DUMFRIES & GALLOWAY SHORELINE MANAGEMENT PLAN

Main Report

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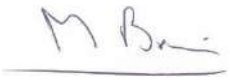
Malcolm Brian  4 January 2023

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EXECUTIVE SUMMARY

Introduction

A Shoreline Management Plan (SMP) is a broad-scale assessment of the risks to people and the developed, historic and natural environment, associated with coastal processes and helps to inform the management of these risks. The first version of the SMP was introduced in 2005 with the intention of the setting out a coastal defence strategy and providing management policies for the next 50 years. The impetus for updating this SMP has stemmed from a recommended action listed in the Solway Local Flood Risk Management Plan co-ordinated by Dumfries & Galloway Council. This action suggested updating the understanding of coastal flooding and issues associated with the Scottish Solway coastline and identifying where further work may be required to mitigate against flooding.

The administrative boundaries of the SMP extend from the Scottish Border all the way along the northern shoreline of the Solway Firth, around Luce Bay, along the Western Rhinns and around the shoreline of Loch Ryan. It is estimated that there is about 340km of shoreline within the Dumfries & Galloway Council operational area, as shown in Figure 1-1.

The implications of relevant suggested shoreline management policies for the adjacent administrative areas of South Ayrshire and Cumbria (England) have been considered in developing the SMP, however, it should be noted that the policies relating to these areas have not been defined by this SMP.

Basis for Development of the Plan

To facilitate the identification of appropriate shoreline management policies the Dumfries & Galloway coast was sub-divided into several geographic sections. This approach follows on from the reasoning outlined in 2005 SMP and builds on previous work undertaken by HR Wallingford in 1997 that identified one coastal cell (7) within the Solway Firth and Sub-cell (6d) to include the shoreline of the North Channel and Loch Ryan. This concept of coastal cells was later reviewed by Hansom et al. (2004), who preferred to split the Scottish coastline into Coastal Process Units (CPU's), noting that much of the Scottish coast does not have the degree of intra-coastal sediment exchange that defines the integrity of a coastal cell. Based upon this research, the Dumfries & Galloway coastline was divided into six CPU's for the 2005 SMP.

Given the spatial extent of the Dumfries & Galloway coastline each of the CPU's were further broken down into smaller geographical sections for the 2005 SMP to better facilitate the assessment of existing management policies and to the selection of appropriate shoreline management policies. A total of 37 'Management Unit's' were initially identified during the 2005 SMP process, however following review as part of the development of this updated SMP, the spatial extent of some of these units was amended, with 35 'Policy Units' identified for this SMP. Table 3-2 provides a summary of the CPU's and the Policy Units (PU) contained within each of these.

Whilst a management policy or combination of policies are identified for each policy unit, the identification of a specific management policy does not imply or provide a commitment that this policy must be applied uniformly over the full extent of the policy unit. The actual implementation of the policy through measures at any location will only be progressed if there is justifiable need and all relevant criteria are met at detailed design stage.

Shoreline Management Policies

There are principally four high level management policies available to shoreline managers, however a much wider range of measures are available to implement these policies. A brief outline of the typical shoreline management measures available to achieve the desired policy for any particular section of the coastline is presented in Section 1.2, further information on measures is contained in the publication 'Shoreline Management Guidelines', Mangor et al. (2017).

The first version of the SMP for the Dumfries & Galloway coastline was published in June 2005 (HR Wallingford, 2005a). The stated intention of this Plan was to develop a coastal defence strategy for the coastline and provide management policies for the next 50 years. The 2005 SMP identified a preferred policy of 'No Active Intervention' for the majority of the shoreline. In other words, the shoreline should

be allowed to continue to evolve naturally over time, where possible. However, in many instances, the 'No Active Intervention' policy was considered alongside localised management needs by combining some elements of other shoreline management policies producing hybrid policies of localised Hold the Line and what would now be considered as Managed Realignment.

Within the 2005 SMP a policy of 'Hold the Line' was recommended for some sections of the coast, five out of the 37 Management Units, while a localised Hold the Line policy was recommended alongside No Active Intervention for most of this shoreline, 23 out of the 37 Management Units. Advance the Line was recommended for one Management Unit located within Loch Ryan where there are nationally significant ferry and port operations. In a concluding statement, the original 2005 SMP noted that these policies 'may change', when better information may lead to different decisions being made about appropriate management policies. This statement summarised the scarcity of suitable information, particularly relating to coastal processes when the original shoreline management policies were recommended.

Even after considering new and improved coastal process information, summarised in Section 3.2, this revised SMP also recommends 'No Active Intervention' for most of this shoreline. Hold the Line policies are mainly recommended for management units within CPU 1 (Inner Solway Firth) and CPU 6 (Loch Ryan). More localised versions of Hold the Line are recommended for other areas where the identified localised coastal flood and erosion risk can justify this policy approach, particularly over the short term (0-20 years). Within this updated SMP it is recognised that due to anticipated future sea level rise, it is likely that Hold the Line will become increasingly unsustainable over time, therefore over the medium and longer term (>20years <100years) Managed Realignment has been introduced as an alternative policy.

Shoreline Management Process

The production of this SMP has involved five main tasks, as follows

- Data Collection and development of the Baseline Understanding of the risks,
- Policy Development and identification of Preferred Policies,
- Identification of actions to implement the Preferred Policies and Action Planning,
- Strategic Environmental Assessment of the Plan and Policies,
- Consultation and Stakeholder Engagement.

Data Collection and Baseline Understanding

This stage of the SMP process involved the collation of and review of existing and new information, observations and measurements relating to the Dumfries & Galloway coast. The objective of this stage was to establish an updated understanding of the coastal flood and erosion risk, within a spatial and temporal framework. In summary an improved understanding of the potential coastal risk to property, infrastructure, the natural and historic environment, over the next 100 years is essential for the identification of appropriate and sustainable coastal management policy.

Since the completion of the first SMP, much additional information relating to coastal processes and risk has been developed and presented. This information has been used to reappraise the original SMP policies in terms their appropriateness and sustainability for today's climate and over the next 100 years to identify present day and future policy options.

Policy Development and the Preferred Policy

Preferred Policy Statements were produced for each policy unit, summarising the rationale of the decision-making process, resulting in the selection of specific shoreline policy or combination of policies, for managing the risks from coastal flooding and erosion for a particular section of shoreline, over the next century. In essence this process involved striking a balance between the level of risk, the spatial distribution of risk, environmental sensitivities and the consequences of coastal evolution for each policy unit.

It is important to recognise that this SMP is produced for the entire Dumfries & Galloway coast and although some of these individual Preferred Policy Statements focus upon local details, relevant only to that policy unit, issues that extend beyond those specific locations were also considered.

Action Planning

The purpose of the Action Plan is to identify the steps required to put the 'Preferred' policies into practice. This primarily involved identifying the steps needed to ensure that the SMP policies were taken forward in the short term but also to identify more detailed studies required for managing and / or improving coastal management in the medium to long term.

The Action Plan provides a list of actions that should be undertaken by various stakeholders over the life of the SMP, and should be reviewed at the next SMP review, which will ultimately lead to better informed decision-making in terms of coastal management policy. Typically, a SMP review period would be every ten years; however, this is not set in stone and should be kept under regular review especially as the understanding of the implications of climate change improves in order to ensure that the SMP does not become outdated.

Another vitally important aspect of the Action Plan is to ensure that information provided by the SMP on future coastal risks and their management is disseminated to stakeholders, particularly Planning Authorities to ensure that the outputs from the SMP are considered when developing and implementing land use plans.

Strategic Environmental Assessment

A Strategic Environmental Assessment (SEA) has been prepared in accordance with the Environmental Assessment (Scotland) Act 2005. The full detail of the SEA is provided in a separate document "the SEA Environmental Report.

The purpose of this Environmental Report was to provide a formal and transparent assessment of the likely significant impacts on the environment arising from the implementation of the SMP, including consideration of reasonable alternatives.

Where necessary mitigation measures have been recommended where potential negative impacts were considered likely to result from implementation of a proposed shoreline management policy. The mitigation measures are detailed in the SEA Environmental Report and aim to prevent, reduce and as fully as possible offset any significant adverse effects on the environment due to the implementation of the SMP.

The principal mitigation recommendation is that the predicted negative effects should be considered further at the next stage of development, when details of the physical shoreline management measures (e.g., Visual appearance and alignment of hard engineering works) can be optimised through detailed feasibility studies and design in order to limit potential identified impacts on sensitive receptors. Where feasible, natural flood management and soft / green engineering methods should be incorporated into the detailed planning to reduce the negative environmental impacts of any scheme. It is noted that no new hard defences have been recommended.

Monitoring of coastal change is a key aspect of sustainable shoreline management, both in terms of informing policy decisions and also in establishing the effectiveness of policies and quantifying any impacts. Consequently, the establishment and implementation of a regular monitoring programme is a key action that should be progressed for the entire coastline but with particular focus on those areas of greatest risk. Additionally, the SEA Directive requires that the implementation of a plan is monitored to identify at an early stage any unforeseen adverse effects to facilitate undertaking appropriate remedial action. For the environmental monitoring of the SMP the proposed indicators, data and potential data sources are documented in section 7.2 of the SEA Environmental Report. These are based on the Targets and Indicators established in the SEA Objectives and the monitoring will be undertaken following the SMP adoption. However detailed monitoring for specific policies should be re-scoped in consultation with the appropriate authorities at the detailed feasibility and design stages. This agreed detailed monitoring should then be undertaken before, during and after construction, where and when appropriate.

Consultation and Stakeholder Engagement

Stakeholder and public engagement have been central to the development of this SMP (and SEA) as ensuring the updated SMP was acceptable to as many parties as possible was a key objective of the development process. To achieve that, stakeholders have been engaged with at each stage and through this process stakeholders and communities have been able to inform and contribute to the development of the updated shoreline management policy recommendations. In simplistic terms, this was a means for everyone to 'have a say'. The main stakeholder groups engaged with, as identified in the original Engagement Plan. Engagement Plan as detailed in Section 2.

The management policies set in an SMP are based on the understanding of coastal processes and risk at the time the plan is developed and as such SMP's should be considered "live" documents and hence be subject to regular review (typically every 10 years) to ensure that they remain relevant to the ever-changing coastal environment. In this way changing knowledge of the effects of climate change, and new data / knowledge of coastal processes and the associated risks can be incorporated ensuring that the SMP policies remain relevant and applicable to the Dumfries & Galloway coastline. Hence the establishment of a periodic review cycle is a key action included within the recommendations of the SMP.

1 INTRODUCTION

1.1 The Shoreline Management Plan

A Shoreline Management Plan (SMP) is a non-statutory and high-level policy document that provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to manage these risks in a sustainable manner. The intention of a SMP is to provide a 'route map' for decision makers to move from the present situation towards the future in a sustainable manner. This SMP considers objectives, policies and shoreline management actions for a range of timescales: short-term, medium-term and long-term, corresponding broadly to time periods of 0 to 20 years, 20 to 50 years, and 50 to 100 years respectively. The SMP approach provides a long lead time for the changes that will take place, which in general will not happen now, but will occur at some point in the future.

Responsibility for mitigation of coastal flood and erosion risk does not fall solely upon national and local government and should not be read as such within this Plan. The terms of the legislation under which the coastal defence operating authorities work confer only "permissive powers" and, as such, there is currently no general obligation on the part of operating authorities or national government to assure protection against flooding or erosion or to provide any compensation for losses.

Shorelines are extremely dynamic and social, environmental and economic pressures and priorities constantly change over time; therefore, it is essential that the SMP is reviewed and updated periodically. Although this revised SMP establishes a robust and evidence-based sustainable approach for managing coastal flood and erosion risk up to the next 100 years, information is constantly being improved and updated based upon additional research and improved measurement. It is therefore recommended that a regular review process is adopted to ensure that the recommendations presented by this SMP can be adapted to account for changes in the appreciation of climate change effects and National policies relating to flood and erosion risk management.

Since the completion of the 2005 SMP, new datasets and studies have become available, including the SEPA coastal flood maps and the Dynamic Coast project coastal erosion risk data. Other studies presenting relevant data / information include the Flood Risk Management Strategy for Solway (SEPA, 2015) and the Solway Local Risk Management Plan (Dumfries & Galloway, 2016). It is noted that the latter plan, recommends the action to update the 2005 SMP by 2022.

Dumfries & Galloway Council are the Responsible Authority for the development and implementation of this Plan. However, this SMP was developed in partnership with other organisations with key roles in shoreline management, including:

- Scottish Environment Protection Agency (SEPA);
- NatureScot (previously Scottish Natural Heritage (SNH));
- Solway Firth Partnership.

The geographical extent of this SMP is outlined in Figure 1-1, and extends from the Scottish Border all the way along the northern shoreline of the Solway Firth, around Luce Bay, along the Western Rhinns and around the shoreline of Loch Ryan. It includes all areas that are affected by coastal processes including the tidal extent of estuaries and rivers.

In line with the first version of the SMP that was published in June 2005 (HR Wallingford, 2005a), the coastline has been divided into six Coastal Process Units (CPU's), which have been further sub-divided into smaller segments or units for management purposes. Following a review of the original 37 'Management Units', based upon natural characteristics of the coastline, as well as the usage and development of the immediate hinterland, and coastal defence (if any) 35 'Policy Units' (PU's) have been defined for this version of the SMP.

Figure 1-1 Geographical Extent of the Dumfries & Galloway Shoreline Management Plan

1.2 Shoreline Management Policies and Measures

There are four high level SMP policies available to shoreline managers as defined by national guidance, as outlined in Table 1-1.

Policy	Description
Advance the Line (ATL)	The shoreline is advanced, defences are built seawards of the existing defence line or land is reclaimed for development. This policy will require active management and construction. It should be noted that setting this policy for a section of shoreline does not represent a requirement that actions must be taken to advance the defence line, rather it indicates that these actions are considered acceptable, however it is important to note that lesser actions which will hold the existing defence line or indeed allow the coastline to retreat are also acceptable.
Hold the Line (HTL)	The shoreline is proposed to be held in its contemporary position. This policy is likely to require active management and construction. This policy may require maintenance or improvement of the standard of protection presently afforded. In addition to covering situations where the existing defence structures need to be maintained, this policy also covers those situations where work or operations are carried out in front of the existing defences (such as beach recharge, rebuilding the toe of a structure, building offshore breakwaters and so on) to improve or maintain the standard of protection provided by the existing defence line. This policy also includes other policies that involve operations to the rear of existing defences (such as building secondary floodwalls) where they form an essential part of maintaining the current coastal defence system.
Managed Realignment (MR)	This policy allows the shoreline to move backwards or forwards, with management to control or limit movement such as building new defences on the landward side of the original defences. This approach has been termed as managed retreat and setback.
No Active Intervention (NAI)	No action is taken and natural uninterrupted coastal processes, including erosion and accretion continue.

Table 1-1 Summary of Shoreline Management Policies

The first version of the SMP developed and introduced an initial coastal defence strategy for the coastline and provided management policies for the next 50 years. For most of spatial extent of the Dumfries & Galloway shoreline little or no intervention (No Active Intervention) was recommended. A 'Hold the Line' policy was recommended for five out of the original 37 Management Units (Policy Units) while 'Advance the Line' was recommended for planned port development, particularly within Loch Ryan.

This first version of the SMP also introduced three hybrid versions of 'No Active Intervention', that included a localised Hold the Line measure and elements of what is now defined as Managed Realignment. Managed Realignment was defined as deliberately removing defences to create new areas of habitat including saltmarsh. However, it can be argued that 'limited intervention', defined as working with natural processes to allow for natural coastal change, i.e., dune management can also be viewed as Managed Realignment.

1.2.1 Aims

The aim of a SMP is to provide the basis for developing management policies for a length of coast and set the framework for managing coastal flood and erosion risks in the future. (Defra, 2006). The development of this updated SMP involved a review of the 2005 SMP policies, considering a longer 100-

year planning horizon. This updated SMP also referred to and employed more recent data to inform the review and justification of shoreline management policies.

The management policies identified should provide a sustainable approach as set out *Shoreline Management Plan Procedural Guidance* (Defra, 2006). They have also been developed in accordance with best practice for appraising coastal flood and erosion risk as set out in the *FCERM Appraisal Guidance* (Environment Agency, 2010) and *Multi-Coloured Handbook* (FHRC, 2018).

1.2.2 Objectives

To achieve the aims set out previously, a set of objectives were defined as follows,

- Setting out the risks from flooding and erosion to people and the developed, historic and natural environment within the SMP area;
- Identifying opportunities to maintain and improve the environment by managing the risks from floods and coastal erosion;
- Identifying the preferred policies for managing risks from flooding and erosion over the next century;
- Identifying the consequences of putting the preferred policies into practice;
- Setting out procedures for monitoring how effective these policies are;
- Informing others so that future land use, planning and development of the shoreline takes account of the risks and the preferred policies;
- Discouraging inappropriate development in areas where the flood and erosion risks are high;
- Ensuring compliance with international and national nature conservation legislation and aiming to achieve the biodiversity objectives; and
- Ensuring that key stakeholders and communities are engaged throughout the study to inform and contribute to the development of updated SMP policy recommendations.

1.2.3 General Principles

A SMP is a non-statutory policy document for coastal defence management planning. The requirement for an updated SMP covering the Dumfries & Galloway coastline was identified by SEPA in 2015 through the development of the Flood Risk Management Strategy for the Solway District. Dumfries & Galloway Council is the Lead Local Authority for the Solway Plan District, and the implementation of the strategy is detailed in the Solway Local Flood Risk Management (LFRM) Plan.

The preparation of the updated SMP has taken due cognisance of appropriate guidance, including the Defra document 'Shoreline Management Plan Guidance Volume 1 and 2' (2006). Other existing planning initiatives and legislative requirements have also been considered, as the SMP is intended to inform wider strategic planning.

The SMP does not set policy for anything other than coastal defence management; however, as there can be significant social, economic and environmental implications associated with the policies delivered by an SMP, stakeholder engagement has formed a significant element of the development process.

Whilst the SMP sets out policy that is adopted and agreed by the participating organisations, this does not represent any commitment to future funding or implementation. Funding for the implementation of the SMP policies needs to be sought individually through implementation of the recommendations of the Action Plan and will be subject to the proposed measures satisfying relevant environmental, social and economic criteria.

1.2.4 Sustainable Shoreline Management

The SMP seeks to identify 'sustainable shoreline management policies', however 'sustainability' can mean different things depending upon the individual viewpoint. The conflicting pressures on the coast and constraints upon its management therefore were an important consideration in the development of an optimised plan which provides 'balanced sustainability'.

The SMP promotes management policies for the coastline into the 22nd century, thus the adopted policies must achieve long-term objectives without committing to unsustainable defence practices. It was, however, recognised that due to present-day objectives and acceptance, wholesale changes to

existing defence management may not be appropriate in the very short-term. Consequently, the SMP provides a 'route map' for decision makers to move from the present situation towards the future in a sustainable manner based on the present understanding of climate change impacts.

The SMP considers objectives, policies and shoreline management actions for a range of timescales: short-term, medium-term and long-term. These correspond broadly to time periods of 0 - 20 years, 20 - 50 years and 50 -100 years respectively.

1.2.5 Outline of this Shoreline Management Plan

The SMP is set out as follows,

- **Section 1** is an introduction relating to the SMP.
- **Section 2** outlines the basis for the SMP development including a description of the Dumfries & Galloway shoreline, including a summary of coastal flood and erosion risk (Appendix A), and defence asset condition assessment (Appendix B). Other datasets and relevant studies used during policy development and appraisal are outlined.
- **Section 3** provides a summary of the consultation and engagement process and outcomes (Appendix C)
- **Section 4** provides an overview of the preferred policies and implications for individual sections of the coastline (Policy Units). Appendix D provides further local detail and considers locally specific issues and objectives.
- **Section 5** outlines the objectives of the Action Plan and its approach. Appendix E provides the Action Plan for each Policy Unit.
- **Section 6** provides detail of how the SMP complies with the requirements for a Strategic Environmental Assessment (SEA) (Appendix F).
- **Section 7** outlines the next steps in the SMP process including how the policies should influence planning decisions and how the Plan will be reviewed and updated.

1.2.6 Supporting Documents (Appendices)

A series of supporting documents are provided with the SMP. These provide technical detail to support this SMP

A. **Baseline Processes:** Geomorphological assessment of coastal processes around the Dumfries & Galloway coastline. This provides an assessment of long-term issues associated with undertaking a 'No Active Intervention' baseline. This includes an assessment of future coastal change risk and coastal habitat change. Key assumptions and uncertainties, including limitation associated with the data used to inform this assessment are included.
B. **Coastal Defence Assessment:** A visual inspection and assessment of coastal defences presents detail of the current state and condition of mainly Council owned and maintained assets.
C. **Engagement and Consultation:** All communications from the stakeholder engagement process are provided here, together with information arising from the consultation process. The impact of Covid-19 and the development of the Virtual Consultation Room is also discussed.
D. **Preferred Policy Statements:** Provides information on the policy / option assessment process. This includes details of the environmental, social, technical and economic issues which have been considered for each Policy Unit.
E. **Action Plan:** These documents provide detail of how the preferred policies may be implemented.
F. **Strategic Environmental Assessment (SEA):** includes the complete SEA document.

2 CONSULTATION AND STAKEHOLDER ENGAGEMENT

Stakeholder and public engagement have been a central theme to the development of this SMP (and the associated SEA). It was a clear objective of this SMP update from the outset, that the recommendations would be acceptable to as many parties as possible, therefore requiring engagement with relevant parties in the process of developing the updated SMP. Stakeholders and communities have therefore been permitted to inform and contribute to the development of the updated shoreline management policy recommendations. In simplistic terms, the engagement approach adopted was a means for everyone to 'have a say'.

2.1 The Stakeholders

The main stakeholder groups involved in the consultation an engagement, as identified at the outset of the study, were as follows,

- Client Steering Forum (CSF), this included the Scottish Environment Protection Agency, NatureScot (previously Scottish Natural Heritage), Marine Scotland, Solway Firth Partnership, Solway Marine Information, Learning and Environment (SMILE) and Dumfries & Galloway Council (Development Planning & Environment).

- Elected Members Forum (EMF), open to all local elected members of Dumfries & Galloway Council, MP's and MSP's.

- Key Stakeholder Forum (KSF), comprising key influential stakeholders including Community Councils, Community groups, State agencies and bodies, Academics, Utilities bodies and MoD.

- Public Stakeholder Group, this group was open to all people living within the vicinity of, or with an interest in the Dumfries & Galloway coast.

2.2 Engagement Events

Public and stakeholder engagement was considered a key component throughout all stages of developing the updated SMP. During the initial stages of the SMP update the engagement with the above listed groups was accomplished via a series of face-to-face meetings and events. This approach focussed on an information sharing platform and uncovered valuable knowledge and insight throughout the policy development process.

At the baseline data collection stage public consultation and engagement events were held in Port Logan, Kirkcudbright, Kirkbean and Annan, however, the Covid-19 pandemic restrictions prevented face-to-face consultation at the preferred policy stage. This led to the development and application of a digital approach for the engagement, involving a Virtual Consultation Room (VCR) and a series of virtual events as a forum to engage with the above listed groups. This method allowed for the continuation the consultation and engagement during the lock-down period and enabled the update of the SMP to continue, albeit after some delay while Covid-19 restriction compliant methods of engagement were developed. A combination of 'face-to-face' events, and virtual consultation was undertaken during the presentation of the 'Action Plan'. Attendance at these events was varied, with some well attended, and in general a good uptake on the virtual forums however the public engagement consultation events on the Action plan were poorly attended with only a few members of the public actually turning up.

The final statutory consultation on the draft SMP and SEA was undertaken virtually, utilising a bespoke consultation website developed by Dumfries & Galloway Council. Feedback and comments were received directly by council staff via phone, email or post and collated for review at the end of the consultation period. The comments and feedback received from this stage resulted in the addition of some clarification but no significant change to the policies set out in the 'Plan'.

2.2.1 Virtual Consultation Space

The virtual consultation space developed for the SMP provided an interactive platform for information sharing and receipt of feedback in the form of an online room as illustrated in Figure 2-1 below. Within the virtual room, visitors could read various posters and banners, much like in a physical consultation environment, watch a narrated presentation on the study progress and findings, download documents such as policy statement and the Action plan and provide feedback via an online form. Alternatively, stakeholders could request virtual meetings to discuss any concerns or receive further explanation of any aspect via the project website although no such requests were submitted. By utilising the virtual platform information was available to stakeholders for longer and at a time that suited them rather than only being available while the physical events were open and at the location of the event, thus the window for reviewing the documentation and providing feedback was significantly increased using virtual platform when compared to the physical events.

Figure 2-1 Virtual Consultation Room

2.3 Issues raised

During each engagement period all comments and feedback received was reviewed and noted, and engagement summaries produced as detailed in Appendix C. Following each engagement stage, the draft outputs were reviewed alongside the feedback received and changes made where it was adjudged that the feedback justified a change in policy or action. An example of a change that resulted from the engagement process was the updating of the erosion assessment to include the then draft output of the second phase of the Dynamic Coast project.

3 BASELINE UNDERSTANDING, POLICY DEVELOPMENT AND APPRAISAL

The main objective of any SMP is to identify sustainable long term management policies for the coast, with the aim of reducing the risk to people, property and the natural environment.

This section outlines the approach and method adopted for policy development and appraisal. In summary, the development of this SMP has involved six main stages, as outlined in

Figure 3-1 with public and stakeholder engagement being a key component throughout all stages (refer to Section 2).

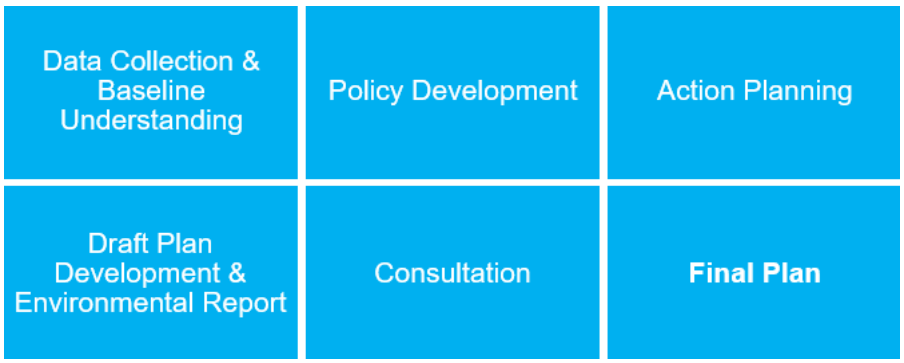

Figure 3-1 Main Stages of developing a SMP

3.1 Data Collection & Baseline Understanding

A comprehensive understanding of shoreline processes and behaviour supports the selection of sustainable long-term policy. Part of the SMP process is to regularly review and update the policies considering new and emerging science. As a closing comment, the first SMP recommended that policies would need to be reviewed and reassessed when there was improved information relating to, coastal flooding, coastal change and detail relating to coastal defence assets. Since the completion of the first SMP for Dumfries & Galloway in 2005, the science upon which coastal planners base their decisions has improved, hence the decision to undertake this update.

The main drivers for the generation of additional information have been in response to the Flood Risk Management (Scotland) Act 2009 and the Climate Change (Scotland) Act 2009. Following the implementation of these Acts, steps have been undertaken to better understand and inform sustainable mitigation of coastal flooding and erosion. Research led by the Scottish Government has identified coastal flood risk through the National Flood Risk Assessment (NFRA), while the coastal erosion risk has been identified through the Dynamic Coast Project. As part of this SMP update, these new datasets have been used to identify coastal flood and erosion risk (refer to Section 3.1.6 and 3.1.7).

The creation of Open Data Network web portals including those hosted by Marine Scotland have also brought together a wide range of information and made this much easier to access. This has provided a useful starting point for developing the baseline understanding of the Dumfries & Galloway coast beyond that presented in the 2005 SMP. The spatial data available as interactive or downloadable maps, with datasets and downloadable documents and links to other relevant websites have been invaluable in informing the assessments behind this SMP.

In addition, various academic research publications (Journals), have provided site-specific information relating to the Dumfries & Galloway coast and its evolution. Finally, local knowledge, provided by the people who live by and use this shoreline, collected during consultation has also been invaluable in developing the understanding of this coast. The following sections provides a summary of past (Section 3.1.1), present (Section 3.1.2), and likely future coastal processes and behaviour (Section 3.1.4 and Appendix A).

3.1.1 Past Coastal Processes and Behaviour

The evolution of the Scottish coast, including that of Dumfries & Galloway is influenced by the underlying geology, with areas of weak rock retreating at a faster rate than adjacent, more resistant segments. The various Ice Ages have magnified these geological differences, whereby glaciers eroded the 'softer' rocks resulting in the formation of peninsulas and bays and re-deposited this ground-up material as sediment deposits. As a result, the Solway Firth has large quantities of soft sediments, including mud and sand, particularly in the inner Firth, with similar deposits also occurring within Luce Bay. Over time the occurrence of Ice Ages and relative sea level change have contributed to the reworking of this sediment into the beaches, coastal dunes and saltmarsh located along this shoreline.
The current form of the Inner Solway Firth is strongly influenced by its geology, with the relatively subdued relief of the inner Solway Firth in part due to the underlying New Red Sandstone of Permo-Triassic age. Further west, between Rough Firth and Mersehead Sands, the Caledonian Criffel granitic batholith maritime cliffs exceed 50m in height, while at the coast between Balcary Point and Abbey Head Carboniferous rocks including sandstones and mudstones are exposed as intertidal shore platforms that produce a rugged shoreline. The morphology of Loch Ryan is also attributed to its geological past, particularly the erosive influence of ice that carved out the softer Permian Sandstone at a faster rate than the surrounding harder Ordovician rock, leaving behind the Loch Ryan basin.

The antecedent glacial / deglacial environment of the late-Pleistocene and the Holocene relative sea level changes have been important factors in the evolution the Dumfries & Galloway coast. Deglaciation left extensive sediments that have been re-worked, through a pattern of rapid relative sea level rise during the early Holocene period culminating in a mid-Holocene sea-level maximum, with a gradual fall to the present day, although sea levels are again rising. East of Powfoot and within the Nith estuary there are examples of Holocene raised beaches. Raised beaches are also located on the eastern side of Luce Bay, where a relict cliff line is fronted by a raised beach which determines the present route of the A747. Much of the coastline of Loch Ryan, from Kirkcolm to Old House Point also consists of raised beaches, and marine deposits, providing evidence of a shoreline that has evolved due to the long-term response to isostasy and Holocene relative sea-level change. The presence of short stretches of gravel beach at Southerness, Annan, Torduff Point and Browhouses provide evidence of a former wave dominated shoreline at these locations. Further detail on coastal processes is contained in Appendix A.

