic Dockyard). The long term plan is to continue protecting the developments including the residential, commercial, infrastructure and heritage assets from flooding and erosion. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. In the short term under this policy, intertidal areas are likely to be stable in this area; therefore there is expected to be very little change in estuary processes. In the later epochs, intervention to upgrade defences will be required. As sea levels rise and fluvial flows increase with climate change, the constrained channel and intertidal areas will become increasingly subject to erosion. This may impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion, sediment loading / substrate conditions and heterogeneity of habitat. Therefore, some deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very	n/a	X Medway	✓	✓

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					minor part of the Medway coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement. The estuarine / tidal River Medway currently overlaps groundwater SPZ 3 and this will not change with the SMP2 policy; therefore no impact on groundwater body quality is expected.				
E4 13	**St Mary's Island to The Strand**	HTL	HTL	HTL	**TrAC – Medway** The frontage is dominated by the expanding residential area of St Mary's Island and the residential, commercial and recreational areas along the Gillingham frontage, both of which extend to the shoreline. The frontage is of considerable importance for attracting visitors to its recreational areas (e.g. Gillingham Pier and Marina). The narrow Intertidal mudflats along the eastern shoreline of St Mary's Island are nationally designated, whilst the intertidal mudflat and saltmarshes along The Strand frontage are internationally designated. The long term plan is to continue protecting these developments from flooding and erosion. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. In the short term under this policy, intertidal areas are likely to be stable in this area; therefore there is expected to be very little change in estuary processes or Water Body hydromorphological conditions. In the later epochs, intervention to upgrade defences will be required. As sea levels rise and fluvial flows increase with climate change, intertidal areas and constrained areas of the channel towards the eastern end of the policy unit will become increasingly subject to erosion. This may impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion, sediment loading / substrate conditions and heterogeneity of habitat. Therefore, some deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very minor part of the Medway coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement.	n/a	X Medway	✓	n/a
E4 14	**The Strand to West Motney Hill**	HTL	MR	MR	**TrAC – Medway** The short term plan is to continue to defend recreational areas including a Local Nature Reserve from flooding and erosion, to allow further studies to investigate MR with regards to infrastructure and potential contamination issues (Horrid Hill china clay waste). The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood and erosion defence to built assets. Intertidal mudflat and saltmarshes along the frontage are internationally designated for their ecological importance. MR in unit E4 14 will increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site), but with a concomitant loss in freshwater habitat; however, this is re-creatable (scrub woodland). The net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. Thus, the long term SMP2 policy: (a) is unlikely to result in any deterioration in Ecological Potential; (b) will contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2; and (c) supports the conservation objectives for this Protected Area through allowing long term natural development of the coastline.	n/a	✓	✓	n/a
E4 15	**Motney Hill to Ham Green**	MR with local HTL	MR with local HTL	MR with local HTL	**TrAC – Medway** The frontage incorporates the shoreline around Motney Hill, Otterham and the western and northern edge of the Upchurch peninsular. Sections of the frontage form part of the Nor Marsh and Motney Hill RSPB Reserve. Localised settlements of Otterham, Upchurch and Ham Green are interspersed with agricultural land and freshwater marsh. Intertidal areas adjacent to the shoreline as well as areas of freshwater habitat at Motney Hill and at Horsham Marsh are nationally and internationally designated for their ecological importance. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood and erosion defence to assets and backing low-lying land. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancements and habitat creation through localised MR, although no specific realignment positions have been identified for the SMP and there is also a requirement to investigate potential contamination issues. MR in unit E4 15 will increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site), but with a concomitant loss in grazing marsh. The net effect on the	n/a	✓	✓	n/a