3.1.2 Contemporary Coastal Processes and Behaviour

A summary of contemporary coastal processes and behaviour associated with the Dumfries & Galloway coast is given below. This summary builds upon the information outlined in the 2005 SMP and further detail is contained in Appendix A. The shoreline is divided into six 'Coastal Process Units', which reflect the different character and processes of each area, as well as the usage and development of the immediate hinterland. Coastal cell 7 was divided into four CPU's and sub-cell 6d was divided into a further two CPU's with the approximate extents listed in Table 3-1.

Coastal Cell	CPU	Name	Boundary Locations
7	1	Inner Solway Firth	Gretna to Southerness
	2	Outer Solway Firth	Southerness to Torrs Point
	3	Wigtown & Kirkcudbright Bays	Torrs Point to Isle of Whithorn
	4	Luce Bay	Isle of Whithorn to Mull of Galloway
6d	5	Western Rhinns of Galloway	Mull of Galloway to Milleur Point
	6	Loch Ryan	Milleur Point to Galloway Burn

Table 3-1 List of Coastal Process Units

Part of Loch Ryan (CPU 6) is also incorporated into the Ayrshire SMP and defined as sub-cell 6d2, while the Solway Firth shoreline within the jurisdiction of England (from St Bees Head to the Scottish Border) is included in Sub-cell 11e, of the Cumbrian SMP.

3.1.2.1 CPU 1 Inner Solway Firth

The Inner Solway Firth is the narrow section of this large macro-tidal estuary, extending from the mouth of the River Sark at Gretna seawards to Southerness Point, this area contains seven Policy Units (PU 1 to PU 7). This shoreline is mainly composed of soft sediment, although there is a section of hard and mixed shoreline to the north of PU 7 between Borron Point and the Arbigland estate. This CPU is relatively sheltered from waves, with Gretna in the east being more sheltered than Kirkconnell, Eastriggs or Southerness Point in the west. The Inner Solway Firth is a sediment sink and the supply and movement of material is heavily influenced by tidal processes, with sediment transferring between the River Sark and the River Eden. Mean Spring Tidal Range varies from 7.9m at Eastriggs to 7.41m at Southerness Point.

The shoreline is lined with beaches and salt marshes, whilst during low tide a vast area of intertidal mud and sand is exposed. Coastal sand dunes occur at the head of Gilfoot Bay, these landforms have developed under the influence of south-westerly winds, which transport sand across the Southerness headland towards Gillfoot Bay. The Southerness headland represents a subdued dune relief. There is about 14km² of saltmarsh within CPU 1, with PU 5 containing the largest areas, including Caerlaverock (7.6 km²) and Kirkconnell Merse (2.2 km²). The western edge of Caerlaverock has undergone substantial erosion, which has been attributed to several factors, including the dredging of the main Nith channel, the increased frequency of high-water levels (storm surge combined with high tide) resulting in increased erosion of the saltmarsh edge, creek development, overgrazing by large numbers of wintering wildfowl and finally sea-level rise. Accretion to the east of this site is reflective of the highly dynamic and complex nature of coastal processes along this section of the shoreline. Elsewhere within CPU 1, some saltmarshes show signs of erosion and rebuilding such as the Annan saltmarsh located within PU 3, while some areas of saltmarsh have completely eroded, including that formerly located at Southerness. Overall, it has been noted that Atlantic saltmarsh is displacing pioneering saltmarsh in the Solway Firth, suggesting that sediment deposition is outpacing relative sea level rise.

3.1.2.2 CPU 2 Outer Solway Firth

The Outer Solway Firth refers to the wider area of the firth as it opens out towards the Irish Sea and extends from Southerness Point to Torrs Point in the west, containing four policy units (PU 8 to PU 11). This is an area of shallow open sea with numerous inlets and enclosed bays that is macro-tidal with a large tidal range, the Mean Spring Tidal Range is 7.41m at Southerness Point decreasing westwards to 6.45m at Torrs Point. The shoreline is flanked by shingle, dunes and maritime cliffs. There are several pocket beaches located within CPU 2, including White Port Beach (PU 11). The shoreline of CPU 2 is a complex combination of soft, hard and artificial (defended) types. The largest section of soft shoreline is located to the east of Southerness Point and extends towards Southwick Water (PU 8). Other notable areas of soft shoreline are located in the bay head areas of PU's 9 and 10.

From Southerness Point to Southwick, the presence of an extensive intertidal sand bank, Mersehead Sands may act to reduce wave exposure at this location. Regardless of this, the coastal edge of Preston Merse has and continues to experience coastal erosion. The heads of Auchencairn and Orchardton Bays and the Rough Firth are sheltered from wave exposure due to the indented nature of the shoreline, consequently these embayment's act as natural traps to sediment movement within the nearshore zone. From Balcary Point to Torrs Point there is increased exposure to waves, hence this section of shoreline is backed by rugged cliffs and several gravel dominated pocket beaches.

Within CPU 2 there are coastal sand dunes located at Mersehead and Sandyhills Bay. Southerness Golf Course located to the east of Mersehead also shows clear but subdued dune morphology. The small area of active linear frontal dunes located along the shoreline towards Mersehead is influenced mostly by the occurrence of south-easterly winds. Similarly, the coastal dunes located at Sandyhills Bay, are influenced by the south-easterly fetch across Mersehead Sands. There is a low spit actively developing at mouth of the Southwick Water, indicating a westwards movement of sediment at this location. Saltmarsh is found within the sheltered confines of Auchencairn Bay, Orchardton Bay, Rough Firth and at Southwick. The Southwick area located within PU 8 it the largest single site, however PU 10 contains the largest total area of saltmarsh,

3.1.2.3 CPU 3 Wigtown and Kirkcudbright Bays

CPU 3 includes the large embayment of Wigtown Bay and the smaller estuaries of Kirkcudbright Bay and Fleet Bay indented into its eastern shoreline. Major rivers including the Dee, the Water of Fleet, the Cree and the Bladnoch flow into this area which represents the central and southern portion of the Dumfries & Galloway shoreline. CPU 3 incorporates seven Policy Units (PU12 to PU 18). At its widest Wigtown Bay is circa 13km wide and is macro-tidal, with the Mean Spring Tidal Range varying from 6.45m at Torrs Point to 6.52m at Creetown. From Creetown towards the Isle of Whithorn the Mean Spring Tidal range decreases to 6.18m. This pattern is reflective of the morphology of a narrowing estuary.

Kirkcudbright and Fleet Bays are relatively sheltered from waves, in contrast the Isle of Whithorn and the seaward extent of Brighouse Bay are significantly more exposed locations. The head of Kirkcudbright Bay, within the River Cree Estuary and along the north-western shoreline of Wigtown Bay are composed of soft sediment. Seawards from these more sheltered locations, there is a predominance of hard coastal types, with mostly artificial shorelines located at Garlieston and the Isle of Whithorn. At the head of Wigtown Bay, there are extensive intertidal sediment deposits including Wigtown Sands and Baldoon Sands. Beyond the extent of these intertidal deposits, the shoreline is more exposed and is fringed with rugged cliffs, outcrops and rock platforms composed of Silurian rocks. There are several pocket beaches and small crescentic bays indented into this predominately rocky shoreline including Brighouse Bay, Ross Bay, Garlieston and the Isle of Whithorn. Saltmarsh occurs within the sheltered confines of the estuaries, including at the head of Kirkcudbright Bay (Manxman's Lake, along the shore of the tidally influenced section of the River Dee), at the head of the Water of Fleet and in Skyeburn Bay. The most extensive saltmarsh deposits are located along the shores of the River Cree at Creetown and Wigtown. The presence of these wide intertidal sand banks dissipates wave energy, however the shoreline at Creetown has undergone substantial erosion in recent times.

3.1.2.4 CPU 4 Luce Bay

The shoreline of Luce Bay is a 20km wide macro-tidal marine embayment located along the northern coast of the outer Solway Firth and is split into eight SMP policy units (PU 19 to PU 26). The shoreline is mainly soft with areas of hard shoreline located towards the northern extent of PU 21 and at the Mull of Galloway, PU 26. There are also small sections of artificial shoreline, notably at Portwilliam (PU 20) and along the shoreline of PU 24. The Spring Tidal Range within Luce Bay ranges from 5.3m in the north at Luce Sands to 4.91m at the Mull of Galloway to the south. CPU 4 is described as a self-contained sediment unit with Burrow Head being the drift divide. Within Luce Bay the tidal stream is reported to rotate in an anticlockwise direction with a peak spring rate of 2m/s.

Luce Bay is exposed to the south-east where fetch lengths extend approximately 200km to the Lancashire coast, the largest waves however are generated from the southwest and diffract into the bay driving a general northwards drift of sediment towards the head of the bay. This northward drift of sediment has contributed to siltation issues at Drummore. Burrow Bay and the Mull of Galloway are most exposed to waves, whereas the Torrs Warren area in the north of Luce Bay is significantly more sheltered.

PU 22 at the head of Luce Bay, encompasses a 24km² coastal dune system (Torrs Warren / Luce Sands) which is fronted by a wide and shallow ridge and runnel beach. This dune field stretches 8 km from Sandhead in the south-west to Ringdoo Point in the north-east. The dunes reach an altitude of over 28m OD and are indicative of a sediment sink as sand dunes only form where the rate of beach deposition is greater than erosion.

Saltmarsh is found at the head of Luce Bay in three separate locations associated with the sheltered back-beach environment of this coastal dune complex. Gravel beaches and marine deposits are located along the west and east shorelines of Luce Bay, including at Terally Bay. The lack of sand on the upper beaches has been attributed to the predominance of a northerly sediment drift and the transportation of sediment towards the head of Luce Bay. The presence of extensive coastal protection works along the A716 are indicative of considerable erosion along the coastal edge and various attempts to arrest it. Storm waves are known to overtop this defence, depositing gravel and other material on the road.

3.1.2.5 CPU 5 Western Rhinns of Galloway

The Western Rhinns of Galloway extends from the Mull of Galloway northwards to Milleur Point located close to the entrance of Loch Ryan. Marine Scotland data indicates the Mean Spring Tidal Range to generally decrease in a south to north direction, close to Port Logan it is 4.02m, 3.66m at Portpatrick decreasing further at Milleur Point to 3.01m. CPU 5 contains three SMP policy units (PU 27 to PU 29). Almost all of this shoreline is exposed to the open sea conditions of the North Channel and as a consequence this shoreline is predominately hard, with smaller areas of soft shoreline located within bays. The Mull of Galloway acts as a drift divide to any sediments being moved by wave action along the coast but does not hinder sediment moved by strong tidal currents. Saltpan Bay located to the north of Portpatrick is the most exposed to waves, whereas Port Logan is less exposed.

Several small crescentic bays and pocket beaches are indented into this rocky coastline, including Float Bay and Clanyard Bay, the sandy beaches located at the head of these bays are the only soft shorelines within this CPU. The settlements of Port Logan and Portpatrick are similarly situated in relatively sheltered locations. Portpatrick Harbour has encountered siltation issues and a small beach is located along the shore, while Port Logan has a self-contained beach with coastal sand dunes located along the back beach. Small areas of coastal dune morphology are also located at Knock Bay and Killitrangan, indicative of a westerly and north-westerly fetch across the North Channel.

Storm surges are an important factor in producing high coastal water levels and high waves along this section of the Dumfries & Galloway coastline, these conditions can lead to localised flooding and accelerated erosion issues. For example, from the 3rd to 6th January 2014, Storm Anne coincided with a high spring tide (4.2m) and caused high waves to overtop the frontage at Portpatrick. This storm generated a total water level of circa 4.98 m, including a 0.78m surge which overtopped defences leading to flooding.

3.1.2.6 CPU 6 Loch Ryan

Loch Ryan is an enclosed bay, 5km wide and 13km long, with a tidal range of 2.8m at Stranraer. The northern extent of Loch Ryan is defined by Milleur Point and Finnart Port located to the west and east, respectively. CPU 6 contains six SMP policy units (PU 30 to PU 35). The shoreline is mainly soft, with smaller areas of hard shoreline located towards the north of Loch Ryan. There is an extensive stretch of artificial shoreline at Stranraer (PU 32) located at the head of Loch Ryan. Loch Ryan is sheltered, and the short fetch associated with this sea loch, and the bathymetry / topography restrict the wave conditions at the shoreline within the southern part of the Loch.

Sediment transport within CPU 6 is in a predominantly southerly direction, with sediment deposited on mudflats at Stranraer, and as a result the shoreline of Loch Ryan is generally more rugged and rocky towards the north and east, with a greater occurrence of sand and gravel beaches in the south and west. Stranraer is located along the head of Loch Ryan and fronted by a sandy beach referred to as the Cockle Shore Beach. The Wig, located on the western side of Loch Ryan indicative of the northward movement of sediment from Soleburn to Kirkcolm Point.

3.1.3 Future Coastal Processes and Behaviour

A significant change between this new SMP and the previous one is the timeline for which sustainable coastal management policy is proposed, 100 years compared to the previous SMP timeline of 50 years. Consideration of this longer planning timeframe is possible as there is a greater understanding regarding climate change and the anticipated impact of sea level rise upon coastal flood risk and coastal change.

It is known that Scotland is now experiencing relative sea-level rise although the rate of increase differs regionally mainly due to the different rates at which the land is moving relative to sea level through isostatic uplift. All future projections expect the rate of sea level rise to accelerate in the future, thus sea level rise and coastal flooding are key climate change risks for Scotland in the future. For this SMP the effects of climate change have been included as follows,

- Future coastal flood risk is based on the UKCP09 outputs since the more recent UKCP18 data was not available to inform the 2018 National Flood Risk Assessment,

- UKCP18 outputs have been applied to the future coastal erosion estimates, provided by Dynamic Scotland.

That is, for the updated SMP no specific assessment of future coastal processes and behaviour has been undertaken, and reliance has been placed on the outputs of the two National studies mentioned previously.

For further detail on the data informing the future coastal evolution assessment used to establish the need for, and type of management policy refer to https://www.sepa.org.uk/data-visualisation/nfra2018/ and www.DynamicCoast.com.

3.1.4 Baseline Scenarios

In order to assess the future change in the coastline and hence the need for and applicability of shoreline management policies it was necessary to first define a baseline scenario. In essence this can be either represent 'Do Nothing' or 'With Present Management' (relating to the policies presented in the original 2005 SMP) or potentially a combination of both. It is important to note that the baseline scenario is NOT intended to be realistic scenario for managing the coast going forward, instead, it forms the basis for revised policy appraisal. Following the official DEFRA SMP guidelines a **'behavioural systems approach'** was followed in developing the baseline scenario, whereby 'how' and 'why' the shoreline will change was considered, refer to Appendix A for more information.

3.1.5 The Policy Units

Dumfries & Galloway Council's operational area extends from the Mouth of the River Sark to the Mull of Galloway, along the Western shoreline of the Rhinns and around the shoreline of Loch Ryan. This entire area is contained within Scottish Coastal Cell 7 and sub-cell 6d. Coastal cell 7 extends from the Mull of Galloway to Gretna, with the remainder of the coastline within coastal cell 6, specifically sub-cell 6d. For the purposes of the previous SMP and indeed this update the Dumfries & Galloway coastline was further sub-divided into six Coastal Process Units (CPU's). The CPU's are the Inner and Outer Solway Firth (CPU 1 and CPU 2), Wigtown & Kirkcudbright Bays (CPU 3), Luce Bay (CPU 4), the Western Rhinns (CPU 5) and Loch Ryan (CPU 6). For more information on how these were defined refer to the 2005 SMP (HR Wallingford, 2005a).

To assist with the identification of sustainable long term management policies for the coast, the shoreline has been further sub-divided into individual areas based upon coherent characteristics. Coastal processes, land use, existing defence assets, as well as present day and future flood and erosion risk were considered in this process. The shoreline of Dumfries & Galloway is about 340km long, and for the 2005 SMP it was divided into 37 management units. Following a review of these management units, based on the criteria outlined above, 35 Policy Units are presented for this SMP. Table 3-2 provides a list of Policy Units, the associated CPU and Coastal Cell.

The boundaries of the CPU's were reviewed, based upon new information. For example, the western boundary of CPU 1 was moved towards Southerness Point to include the entire extent of the village. The western extent of CPU 2 was extended towards Torrs Point, the western extent of CPU 3 and CPU 4 remain the same, whereas CPU 6 has been adjusted from Finnarts Point to the Galloway Burn to correspond with the boundary between the South Ayrshire and Dumfries & Galloway Unitary Authorities.

The geographical extent of each Policy Unit was also reviewed based upon new information, this meant that the extent of some management units was either moved or merged. For example, the extent of PU 1 was merged with area formerly located within Management Unit 2 and PU 2. Similar adjustments were made to other former management units ensuring that the extent of defences, 'at risk' features including settlements, cultural heritage features, protected sites and similar areas of land use remained intact, bearing in mind the natural characteristics of the coast. Appendix D provides more detail relating to the extent of individual policy units.

Coastal Cell	CPU	Policy Unit	Boundary Location
7	1	1	Gretna - Browhouses
		2	Browhouses – Dornock Burn
		3	Dornock Burn - Waterfoot
		4	Waterfoot to Nethertown
		5	Nethertown to Drum Mains
		6	Glencaple to Dumfries
		7	Drum Mains to Southerness
	2	8	Southerness to Castlehill Point
		9	Castlehill Point to Dalbeattie
		10	Castlehill Point to Balcary Point
		11	Balcary Point to Torrs Point
	3	12	Torrs Point to Doon of Carsluith
		13	St Mary's Isle to Tongland
		14	Gatehouse of Fleet
		15	Doon of Carsluith to Eggerness Point
		16	Garlieston
		17	Garlieston to Isle of Whithorn
		18	Isle of Whithorn
	4	19	Isle of Whithorn to Barsalloch Point
		20	Barsalloch Point to Low Drumskeog (Port William)
		21	Low Drumskeog to Kilfillan Point
		22	Kilfillan to Sandhead
		23	Sandhead to Chapel Rossan
		24	Chapel Rossan to Drummore
		25	Drummore
		26	Drummore to the Mull of Galloway
6	5	27	Mull of Galloway to Portpatrick
		28	Portpatrick
		29	Portpatrick to Milleur Point
6d	6	30	Milleur Point to Kirkcolm
		31	Kirkcolm to McCullochs Point
		32	McCullochs Point to Innermessan (Stranraer)
		33	Innermessan to Bankhead
		34	Bankhead to Old School House Point
		35	Old School House Point to Galloway Burn

Table 3-2 List of Policy Units

3.1.6 Coastal Flood Risk

The availability of robust scientific information is vital to the selection of sustainable coastal management policies. In this regard the Flood Risk Management (Scotland) Act (2009) (FRM) has been the impetus for improving the knowledge and understanding of flood risk and its proactive and sustainable management. A key milestone of the FRM Act was the production of flood hazard and flood risk maps for all of Scotland. This information represents a comprehensive national data source relating to flood hazard and risk from both fluvial and coastal sources. The availability of the National Flood Risk Assessment (NFRA) has allowed for the identification of coastal flood risk associated with the Dumfries & Galloway coastline. To define the level of coastal flood risk in each policy unit, the number of receptors at a medium likelihood coastal flood risk was extracted from this dataset. In terms of coastal flooding, medium likelihood flood risk refers to a statistical probability of annual exceedance flood event likely to occur with a 0.5% chance of happening in any one year or referred to as 1:200 year flood event.

The future risk considering climate change effects was also identified as outlined in Table 3-3 for the entire Dumfries & Galloway coastline. This data clearly shows the potential increase in flood risk into the future primarily associated with global sea level rise as a consequence of global climate change. It is important to note that the figures presented in Table 3-3 related only to direct tidal inundation, as the NFRA data does not consider the effects of wave over-topping and thus it is likely that the actual coastal flood risk along the Dumfries & Galloway coastline is greater than that indicated. However, there is no nationally or even regionally consistent dataset on wave overtopping risk currently available.

Receptor	Medium Likelihood	*Medium Likelihood with climate change
Homes	544	914
Businesses	262	433
Utilities	40	49
Community facilities	11	12
Cultural Heritage	198	244
Transport roads (km)	47.27	66.36
Transport rail (km)	0.85	2.04
Agricultural Land (ha)	2587.25	3305.08

Table 3-3 Summary of Coastal Flood Risk

Refer to https://www.sepa.org.uk/data-visualisation/nfra2018/ regarding flood assessment information

It is noted that the climate change scenarios used to inform the future coastal flood risk were based on UK Climate Projections (UKCP09) which was the best information available when national modelling was undertaken (2011-2013). While these projections have since been updated as part of the UK Climate Projection 2018 (UKCP18), the national flood mapping had not been updated to reflect this new climate change assessment at the time this SMP was prepared. It should also be noted that additional sea level rise beyond the projected ranges cannot be ruled out as there is uncertainty regarding the Antarctic ice sheet contribution to sea level rise.

A summary of the identified coastal flood risk is provided below,

- There was no medium likelihood coastal flood risk to receptors in policy units 10, 11, 17, 19, 26, 27, 29, 30 and 35. In contrast, a significant medium likelihood coastal flood risk is associated with policy units 4, 5, 6, 13, 15 and 32. There was a tendency for population centres, including coastal towns and villages located within policy units 4 (Annan and Powfoot), 13 (Kirkcudbright) and 32 (Stranraer) to be impacted the most.

- 40 utilities were identified to be at coastal flood risk located mostly within policy units 1, 3, 6, 7, 9, 10, 13, 15, 16, 18, 20, 23, 28 and 32. PU 6 (Dumfries and Glencaple) was identified to have the greatest number of utilities at coastal flood risk.

- A total of 11 community facilities were identified to be at medium likelihood coastal flood risk, located within policy units 6, 13, 15, 16, 27, 28 and 32.

- Cultural heritage features, this is a broad term to describe listed buildings, historic sites etc., were also identified to be at flood risk in policy units 4, 6, 16, 18, 27, 28, 32.

- Approximately 47km of road was identified to be at medium likelihood coastal flood risk. At present, less than 1km is railway infrastructure was identified to be at flood risk.

- The Dumfries & Galloway shoreline is predominately rural with a large area utilised for agriculture. Approximately 2,600ha of this was identified to be at risk of medium likelihood coastal flooding.

3.1.7 Coastal Erosion Risk

The nature of the shoreline and the output of the anticipated coastal change analysis from the Scottish Government's Dynamic Coast project (Phase 2 results, published summer 2021, www.DynamicCoast.com) were used to inform the quantification of erosion risk for the updated SMP. Table 3-4 presents a summary of the coastal erosion risk along the entire Dumfries & Galloway coastline. This summary table highlights the assets at risk under a High Emission Scenario and a 'do nothing' coastal management scenario. This assumes that artificial and natural defences are not maintained and where present erosion can therefore affect landward assets. Erosional Area (EA) is defined as the eroded land seaward of the future MHWS position. Erosion Influence (EI) is a 10m buffer landward of the anticipated position of the future MHWS position. Assets within both EA and EI are expected to be 'affected' by erosion. Erosion Vicinity (EV) considers the adjacent assets a further 50m landwards from the EI.

Homes			Businesses			Roads (all) (km)		
2050								
Erosional Area	Erosion Influence	Erosion Vicinity	Erosional Area	Erosion Influence	Erosion Vicinity	Erosional Area	Erosion Influence	Erosion Vicinity
11	25	170	2	8	67	1.92	2.673	15.382
2100								
Erosional Area	Erosion Influence	Erosion Vicinity	Erosional Area	Erosion Influence	Erosion Vicinity	Erosional Area	Erosion Influence	Erosion Vicinity
212	43	202	41	13	72	11.884	16.377	18.22

Table 3-4 Summary of Coastal Erosion Risk

A summary of the coastal erosion risk around the Dumfries & Galloway coastline is outlined below,

- In some policy units (1, 3, 5, 11, 12, 19, 21, 33, 35) no receptors were identified to impacted by coastal erosion.

- It was estimated that by 2050, 13 coastal properties would be located within the EA area and a further 33 located within the EI zone. It was noted that most of these properties were situated within PU 7 (Carsethorn and Southerness).

- It was also anticipated that by 2050, about 2km of road would be located within the EA area, and almost 3km within the EI zone.

- By 2100, due to the ongoing influences erosion and of climate change, 225 properties were identified to potentially be located within the EA area and 68 within the EI zone.

- Within PU 23, Sandhead was identified as an area where a present relatively low erosion risk would become significant by 2100, with up to 172 properties potentially within the EA area and 10 properties in the EI zone by this time.

3.1.8 Defence Asset Condition Assessment

During the early part of this study, a defence asset survey identified and visually assessed the condition of 175 coastal structures, both privately and council owned, which protect circa 30km of coastline. PU 6 (Dumfries to Glencaple), PU 32 (Stranraer) and PU 34 (Cairnryan) represent the most heavily defended areas of coastline. There were also some areas of shoreline where no coastal defence assets were identified, including policy units 1, 5, 11, 14, 19, 22, 29 and 35.

Each defence asset surveyed was assigned a condition grade ranging from 1 to 5, grade 1 being very good, 2 good, 3 fair, 4 poor and grade 5 very poor. Most of the defences assessed were found to be either in a fair (47%) or poor (36%) condition. No defence assets were identified to be in very good condition (grade 1), whereas 11% were in good condition and 5% were in very poor condition. It was estimated that the residual life of these coastal defence assets ranged from less than 5 years to around 65 years. The defence asset condition assessment is included in Appendix B, which includes a summary of the asset condition grade, that informed the baseline scenario assessments, providing an indication of how effective defences may be in the future. The Preferred Policy Statements in Appendix D present images and a summary of defence assets located within each policy unit.

3.1.9 Other Datasets

The Scottish saltmarsh survey (SSS) was used to provide geospatial information on the occurrence of saltmarsh areas greater than three hectares or more than 500m in length. It is notable that saltmarsh sites that are over 100 hectares are under statutory protection and therefore represent a significant constraint on applicable shoreline management policy. Approximately, 9,600ha of Saltmarsh habitat was identified to be associated with the Dumfries & Galloway shoreline, 77% of this was identified to be located within CPU 1 (Inner Solway Firth), with three of Scotland's largest saltmarshes located within PU 5 (Caerlaverock and Kirkconnell Merse) and PU 14 (Wigtown). The caveat associated with this dataset is that it was completed a decade ago (at the time of writing) and the shoreline is a dynamic system that changes over time and the spatial salt marsh dimensions reported above will probably have changed.

3.1.10 Other Relevant Studies

Several other relevant studies had been completed since the 2005 SMP was produced. These relevant studies, as listed below, contained useful information that was used to inform the new SMP:

- The *Solway Energy Gateway Feasibility Study* (Mott Macdonald *et al*, December 2009) was the output from an initial investigation into the technical, financial and environmental feasibility of generating renewable energy from the available tidal resource within the Solway Firth. It included a summary of coastal processes and environmental features in the area which provided useful information to inform the development of the understanding of coastal processes.
- The *Stranraer Marina - Review of Wave Conditions* (Royal Haskoning, May 2009) provided information on the wave climate at Stranraer which was useful in identifying the risk of wave over-topping in PU 32.
- The *Solway Flood Risk Management Strategy* (SEPA, 2015), defined the short to long-term flood risk management approach for each of the Potentially Vulnerable Areas (PVA) along the Dumfries & Galloway coast, and was therefore useful is determine the need for management measures.
- The *Local Flood Risk Management Plan for Solway* (Dumfries & Galloway, 2016) defines actions in the near future (2016 to 2022) to deliver the 2015 Flood Risk Management Strategy in each of the PVAs. Again, this was useful in considering the suitability of shoreline management policies.

- The current adopted *Local Development Plan* 2 (Dumfries & Galloway, 2019) sets out the development plan vision for the Dumfries & Galloway area. This includes the overarching principle to "reduce overall flood risk by avoiding areas at risk of flooding and erosion." Whilst the SMP considered the implications of different policy options on the Local Development Plan in full, it gave specific regard to the following three key policies:
  - **NE9** DEVELOPED AND UNDEVELOPED COAST
  - **NE10** EROSION AND COASTAL PROTECTION
  - **IN7** FLOODING AND DEVELOPMENT.
- The *Ayrshire Shoreline Management Plan* (SMP) (RPS, 2018), this plan was reviewed to ensure compatibility between policies in Loch Ryan.
- The *North-West England and North Wales Shoreline Management Plan Review (SMP2)* (Halcrow, 2011) was used to ensure policies are aligned at the Scotland / England Border, and any cumulative impacts of policies around the Solway Firth were accounted for.

3.2 Policy Screening & Selection

The identification and selection of appropriate shoreline management policies was split into four stages.

- **Stage 1**, all data and information were collated, organised and reviewed. The Dumfries & Galloway shoreline was organised into manageable sections (Policy Units). The 2005 SMP identified 37 management / policy units, within the 6 Coastal Process Units (CPU's), during this review 35 Policy Units were re-defined, refer to Section 3.1.5, based upon baseline coastal flood risk (Section 3.1.6) and coastal erosion risk (Section 3.1.7), the location of assets, coastal geomorphology in addition to social, environmental and economic factors.

- **Stage 2**, shoreline management policies were identified for each policy unit, and a screening approach applied. Each shoreline management policy was reviewed for technical issues, if a potential policy was not technically viable, then another was considered, potential economic viability and potential environmental and social issues were considered. Figure 3-2 is an example of the output from policy screening and illustrates the matrix used during the decision-making process adopted to identify appropriate policies for individual policy units.

REVIEW OF MANAGEMENT POLICIES					
Policy	Screening Criteria				Comment
	Technical	Economic	Environment & Heritage	Social	
Advance the Line	×				No justification for Advance the Line in this policy unit.
Hold the Line	✓	×			Not likely to be economically viable to Hold the Line in this policy unit.
Managed Realignment	✓	✓	✓	?	No significant issues anticipated. However localised flood defence works, or resilience measures will be required.
No Active Intervention	✓	✓	✓	?	No significant issues anticipated. However localised flood defence works, or resilience measures will be required.