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. Although more than half of the frontage will remain defended, this is mostly around the raised Motney Hill peninsular, which represents a relatively small proportion of the potential intertidal area. Thus, the short and long term SMP2 policies support the long term natural development of the coastline. Deterioration in Ecological Potential of the Medway is considered unlikely as a result of this SMP2 policy, which will contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2.				
E4 16	**Ham Green to East of Upchurch**	NAI	NAI	NAI	**TrAC – Medway** This unit is currently undefended. A NAI policy will allow movement of the shoreline towards higher ground. The SMP2 policy thus supports natural development of the coastline at Ham Green to East of Upchurch, which is in line with the objectives of the WFD.	n/a	✓	✓	n/a
E4 17	**East of Upchurch to East Lower Halstow**	MR with local HTL	MR with local HTL	MR with local HTL	**TrAC - Medway** **River – Swale Tributary at Lower Halstow** The frontage between east Upchurch and east of Lower Halstow constitutes a relatively narrow floodplain and comprises agricultural land, locally important nature conservation sites at Upchurch and Lower Halstow Brickworks and the historically important area of Lower Halstow. Intertidal habitats along the whole frontage are nationally and internationally designated for their ecological importance. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood defence and erosion defence to assets and backing low-lying land. This section of shoreline provides a significant opportunity for habitat creation through MR. The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. Although defended reaches will remain these are associated with small areas of land when compared with those at MR sites. Thus, the short and long term SMP2 policies support the long term natural development of the coastline and the Water Body. Deterioration in Ecological Potential of the Medway is considered unlikely as a result of this SMP2 policy, which will contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2. _____ A tributary enters the Medway via a flapped outfall (indicated by NFCDD) within this unit within a reach that has an HTL policy, and thus will not be affected by the SMP policy. Therefore, deterioration in Ecological Potential, and failure to meet future Good Potential as a result of the policy, are both considered unlikely.	✓	✓	✓	n/a
E4 18	**Barksore Marshes**	MR	NAI	NAI	**TrAC – Medway** Barksore Marshes is a peninsular of agricultural land and freshwater grazing marshes most of which, along with intertidal habitats skirting the shoreline, are nationally and internationally designated for their ecological value. In the short term the plan is to realign defences to ensure that freshwater habitat landward of existing defences is appropriately managed before NAI policy is implemented from the medium term. This will allow further study to take place regarding NAI along the frontage, including investigation of potential contamination issues. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system. NAI in unit E4 18 will allow an increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site), but with a concomitant loss in grazing marsh. The net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. Thus, the proposed SMP2 policy will allow natural development of the coastline. Deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy, which will contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2;.	n/a	✓	✓	n/a

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
E4 19	**Funton to Raspberry Hill**	NAI	NAI	NAI	**TrAC – Medway** This unit is currently defended but the only infrastructure asset is a minor road. With plans to close this road, a NAI policy will allow movement of the shoreline towards higher ground. The SMP2 policy thus supports natural development of the coastline at Funton to Raspberry Hill, which is in line with the objectives of the WFD. Deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy, which will contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2.	n/a	✓	✓	n/a
E4 20	**Chetney Marshes**	MR	MR	MR	**TrAC – Medway, Swale** **River – Iwade** MR will increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site), but with a concomitant loss in grazing marsh and standing freshwater habitats (although the latter could be mitigated by recreation elsewhere at the site). The net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. The SMP2 policy allows for a more natural long-term development of the coastline at Chetney Marshes compared to the present and it is considered unlikely that the policy will result in deterioration of Ecological Potential of either the Medway or the Swale, and the policy will contribute to the future achievement of Good Potential in these water bodies by supporting identified mitigation measures as summarised in Assessment Table 2. _____ There may be hydromorphological changes at the tidal interface with the River Iwade, but this will likely result in a redistribution of key biological quality elements as part of a more natural habitat development. Therefore, the consequences will be an improvement in Ecological Potential.	n/a	✓	✓	n/a
E4 21	**Kingsferry Bridge to Milton Creek**	HTL	HTL	HTL	**TrAC – Swale** The Kingsferry Bridge and rail link to the Isle of Sheppey border the frontage to the north. Regionally important industrial, commercial and dock developments and associated infrastructure are located along the remaining low lying frontage. Coastal grazing marsh on the flood plain and fronting intertidal mudflat and saltmarsh areas are of national and international ecological importance. The long term plan is to minimise flood risk and protect developments, as well as the backing hinterland and its ecological assets. In the short term epoch, continued maintenance of rock revetment defences is unlikely to affect the existing estuary processes or water Body hydromorphological conditions, and intertidal areas will accrete or remain stable. In the medium to long term some upgrading of defence structures will be required. Where the estuary is particularly wide (e.g. towards the mouth of Milton Creek) continued vertical saltmarsh accretion is expected as sediment supply is assumed to meet demand. Sea level rise may however, result in coastal squeeze and consequently increased potential for intertidal erosion in constrained channel locations. This may impact on angiosperms, benthic / macro invertebrate and fish through potential changes in inundations / water depth / beach water table (related to tidal regime), abrasion, sediment loading / substrate conditions and heterogeneity of habitat. Therefore, some local deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very minor part of the Swale coastline, and the policy is unlikely to prevent future attainment of Good Potential if appropriate mitigation measures are implemented to support such an improvement.	n/a	X Swale	✓	n/a
E4 22	**Milton Creek**	HTL	HTL	HTL	**TrAC – Swale** **River – Dry Valley South of Sittingbourne** Milton Creek extends from the Swale south towards Sittingbourne. The eastern bank comprises a number of regionally important commercial and industrial built assets, located close to the creek shoreline. Large residential and commercial areas are located on the creek's floodplain. The north eastern bank of the creek is internationally designated for its ecological interests. The long term plan is to continue protecting the developments including the residential, commercial and industrial assets. In the short term epoch, continued maintenance of rock revetment and embankment defences is unlikely to affect the existing estuary processes or Water Body hydromorphological conditions, and intertidal areas will accrete or remain stable. In the medium to long term some upgrading of defence structures will be required. However, intertidal habitats are expected to remain stable in the medium term	n/a	✓	✓	✓