× - Reject
✓ - Progress
? - Progress, however potential for impacts identified
! - Progress, however potential for significant impacts identified

Figure 3-2 Policy Screening Matrix

- **Stage 3,** identification of the Preferred Policy or combination of policies and possible alternative policies over the short, medium and long term, to determine the most sustainable approach. Figure 3-3 is an example of a policy selection matrix, which presents the most appropriate and sustainable policy for each policy unit (**C**) and where relevant alternative or secondary policies (**A**).

SELECTION OF PREFERRED POLICY			
Policy	**Short Term (0-20yr)**	**Medium Term (20-50yr)**	**Long Term (50-100yr)**
Advance the Line	×	×	×
Hold the Line	C*	×	×
Managed Realignment	A*	C*	C*
No Active Intervention	C	C	C
× - Reject C - Consider A – Alternative * Localised			

Figure 3-3 Policy Selection Matrix

- **Stage 4**, stakeholder engagement and review of the draft Preferred Policies giving due regard to the feedback received through the stakeholder engagement process. The final preferred policies established following a review and assessment of comments and feedback received are summarised in Appendix C, which contains the Preferred Policy Statements, outlining the screening and selection of policy for each Policy Unit.

4 THE POLICIES AND PLAN

Shoreline Management Policies for the sustainable management of coastal flood and erosion risk along the Dumfries & Galloway coastline have been identified for three epochs, short term (0 – 20 years), medium term (20 – 50 years) and long-term (50 – 100 years).

Due to the complexity of the shoreline and considerable uncertainty over the medium- and long-term evolution of the coast often more than one management policy has been proposed during a single epoch. Where this is the case the management policy was specified as either a combination of primary and localised policies or as a primary or localised policy with an alternative.

In this context the terms primary, localised and alternative are used as follows;

- **Primary** policies cover the greater spatial extent of a policy unit or are preferred in terms of sustainability. These are shown in **Bold** text on the top row in the policy summary tables for each policy unit for each epoch. The selected policy will remain consistent or change over time.

- **Secondary / Localised** polices are of localised spatial extent to address specific risks, these are placed on the second row in normal text and considered for each epoch.

- **Alternative** policies are identified in situations where there are uncertainties regarding the need for or sustainability of the primary or localised policy, particularly where the justification for a particular management policy may become challenging because of climate change. These policies are displayed in *italics* in ether row of the policy summary table.

Table 4-1 shows the format of the presentation of selected primary, localised and alternative management policies in the policy summary tables for each policy unit.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
Policy Unit Number and Name	**Primary Policy**	**Primary Policy**	**Primary Policy**
	Localised & / or *Alternative*	Localised & / or *Alternative*	Localised & / or *Alternative*

Table 4-1 Example of Selected Policies

An example of a situation where all three classes of policy may apply is a policy unit with a primary policy of No Active Intervention, and a localised policy of Hold the Line for areas where there are existing defences, moving to an alternative localised policy of Managed Realignment in the medium to longer term as the effect of sea level rise becomes more significant.

The identification of the preferred management policies for each coastal process unit and policy unit are summarised in individual Preferred Policy Statements in Appendix D. For each CPU a summary table of the 'Preferred Policies' is presented here.

4.1 Coastal Process Unit 1 – Inner Solway Firth (CPU 1)

Coastal Process Unit 1, the dynamic inner section of Solway Firth, extends from Gretna in the east to Southerness Point in the west. Its spatial extent includes the tidal reaches of the Rivers Sark, Annan and Nith. There are seven 7 Policy Units within CPU 1 for which the management policies are as follows.

4.1.1 Policy Unit 1 Gretna – Browhouses

PU 1 is about 6.2km long, starting at the downstream face of the B7076 road bridge that crosses over the River Sark (NY337661) and extending to Browhouses (NY284650), located to the west of Redkirk Point.

The recommended shoreline management policies for PU 1 are listed in Table 4-2 and the geographical extent of application of the management policies over the short terms is shown in Figure 4-1. A primary policy of No Active Intervention is recommended for the next 100 years. Hold the Line or Managed Realignment could be accommodated where there are existing defences along the River Sark and at Redkirk Point if a detailed assessment indicated this to be justified.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
1. Gretna - Browhouses	**NAI**	**NAI**	**NAI**
	HTL / *MR*	MR	MR

Table 4-2 Summary of Policies for Policy Unit 1

Table 4-3 provides a summary of the suggested actions to implement the recommended policies over the short (S), medium (M) and long (L) term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and the establishment of a 'No Development Zone' should be considered. To quantify the risk to properties and identify the need for further management measures or the implementation of managed realignment a detailed flood risk study is recommended.

In PU 1 while the primary management policy is No Active intervention, existing defence owners should be allowed to maintain existing defences, subject to consent and viability.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L	S	S		S					S/M	M

Table 4-3 Summary of Actions for Policy Unit 1

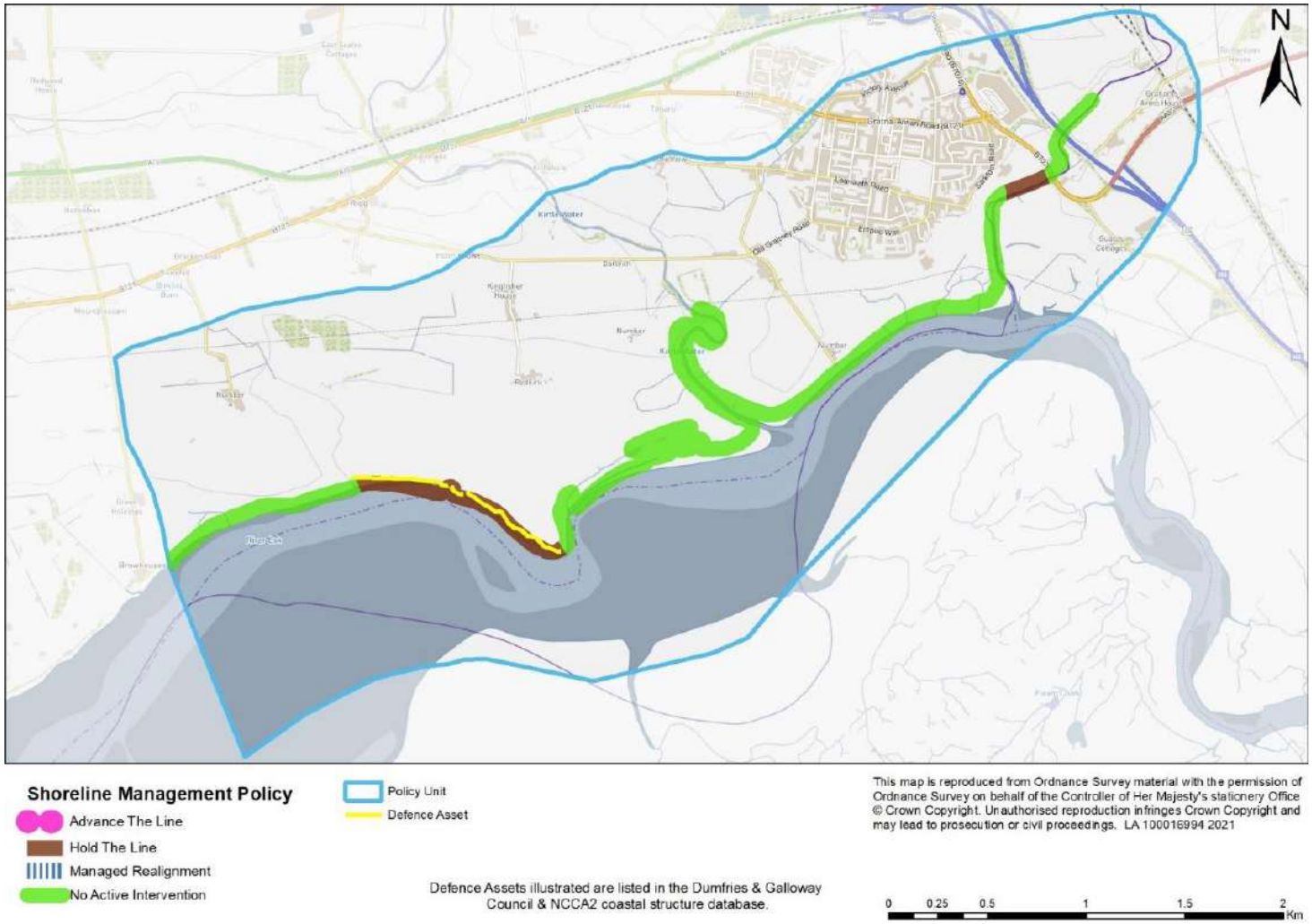

Figure 4-1 Policy Unit 1 SMP Policy (0-20 years)

4.1.2 Policy Unit 2 Browhouses – Dornock Burn

Policy Unit 2 is about 6.1km in length, extending westwards from east of Browhouses (NY284650), past Torduff Point to the mouth of the Dornock Burn in the west (NY227653).

The draft SMP recommended a shoreline management policy of Hold the Line for PU 2 based on the precautionary principle due to the unquantified potential for contaminated ground to be at risk as a consequence of historic military use of significant areas of the frontage. However, information received from the owners of this site in response to the consultation on the draft SMP confirmed that investigations had identified the risk of contamination to be low consequently the preferred policy was changed to one of localised Hold the Line in combination with Managed Realignment and possibly No Active Intervention as listed in Table 4-4 as this was considered a more sustainable policy. The geographical extent of application of the recommended management policies over the short term is illustrated in Figure 4-2.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
2. Browhouses – Dornock Burn	**MR / *NAI***	**MR / *NAI***	**MR / *NAI***
	HTL	HTL / *MR*	HTL / *MR*

Table 4-4 Summary of Policies for Policy Unit 2

Table 4-5 provides a summary of the suggested actions to implement the recommended management policy over the short, medium and long term. Like PU 1, awareness raising and reviewing and updating existing development policy is vital over the short term.

The condition of the existing defences at Browhouses should be monitored to inform future maintenance and/or decisions relating to a change of policy. To inform management decisions, detailed assessment of coastal flood and erosion risk and a feasibility study of management options is recommended over the short to medium scale. Over the short to medium scale, subject to appropriate consents being granted, defence owners should be allowed to maintain existing defences.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**		**S**	**S**		**S/M**					**S/M**	**M**

Table 4-5 Summary of Actions for Policy Unit 2

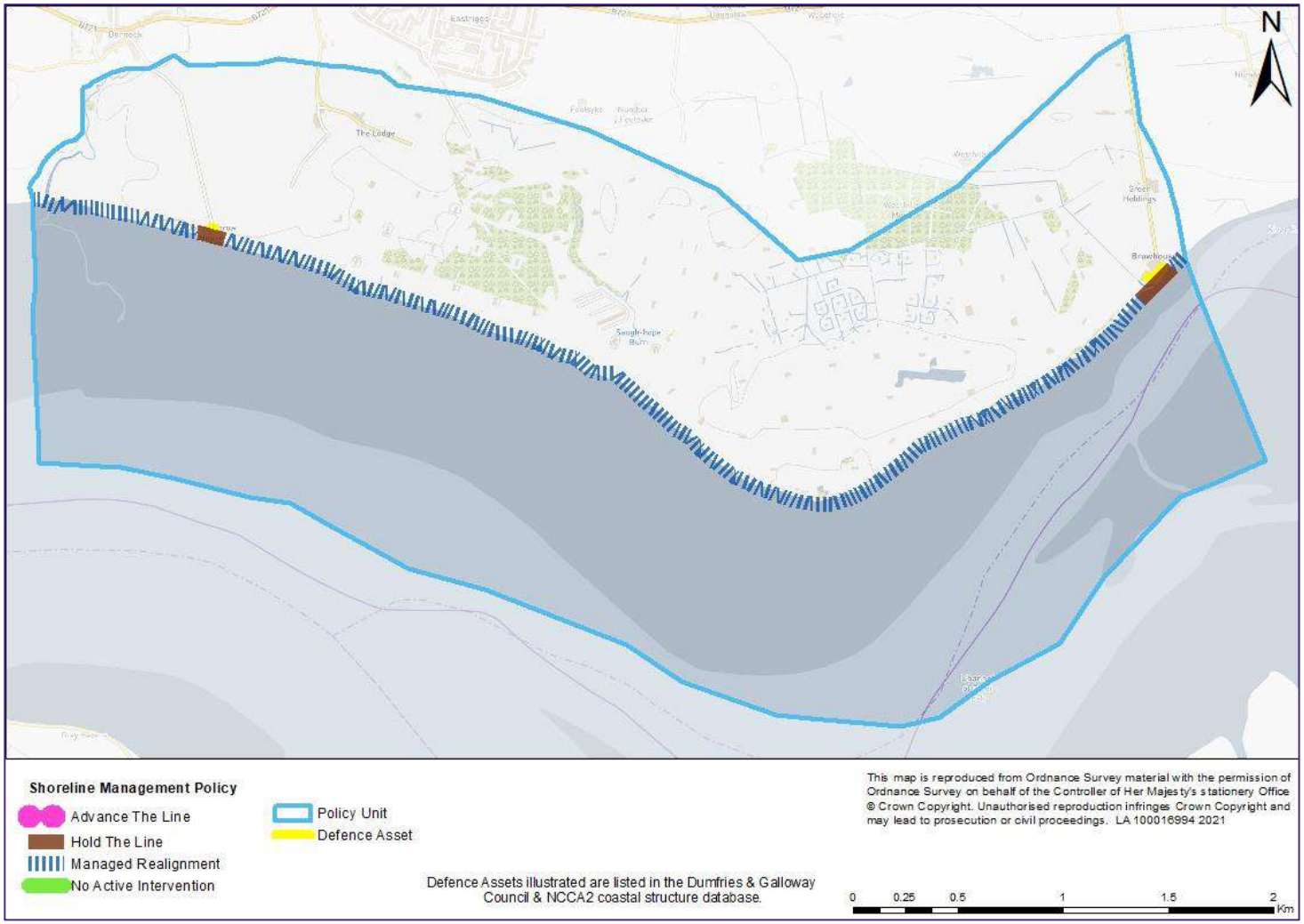

Figure 4-2 Policy Unit 2 SMP Policy (0-20 years)

4.1.3 Policy Unit 3: Dornock Burn – Waterfoot

Policy Unit 3 is about 4km in length extending from the Dornock Burn (NY227653) in the east to Waterfoot (NY190645) in the west. The coastal settlements of Battlehill and Seafield are located within this Policy Unit.

The recommended shoreline management policies for PU 3 are listed in Table 4-6 while the geographical extent of application of the policies over the short term is shown in Figure 4-3. A primary policy of No Active Intervention is recommended for most of this coastline, with a localised policy of Hold the Line or Managed Realignment where there are existing defence structures at Battlehill and around the Chapelcross outfall at Seafield.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
3. Dornock Burn - Waterfoot	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	HTL / *MR*

Table 4-6 Summary of Policies for Policy Unit 3

Table 4-7 outlines the suggested actions to implement the recommended management policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered. Defence owners should be allowed to maintain existing defences, subject the appropriate consents being obtained.

The condition of existing defences should be monitored, to inform future maintenance requirements, while a detailed flood and erosion risk assessment is required to assess the feasibility of future management HTL/MR options.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**					**S/M**	**M**

Table 4-7 Summary of Actions for Policy Unit 3

Figure 4-3 Policy Unit 3 SMP Policy (0-20 years)

4.1.4 Policy Unit 4: Waterfoot to Nethertown

Policy Unit 4 extends from Waterfoot (NY190645) in the east, past Powfoot towards Nethertown (NY123652) in the west and includes approximately 7.5km of shoreline, including the tidal reach of the River Annan from Waterfoot – Barnkirk Point to the A75 road bridge upstream of Annan.

The recommended shoreline management policies for PU 4 are listed in Table 4-8 and comprise a primary policy of No Active intervention for those parts of the coast where coastal flood and erosion risk is low in combination with maintaining existing defences through a localised Hold the Line policy. The indicative spatial extent of each of the policies over the short term is shown in Figure 4-4. With anticipated sea level rise it is acknowledged that maintaining the HTL policy will become challenging over time and thus an alternative policy of Managed Realignment is suggested for the medium to long term.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
4. Waterfoot to Nethertown	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	HTL / *MR*

Table 4-8 Summary of Policies for Policy Unit 4

Table 4-9 outlines the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered. It should be noted that for PU 4 no new coastal defence measures are to be implemented along the unprotected shoreline which should be allowed to evolve naturally.

However subject to appropriate consents being granted defence owners should be allowed to maintain existing defences for as long as this is sustainable. An assessment of coastal flood and erosion risk and feasibility will inform the selection of HTL/MR options in relation to the impact of climate change.

Wave overtopping has been reported to affect this area, particularly at Powfoot. It is therefore recommended that a detailed assessment of wave overtopping potential, and the evaluation of the associated risk should be undertaken.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**	**S**				**S/M**	**M**

Table 4-9 Summary of Actions for Policy Unit 4

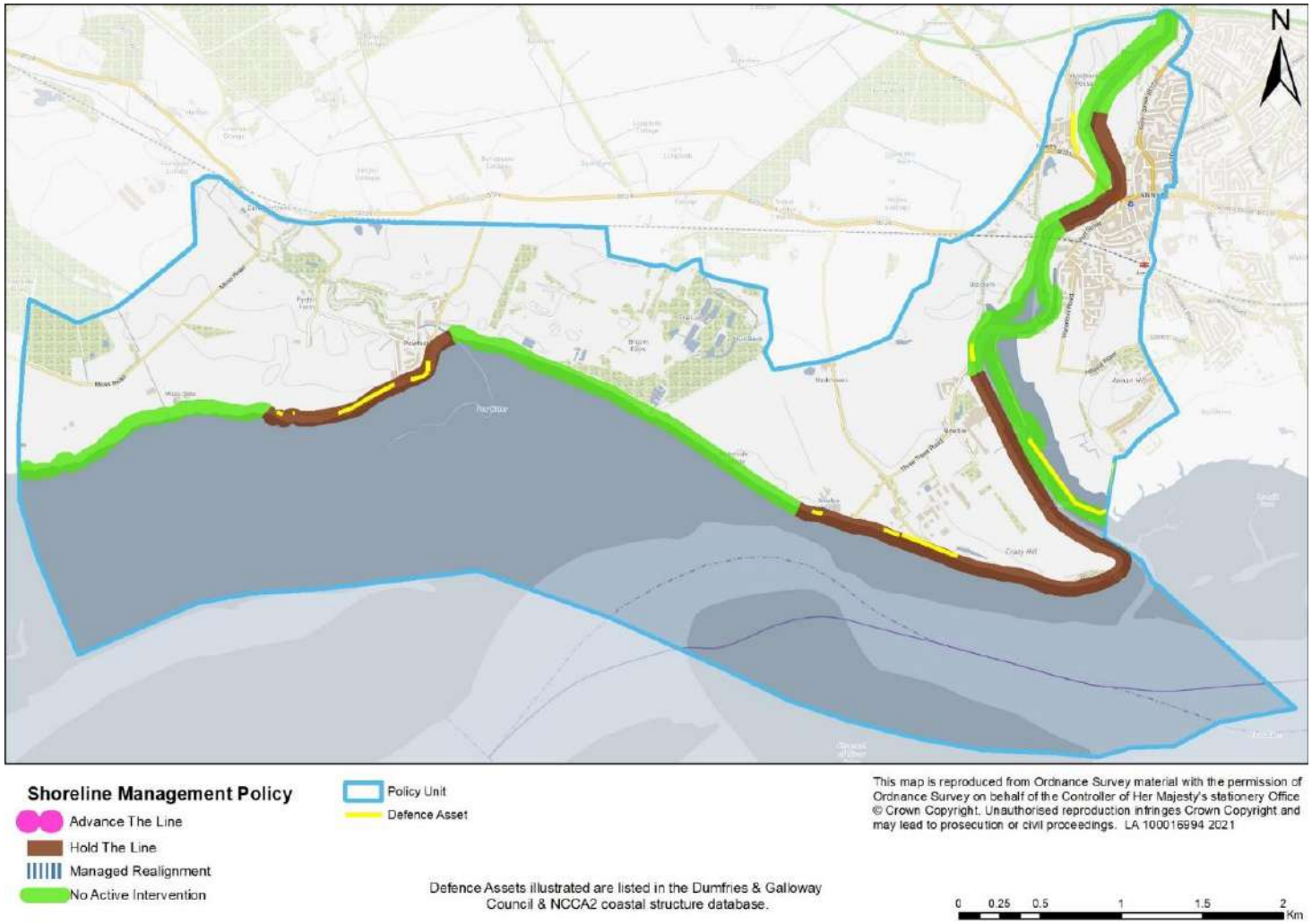

Figure 4-4 Policy Unit 4 SMP Policy (0-20 years)

4.1.5 Policy Unit 5 Nethertown to Drum Mains

Policy Unit 5 extends from Nethertown (NY123652) in the east to Drum-Mains (NX979597) in the west and includes the left bank of the River Nith downstream of Glencaple and right bank downstream of Flatts of Cargen. Policy Unit 5 includes approximately 40.7km of shoreline including the tidally influenced section of the Lochar Water and part of the River Nith.

The recommended shoreline management policies for PU 5 are listed in Table 4-10 while the spatial extent of the short term policy is shown in Figure 4-5. The primary policy is one of No Active Intervention in association with consideration of a localised policy of Managed Realignment over the medium term moving to a firmer policy of Managed Realignment in the long term. This is to allow for the management of the road assets due to the uncertainty associated with the response of natural environment, including salt marsh to future anticipated sea level rise.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
5. Nethertown to Drum Mains	**NAI**	**NAI**	**NAI**
		MR	MR

Table 4-10 Summary of Policies for Policy Unit 5

Table 4-11 outlines the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered. The shoreline should be allowed to evolve naturally, although this should be monitored to establish where action other than NAI is required and to inform the future updates of the Plan. A coastal flood and erosion risk assessment and feasibility study will inform the need for future MR options.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**						

Table 4-11 Summary of Actions for Policy Unit 5

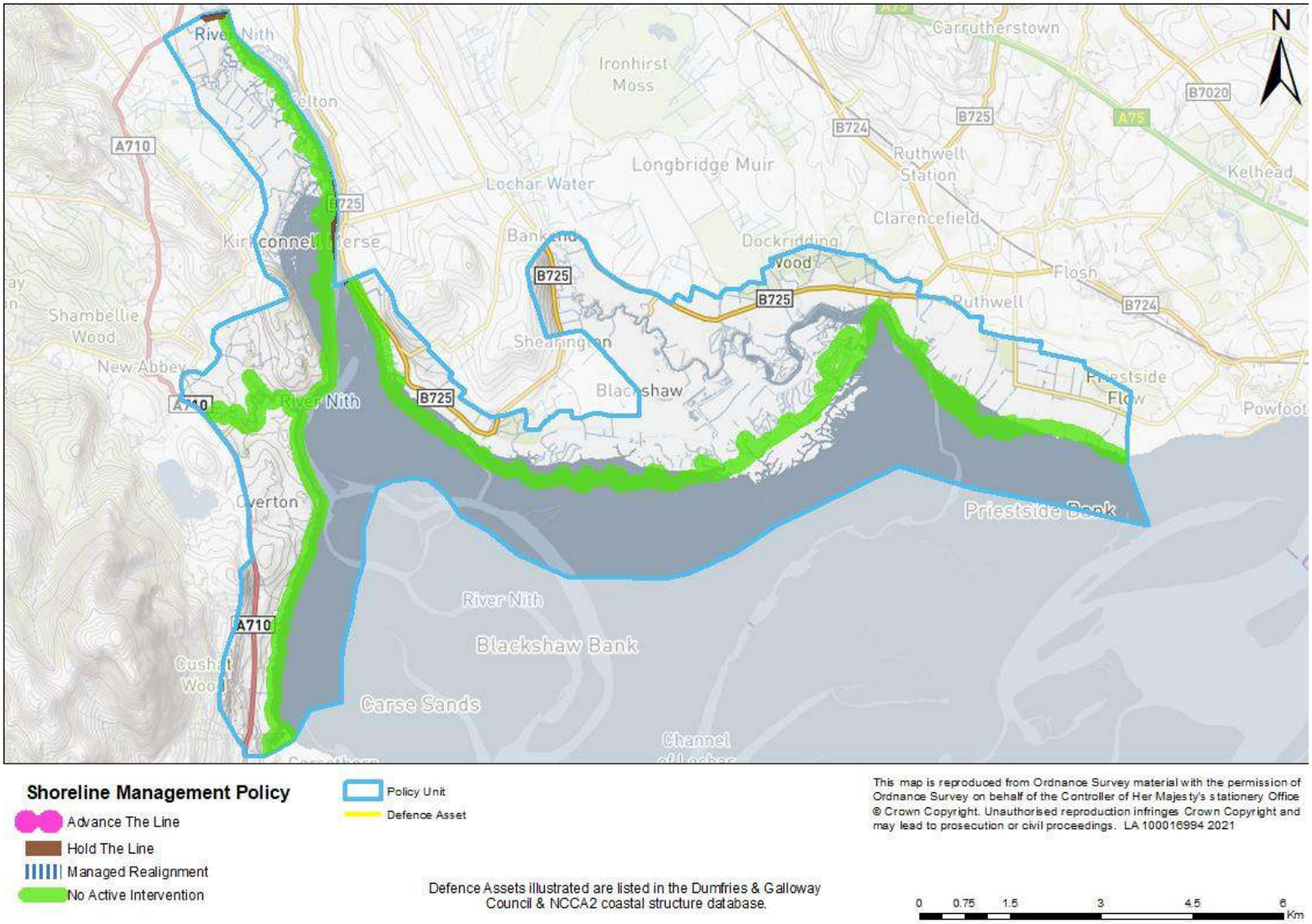

Figure 4-5 Policy Unit 5 SMP Policy (0-20 years)

4.1.6 Policy Unit 6 Glencaple to Dumfries

Policy Unit 6 includes the tidally influenced extent of the River Nith (NY029703), as it flows in a mainly southerly direction through Dumfries and past Glencaple i.e., the narrow section of the estuary just before it opens outs into the Solway Firth (NX997678). Dumfries is the main settlement within this policy unit, the only other significant settlement being Glencaple.

The recommended shoreline management policies for PU 6 are listed in Table 4-12 while the geographic extent of the short term policies is shown in Figure 4-6. The primary policy is one of Hold the Line possibly in combination with Managed Realignment (landward movement of roads in the future) for most of the coastline. For those parts of the coast that do not require intervention, a localised policy of No Active Intervention is recommended.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
6. Glencaple to Dumfries	**HTL**	**HTL / *MR***	**HTL / *MR***
	NAI	NAI	NAI

Table 4-12 Summary of Policies for Policy Unit 6

Table 4-13 outlines the suggested actions to implement the recommended policies over the short, medium and long term. The condition of existing defences should continue to be monitored, to inform decisions regarding maintenance or upgrade. Monitoring of the shoreline should also be implemented to identify any areas where HTL is having an unacceptable adverse impact and to inform updates of the SMP. Defence owners should be allowed to maintain existing defences over the short to medium term, subject to appropriate consents being granted. A detailed coastal flood and erosion risk assessment and feasibility study should be commissioned to inform future MR options.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**					**S/M**	**M**

Table 4-13 Summary of Actions for Policy Unit 6

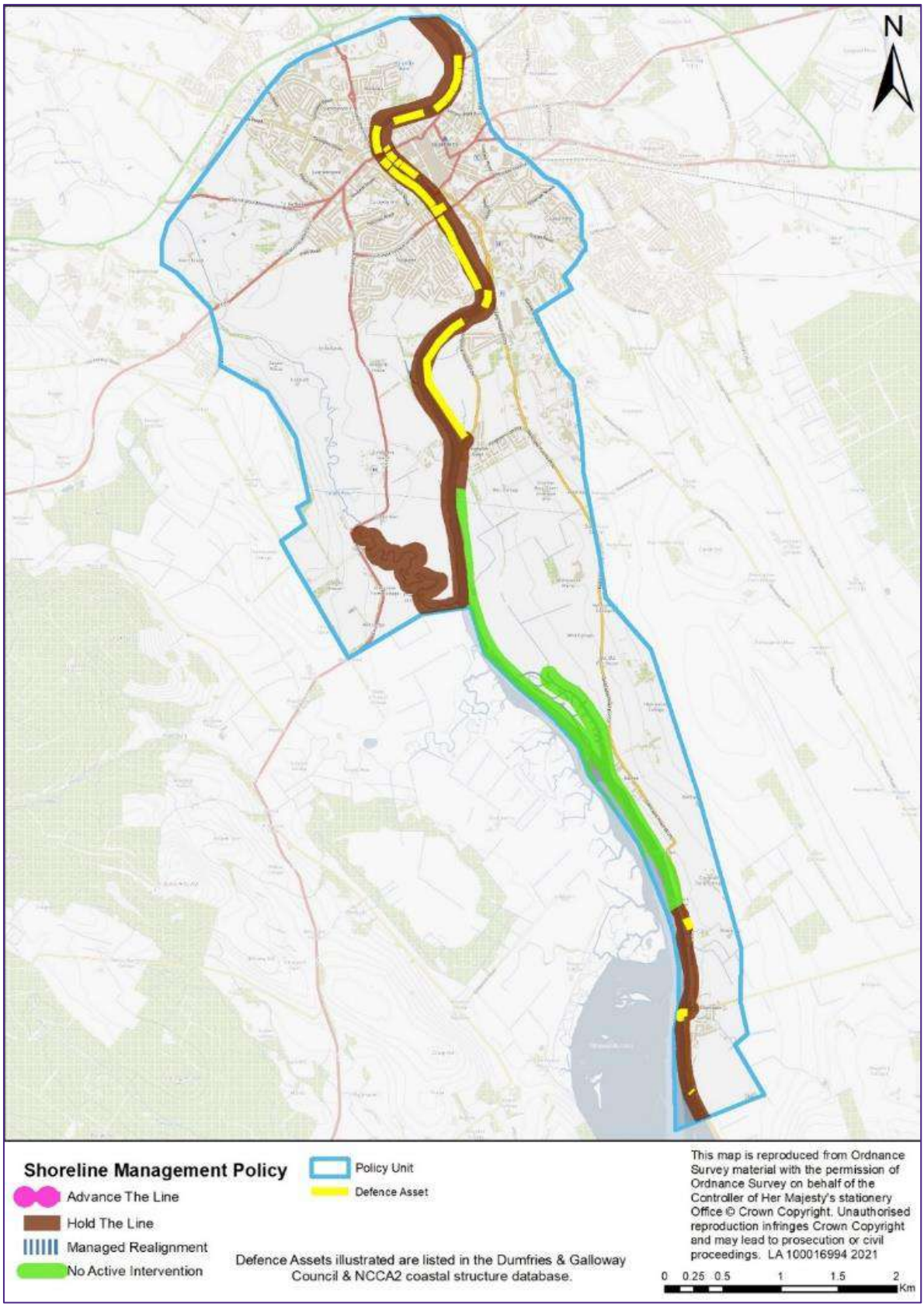

Figure 4-6 Policy Unit 6 SMP Policy (0-20 years)

4.1.7 Policy Unit 7 Drum Mains to Southerness

Policy Unit 7 includes the section of the Dumfries & Galloway shoreline between Drum-Mains (NX979597) in the north and Southerness Point (NX975543) in the south. This area includes the settlements of Carsethorn and Southerness.