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					epoch, and suffer only minor erosion in the long term. Any effects on water body hydromorphology and associated biological quality elements will be limited, and it is considered unlikely that the policy will result in deterioration of Ecological Potential of the Swale, which will contribute to the future achievement of Good Potential in the Swale by supporting identified mitigation measures as summarised in Assessment Table 2. A tributary enters the Medway at High Halstow. The HTL policy will not result in any changes. Therefore, deterioration in the existing Good Ecological Potential of this river water body is considered unlikely. The landward end of the tidal Milton Creek currently overlaps groundwater SPZ 3 and this will not change with the SMP2 policy. Groundwater levels are rising here following the cessation and reduction of abstraction at Sittingbourne Mill and Kemsley Mills, respectively. As a result it is likely that the flow of fresh water in these river water bodies will increase, and any potential for saline intrusion will be lower than has been the case previously.				
E4 23	**Murston Pits to Faversham**	HTL	MR with local HTL	MR with local HTL	**TrAC – Swale, Murston Lakes (AWB)** **River – Dry Valley South of Sittingbourne, Dry Valley South West of Faversham, Dry Valley South of Faversham** This frontage extends along the southern shore of the Swale, and incorporates 3 creeks. The frontage comprises a large expanse of floodplain which consists mainly of agricultural land and coastal grazing marsh which, like the intertidal mudflat and saltmarsh along the frontage, are nationally and internationally designated. Land rises to the south, with a small number of properties located on higher land, around the edge of the floodplain and in the communities of Conyer and Oare. In the short term the recommended plan is to protect the environmental assets and the low-lying floodplain, which includes properties, roads, agricultural land, freshwater habitats and Murston Lakes Nature Reserve. The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the large floodplain and the residential communities of Conyer and Oare. MR will increase the intertidal habitat extent (and notably this policy unit is also within The Swale SPA and Ramsar site), but with a concomitant loss in grazing marsh and standing freshwater habitats (although the latter could be mitigated by recreation elsewhere at the site). The net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. Potentially, the majority of the frontage will be subject to MR. Further studies will be required to, amongst other things, investigate associated affects on processes within the creeks, to identify appropriate freshwater habitat re-creation requirements and to identify any need for mitigation for the potential effects of the mid term policy on tidal inundation on Murston Lakes (AWB), although noting that these lakes are already connected hydraulically to the transitional water body and are classified in the RBMP as a saline lagoon. Thus, the longer term policies will allow more natural development of the shoreline. Deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy (subject to confirmation during the first epoch of the effects on the 3 creeks), which will contribute to the future achievement of Good Potential in the Swale by supporting identified mitigation measures as summarised in Assessment Table 2. Three tributaries enter the Swale in this policy unit. In each case, these are located on a frontage where HTL applies, and this policy will not result in any changes. Therefore, deterioration in Ecological Status / Potential of these river water bodies is considered unlikely, and the policy will not prevent attainment of Good Status / Potential in the future.	n/a	✓	✓	n/a
E4 24	**Faversham to Nagden**	HTL	HTL	HTL	**TrAC – Swale** **River – Dry Valley South of Faversham** This frontage incorporates the south of Faversham Creek and a short section of the eastern bank. A large number of industrial, commercial, residential and heritage assets are located along the southern sections of Faversham Creek, including the historic town of Faversham with a nationally important	n/a	✓	✓	n/a

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					Conservation Area. Intertidal habitats and a narrow section of creek bank are internationally designated for their ecological importance. The long term plan is to continue protecting the developments, including the residential, historic, commercial and industrial assets and agricultural land. In the short term epoch, continued maintenance of rock revetment and embankment defences is unlikely to affect the existing estuary processes or Water Body hydromorphological conditions, and intertidal areas will accrete or remain stable. In the medium to long term some upgrading of defence structures will be required. However, intertidal habitats are expected to remain stable in the medium term epoch, and suffer only minor erosion in the long term (although this latter risk may increase). Any effects on water body hydromorphology will be limited, and it is considered unlikely that the policy will result in deterioration of Ecological Potential of the Swale or prevent future attainment of Good Potential. A tributary enters the Swale within this unit. The HTL policy will not result in any changes. Therefore, deterioration in Ecological Status / Potential of this river water body is considered unlikely and the policy will not prevent any future attainment of Good Potential.				
E4 25	**Shell Ness to Sayes Court**	MR	MR	MR	**TrAC – Swale** MR will increase the intertidal habitat extent (and notably this policy unit is also within The Swale SPA and Ramsar site), but with a concomitant loss in grazing marsh and standing freshwater habitats (although the latter could be mitigated by recreation elsewhere at the site). The net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. The SMP2 policy allows for a more natural long-term development of the coastline between Shell Ness and North Elmley Island compared to the present and it is considered unlikely that the policy will result in deterioration of Ecological Potential of the Swale; rather it will contribute to the future achievement of Good Potential in the Swale by supporting identified mitigation measures as summarised in Assessment Table 2.	n/a	✓	✓	n/a
E4 26	**Sayes Court to North Elmley Island**	MR	MR	MR					
E4 27	**North Elmley Island to Kingsferry Bridge**	HTL	MR	MR	**TrAC – Swale** The low-lying hinterland consists mainly of agricultural land and coastal grazing marsh which, like the intertidal mudflat and saltmarsh along the frontage, are internationally designated. The southern section of hinterland forms part of the Swale National Nature Reserve and the Elmley National Nature Reserve. In the short term the recommended plan is to protect these ecological (and other) assets. The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the large floodplain and isolated properties. Thus, the short term SMP2 policy supports the conservation objectives for National Nature Reserves, whilst the longer term policy will allow natural development of the coastline and Water Body. Deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy, which will contribute to the future achievement of Good Potential in the Medway by supporting identified mitigation measures as summarised in Assessment Table 2.	n/a	✓	✓	n/a
E4 28	**Kingsferry Bridge to Rushenden**	HTL	MR	MR	**TrAC – Swale** A low lying area immediately north of Kingsferry Bridge which leads to Rushenden Dredging Disposal Site, an area of higher land along the north of the frontage. Sections of the low lying hinterland and intertidal habitats close to the shoreline along the whole of the frontage are internationally designated for their ecological importance. In the short term the recommended plan is to protect properties, infrastructure, agricultural land and freshwater habitats. The recommended mid to long term plan is to allow the coastline to realign to a more naturally functioning system, subject to further investigation of potential contamination issues, whilst continuing to provide flood defence to the large floodplain and isolated properties. MR in unit E4 28 will increase the intertidal habitat extent (and notably this policy unit is also within The Medway Estuary & Marshes SPA and Ramsar site, which overlaps the Swale water body), but with a concomitant loss in standing freshwater habitats, although this could be mitigated by recreation elsewhere at the site. The net effect on the Water Body's biological quality elements will be an improvement associated with the more naturally functioning hydromorphological processes. Thus, the short term SMP2 policy supports the conservation objectives for National Nature Reserves, whilst the longer term policy will	n/a	✓	✓	n/a