The recommended shoreline management policies for PU 7 are listed in Table 4-14 while the geographic extent of the short term policies is shown in Figure 4-7. The primary policy is one of No Active Intervention for those parts of the coast that do not require intervention in association with a localised policy of Hold the Line for the short to medium term moving to a policy of Managed Realignment in the long term at presently defended areas of the coast.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
7. Drum Mains to Southerness	**NAI**	**NAI**	**NAI**
	HTL/MR	HTL / *MR*	MR

Table 4-14 Summary of Policies for Policy Unit 7

Table 4-15 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. It is important that the frequency and severity of coastal events is monitored, to inform any potential future move from HTL to MR. An improved understanding of the evolution of the shoreline should also inform future revisions of the SMP.

Carsethorn has been reported to be subject to significant wave over-topping, therefore, a detailed assessment of wave over-topping potential and evaluation of the risk associated with this should be undertaken. A coastal flood and erosion risk and feasibility study incorporating consideration of wave over-topping risk, will inform the selection of HTL / MR policies and future updates of the SMP.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**	**S**				**S/M**	**M**

Table 4-15 Summary of Actions for Policy Unit 7

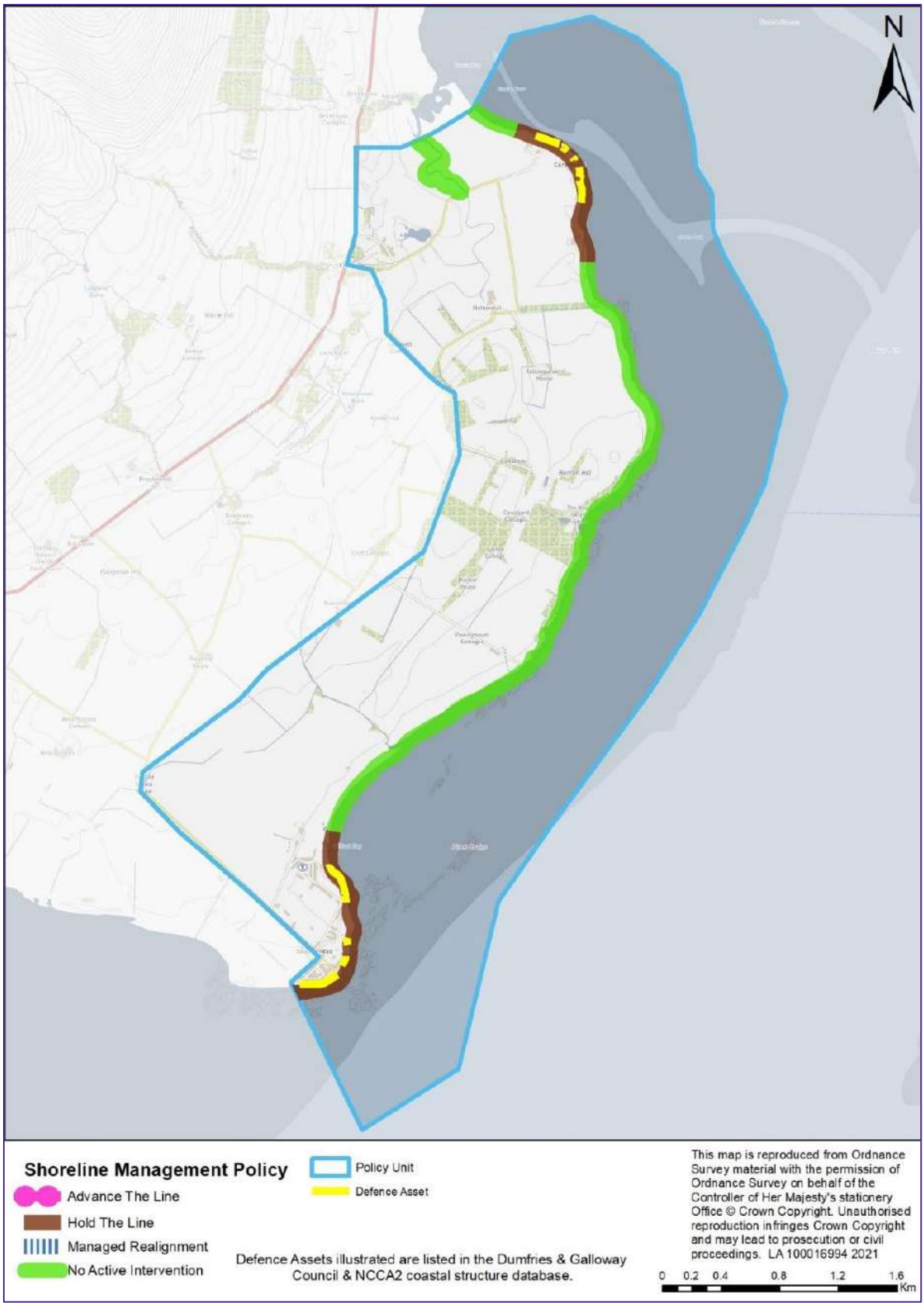

Figure 4-7 Policy Unit 7 SMP Policy (0-20 years)

4.2 Coastal Process Unit 2 – Outer Solway Firth (CPU 2)

Coastal Process Unit 2, the outer section of Solway Firth extends from Southerness Point to Torrs Point. The Outer Solway Firth is an area of shallow open sea with numerous inlets and enclosed bays. There are 4 Policy Units within CPU 2, and the shoreline is a complex combination of soft, hard and artificial types. The largest section of soft shoreline is located immediately to the east of Southerness Point and extends towards the Southwick Water (PU 8). Other notable areas of soft shoreline are located in the bay head areas of PU 9 and PU 10. The management policies for CPU 2 are as follows.

4.2.1 Policy Unit 8 Southerness to Castlehill Point

Policy Unit 8 covers about 16km of shoreline from Southerness Point (NX975543) in the east to Castlehill Point (NX847523) in the west.

The recommended shoreline management policies for Policy Unit 8 are listed in Table 4-16 while the spatial extent of the short term policies is shown in Figure 4-8. The primary policy is one of No Active Intervention for those parts of the coast that do not require intervention in combination with a localised policy of Hold the Line over the short to medium term moving to a policy of Managed Realignment in the long term for presently defended areas of the coast.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
8. Southerness to Castlehill Point	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	MR

Table 4-16 Summary of Policies for Policy Unit 8

Table 4-17 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

The A710 at Sandyhills should be monitored to inform the need for management and to inform future revisions of the SMP. Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. A detailed feasibility study would provide more justification for measures to protect the A710.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**					**S/M**	**M/L**

Table 4-17 Summary of Actions for Policy Unit 8

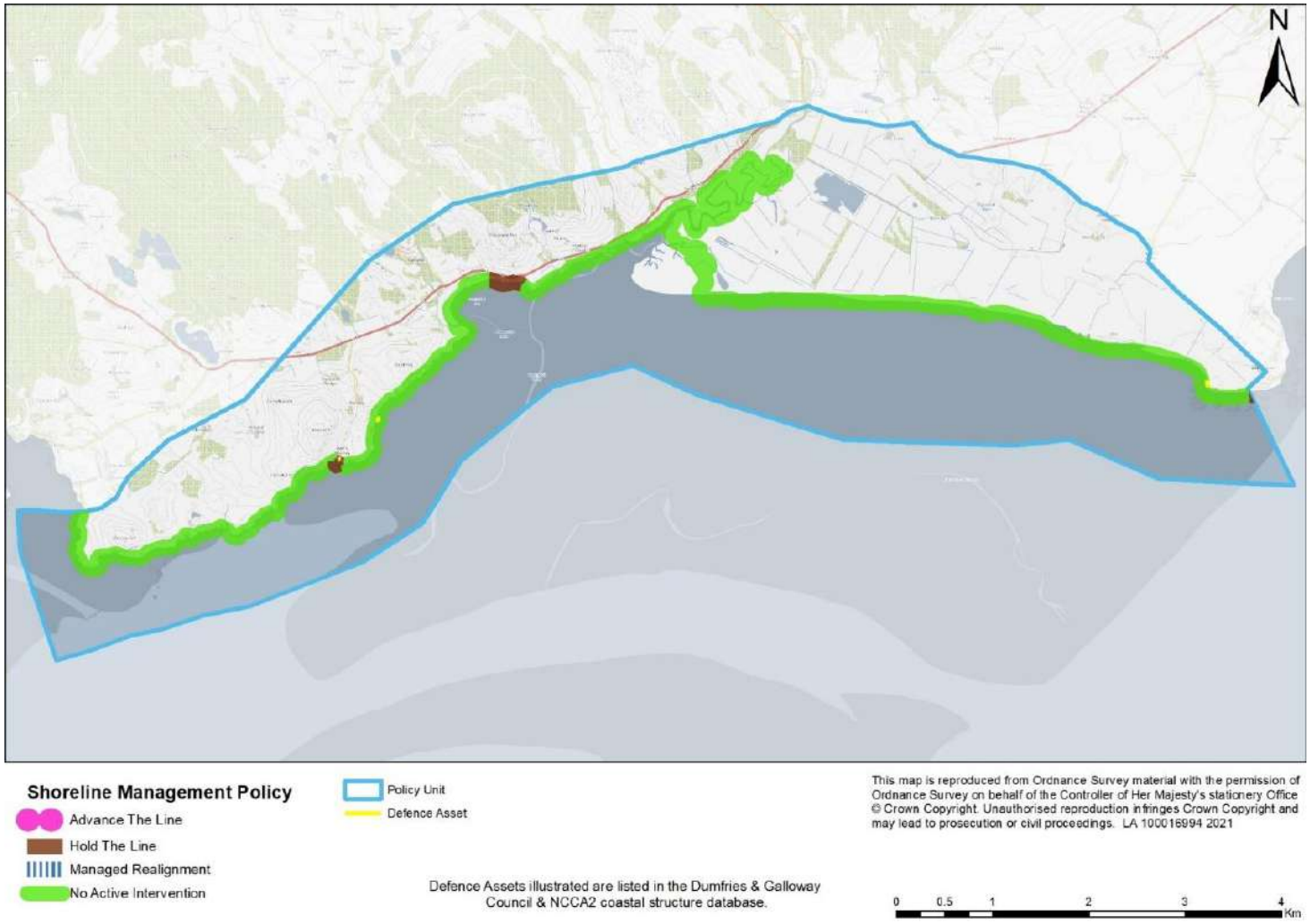

Figure 4-8 Policy Unit 8 SMP Policy (0-20 years)

4.2.2 Policy Unit 9 Castlehill Point to Dalbeattie

Policy Unit 9 covers the tidally affected reaches of the Urr Water and Dalbeattie Burn as they flow south towards the Rough Firth and extends from West Barcloy in the south (NX854529) northwards to the tidal extent of Urr Water, close to Buittle Castle (NX819616).

The recommended shoreline management policies for PU 9 are listed in Table 4-18 while the spatial extent of the short term policies is shown in Figure 4-9. The primary policy is one of No Active Intervention for those parts of the coast that do not require intervention in combination with a localised policy of Hold the Line where assets are at risk.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
9. Castelhill Point to Dalbeattie	**NAI**	**NAI**	**NAI**
	HTL	HTL	HTL

Table 4-18 Summary of Policies for Policy Unit 9

Table 4-19 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences while the condition and performance of existing defence structures should be monitored to inform requirements for maintenance or upgrade. A detailed assessment is required to quantify the risk to properties and identify the need for further management measures, while the evolution of the shoreline should be monitored to inform future revisions of the SMP.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**					**S/M**	**M/L**

Table 4-19 Summary of Actions for Policy Unit 9

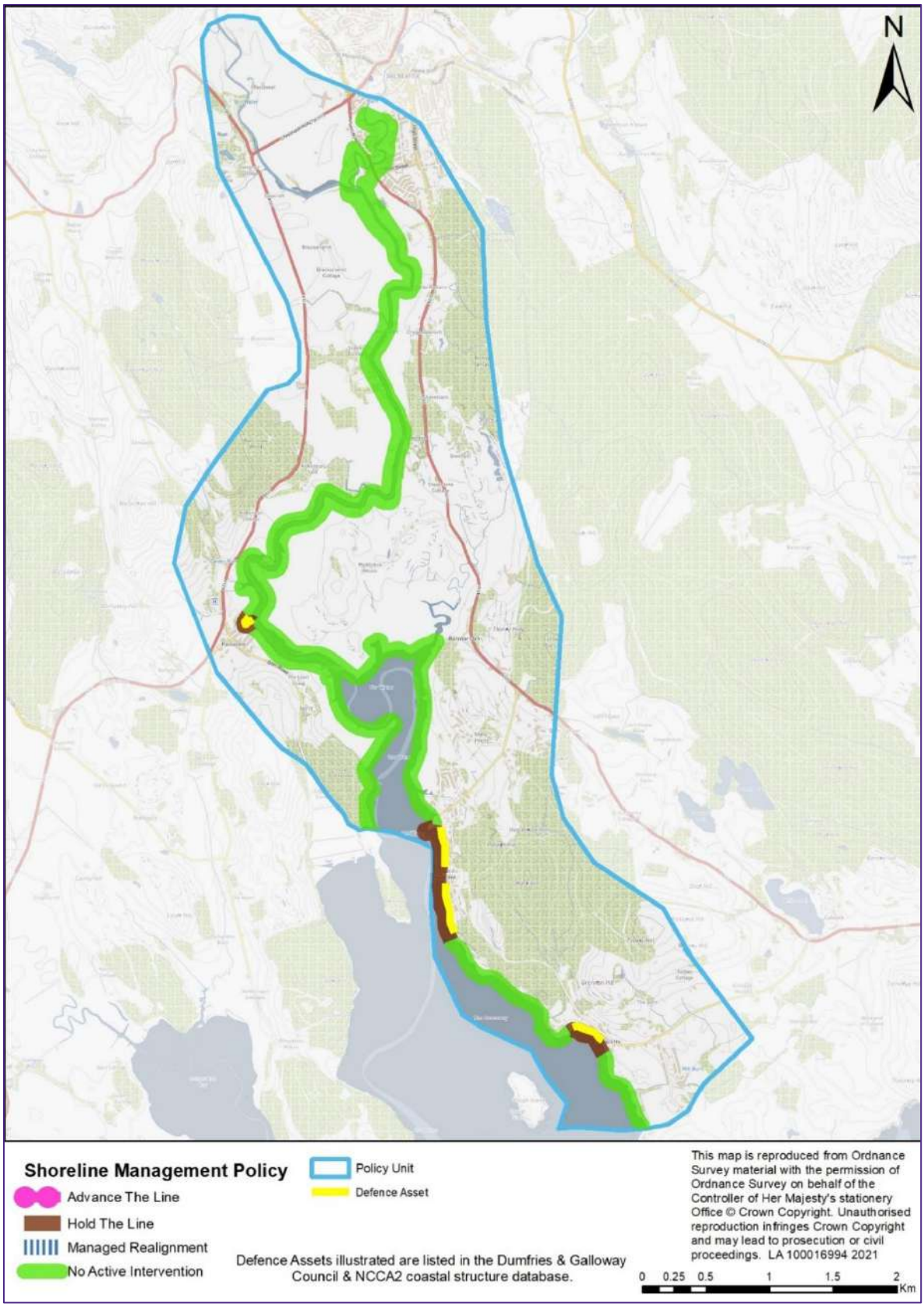

Figure 4-9 Policy Unit 9 SMP Policy (0-20 years)

4.2.3 Point Unit 10 Castlehill Point to Balcary Point

Policy Unit 10 includes the western shore of the Rough Firth and the shorelines of Orchard Bay, Auchencairn Bay and Balcary Bay and extends from north of Castlehill (NX828554) towards Balcary Point (NX827494).

The recommended shoreline management policies for PU 10 are listed in Table 4-20 while the spatial extent of the short term policies is shown in Figure 4-10. A primary policy of No Active Intervention for most of the coastline, in combination with a localised policy of Hold the Line where there are existing defences, such as those protecting the Shore Road and properties at Balcary Bay is recommended.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
10.Castlehill Point to Balcary Point	**NAI**	**NAI**	**NAI**
	HTL	HTL	HTL

Table 4-20 Summary of Policies for Policy Unit 10

Table 4-21 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Where defences exist, the condition / performance of existing defences should be monitored, and defence owners permitted to maintain defences subject to appropriate consents being granted. A detailed feasibility study should be undertaken to identify feasible measures.

Balcary Bay has been reported to be subject to significant wave over-topping, therefore, a detailed assessment of wave over-topping potential at Balcary Bay and along the Shore Road is recommended. This assessment would quantify the risk to properties and identify the need for further management measures. The evolution of the coastline should be monitored to inform future revisions of the SMP.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**	**S**				**S/M**	**M/L**

Table 4-21 Summary of Actions for Policy Unit 10

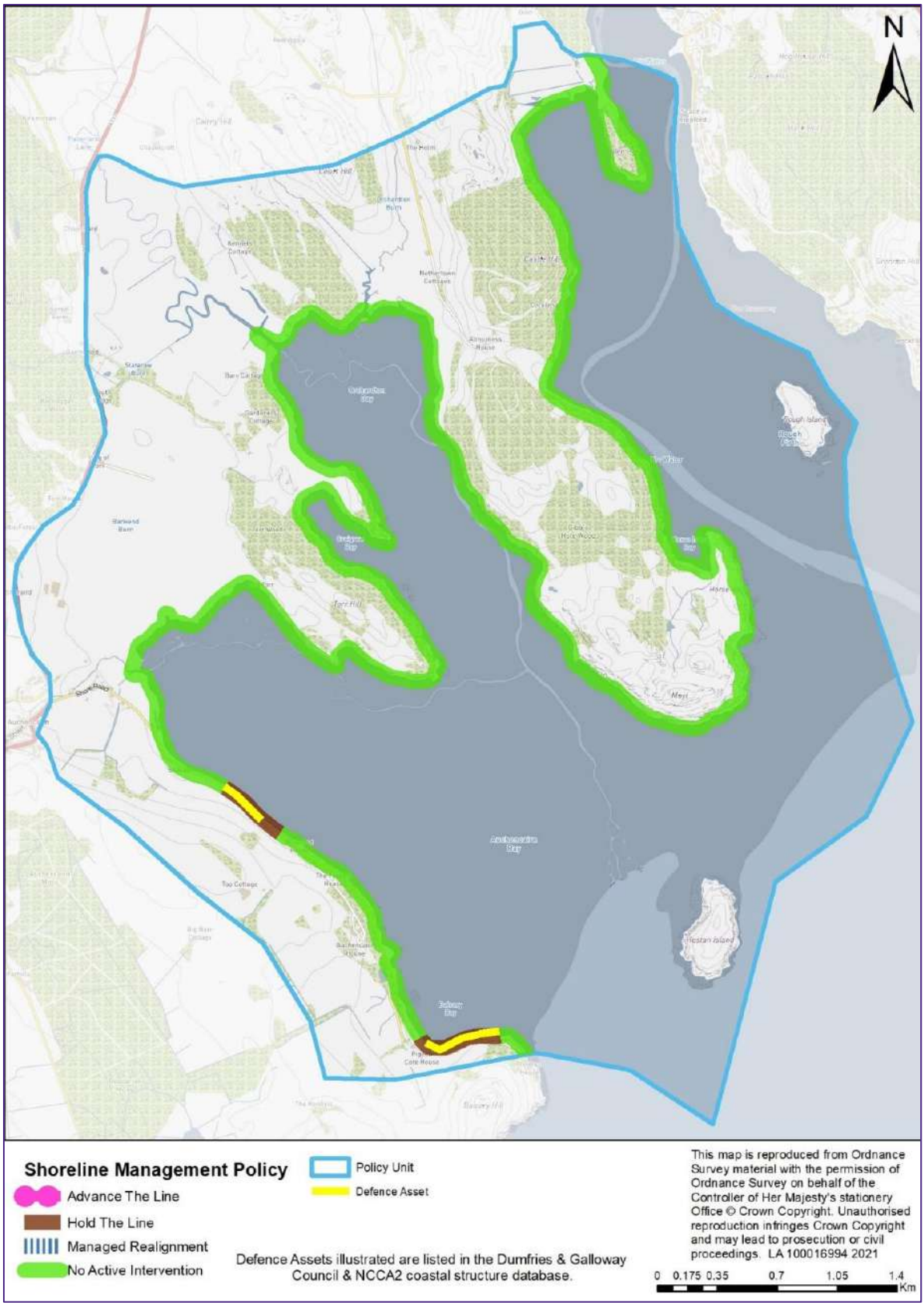

Figure 4-10 Policy Unit 10 SMP Policy (0-20 years)

4.2.4 Policy Unit 11 Balcary Point to Torrs Point

Policy Unit 11 extends from Balcary Point (NX827494) in the east to Torrs Point in the west (NX673448) and is largely rural with land use dominated by agriculture and a large MoD training area.

The recommended shoreline management policy for PU 11 is listed in Table 4-22 while the spatial extent of the short term policy is shown in Figure 4-11. A policy of No Active Intervention is recommended for this section of the coastline.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
11. Balcary Point to Torrs Point	NAI	NAI	NAI

Table 4-22 Summary of Policies for Policy Unit 11

Table 4-23 lists the suggested actions to implement the recommended policy over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L	S	S								

Table 4-23 Summary of Actions for Policy Unit 11

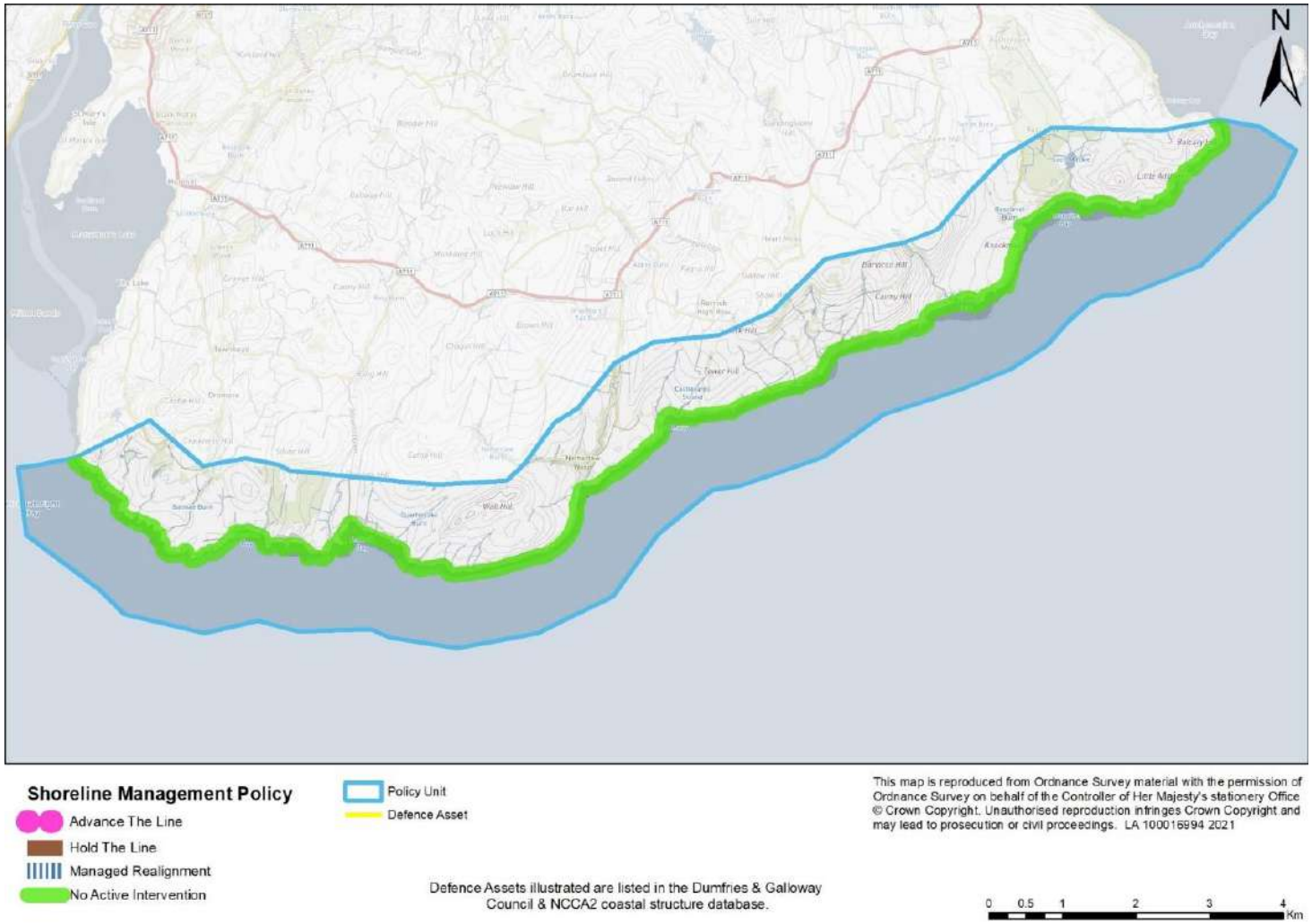

Figure 4-11 Policy Unit 11 SMP Policy (0-20 years)

4.3 Coastal Process Unit 3 – Wigtown and Kirkcudbright Bays (CPU 3)

Coastal Process Unit 3 represents the central and southern portion of the Dumfries & Galloway shoreline, including the large embayment of Wigtown Bay and the smaller estuaries of Kirkcudbright Bay and Fleet Bay. The River Dee, the Water of Fleet, the River Cree and the Bladnoch flow into this area. There are seven Policy Units (PU 12 to PU 18) within CPU 3, for which the recommended management policies are as follows.

4.3.1 Point Unit 12 Torrs Point to Doon of Carsluith

Policy Unit 12 is located on the western side of Wigtown Bay, and extends from Torrs Point (NX673448) to Sandside, south of Kirkcudbright at the head of Manxman's Lake (NX683501) and westwards to Doon of Carsluith (NX488543).

The recommended shoreline management policies for PU 12 are listed in Table 4-24 while the spatial extent of the short term policies is shown in Figure 4-12. A primary policy of No Active Intervention is recommended for most of the coastline in combination with a localised policy of Hold the Line / Managed Realignment where there are existing coastal structures. This localised policy may also apply to the A75 at Skyburn pending the outcome of a detailed risk assessment.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
12. Torrs Point to Doon of Carsluith	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	HTL / *MR*

Table 4-24 Summary of Policies for Policy Unit 12

Table 4-25 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Defence owners should be allowed to maintain existing defences, subject to appropriate consents being obtained. The condition / performance of existing defences should be monitored, and a feasibility study completed to identify feasible measures. The evolution of the coastline should be monitored to inform future revisions of the SMP.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**					**S/M**	**M**

Table 4-25 Summary of Actions for Policy Unit 12

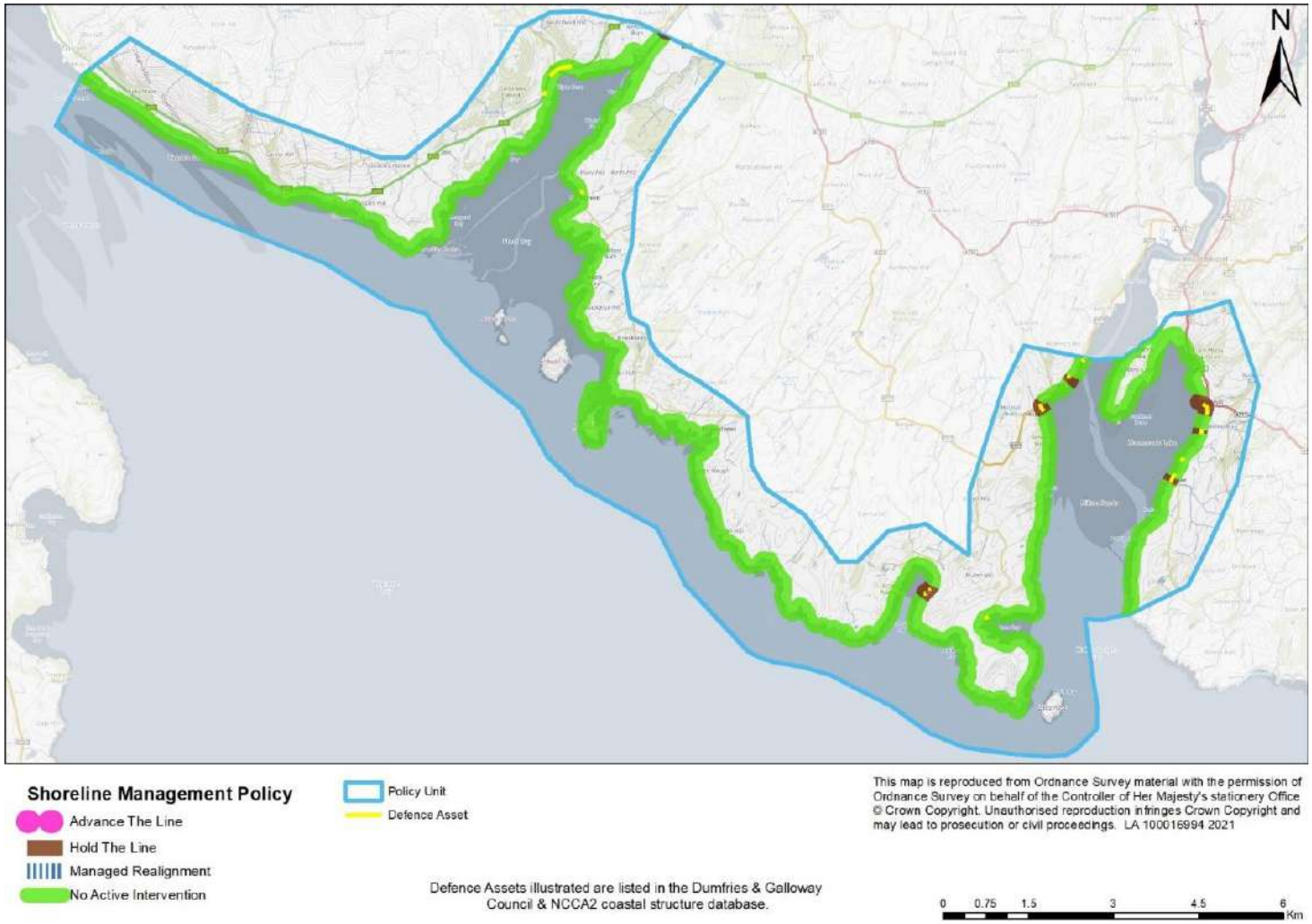

Figure 4-12 Policy Unit 12 SMP Policy (0-20 years)

4.3.2 Point Unit 13 St Mary's Isle to Tongland

Policy Unit 13 includes the tidal section of the River Dee that flows through the town of Kirkcudbright from the tidal extent close to Tongland (NX684547). This policy unit is bounded by the confluence of the Tarff and Dee in the north and St Marys Isle (NX671493) in the south where it abuts PU 12.