Policy Unit		SMP Policy (see key)			Assessment of impact (including list of water bodies affected)	Environmental objectives met? (see Assessment Table 2)			
		2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
					allow natural development of the coastline and water Body, although the evolution of natural processes will remain constrained to a large degree by the defended Kingsferry Bridge. Deterioration in Ecological Potential is considered unlikely as a result of this SMP2 policy which will contribute to the future achievement of Good Potential in the Swale by supporting identified mitigation measures as summarised in Assessment Table 2.				
E4 29	**Rushenden to Sheerness**	HTL	HTL	HTL	**TrAC – Medway, Swale** Rushenden to Sheerness marks the western extremity of the Isle of Sheppey and the interface between the Medway estuary and the open coast. The shoreline comprises the urban areas of Rushenden and Queenborough, which is of national heritage importance, the internationally important port of Sheerness and regionally important strategic links. Intertidal habitats between Rushenden and north of Queenborough (i.e. Swale water body rather than Medway water body) are internationally designated. The long term plan is to continue protecting the developments including the residential, commercial and industrial assets. HTL in the short term epoch will require maintenance and some upgrade or replacement of existing defences, which comprise embankments, seawalls and quay walls. Intertidal areas will be subject to continued erosion in confined sections of the channel (i.e. Swale water body). In the medium and long term epochs, defence upgrade will be needed to counter rising sea levels, and the intertidal area will narrow further with coastal squeeze in constrained areas. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan. However, considering the effects in unit E4 29 in isolation, the policy is likely to result in locally increased abrasion, loss of sub-tidal habitat variability and loss of intertidal habitat in the Swale water body (but not in the Medway water body). This may impact on angiosperms, benthic / macro invertebrate and fish. Therefore, some localised deterioration in Ecological Potential is considered probable as a result of this SMP2 policy. However, the policy unit's frontage constitutes only a very minor part of the Medway and Swale coastlines, and the policy is unlikely to prevent future attainment of Good Potential in either water body if appropriate mitigation measures are implemented to support such an improvement.	n/a	X Swale	✓	n/a
E4 30	**Medway Islands**	NAI	NAI	NAI	**TrAC – Medway** The Medway Islands are currently undefended. The SMP2 policy supports continued natural development of the coastline at Medway Islands (subject to an investigation of potential contamination issues at Hoo Ness Island, E4 30a) which is in line with the objectives of the WFD.	n/a	✓	✓	n/a

Key: NAI – No active intervention, HTL - Hold the line, A - Advance the line, MR – Managed Realignment

Assessment Table 4 - Summary of Achievement (or Otherwise) of Environmental Objectives for Each Water Body in the SMP2 Area

Water Body (& related SMP policy units)	Environmental objectives met?				WFD Summary Statement required?
	WFD 1	WFD 2	WFD 3	WFD 4	
TrAC Water Bodies					
Medway GB530604002300 **(E4 01, E4 02, E4 03, E4 04, E4 05, E4 06, E4 07, E4 08, E4 09, E4 10, E4 11, E4 12, E4 13, E4 14, E4 15, E4 16, E4 17, E4 18, E4 19, E4 20, E4 29, E4 30)**	n/a	X	✓	n/a	**Yes** - Environmental Objective WFD2 may not be met by the SMP2 policy in some areas in this water body, i.e. E4 01, E4 03, E4 06, E4 07, E4 12, E4 13 (At the water body scale, 12 of the remaining policy units will have a neutral effect on WFD objective 2, and 4 will contribute positively to the objective by promoting the development of intertidal habitat)
Swale GB530604011500 **(E4 20, E4 21, E4 22, E4 23, E4 24, E4 25, E4 26, E4 27, E4 28, E4 29)**	n/a	X	✓	n/a	**Yes** - Environmental Objective WFD2 may not be met by the SMP2 policy in some areas in this water body, i.e. E4 21, E4 29 only (At the water body scale, 4 of the remaining policy units will have a neutral effect on WFD objective 2, and 4 will contribute positively to the objective by promoting the development of intertidal habitat)
Murston Lakes GB30642956 **(E4 23)**	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
River Water Bodies					
Tributary of Medway Estuary at High Halstow GB106040024120 **(E4 01)**	(✓) (water body not yet assessed)	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Tributary of Medway Estuary at Kingsnorth GB106040024030 **(E4 03)**	(✓) (water body not yet assessed)	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Medway Estuary GB106040024180 **(E4 06)**	(✓) (water body not yet assessed)	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy

Water Body (& related SMP policy units)	Environmental objectives met?				WFD Summary Statement required?
	WFD 1	**WFD 2**	**WFD 3**	**WFD 4**	
Leybourne Stream GB106040018450 (E4 08)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Ditton Stream GB106040018200 (E4 09)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Medway at Maidstone GB106040018440 (E4 09, E4 10)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Swale Tributary at Lower Halstow GB106040018220 (E4 17)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Iwade GB106040018600 (E4 20)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Dry Valley South of Sittingbourne GB106040018550 (E4 22, E4 23)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Dry Valley South West of Faversham GB106040018540 (E4 23)	(✓) (water body not yet assessed)	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Dry Valley South of Faversham GB106040018530 (E4 23, E4 24)	n/a	✓	✓	n/a	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
Groundwater Bodies					
North Kent Medway Chalk	n/a	n/a	n/a	✓	**No** - not necessary as delivery of Environmental Objectives is likely

Water Body (& related SMP policy units)	Environmental objectives met?				WFD Summary Statement required?
	WFD 1	WFD 2	WFD 3	WFD 4	
GB40601G500300 **(E4 06, E4 07, E4 08, E4 10, E4 11, E4 12, E4 13)**					to be supported by the proposed SMP policy
Kent Greensand Middle GB40601G500400 **(E4 09, E4 10)**	n/a	n/a	n/a	✓	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
North Kent Swale Chalk GB40601G501700 **(E4 13, E4 14, E4 22, E4 24)**	n/a	n/a	n/a	✓	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy
North Kent Tertiaries GB40602G500200 **(E4 15, E4 16, E4 17, E4 18, E4 19, E4 20, E4 21, E4 22, E4 23)**	n/a	n/a	n/a	✓	**No** - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policy

Assessment Table 5 - Water Framework Directive Summary Statement

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
Medway GB530604002300 **E4 01, E4 03, E4 06, E4 07, E4 12, E4 13** **(Other units neutral or contribute to WFD objectives)**	**Mitigation measures:** have all practicable mitigation measures been incorporated into the preferred SMP 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.	The principal mitigation within the SMP2 is apparent when considering the effects at the scale of the whole water body, rather than individual frontages (policy units). Overall, the proposed NAI at 4 units and MR at 10 will provide opportunities for the water body to return to a more natural state, improving habitats and conditions for biological quality elements. These improved hydromorphological conditions focussed on the middle reaches of the water body will offset the localised coastal squeeze impacts experienced in later epochs along the Isle of Grain and in the constrained estuary around Rochester. On a more local scale, the development of schemes associated with proposed Hold the Line SMP2 policies should take account of the hydromorphological mitigation measures for TrAC water bodies outlined by the UK Technical Advisory Group (UKTAG); (measures not relevant to HTL policy frontages are shown in parentheses [] for completeness): Pressure: Shoreline reinforcement / elevation – bank reinforcement: Mitigation: Modify existing structure; Replace with soft engineering solution; Bank reprofiling; [Managed realignment of flood defence]; Restore/create/enhance aquatic and marginal habitats; Indirect /offsite mitigation (offsetting measures) Pressure: Manipulation of sediment transport – installation of beach control structures: Mitigation: [Removal of structure]; Modify structure design; Restore/create/enhance aquatic and marginal habitats; Indirect /offsite mitigation (offsetting measures)
	Overriding public interest: can it be shown that the reasons for selecting the preferred SMP policies are reasons of overriding public interest (ROPI) and/or the	SMP Appendix G sets out the conclusions of scenario testing which was used to develop the proposed policies for each of these 6 policy units. Comparison was made of potential policies ATL, HTL, MR and NAI. Appendix H sets out the economic damages associated in particular with NAI. In policy unit **E4 01** there is an overriding interest in defending the nationally important industry (e.g. Grain Power Station and Thamesport Container Terminal) and over 130 properties in the villages of

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
	benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	Lower Stoke and Middle Stoke, with a capital value of c.£132m. Additionally, nationally important infrastructure including the A228 road, railway line and national grid could also be inundated. In policy unit **E4 03** there is an overriding interest in defending the nationally important Kingsnorth Power Station and associated infrastructure, plus over 100 residential and 50 commercial properties at Hoo St Werburg and Kingsnorth, with a capital value of c. £149m. In policy unit **E4 06** there is an overriding interest in defending the urban areas of Lower Upnor, Frindsbury and Strood, the commercial and industrial area of the Medway City Estate and regionally important strategic links. In total, over 350 residential and 1,050 commercial properties) with a capital value of c.£222.6m. Additionally, Strood has been identified as a key regeneration area under the Medway Waterfront Renaissance Strategy. In policy unit **E4 07** there is an overriding interest in defending the residential communities of Cuxton and North Halling, including over 130 residential and 10 commercial properties with a capital value of c.£26.9m, plus the railway line which follows the shoreline. In policy unit **E4 12** there is an overriding interest in defending the dense urban areas of Rochester and Chatham, including over 1890 residential and 370 commercial properties) with a capital value of c. £414.4m. Other features also at risk include Medway Port and Chatham Historic Dockyard which has international heritage importance. In policy unit **E4 13** there is an overriding interest in defending the residential area of St Mary's Island and the residential, commercial and recreational areas along the Gillingham frontage, including over 1500 residential and 170 commercial properties with a capital value of c.£336.1m.
	Better environmental options: have other significantly better options for the SMP policies been considered? Can it be	SMP Appendix G sets out the conclusions of scenario testing which was used to develop the proposed policies for each of these 6 policy units. Table G2.2 summarises the initial appraisal of all conceptual policies - ATL, HTL, MR and NAI – in