The recommended shoreline management policies for PU 13 are listed in Table 4-26 while the spatial extent of the short term policies is shown in Figure 4-13. The recommended policy is Hold the Line through the urbanised areas in combination with a more general policy of No Active Intervention for the remainder of the coastline. In recognition of the challenges associated with implementing a Hold the Line policy particularly in the longer term an alternative more sustainable policy of Managed Realignment is recommended for consideration.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
13. St Mary's Isle to Tongland	**NAI**	**NAI**	**NAI**
	HTL / *MR*	HTL / *MR*	HTL / *MR*

Table 4-26 Summary of Policies for Policy Unit 13

Table 4-27 lists the suggested actions to implement the recommended policies over the short, medium and long term. A detailed flood and erosion risk assessment is recommended to quantify risk to properties and quantify the need for further management measures or localised implementation of the recommended alternative policy of managed realignment. Subject to appropriate all necessary consents being granted defence owners should be allowed to maintain existing defences.

Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered. Within this area there is a potential opportunity for habitat creation, through the realignment of defences at Janefield and parkland south of Kirkcudbright to enable growth of saltmarsh / reed beds.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**				**S/M**	**S/M**	**M**

Table 4-27 Summary of Actions for Policy Unit 13

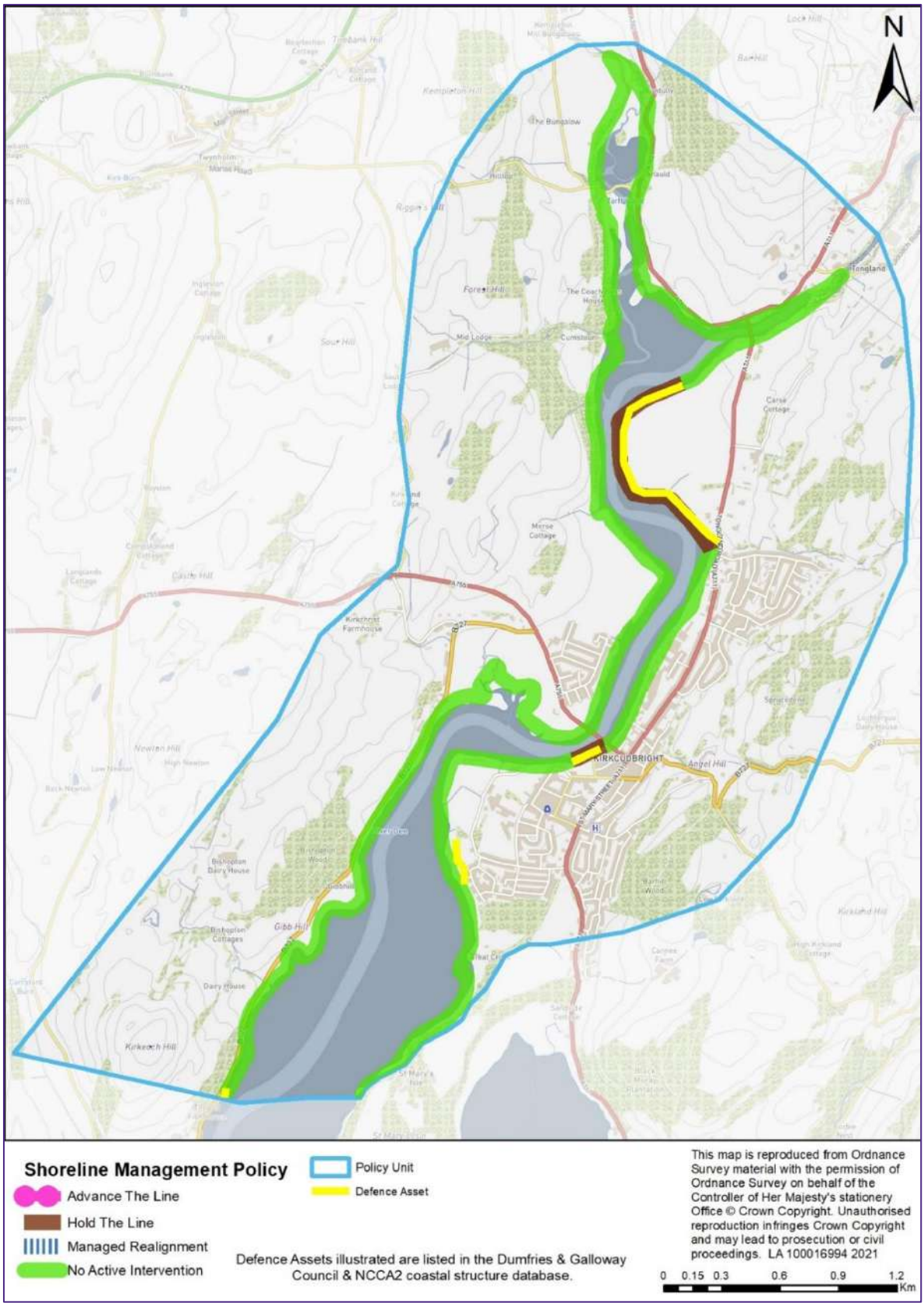

Figure 4-13 Policy Unit 13 SMP Policy (0-20 years)

4.3.3 Point Unit 14 Gatehouse of Fleet

Policy Unit 14 includes the Water of Fleet from the boundary of PU 12 at (NX590551) to upstream of Gatehouse of Fleet.

The recommended shoreline management policies for PU 14 are listed in Table 4-28 while the spatial extent of the short term policies is shown in Figure 4-14. The primary policy is No Active Intervention for most of the coastline in combination a localised Hold the Line policy permitting maintenance works to existing defences to manage flood risk to businesses and properties. Managed Realignment is recommended as an alternative to HTL as opportunities have been identified with Policy Unit 14 to potentially use this to mitigate flood risk.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
14. Gatehouse of Fleet	**NAI**	**NAI**	**NAI**
	HTL / *MR*	HTL / *MR*	MR

Table 4-28 Summary of Policies for Policy Unit 14

Table 4-29 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being obtained, defence owners should be allowed to maintain existing defences. A detailed coastal flood and erosion study should be undertaken to quantify risk to properties and identify need for management measures or localised implementation of the recommended alternative policy of managed realignment. Realignment of defences at Cally should be considered to enable growth of saltmarsh / reed beds and provide flood storage.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**				**M/L**	**S/M**	**M**

Table 4-29 Summary of Actions for Policy Unit 14

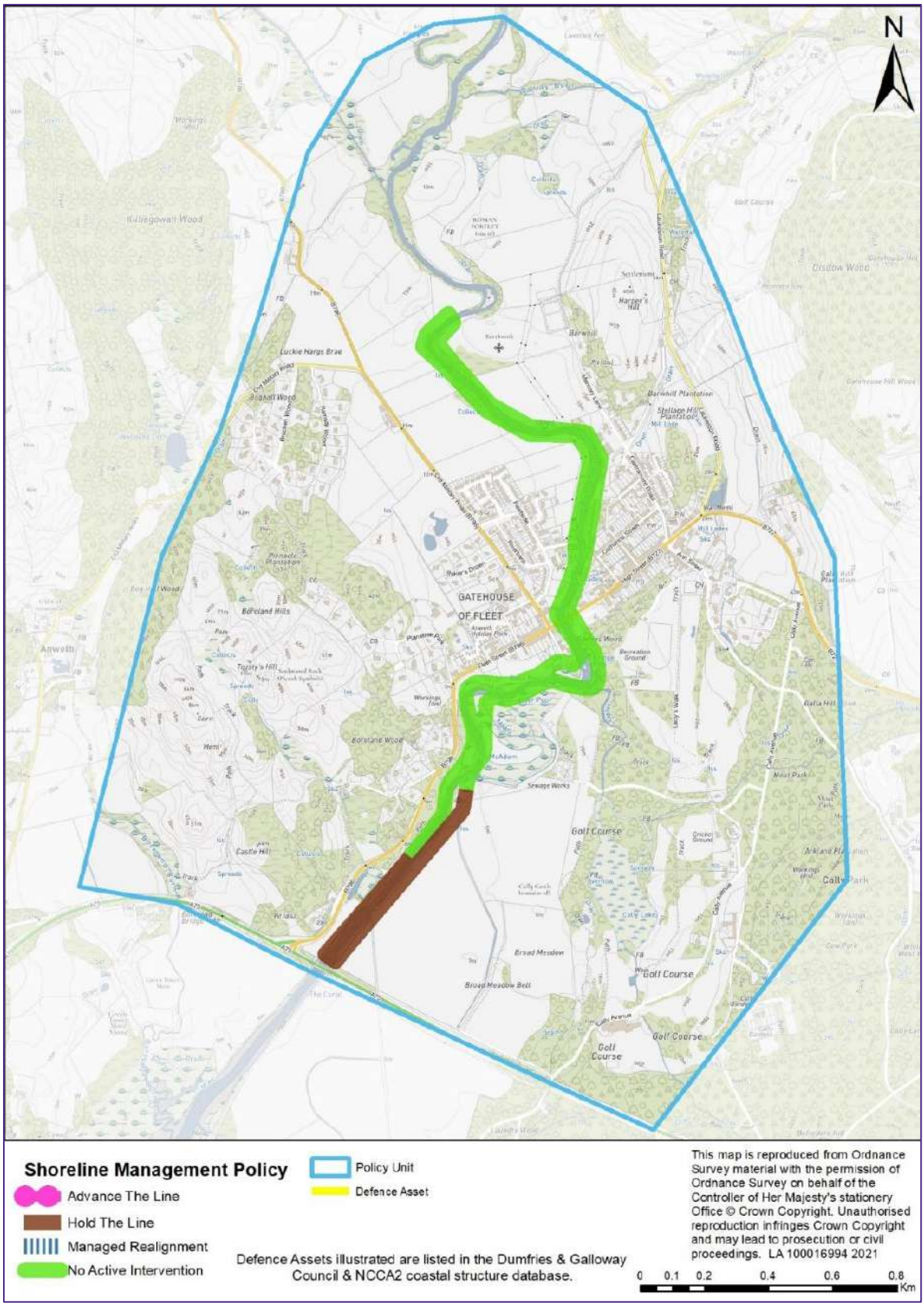

Figure 4-14 Policy Unit 14 SMP Policy (0-20 years)

4.3.4 Point Unit 15 Doon of Carsluith to Eggerness Point

Policy Unit 15 includes the western shoreline of Wigtown Bay and the tidally influenced section of the River Cree as far upstream as Newton Stewart and tidally influenced tributaries that join with the River Cree. At low tide extensive areas of mud and sandflat are exposed as identified in the Salt Marsh Survey of Scotland (SMSS). This Policy Unit extends from the Doon of Carsluith (NX488543) towards Eggerness Point (NX493465). The northern extent is defined by the tidal extents of the Bishops Burn (NX423602), River Cree (NX409657) and Palnure Burn (NX458656).

The recommended shoreline management policies for PU 15 are listed in Table 4-30 while the spatial extent of the short term policies is shown in Figure 4-15. A primary policy of No Active Intervention for most of the coastline, in association with localised Hold the Line and Managed Realignment to permit maintenance works to manage flood risk to businesses and properties protected by existing defences is recommended.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
15. Doon of Carsluith to Eggerness Point	**NAI**	**NAI**	**NAI**
	HTL	MR	MR

Table 4-30 Summary of Policies for Policy Unit 15

Table 4-31 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being obtained, defence owners should be allowed to maintain existing defences. The condition of existing defence should be monitored to inform the need for maintenance or upgrade and the evolution of the coastline should be monitored to establish where action other than NAI is required and to inform future update of SMP. A detailed coastal flood and erosion risk assessment is recommended to quantify risk to assets and identify need for further management measures.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**			**S/M**		**S/M**	**M**

Table 4-31 Summary of Actions for Policy Unit 15

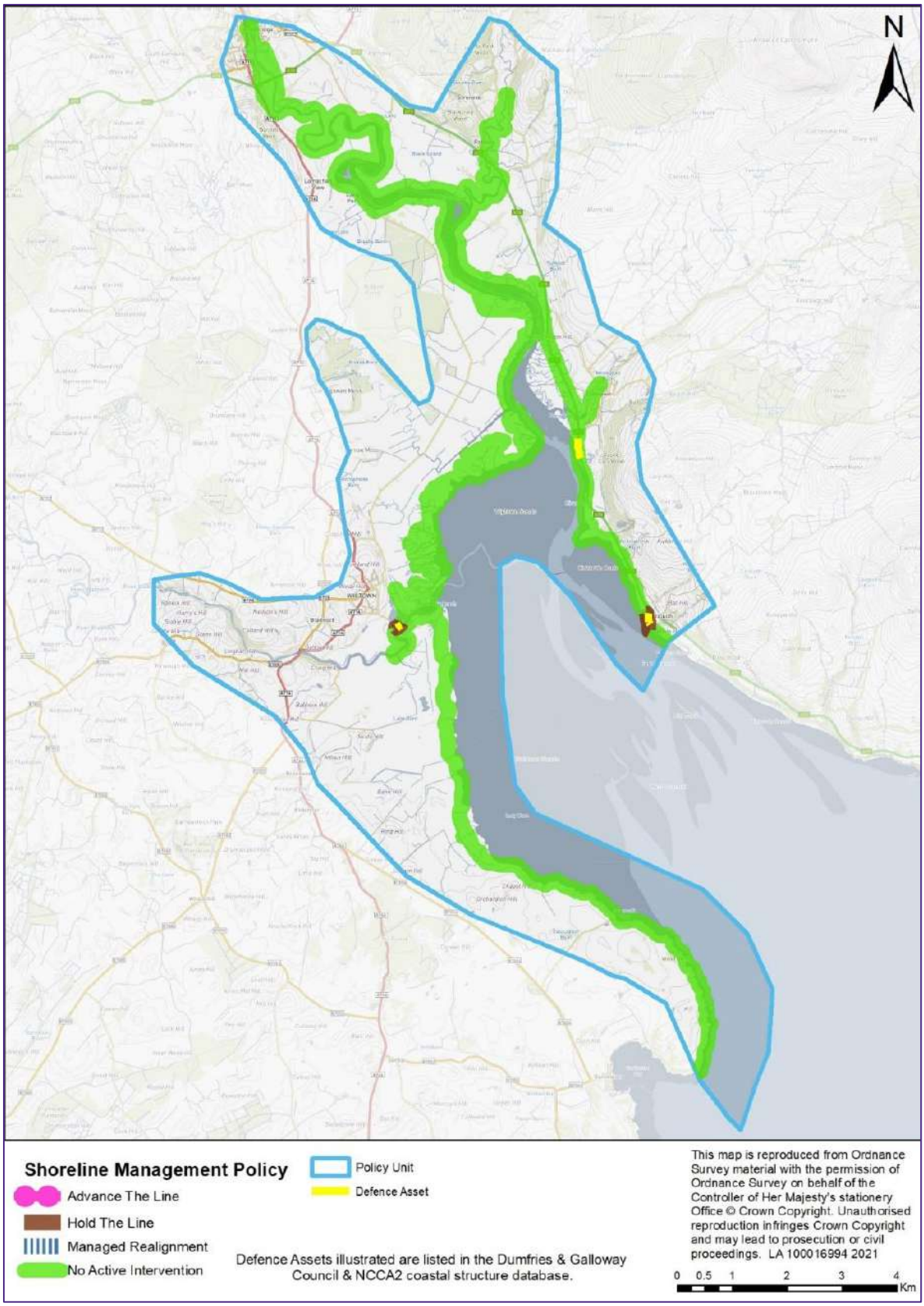

Figure 4-15 Policy Unit 15 SMP Policy (0-20 years)

4.3.5 Point Unit 16 Garlieston

Policy Unit 16 extends from Eggerness Point (NX493465) to Ringan Point (NX480456) including Garlieston Bay (NX478468).

The recommended shoreline management policies for PU 16 are listed in Table 4-32 while the spatial extent of the short term policies is shown in Figure 4-16. Hold the Line is recommended for PU 16 in combination with a localised policy of No Active Intervention for the undefended sections of the coastline. Managed Realignment is included as an alternative policy over the medium to long term for the defended sections of the coastline.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
16. Garlieston	**HTL**	**HTL / *MR***	**HTL / *MR***
	NAI	NAI	NAI

Table 4-32 Summary of Policies for Policy Unit 16

Table 4-33 lists the suggested actions to implement the recommended policies over the short, medium and long term. The condition of existing defences should be monitored to inform the need for maintenance and upgrade. Defence owners should be allowed to maintain existing defences, subject to all necessary consents being obtained. A detailed assessment of coastal processes, including wave over-topping, is required to inform selection of appropriate future management measures as Garlieston is reported to be affected by wave overtopping.

Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**	**S**				**S/M**	**M**

Table 4-33 Summary of Actions for Policy Unit 16

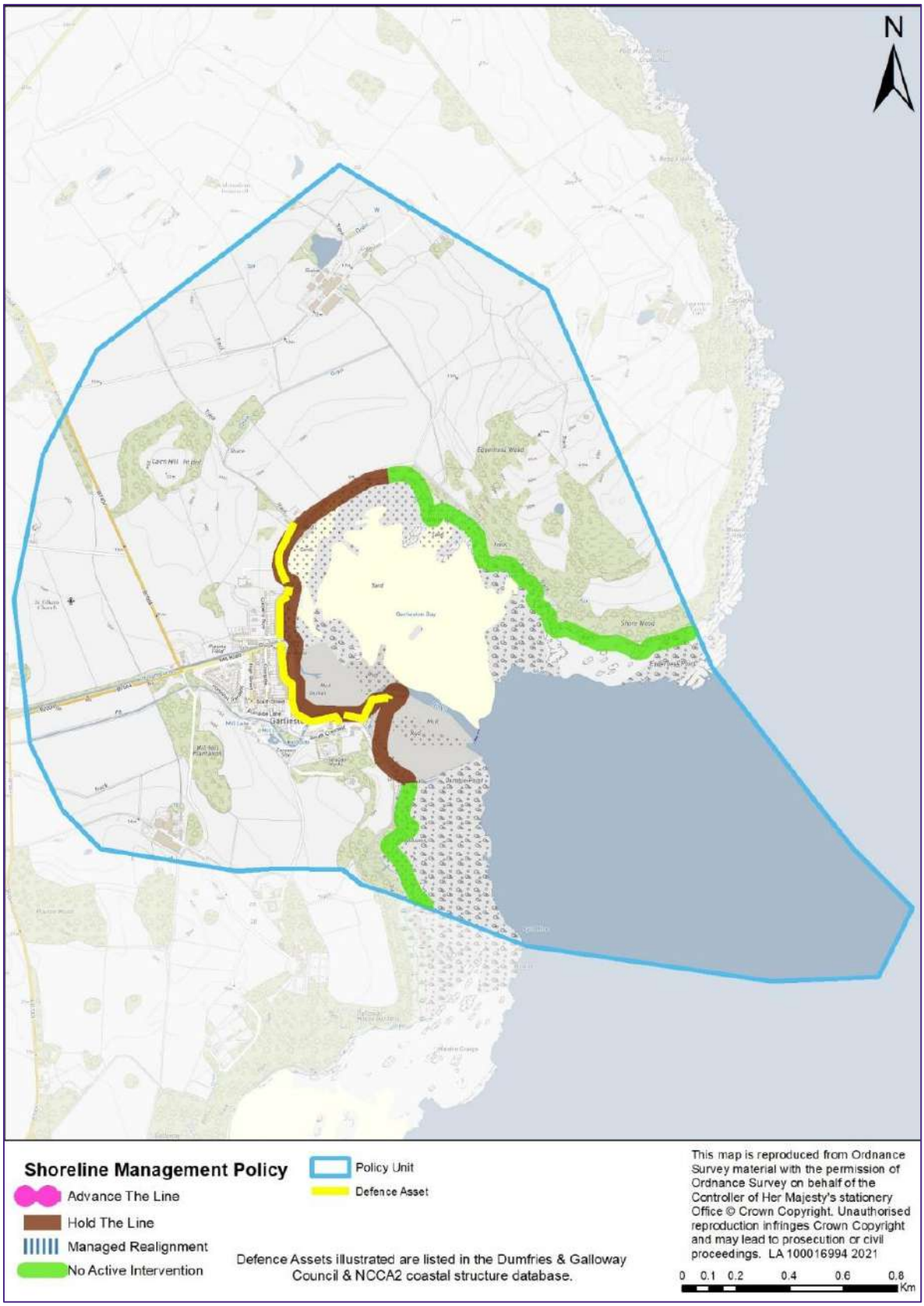

Figure 4-16 Policy Unit 16 SMP Policy (0-20 years)

4.3.6 Point Unit 17 Garlieston to Isle of Whithorn

Policy Unit 17 extends from Ringan Point at the southern end of Garlieston Bay (NX480456) to north of the Isle of Whithorn (NX482362).

The recommended shoreline management policies for PU 17 are listed in Table 4-34 while the spatial extent of the short term policies is shown in Figure 4-17. A policy of No Active Intervention is recommended for virtually all the coastline with a very localised policy of Hold the Line / Managed Realignment for managing a section of the B7063.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
17. Garlieston to Isle of Whithorn	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	MR

Table 4-34 Summary of Policies for Policy Unit 17

Table 4-35 lists the suggested actions to implement the recommended policies over the short, medium and long term. For a management policy of No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being granted the defences protecting the B7063 should be maintained, and the evolution of the coastline monitored to inform future revisions of the SMP. A detailed assessment is recommended to quantify risk to public road and identify need for further management measures or localised implementation of the recommended alternative policy of managed realignment for the B7063.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**					**S/M**	**M**

Table 4-35 Summary of Actions for Policy Unit 17

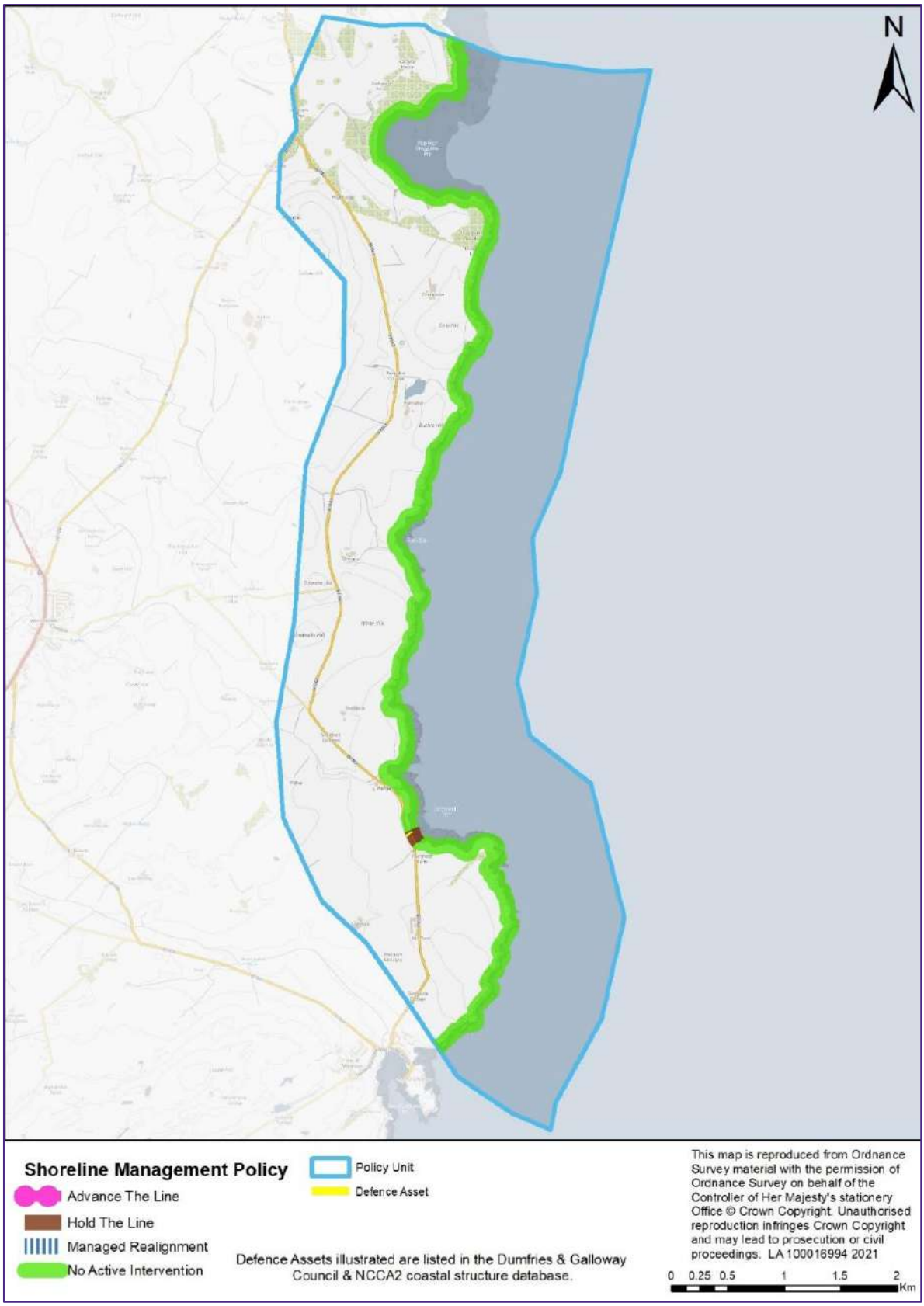

Figure 4-17 Policy Unit 17 SMP Policy (0-20 years)

4.3.7 Point Unit 18 Isle of Whithorn

Policy Unit 18 includes the entire frontage of Isle of Whithorn village (NX478362) located on the coast northeast of Burrow Head at the tip of the Machars peninsula in Galloway (NX475354).

The recommended shoreline management policies for PU 18 are listed in Table 4-36 while the spatial extent of the short term policies is shown in Figure 4-18. A policy of Hold the Line is recommended to manage the developed frontage for as long as this is sustainable, then moving to a policy of Managed Realignment, supplemented with a localised policy of No Active Intervention for undeveloped sections of the coast.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
18. Isle of Whithorn	**HTL**	**HTL / *MR***	**HTL / *MR***
	NAI	NAI	NAI

Table 4-36 Summary of Policies for Policy Unit 18

Table 4-37 lists the suggested actions to implement the recommended policies over the short, medium and long term. The condition of existing defences should be monitored to inform the need for maintenance and upgrade. Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences as necessary.

Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

A detailed assessment of coastal processes is required to inform the selection of appropriate future management measures for Isle of Whithorn which is reported to be affected by wave overtopping.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L	S	S		S	S				S/M	M

Table 4-37 Summary of Actions for Policy Unit 18

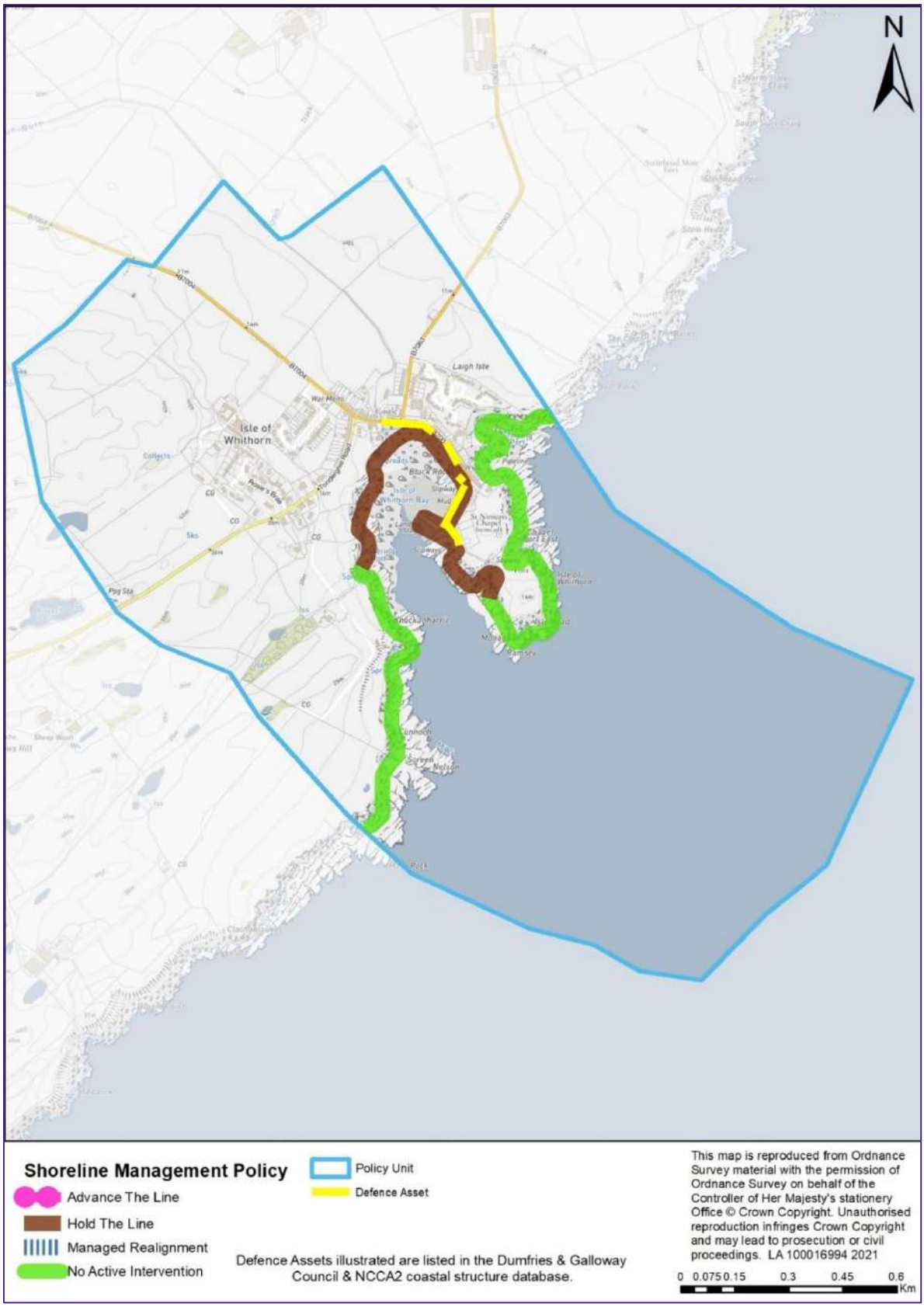

Figure 4-18 Policy Unit 18 SMP Policy (0-20 years)

4.4 Coastal Process Unit 3 – Luce Bay (CPU 4)

Coastal Process Unit 4 represents encompasses the shoreline of Luce Bay, a 20km wide embayment located on the northern coast of the outer Solway Firth. There are eight Policy Units (PU 19 to PU 26) within CPU 4 for which the recommended management policies are as follows.