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
	demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	terms of the consequent shoreline response, and thus determine options which might be considered further in the context of achieving the SMP2's objectives. Table G3.1 then assesses each plausible policy in each epoch against each objective. Critically to this WFD assessment, those objectives included: • Promote biodiversity opportunities to enhance / create intertidal habitat • Avoid net loss of intertidal habitat and associated species from coastal squeeze and flood risk management works • Promote biodiversity opportunities to enhance / create coastal grazing marsh • Avoid net loss of coastal grazing marsh and associated species from flooding and flood risk management works Conceptually, MR or NAI (where this would allow defences to fail) might present better options for the water body than HTL. However, in 5 of these 6 policy units the opportunities for migrating the shoreline are severely constrained by local topography or, more commonly, existing human development which would present significant risk to the water body if flooded (e.g. through water contamination). Only at E4 03 Kingsnorth Power Station are there opportunities for intertidal habitat gain, but the multicriteria assessment here identified concomitant risks to other objectives which were considered to outweigh the potential environmental benefits. Specifically, considerations which were considered to make MR or NAI both technically unfeasible and disproportionately costly are: (1) the presence of a nationally important power station and associated infrastructure, which would need to be decommissioned and removed; (2) an approved plan for a new power station along the frontage which also has national importance to the economy; and (c) concerns over probable historic contamination of the frontage and hinterland which could be mobilised and present a risk to water body chemical potential (see Appendix G). Thus, in none of the six policy units could MR or NAI present an environmentally better option that could also meet the overriding public interest objectives associated with continuing to defend key assets (summarised above).
	Affect on other water bodies: Can it be demonstrated that the preferred SMP policies do not permanently exclude or	As indicated in Table 3, E4 06, E4 07, E4 12 and E4 13 all overlie a SPZ associated with the North Kent Medway Chalk groundwater body. However, (a) this groundwater body is not a risk of saline intrusion, and (b) the SMP2 policies will not change the association between the TrAC water body (Medway) and the groundwater body.

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
	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?	As indicated in Table 3, several policy units (E4 01, E4 03, E4 04, E4 06, E4 08, E4 09, E4 10, E4 17 and E4 20) are associated with river water bodies, but the SMP2 policy will either have no effect on these (HTL frontages) or will result in a move towards a more naturally functioning intertidal zone (MR / NAI frontages). Any effects of the SMP2 policies will be localised within the respective policy units.
	Other issues: Can it be shown that there are no other over-riding issues that should be considered (such as designated sites, recommendations of the Appropriate Assessment)?	SMP Appendix J sets out the conclusions of an initial assessment of the potential for the SMP policies to have significant effects on any internationally designated site within the SMP2 study area, carried out by the Environment Agency and agreed with Natural England. Policy units E4 01, E4 03, E4 06, E4 07, E4 12 and E4 13 present no risk of significant effect on any of the SPAs / Ramsar sites in the SMP2 study area.
Swale GB530604011500 **E4 21 & E4 29 only** **(Other units neutral or contribute to WFD objectives)**	**Mitigation measures:** have all practicable mitigation measures been incorporated into the preferred SMP 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.	The principal mitigation within the SMP2 is apparent when considering the effects at the scale of the whole water body, rather than individual frontages (policy units). Overall, the proposed MR at 6 will provide opportunities for the water body to return to a more natural state, improving habitats and conditions for biological quality elements. These improved hydromorphological conditions focussed on the middle reaches of the water body will offset the localised coastal squeeze impacts experienced in later epochs in the more constrained channel on the south-west of the Isle of Sheppey. On a more local scale, the development of schemes associated with proposed Hold the Line SMP2 policies should take account of the hydromorphological mitigation measures for TrAC water bodies outlined by the UK Technical Advisory Group (UKTAG); (measures not relevant to HTL policy frontages are shown in parentheses [] for completeness): Pressure: Shoreline reinforcement / elevation – bank reinforcement: Mitigation: Modify existing structure; Replace with soft engineering solution; Bank reprofiling; [Managed realignment of flood defence]; Restore/create/enhance aquatic and marginal habitats; Indirect /offsite mitigation (offsetting measures)