4.4.1 Point Unit 19 Isle of Whithorn to Barsalloch Point

Policy Unit 19 extends from the Isle of Whithorn (NX478362) past Burrow Head (NX457339) to Barsalloch Point (NX346410).

The recommended shoreline management policy for PU 19 is listed in Table 4-38 while the spatial extent of the short term policy is shown in Figure 4-19. The recommended policy for PU 19 is No Active Intervention.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
19. Isle of Whithorn to Barsalloch Point	NAI	NAI	NAI

Table 4-38 Summary of Policies for Policy Unit 19

Table 4-39 lists the suggested actions to implement the recommended policy over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

The evolution of the coastline should be monitored to inform future revisions of the SMP.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L	S	S								

Table 4-39 Summary of Actions for Policy Unit 19

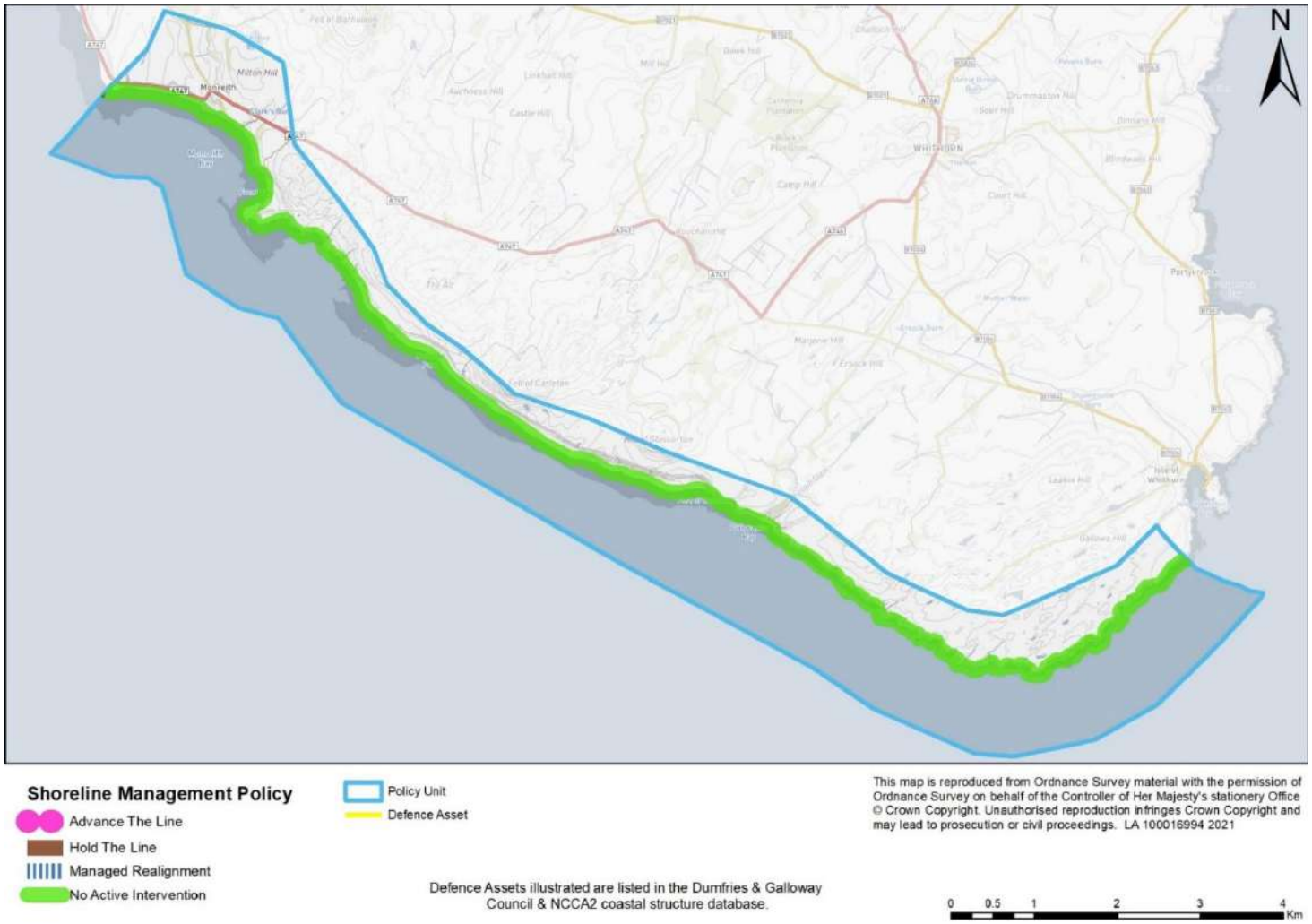

Figure 4-19 Policy Unit 19 SMP Policy (0-20 years)

4.4.2 Point Unit 20 Barsalloch Point to Low Drumskeog (Port William)

Policy Unit 20 extends from Barsalloch Point (NX346410) to the northern extent of the village of Port William (NX335445).

The recommended shoreline management policy for PU 20 is listed in Table 4-40 while the spatial extent of the short term policy is shown in Figure 4-20. The recommended policy is Hold the Line over the short to medium term, with a move towards Managed Realignment in the medium to long term for presently defended areas of the coastline.

Policy Unit	Short Term	Medium Term	Long Term
20. Barsalloch Point to Low Drumskeog (Port William)	**HTL**	**HTL**	**MR / *HTL***

Table 4-40 Summary of Policies for Policy Unit 20

Table 4-41 lists the suggested actions to implement the recommended policy over the short, medium and long term. The condition of existing defences should be monitored to inform the need for maintenance and upgrade. The effects of climate change should also be monitored to inform a potential move to MR, while monitoring the evolution of the coastline is required to inform future SMP revisions.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. A detailed assessment of coastal processes is recommended to inform selection of appropriate future management measures as Luce Bay is reported to be affected by wave overtopping.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**		**S**	**S**		**S**	**S**				**S/M**	**M**

Table 4-41 Summary of Actions for Policy Unit 20

Figure 4-20 Policy Unit 20 SMP Policy (0-20 years)

4.4.3 Point Unit 21 Low Drumskeog to Kilfilan Point

Policy Unit 21 covers part of the eastern shoreline of Luce Bay and extends for about 17.5km from Low Drumskeog (NX335445) to Kilfillan (NX201540).

The recommended shoreline management policies for PU 21 are listed in Table 4-42 while the spatial extent of the short term policies is shown in Figure 4-21. A primary policy of No Active Intervention is recommended although localised Hold the Line/ Managed Realignment for the A747 is incorporated to manage risk to this asset.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
21. Low Drumskeog to Kilfillan Point	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	MR

Table 4-42 Summary of Policies for Policy Unit 21

Table 4-43 lists the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being obtained, maintenance of existing defences protecting the A747 should be continues. The condition of these defences should also be monitored to inform the need for maintenance and upgrade and identify the effects of climate change and hence a potential move to MR. Monitoring the evolution of the coastline is also required to inform future SMP revisions.

A detailed assessment of coastal processes is required to inform selection of appropriate future management measures as Luce Bay is reported to be affected by wave overtopping.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M/L**	**S/M/L**	**S**	**S**		**M**	**S**				**S/M**	

Table 4-43 Summary of Actions for Policy Unit 21

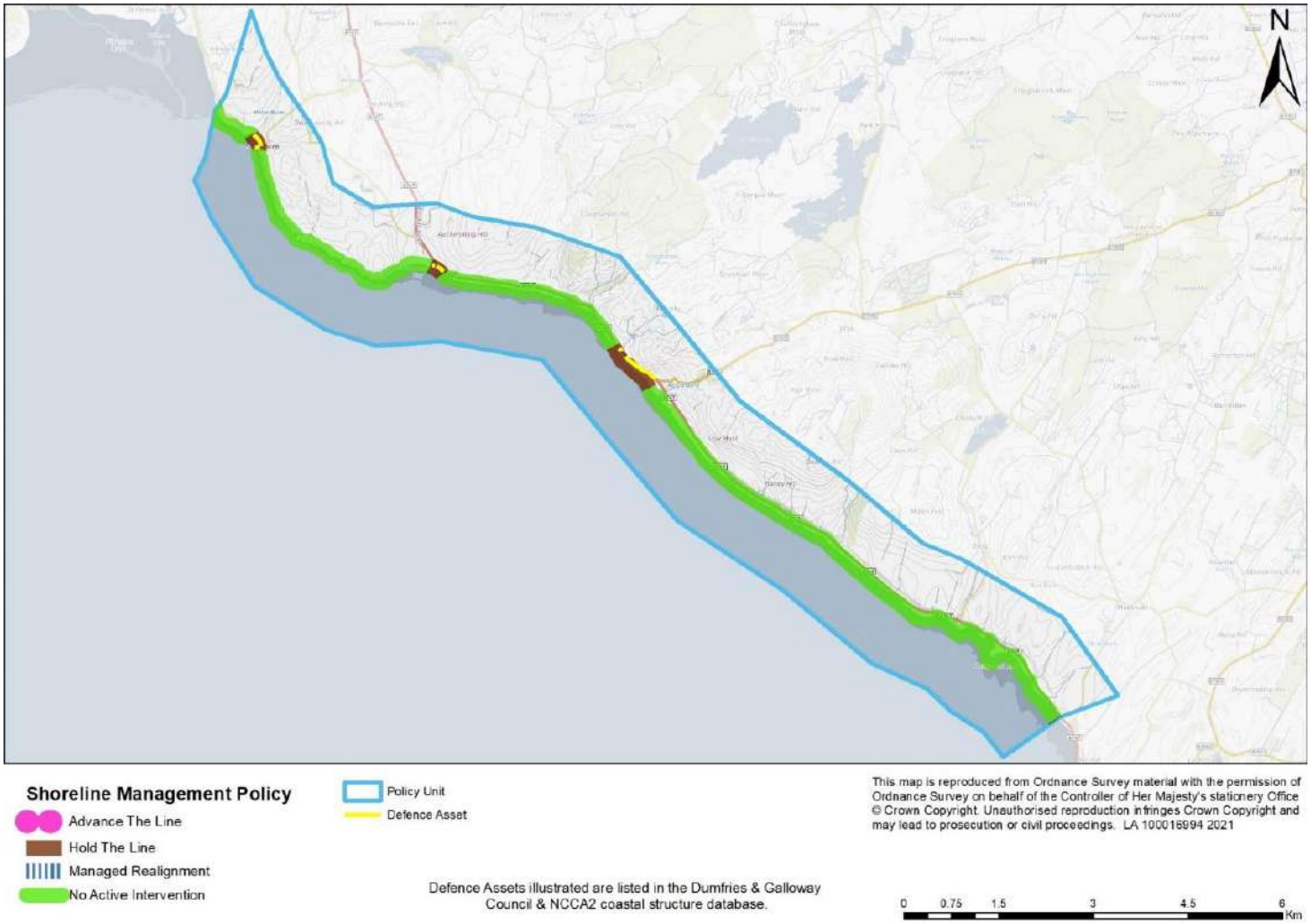

Figure 4-21 Policy Unit 21 SMP Policy (0-20 years)

4.4.4 Point Unit 22 Kilfillan to Sandhead

Policy Unit 22 is located at the head of Luce Bay and covers Luce Sands and Torrs Warren extending for approximately 13km along the shoreline and including the tidally influenced Piltanton Burn and Water of Luce. It extends from Kilfillan (NX201540) in the east to Sandhead (NX014509) in the west.

The recommended shoreline management policies for PU 22 are listed in Table 4-44 while the spatial extent of the short term policies is shown in Figure 4-22. A policy of No Active Intervention is recommended in combination with a localised policy that involves limited intervention at the Golf Course.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
22. Kilfilan to Sandhead	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	MR

Table 4-44 Summary of Policies for Policy Unit 22

Table 4-45 lists the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. Options to replace hard defence structures with dune management should be considered.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**		**S**		**S/M**				**M/L**	**S/M**	**M**

Table 4-45 Summary of Actions for Policy Unit 22

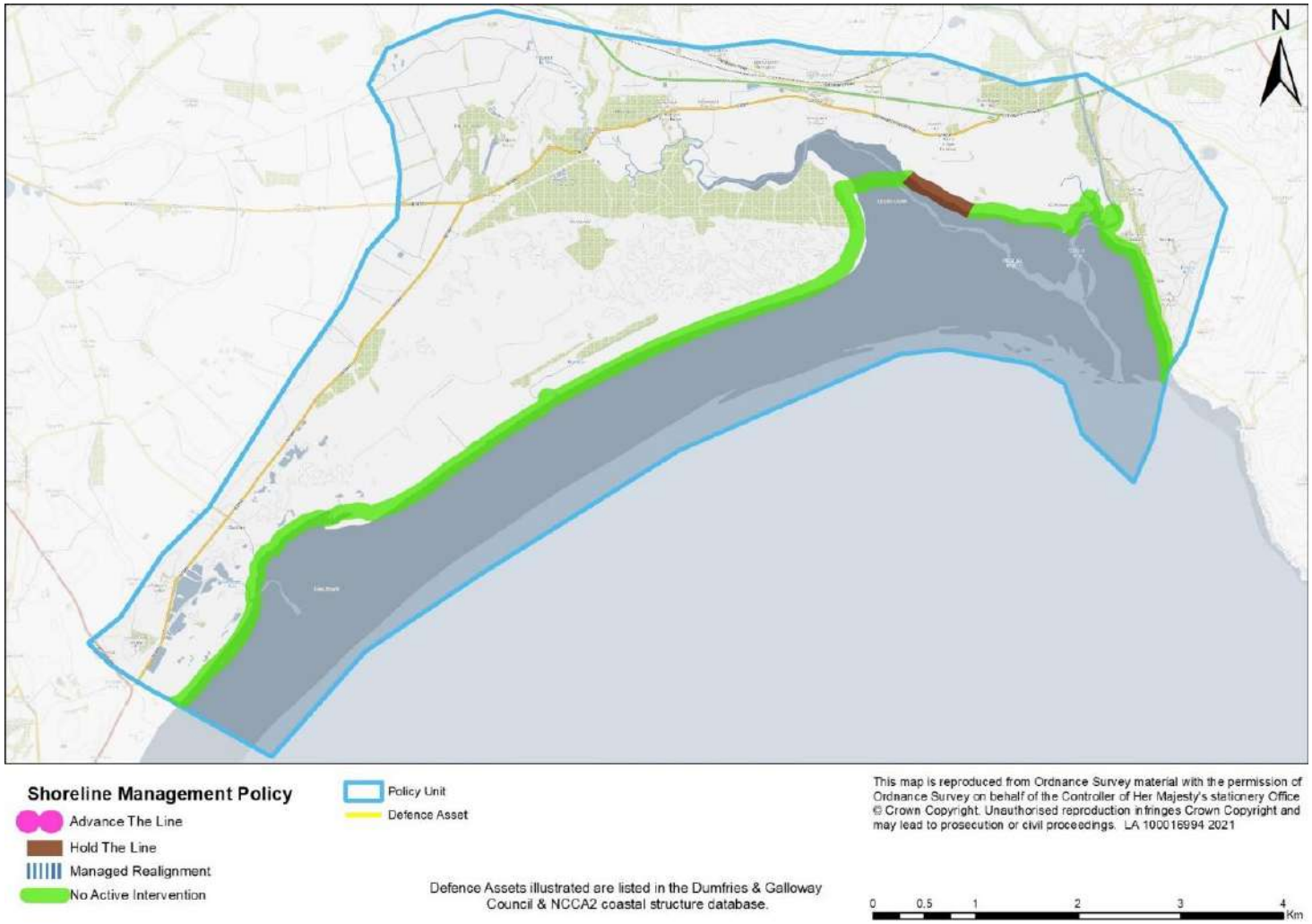

Figure 4-22 Policy Unit 22 SMP Policy (0-20 years)

4.4.5 Point Unit 23 Sandhead to Chapel Rossan

Policy Unit 23 extends from the village of Sandhead (NX014509) to Chapel Rossan Bay (NX114447) and includes approximately 7km of shoreline.

The recommended shoreline management policies for PU 23 are listed in Table 4-46 while the spatial extent of the short term policies is shown in Figure 4-23. A primary policy of No Active Intervention is recommended for those parts of the coast that do not require active management in association with Hold the Line over the short to medium term, with a move towards a policy of Managed Realignment in the medium to long term for presently defended areas of the coastline.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
23. Sandhead to Chapel Rossan	**NAI**	**NAI**	**NAI**
	HTL / *MR*	HTL / *MR*	MR / *HTL*

Table 4-46 Summary of Policies for Policy Unit 23

Table 4-47 lists the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

The response of the coastline to sea level rise and risk to properties should be monitored to inform future policy decisions and subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. A detailed assessment of coastal processes, including wave conditions, is recommended to inform selection of appropriate future management measures, quantify the risk to properties and identify the need for management measures or localised implementation of MR as Luce Bay is described to be a high energy wave environment.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L	S	S		S/M	S				S/M	S/M

Table 4-47 Summary of Actions for Policy Unit 23

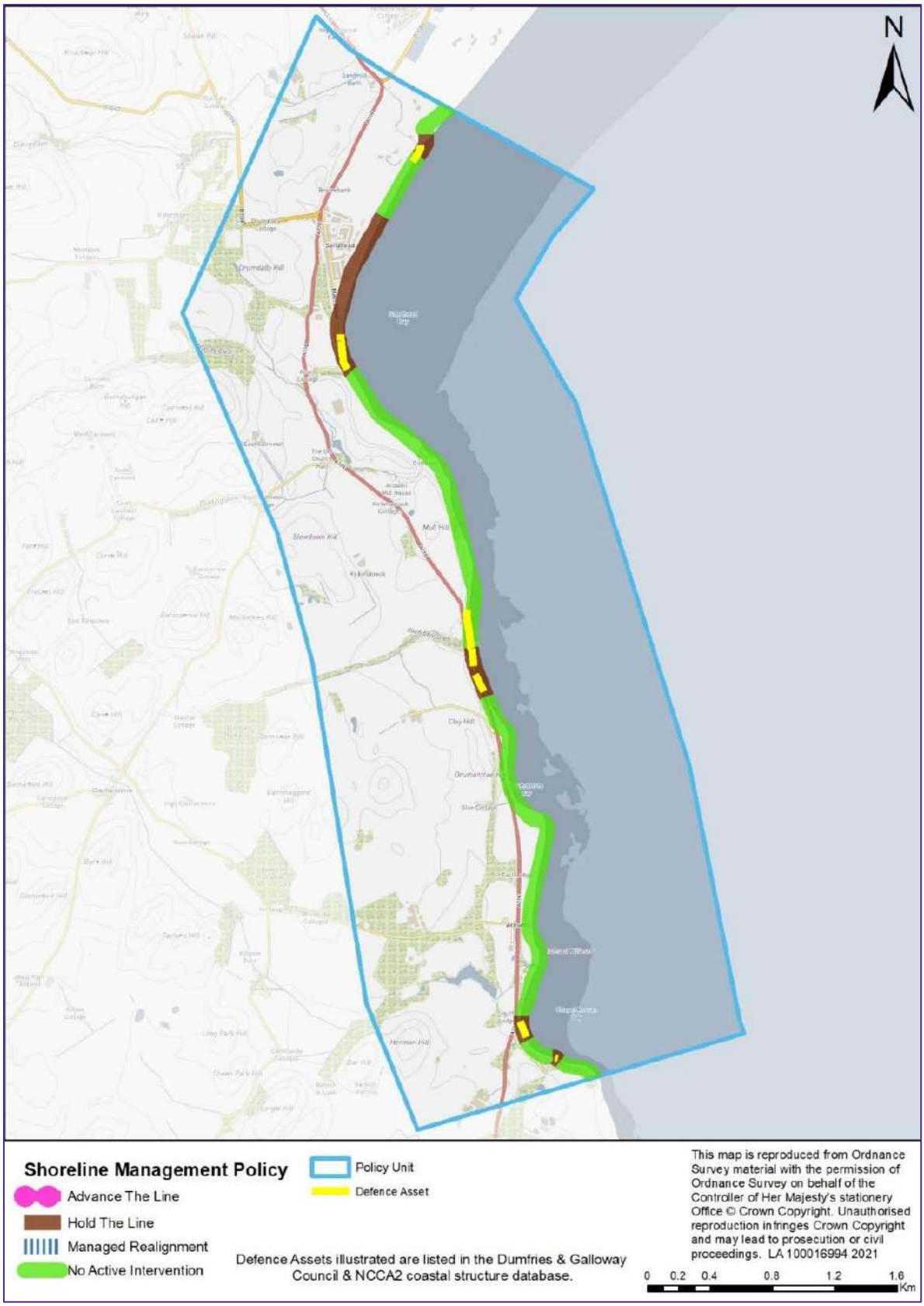

Figure 4-23 Policy Unit 23 SMP Policy (0-20 years)

4.4.6 Point Unit 24 Chapel Rossan to Drummore

Policy Unit 24 extends from the promontory at south end of Chapel Rossan Bay (NX114447) towards Drummore (Inchmore, NX132375) in the south and includes approximately 8km of shoreline.

The recommended shoreline management policy for PU 24 is listed in Table 4-48 while the spatial extent of the short term policy is shown in Figure 4-24. A combination of Hold the Line and Managed Realignment is recommended, with MR becoming increasingly preferred over time as HTL becomes impractical.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
24. Chapel Rossan to Drummore	**HTL / *MR***	**HTL / *MR***	**MR / *HTL***

Table 4-48 Summary of Policies for Policy Unit 24

Table 4-49 lists the suggested actions to implement the recommended policy over the short, medium and long term. Awareness raising and reviewing and updating existing development policy to reflect the shoreline management policy is essential. Monitoring of the coastline is also vital to inform future revisions of the SMP and to inform consideration of the viability of the existing A716 defences, that should be maintained to retain the road in the short term. A detailed assessment of coastal flood and erosion risk and feasibility assessment for MR options, including alternative road infrastructure is recommended as HTL is not considered sustainable into the long term.

Wave overtopping is known to be a significant risk in this area; therefore, a detailed assessment of its potential and evaluation of the risk associated with this should be undertaken.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M		S	S		S	S				S/M	

Table 4-49 Summary of Actions for Policy Unit 24

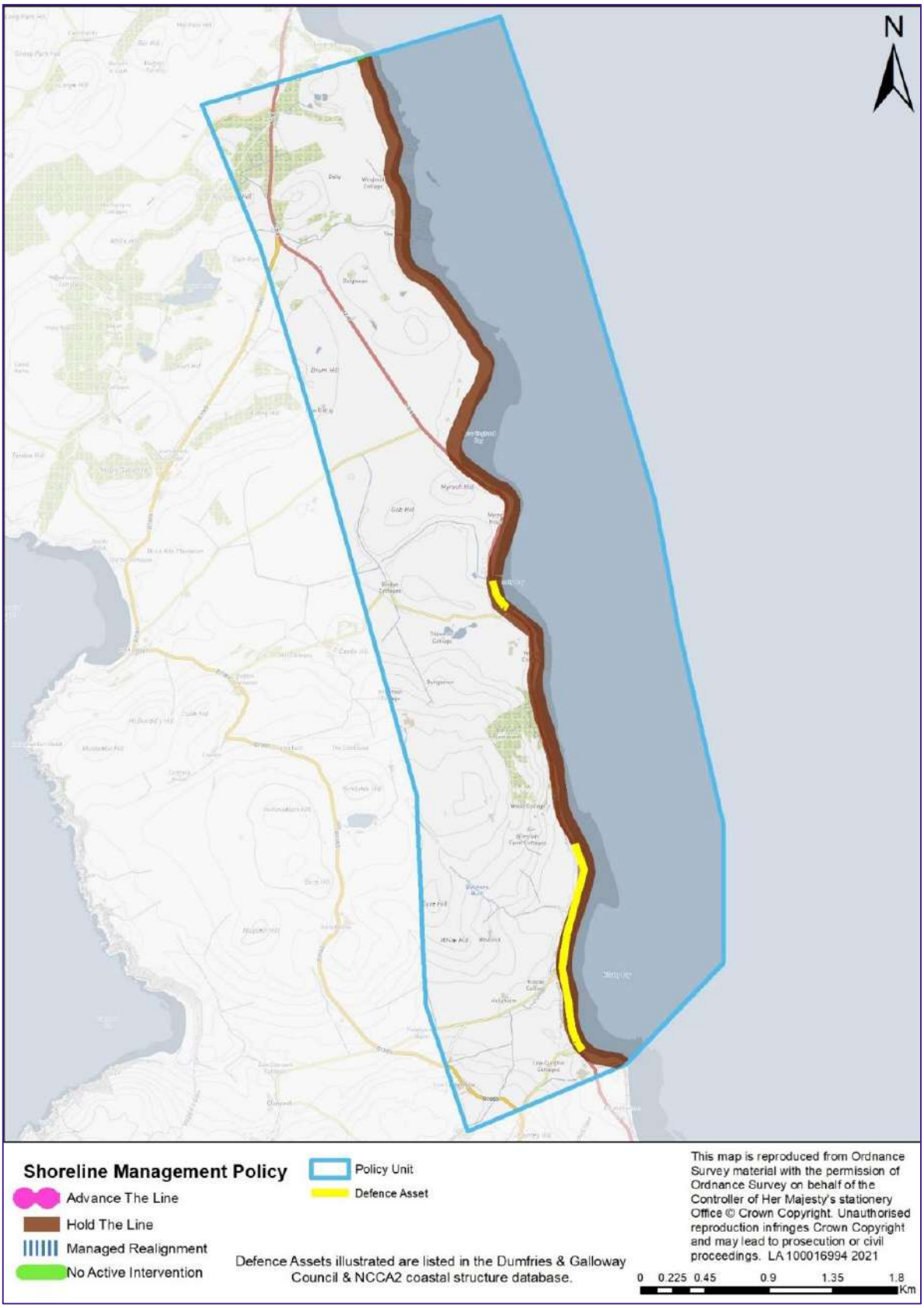

Figure 4-24 Policy Unit 24 SMP Policy (0-20 years)

4.4.7 Point Unit 25 Drummore

Policy Unit 25 includes approximately 2km of shoreline stretching from Inchmore (NX132375) to Cairngarroch Bay (NX143360) including the village of Drummore.

The recommended shoreline management policy for PU 25 is listed in Table 4-50 while the spatial extent of the short term policy is shown in Figure 4-25. The recommended policy is Hold the Line over the short term, with a move towards a policy of Managed Realignment in the medium to long term for presently defended areas of the coastline.

Policy Unit	Short Term	Medium Term	Long Term
25. Drummore	HTL / MR	MR	MR

Table 4-50 Summary of Policies for Policy Unit 25

Table 4-51 lists the suggested actions to implement the recommended policy over the short, medium and long term. Awareness raising and reviewing and updating existing development policy to reflect the shoreline management policy is essential. Monitoring the coastline will inform future revisions of the SMP, while monitoring of defences will inform decisions as to the future integrity of assets and need for management measures over the short and medium term.