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
		Pressure: Manipulation of sediment transport – installation of beach control structures: Mitigation: [Removal of structure]; Modify structure design; Restore/create/enhance aquatic and marginal habitats; Indirect /offsite mitigation (offsetting measures)
	Overriding public interest: can it be shown that the reasons for selecting the preferred SMP 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 SMP policies to human health, to the maintenance of health and safety or to sustainable development?	SMP Appendix G sets out the conclusions of scenario testing which was used to develop the proposed policies for each of these 6 policy units. Comparison was made of potential policies ATL, HTL, MR and NAI. Appendix H sets out the economic damages associated in particular with NAI. In policy unit **E4 21** there is an overriding interest in defending regionally important industrial, commercial and dock developments with a capital value estimated at £21.4 million, and associated infrastructure including the A249 road, railway line and power substation which would also effectively be lost if defence management ceased. In policy unit **E4 29** there is an overriding interest in defending the urban areas of Rushenden and Queenborough (which is of national heritage importance), the internationally important port of Sheerness and regionally important strategic links. If defence management ceased this could result in the loss of approximately 7,335 residential and 879 commercial properties with a capital value of c.£1,340.6m.
	Better environmental options: have other significantly better options for the SMP 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?	SMP Appendix G sets out the conclusions of scenario testing which was used to develop the proposed policies for both of these policy units. Table G2.2 summarises the initial appraisal of all conceptual policies - ATL, HTL, MR and NAI – in terms of the consequent shoreline response, and thus determine options which might be considered further in the context of achieving the SMP2's objectives. Table G3.1 then assesses each plausible policy in each epoch against each objective. Critically to this WFD assessment, those objectives included: • Promote biodiversity opportunities to enhance / create intertidal habitat • Avoid net loss of intertidal habitat and associated species from coastal squeeze and flood

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
		risk management works • Promote biodiversity opportunities to enhance / create coastal grazing marsh • Avoid net loss of coastal grazing marsh and associated species from flooding and flood risk management works Conceptually, MR or NAI (where this would allow defences to fail) might present better options for the water body than HTL. Both of these 6 policy units presented some limited opportunities for migrating the shoreline to increase intertidal habitat area, but the multicriteria assessment identified concomitant risks to other objectives which were considered to outweigh the potential environmental benefits. The principal consideration when concluding that MR or NAI at E4 21 would be both technically unfeasible and disproportionately costly is the need to retreat a large number of regionally important dock developments, industrial and commercial assets and infrastructure elements (including a trunk road and railway line) located along the creek. Indeed, rather than retreating these, further substantial developments have been proposed at Ridham Dock and Kemsley Fields. For policy unit E4 29 the existing features which would need to be retreated and/or decommissioned include: (1) the internationally important Port of Sheerness; (2) more than 8000 residential and commercial properties in Rushenden and Queenborough; and (3) regionally important strategic links. In addition, nationally important built heritage in Queenborough would be lost or at risk, weakening the argument for MR or NAI being "better" than HTL environmentally (see Appendix G). Thus, in neither policy unit could MR or NAI present an environmentally better option that could also meet the overriding public interest objectives associated with continuing to defend key assets (summarised above).
	Affect on other water bodies: Can it be demonstrated that the preferred SMP 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?	As indicated in Table 3, **E4 21** overlies the North Kent Tertiaries groundwater body, although does not overlap any SPZ. The SMP2 policy will not change the association between the TrAC (Swale) and groundwater body. As indicated in Table 3, **E4 29** lies partly within the Medway transitional water body, but the SMP2 policy will not have any significant effect on the estuary processes there (primarily because the Medway estuary is considerably less constrained than the Swale estuary within this policy unit). As indicated in Table 3, policy units E4 22, E4 23 and E4 24 are associated with river water bodies, but the SMP2 policy will have no effect on these (HTL frontages).

Water body (including policy units that affect it)	Water Framework Directive Summary Statement checklist	Brief description of decision making and reference to further documentation within the SMP
	Other issues: Can it be shown that there are no other over-riding issues that should be considered (such as designated sites, recommendations of the Appropriate Assessment)?	SMP Appendix J sets out the conclusions of an initial assessment of the potential for the SMP policies to have significant effects on any internationally designated site within the SMP2 study area, carried out by the Environment Agency and agreed with Natural England. Policy units E4 21 and E4 29 present no risk of significant effect on any of the SPAs / Ramsar sites in the SMP2 study area.

Annex L1

Medway and Swale Estuary SMP compliance with the Water Framework Directive