Subject to appropriate consents being granted, defence owners should be allowed to maintain existing defences while a detailed assessment of coastal flood and erosion risk, including wave overtopping should be.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M		M	M		S/M	S		S/M		S/M	M

Table 4-51 Summary of Actions for Policy Unit 25

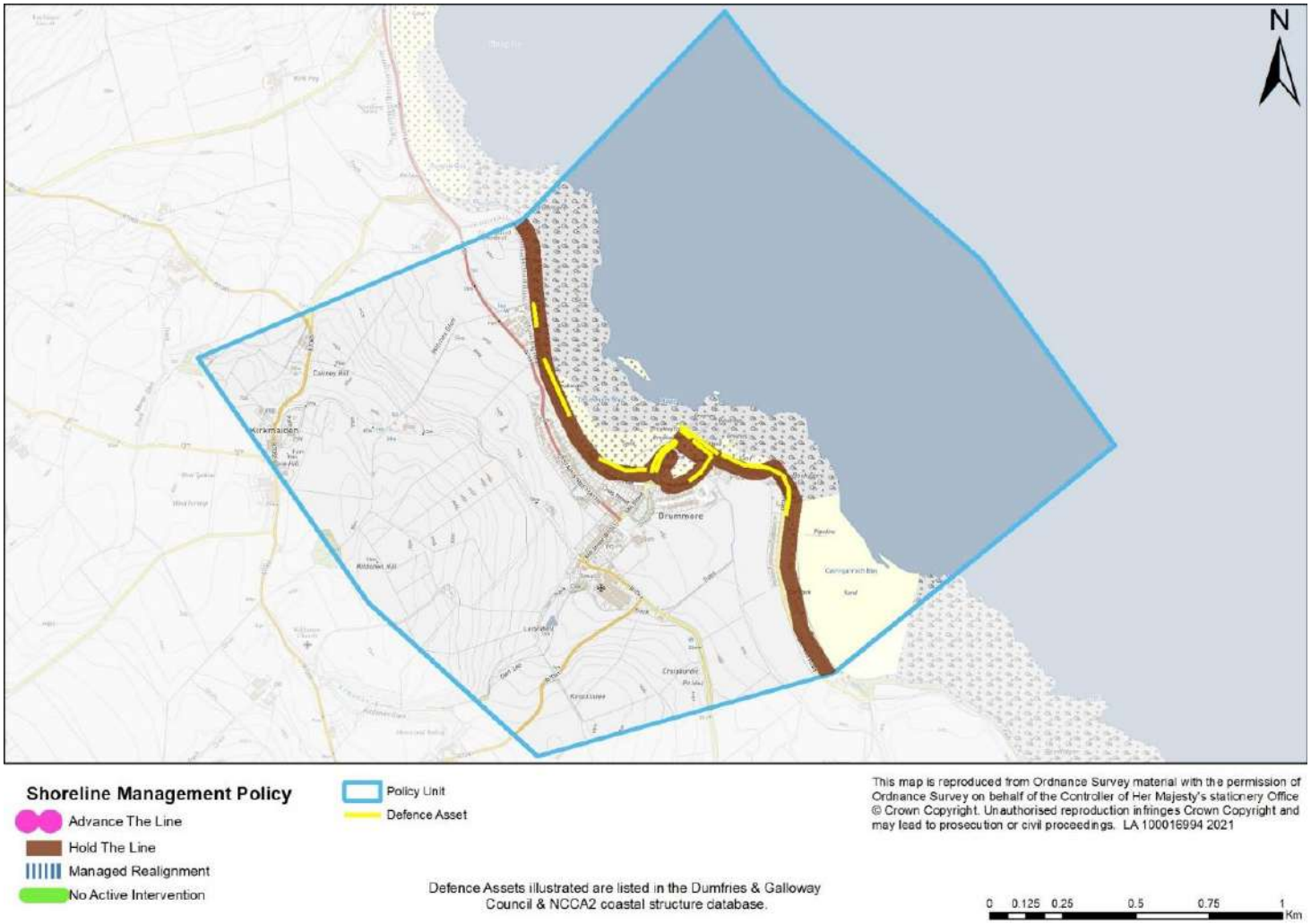

Figure 4-25 Policy Unit 25 SMP Policy (0-20 years)

4.4.8 Point Unit 26 Drummore to the Mull of Galloway

Policy Unit 26 includes 7.5km of shoreline within Coastal Process Unit 4, from Cairngarroch Bay (NX143360) to the Mull of Galloway (NX160305).

The recommended shoreline management policies for PU 26 are listed in Table 4-52 while the spatial extent of the short term policies is shown Figure 4-26. A primary policy of No Active Intervention is recommended, in combination with a localised policy of Hold the Line for existing defences, such as those protecting Maryport.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
26. Drummore to the Mull of Galloway	**NAI**	**NAI**	**NAI**
	HTL / *MR*	HTL / *MR*	MR / *HTL*

Table 4-52 Summary of Policies for Policy Unit 26

Table 4-53 lists the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

The shoreline should be monitored to inform future revisions of the SMP, while, subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. A detailed assessment of coastal flood and erosion risk is recommended to inform the choice between HTL and MR options.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**					**S/M**	**M**

Table 4-53 Summary of Actions for Policy Unit 26

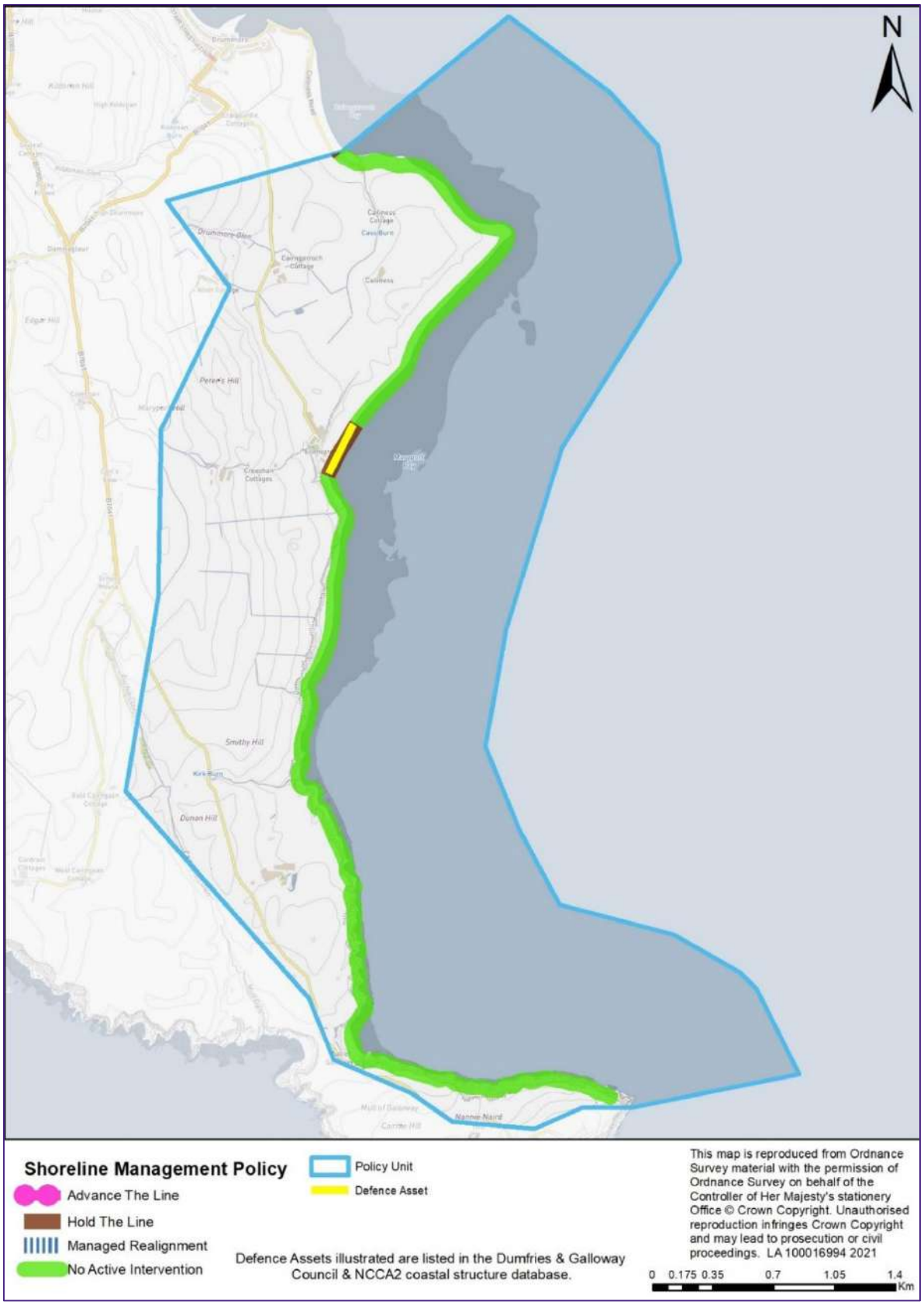

Figure 4-26 Policy Unit 26 SMP Policy (0-20 years)

4.5 Coastal Process Unit 5 – The Western Rhinns (CPU 5)

CPU 5 encompasses the Western Rhinns of Galloway, which extend from the Mull of Galloway northwards to Milleur Point located close to the entrance of Loch Ryan. CPU 5 contains 3 policy units (PU 27 to PU 29) and the recommended shoreline management policies are discussed below.

4.5.1 Point Unit 27 Mull of Galloway to Portpatrick

Policy Unit 27 includes a 33km stretch of shoreline extending from the Mull of Galloway (NX160305) to Lagnawinny (NX001536), just south of Portpatrick.

The recommended shoreline management policies for PU 27 are listed in Table 4-54 while the spatial extent of the short term policies is shown in Figure 4-27. A policy of No Active Intervention for most of the coastline with a localised policy of Hold the Line is recommended. Due to future anticipated sea level rise maintaining a Hold the Line policy will increasingly become challenging, therefore Managed Realignment is recommended as an alternative over the medium and long term.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
26. Drummore to the Mull of Galloway	**NAI**	**NAI**	**NAI**
	HTL / *MR*	HTL / *MR*	HTL / *MR*

Table 4-54 Summary of Policies for Policy Unit 27

Table 4-55 lists the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

It is important that the shoreline is monitored to inform future revisions of the SMP, and management policy. The monitoring of defences will enable informed decisions as to the future integrity of assets and need for management measures, and subject to appropriate consents being granted defence owners should be allowed to maintain existing defences.

A detailed assessment of coastal flood and erosion risk, including wave overtopping is recommended for Port Logan.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**	**S**				**S/M/L**	**M**

Table 4-55 Summary of Actions for Policy Unit 27

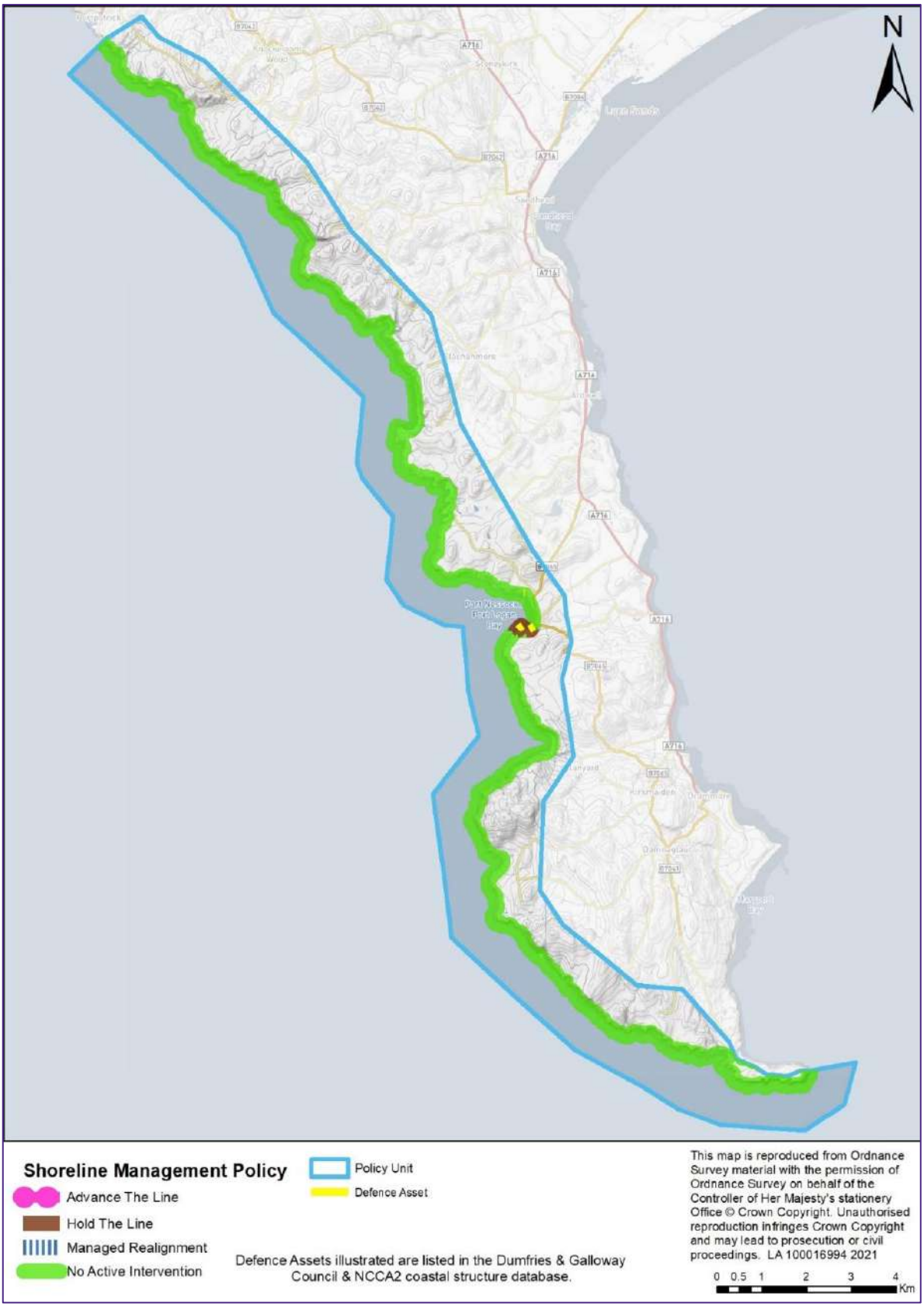

Figure 4-27 Policy Unit 27 SMP Policy (0-20 years)

4.5.2 Point Unit 28 Portpatrick

Policy Unit 28 includes approximately 1.5km of shoreline extending from Lagnawinny (NX001536) to north of Portpatrick (NW993544) and represents the coastal frontage of Portpatrick.

The recommended shoreline management policies for PU 28 are listed in Table 4-56 while the spatial extent of the short term policies is shown in Figure 4-28. A policy of Hold the Line across the developed frontage for the short-term moving to a policy of Managed Realignment over the medium to long term, is recommended. Hold the Line is retained as an alternative primary policy over the medium term as it is identified that Managed Realignment will be challenging to accommodate. A complementary localised policy of No Active Intervention is suggested for undeveloped sections of the coast.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
28. Portpatrick	**HTL**	**MR / *HTL***	**MR**
	NAI	NAI	NAI

Table 4-56 Summary of Policies for Policy Unit 28

Table 4-57 lists the suggested actions to implement the recommended policies over the short, medium and long term. Awareness raising and reviewing and updating development policy to reflect the shoreline management policy is a vital action to minimise future risk. Monitoring defence structures will enable informed decisions to be made on the need for management measures. Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences.

Portpatrick has been reported to be subject to significant wave over-topping, therefore, a detailed assessment of wave over-topping potential and the evaluation of the risk associated with this should be undertaken.

No new coastal defence measures are to be implemented at unprotected parts of the coastline. The shoreline will be allowed to evolve naturally.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**	**S**				**S/M**	**M**

Table 4-57 Summary of Actions for Policy Unit 28

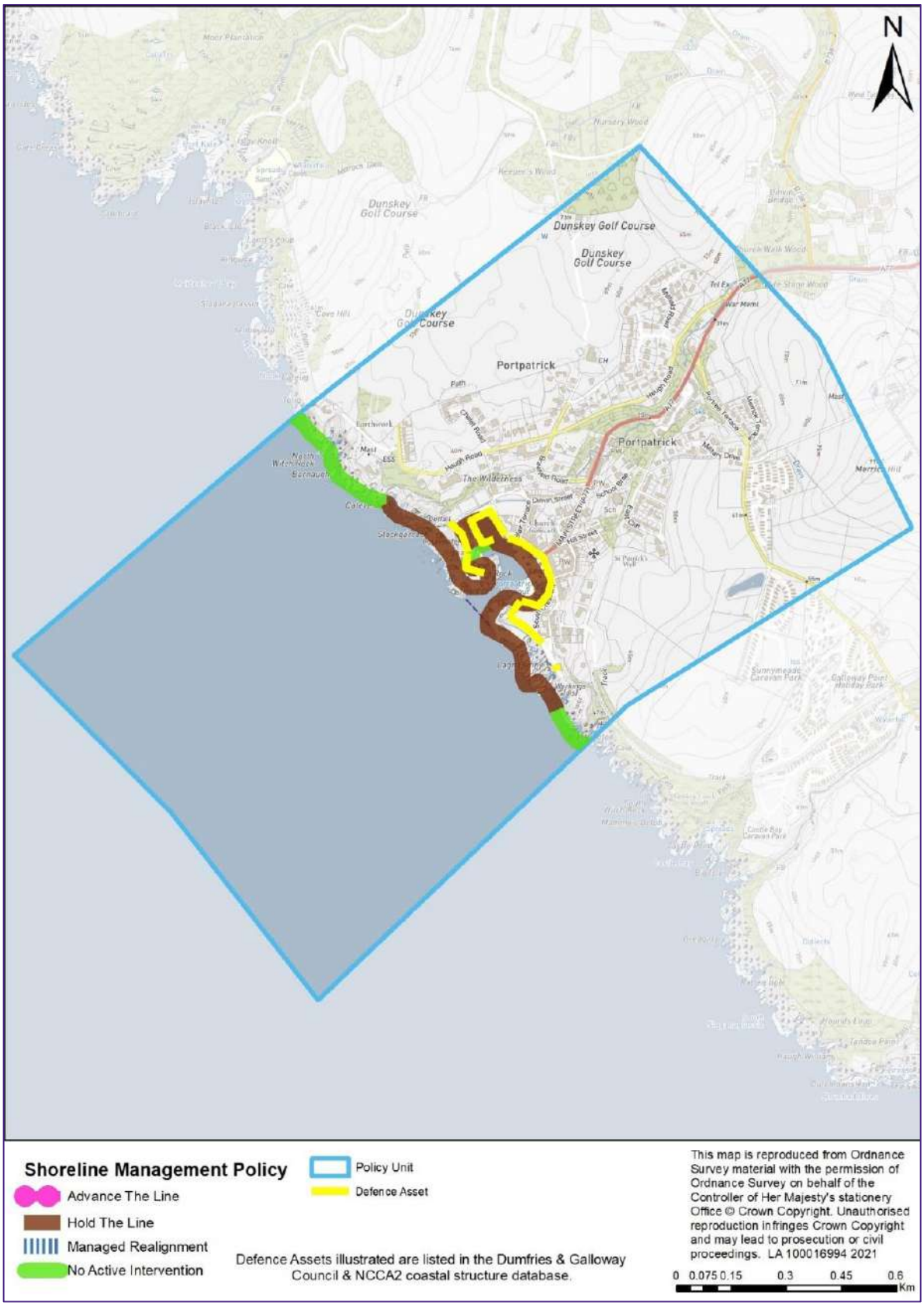

Figure 4-28 Policy Unit 28 SMP Policy (0-20 years)

4.5.3 Point Unit 29 Portpatrick to Milleur Point

Policy Unit 29 includes the northern part of the Rhinns peninsula, from north of Portpatrick (NW993544) to Milleur Point (NX021738).

The recommended shoreline management policy for PU29 is listed in Table 4-58 while the spatial extent of the short term policy is shown in Figure 4-29. The recommended shoreline management policy for PU29 is no Active intervention.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
29. Portpatrick to Milleur Point	NAI	NAI	NAI

Table 4-58 Summary of Policies for Policy Unit 29

Table 4-59 lists the suggested actions to implement the recommended policy over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

No new coastal defence measures are to be implemented and the shoreline should be allowed to evolve naturally.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L	M	M								

Table 4-59 Summary of Actions for Policy Unit 29

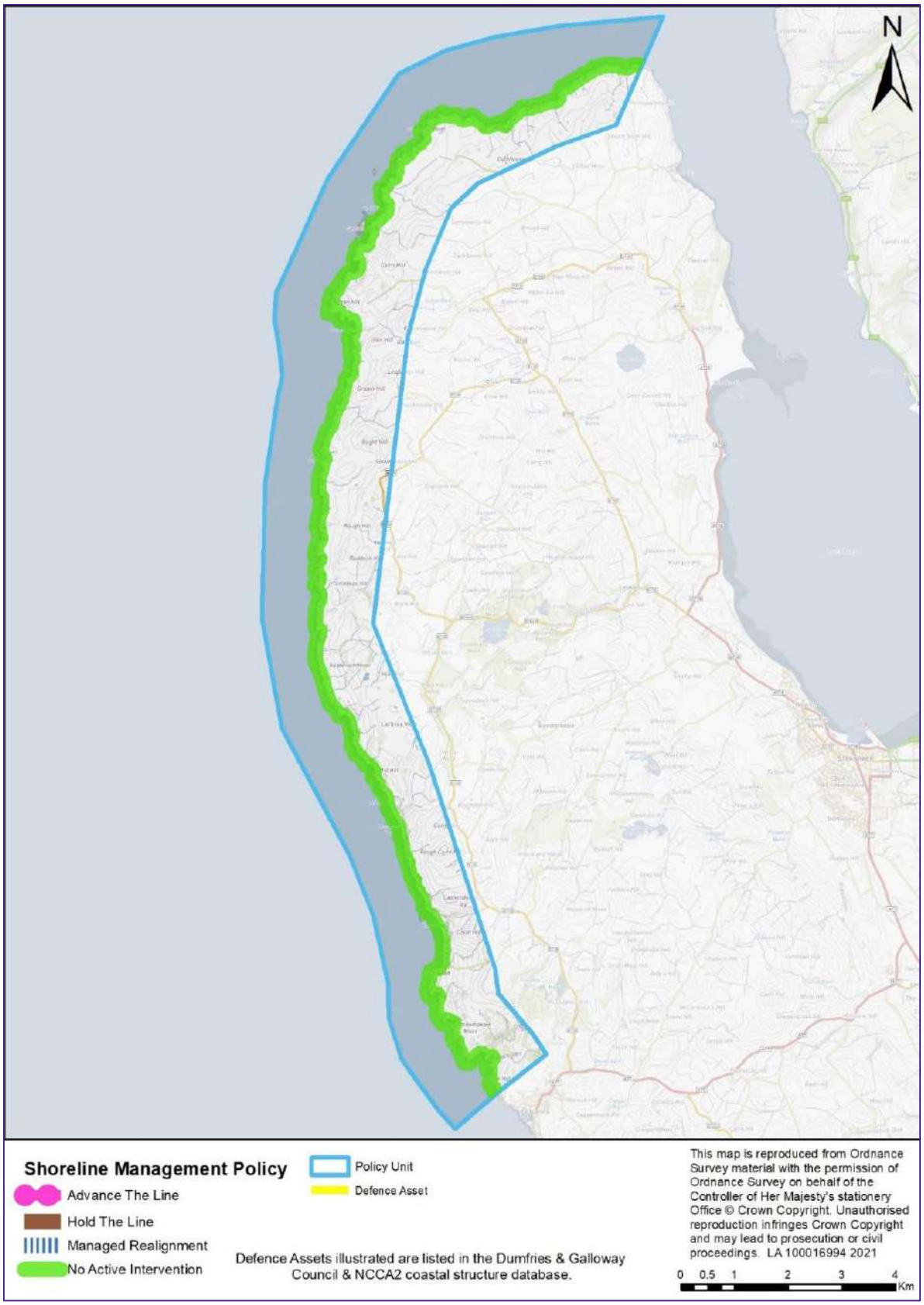

Figure 4-29 Policy Unit 29 SMP Policy (0-20 years)

4.6 Coastal Process Unit 6 – Loch Ryan (CPU 6)

CPU 6 represents the shoreline of Loch Ryan, an enclosed bay with Milleur Point and Finnart Port located at the northern extents. Stranraer is the principal settlement located at the head of Loch Ryan. CPU 6 contains 6 policy units (PU 30 to PU 35) and the recommended shoreline management policies are as follows.

4.6.1 Point Unit 30 Milleur Point to Kirkcolm

Policy Unit 30 includes about 4.6km of the western shoreline of Loch Ryan between Milleur Point (NX021738) and the Fox Plantation at Kirkcolm (NX035696).

The recommended shoreline management policies for PU 30 are listed in Table 4-60 while the spatial extent of the short term policies is shown in Figure 4-30. A general policy of No Active Intervention is recommended, with a localised policy of Hold the Line moving towards Managed Realignment to allow local landowners to maintain existing private defences.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
30. Milleur Point to Kirkcolm	**NAI**	**NAI**	**NAI**
	HTL	HTL / *MR*	MR

Table 4-60 Summary of Policies for Policy Unit 30

Table 4-61 lists the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences although a detailed assessment of coastal flood and erosion risk and feasibility study is recommended to inform the selection of MR options.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S/M**					**S/M**	**M/L**

Table 4-61 Summary of Actions for Policy Unit 30

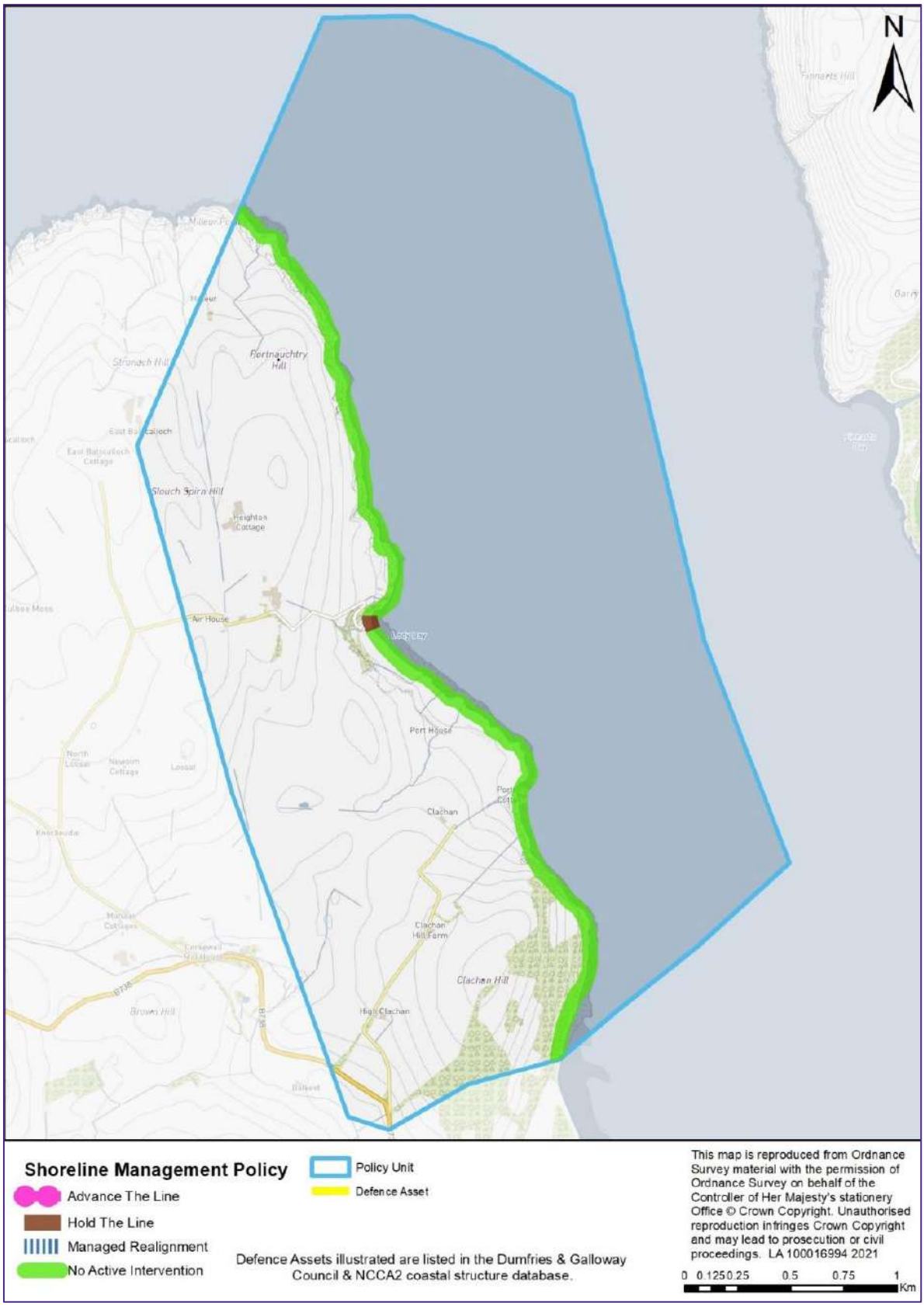

Figure 4-30 Policy Unit 30 SMP Policy (0-20 years)

4.6.2 Point Unit 31 Kirkcolm to McCullochs Point

Policy Unit 31 includes approximately 8km of the low-lying western shoreline of Loch Ryan extending from the Fox Plantation at Kirkcolm (NX035696) to McCullochs Point (NX045628).

The recommended shoreline management policies for PU 31 are listed in Table 4-62 while the spatial extent of the short term policies is shown in Figure 4-31. It is recommended that a primary policy of No Active Intervention through precluding the construction of new defences is adopted, in combination with localised use of Hold the Line and Managed Realignment to manage risk to the A718 and properties protected by existing defences.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
31. Kirkcolm to McCullochs Point	**NAI**	**NAI**	**NAI**
	HTL	MR	MR

Table 4-62 Summary of Policies for Policy Unit 31

Table 4-63 shows the suggested actions to implement the recommended policies over the short, medium and long term. Where the management policy is No Active Intervention, it is a high priority over the short term, to create an awareness of present day and future flood and erosion risk, in order to minimise societal impact and cost. Planning policy, including development plans should reflect the management policy and establishment of 'No Development Zones' should be considered.

Subject to appropriate consents being granted, existing defences should be maintained, this can be informed by regular monitoring of the condition / performance of the existing defences. The effects of climate change on the road infrastructure should also be monitored to inform the potential move from HTL to MR.

A detailed assessment of risk and to identify need for management measures or localised implementation of MR for A718, including consideration of wave over-topping should be undertaken.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	**S**	**S/M**	**S/M/L**	**S**	**S**		**S**	**S**				**S/M**	**M**

Table 4-63 Summary of Actions for Policy Unit 31

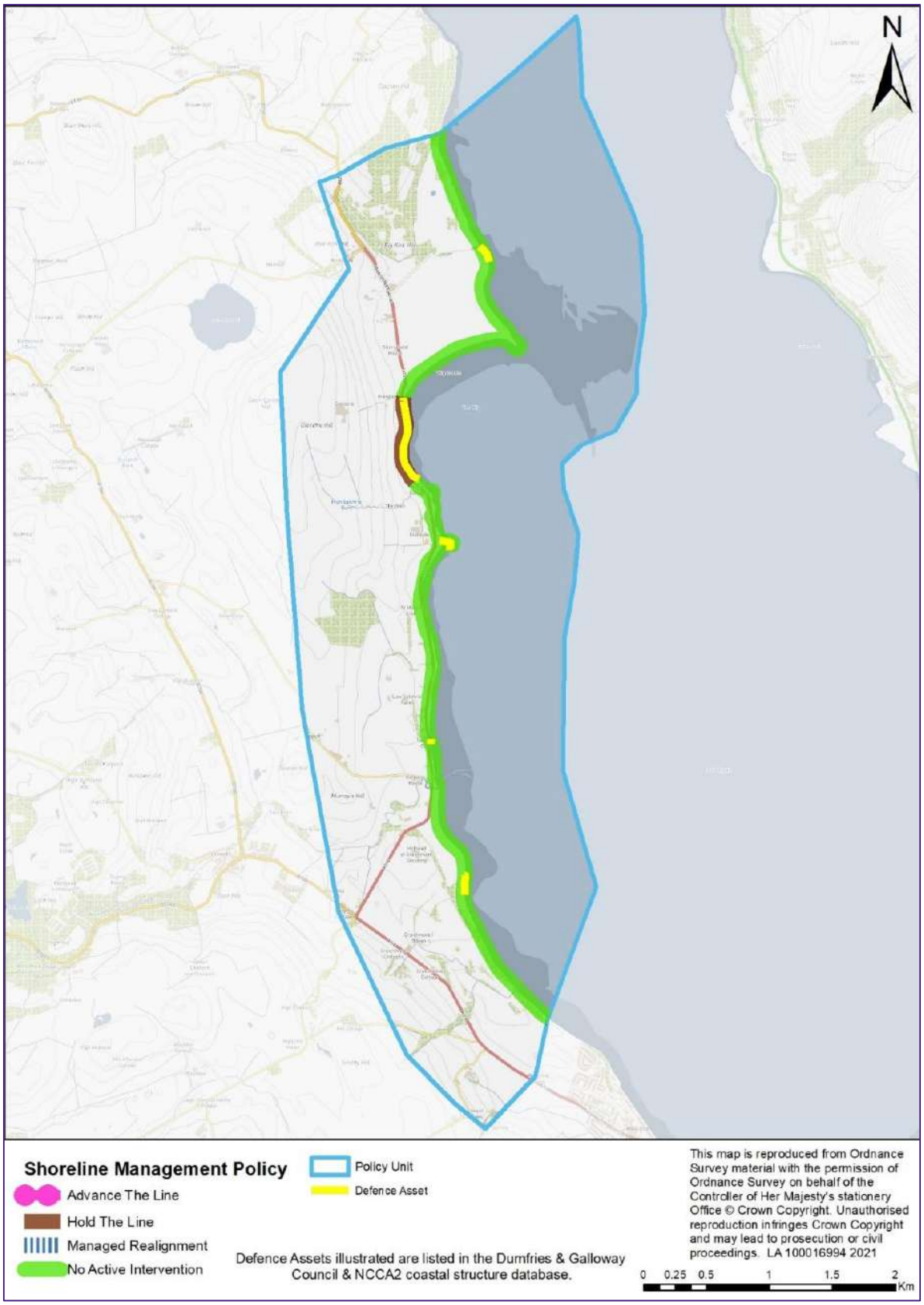

Figure 4-31 Policy Unit 31 SMP Policy (0-20 years)

4.6.3 Point Unit 32 McCullochs Point to Innermessan (Stranraer)

Policy Unit 32 includes approximately 7km of shoreline around the head of Loch Ryan and extends from McCullochs Point (NX045628) to Innermessan (NX087632) along the developed frontage at Stranraer.

The recommended shoreline management policy for PU 32 is listed in Table 4-64 while the spatial extent of the short term policy is illustrated in Figure 4-32. Hold the Line possibly in combination with Managed Realignment (landward movement of roads in the future) is recommended. This is in alignment with the recent Stranraer Waterfront Masterplan that also considered Managed Realignment.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
32. McCullochs Point to Innermessan (Stranraer)	**HTL**	**HTL /** MR	**HTL** / MR

Table 4-64 Summary of Policies for Policy Unit 32

Table 4-65 lists the suggested actions to implement the recommended policy over the short, medium and long term. Awareness raising and reviewing and updating existing development policy to reflect the recommended shoreline management policy is a key action.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences and regular monitoring will help inform decisions as to the need for future maintenance or upgrade. The effects of climate change should be monitored to inform / support the potential move to MR.

A detailed assessment to quantify the risk to properties and identify need for management measures or localised implementation of an alternative policy of MR is advised. As Stranraer is subject to significant wave action, wave over-topping potential should be assessed, and the risk associated with this evaluated.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M		S/M	S/M		S/M	S				S/M	M

Table 4-65 Summary of Actions for Policy Unit 32

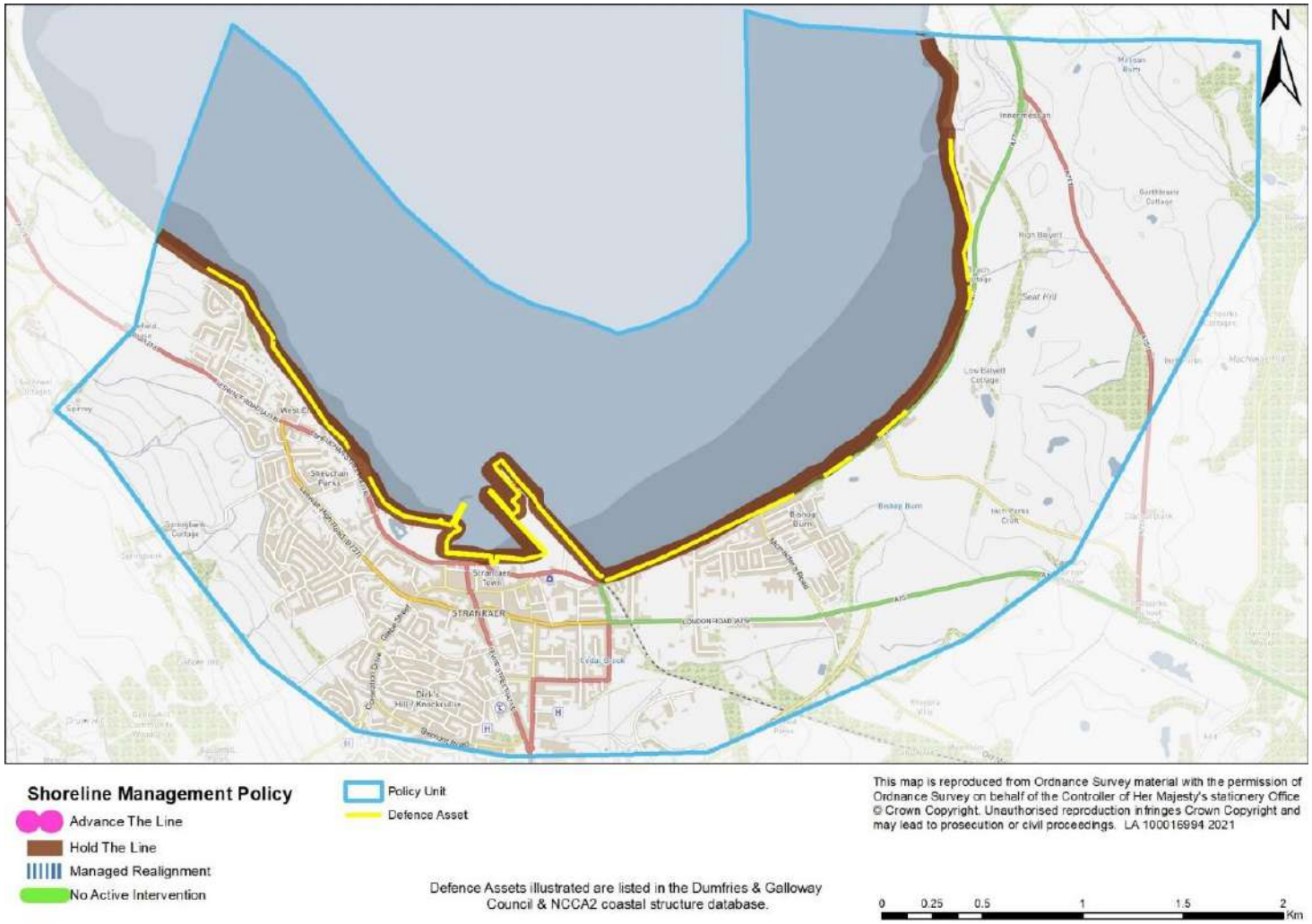

Figure 4-32 Policy Unit 32 SMP Policy (0-20 years)

4.6.4 Point Unit 33 Innermessan to Bankhead

Policy Unit 33 is a 3.5km long low-lying stretch of shoreline located along the eastern shore of Loch Ryan extending from Innermessan (NX087632) in the south to Bankhead in the north (NX073670).

The recommended shoreline management policy for PU 33 is listed in Table 4-66 while the spatial extent of the short term policy is shown in Figure 4-33. Hold the Line is recommended over the short term, with a move towards a policy of Managed Realignment in the medium to long term for presently defended areas of the coastline.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
33. Innermessan to Bankhead	HTL	MR	MR

Table 4-66 Summary of Policies for Policy Unit 33

Table 4-67 lists the suggested actions to implement the recommended policy over the short, medium and long term. Awareness raising and reviewing and updating existing development policy to reflect the recommended shoreline management policy is a key action.

Subject to appropriate consents being granted, maintenance of existing defences should continue, while the condition of existing defence structures protecting the A77 should be monitored to inform decisions as to future maintenance or upgrade. The effects of climate change on risk should also be monitored to inform / support the potential move to MR.

A detailed assessment of coastal flood and erosion risk is also recommended, to assess wave over-topping potential and evaluate the risk associated with this type of flooding.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M	S/M/L				S/M	S				S	M

Table 4-67 Summary of Actions for Policy Unit 33

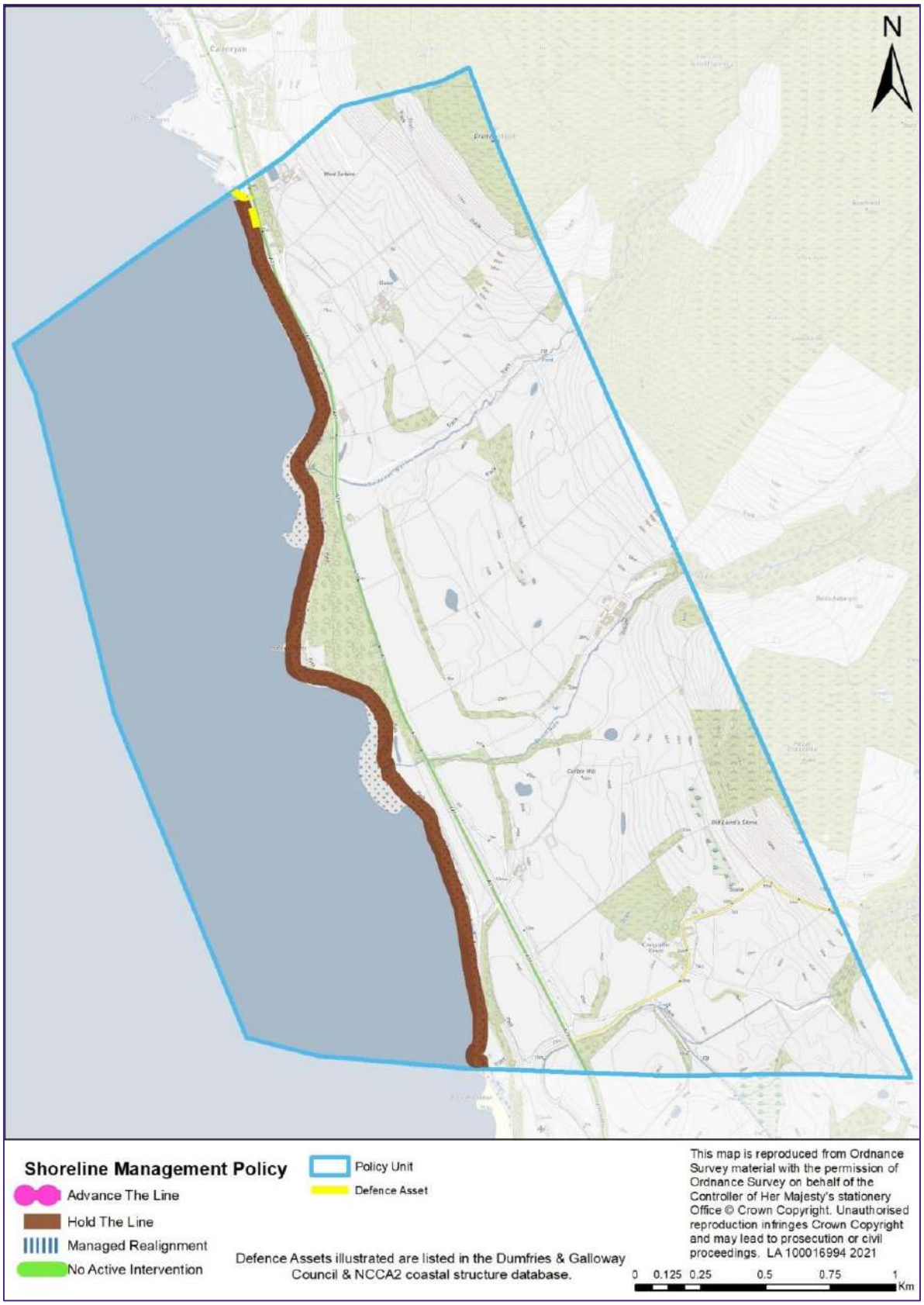

Figure 4-33 Policy Unit 33 SMP Policy (0-20 years)

4.6.5 Point Unit 34 Bankhead to Old School House Point

Policy Unit 34 extends from Bankhead (NX073670) to Old House Point (NX059703) and includes the village of Cairnryan and the Cairnryan and Old House Point (Loch Ryan Port) ferry ports.

The recommended shoreline management policy for PU 34 is listed in Table 4-68 while the spatial extent of the short term policy is shown in Figure 4-34. Hold the Line with an alternative of Advance the Line is recommended, as this provides for continual maintenance and upgrade of defence assets at the strategically important Ferry Ports.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
34. Bankhead to Old School House Point	HTL / *ATL*	HTL / *ATL*	HTL / *ATL*

Table 4-68 Summary of Policies for Policy Unit 34

Table 4-69 lists the suggested actions to implement the recommended policy over the short, medium and long term. Awareness raising and reviewing and updating existing development to reflect the recommended shoreline management policy is a vital action.

Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences, and regular monitoring is suggested to inform decisions as to future maintenance or upgrade.

The HTL / ATL policy at Cairn Point has been assigned on a precautionary principle due to the former military and ship breaking use of the hinterland and the risk of erosion to releasing potentially contaminated material into the marine environment. Quantification of any contamination in this area would enable future consideration of a change in policy to MR or possibly NAI.

An assessment of coastal flood and erosion risk, including wave over-topping is recommended to inform the design and justification for future management measures.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
S	S	S/M					M	S	M			S/M	M

Table 4-69 Summary of Actions for Policy Unit 34

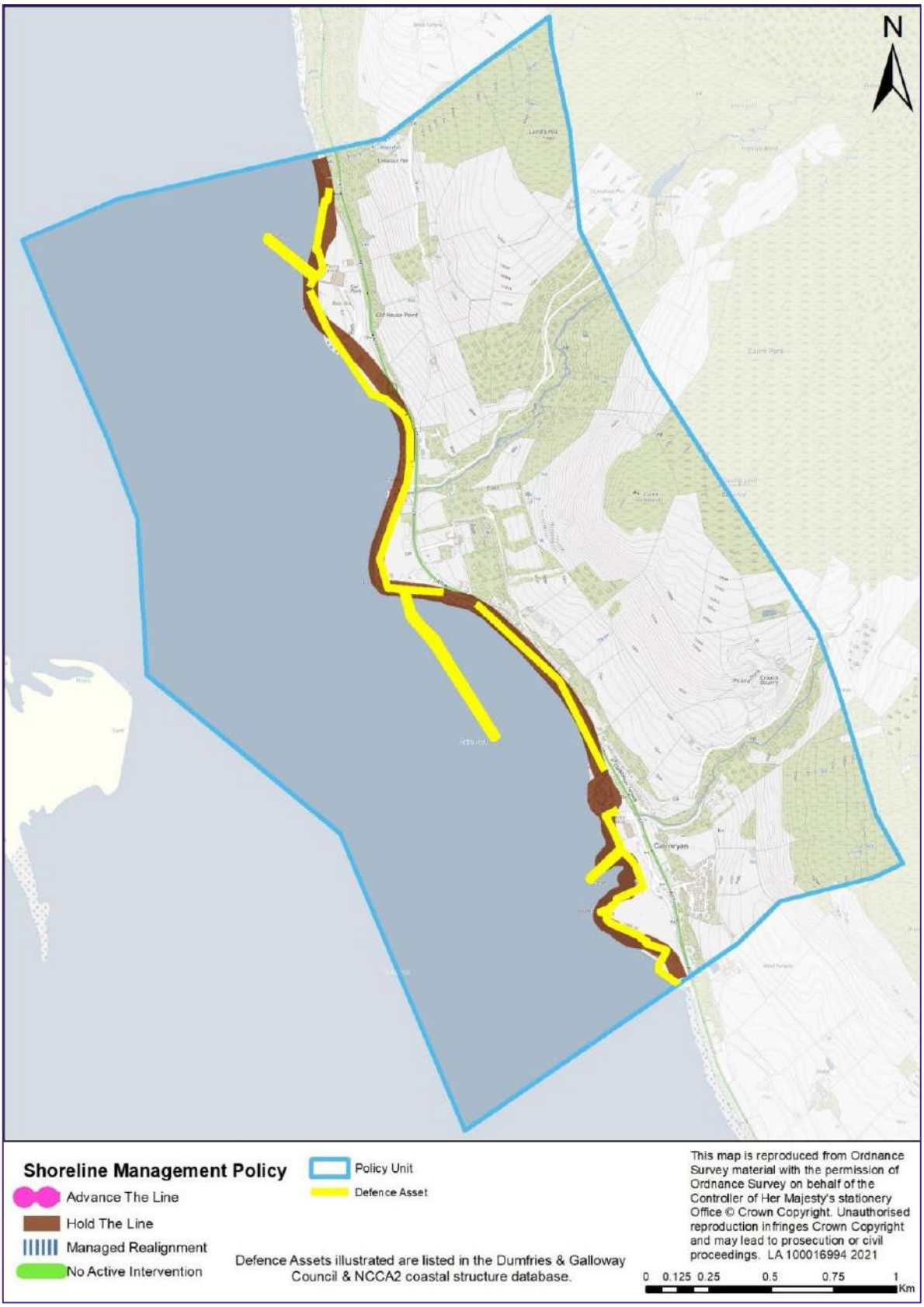

Figure 4-34 Policy Unit 34 SMP Policy (0-20 years)

4.6.6 Point Unit 35 Old School House Point to Galloway Burn

Policy Unit 35 is a 2.8km stretch of shoreline that extends from just north of Loch Ryan Port at Old House Point (NX059703) to the Galloway Burn (NX056715) and the administrative boundary with South Ayrshire.

The recommended shoreline management policy for PU 35 is listed in Table 4-70 while the spatial extent of the short term policy is shown in Figure 4-35.

Policy Unit	Short Term (S)	Medium Term (M)	Long Term (L)
35. Old School House Point to Galloway Burn	**NAI**	**NAI**	**NAI**

Table 4-70 Summary of Policies for Policy Unit 35

Table 4-71 lists the suggested actions to implement the recommended policy over the short, medium and long term. The shoreline should be allowed to evolve naturally with no new coastal defence measures implemented in this area. The evolution of the coastline should however be monitored to inform future revisions of the SMP. Development plans should reflect the management policy for this section of shoreline, possibly considering the introduction of 'No Development Zones', as necessary.

Awareness Raising	Update Planning Policy	Monitoring	Allow Shoreline to Function Naturally	Adaptation & Resilience	Preparation for Flooding and Erosion	Review SMP Policy	Coastal Flood and Erosion Feasibility Study	Wave Overtopping	Contamination Study	Coastal Process Study	Habitat Creation Study	Maintain Existing Defences	Coastal Flood & Erosion Protection Scheme
	S	S/M	S/M/L										

Table 4-71 Summary of Actions for Policy Unit 35

Figure 4-35 Policy Unit 35 SMP Policy (0-20 years)

5 ACTION PLAN

The Action Plan focusses on defining actions relating to implementation of the short-term shoreline management policy or actions required to develop more fully medium to long term shoreline management policies as the level of uncertainty was much higher in terms of medium to long-term risks, actions, funding sources and strategy. The SMP provides a long lead time for the changes that will take place, which in general will not happen now, but will occur at some point in the future. However, to manage these changes effectively and appropriately, the approach put forward in the SMP needs to be considered now, not in several decades time.

Whilst this Action Plan sets out actions that need to be taken to implement the recommendations of the SMP it is important to note that responsibility for mitigation of coastal flood and erosion risk does not fall solely upon national and local government and should not be read as such within this Plan. The terms of the legislation under which the coastal defence operating authorities work confer only “permissive powers” and, as such, there is currently no general obligation on the part of operating authorities or national government to assure protection against flooding or erosion or to provide any compensation for losses.

Consequently, in addition to coastal defence operating authorities, business and commercial enterprises also need to establish the measures that they need to take to address the changes that will take place in the future and indeed may have responsibility for implementing actions required to deliver these policies. This also includes providers of services and utilities, who will need to make provision for long-term change in coastal risk when upgrading or replacing existing facilities in the shorter term. Service providers should also consider how they will relocate facilities that will become inoperable due to erosion or flooding and the potential need to provide for relocated communities. Other parties needing to consider mitigation measures will be highways authorities and bodies responsible for local amenities (including churches, golf clubs, etc.). Finally private land and property owners also need to consider how they will deal with the changing shoreline and its effects on their property under the management policies defined in the SMP.

The policy recommendations in the SMP may be brought about through the implementation of coastal defence schemes or other coastal management actions. The process of implementation will be underpinned by monitoring of the shoreline to identify ongoing behaviour (to confirm assumptions made in policy development), together with targeted study and investigation where specific uncertainties need to be addressed to enable policy (short or longer term) implementation. It should be recognised that funding for these recommended studies and schemes is not guaranteed, in that funding may not be available due to the need for prioritisation of flood and coastal defence spending at a local level. Co-funding of flood and coastal defence projects as well as other funding streams such as private contributions will become increasingly important and therefore need to be considered at the earliest opportunity. In addition, Dumfries & Galloway Council will need to investigate other areas for collaborative working as well as keeping the prioritisation of actions under review to ensure the best value for money in terms of reducing risk. Where the Action Plan tables refer to undertaking monitoring, this includes the proper storage and analysis of data to inform future management practices.

It is also vitally important that information provided by the SMP on the future coastal risks and their management is disseminated to Planning Authorities to ensure that the outputs from the SMP are considered when developing and implementing land use plans.

5.1 Objectives

The objectives of the Action Plan are to:

- Facilitate implementation of the SMP policies;
- Identify and / or promote studies to further / improve understanding where this is required to resolve policy decisions and / or implementation;

- Promote the use of the SMP recommendations in spatial planning;
- Identify procedures for the management of the SMP until its next review; and
- Establish a framework to monitor progress against the Action Plan and initiate future SMP review.

5.2 Approach

The purpose of developing the SMP Action Plan was to identify the steps that need to be taken to put the SMP policies into practice. This primarily includes ensuring that the SMP policies are taken forward in the short term but also providing a strategic basis for more detailed studies and plans for managing and / or improving coastal management in the medium to long term. In some cases, implementation of the recommended SMP actions by the identified parties will be in accordance with their own asset management processes and programmes.

The Action Plan provides a list of actions that should be undertaken by Dumfries & Galloway Council and / or others over the life of the SMP, and may be revised at the next SMP review, which will ultimately lead to better informed decision-making in terms of coastal management policy. The SMP review period is nominally every ten years; however, the SMP provides for reassessment of this timescale should an earlier review be considered necessary.

The actions can be split into those that are applicable to the whole SMP area and those that apply to specific areas or locations (Policy Units). Within the action plan, actions to be taken are assigned an ‘action type’ as summarised in Table 5-1. Other details provided within the Action Plan, Appendix E, include a brief description of the action, an indication of the relevant importance of the action, responsibility for implementing the action, and where relevant links with other actions.

As well as activities to implement the short-term management policies, the SMP Action Plan identifies activities required to facilitate the implementation of the longer term policies where appropriate. This includes actions to:

- Facilitate implementation of the SMP policies through more detailed local studies and engagement with stakeholders on the best approaches to delivery;
- Identify studies to improve understanding or reduce uncertainty where this is required to resolve policy and / or implementation;
- Deal with the consequences of the Plan;
- Promote use of the SMP recommendations in spatial planning of land use;
- Establish a process for informing stakeholders of progress with SMP implementation; and
- Establish a framework to monitor and manage progress against the Action Plan and initiate future SMP review.

Type	Action	Description
Communication	Awareness Raising	Consultation / information actions
	Update Planning Policy	
Monitoring	Monitor Climate Change Impact	Data collection and analysis
	Monitor Coastal Processes	
	Monitor Coastal Evolution	
	Monitor Defence Assets	
	Monitor Habitat Response	
	Monitor the risk to cultural heritage	
Adaptation & Resilience	Allow the shoreline to function naturally	Plans for development and implementation of adaptation activities
	Optimise adaptation and resilience	
	Preparation for coastal flooding and erosion	
Management Area / Unit Studies	Detail FRS	Studies and investigations, including coastal process studies
	Review the Shoreline Management Policy	
	Contamination Assessment	
	Wave Overtopping	
	Coastal Process Study	
Habitat creation	Managed Realignment	Studies and works relating to the creation and restoration of habitats
	Habitat Enhancement	
Asset management	Maintain existing defence	Maintenance of assets
	Coastal protection scheme	

Table 5-1 Summary of Actions and Description

5.2.1 Broad Scale SMP Actions

There are several broad scale actions to be implemented to help authorities and stakeholders adapt to and manage coastal risks as outlined in the following sections.

5.2.1.1 Planning

The risk management policies set out in the SMP cannot be implemented through engineering or coastal defence measures alone. There is a need for spatial planning to reflect the policies and understand their consequences, such that risk areas are avoided by development, and future changes in policy are facilitated to allow a more sustainable approach to management of coastal risks and avoid increasing risks by allowing development in flood and erosion prone areas.

Regional Planning

Regional planning needs to consider the messages being delivered by this SMP and ensure that future proposals for regional development and investment are managed accordingly. Such planning needs to consider implications beyond the current 20-year horizon typically used.

Local Planning

Local planning should consider the risks identified in this SMP and avoid approving inappropriate development in areas at risk of flooding and erosion. Local planning also needs to consider that relocation of displaced people and property may require land set back from the coast to be made available within the same settlements to maintain the same level of community and may need to become increasingly flexible to enable this. Locations for new developments may also need to be identified.

Spatial Planning

The following actions should be adopted in terms of spatial planning activities;

- Include the SMP as reference material for, or an annex to, the Local Development Plans. Where relevant, development plans should identify areas where managed realignment of the coast may be appropriate, setting out the potential benefits such as habitat creation and new recreation opportunities. Planning authorities should also take the likely effect of proposed development on the marine environment into account when preparing development plans and making decisions on planning applications.
- Ensure that SMP policies are integrated into development control activities to limit flood and erosion risk. This may require the definition of 'No Development Zones' in areas where managed realignment and no active intervention are the agreed policy. Along these frontages a coastal setback 'buffer zone' area should be identified to exclude development in areas where there is a risk of erosion. An appropriate 'no development' set back area would typically extend back to the 100-year erosion risk predicted shoreline position. In addition, consideration should be given to restricting development in areas behind dune systems and salt marshes to allow for natural rollback of these features over time, to maintain the integrity and function of the natural habitat as a defence.
- Promote the use of Strategic Flood Risk Assessment (SFRAs) as part of the preparation of Development Plans. Scottish Planning Policy (SPP) requires that planning authorities must take the probability of flooding from all sources and the risks involved into account when preparing development plans. SFRAs are a useful guide for development decisions and meet the requirements of the SPP.
- Ensure local Planning Authorities are aware of the need to promote the development of planning policies to facilitate adaptation to coastal change and address potential housing and other future losses through implementation of 'realignment' and 'no active intervention' policies. This may involve relocation of property, essential services, infrastructure etc. and should involve cross authority working with a range of partners and interested parties, including potential cross boundary issues.

5.2.1.2 Climate Change Adaptation

The UK Climate Change Risk Assessment (CCRA), published on 25 January 2012, was the first assessment of current and predicted impacts of climate change for the UK under Section 56 of the Climate Change Act 2008. This assessment was produced by HR Wallingford on behalf of Defra and drew together evidence and analysis on the threats and opportunities presented by the changing climate. The CCRA consisted of several reports, including 'a Climate Change Risk Assessment for Scotland'. Following publication of the CCRA, Section 53 of the Climate Change (Scotland) Act 2009 required Scottish Ministers to develop a Scottish Adaptation Programme, which addressed the risks identified for Scotland in the CCRA. The second Scottish Climate Change Adaptation Programme (SCCAP) was launched in September 2019, following the publication of the 2017 update to the UK CCRA, the next update of which is due in 2022, and will be followed in due course by a further update to the SCCAP around 2024. Further information on the SCCAP is available on the Scottish Government website http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/adaptation.

In the short-term, the need to ensure that conservation interests within designated sites or in the wider environment are appropriately addressed by coastal management should be undertaken in a way that engages the public and involves local communities in finding long-term solutions to issues. The Marine (Scotland) Act 2010 provides a framework which will help balance competing demands on Scotland's seas by introducing a duty to protect and enhance the marine environment. The Act aims to improve marine nature and historic conservation with new powers to protect and manage areas of importance for marine wildlife, habitats and historic monuments. To accommodate shoreline retreat and loss of property and assets, whether due to coastal erosion or flooding, local operating authorities will need to develop adaptation plans. These will need to address the removal of buildings and other cliff-top facilities well in advance of their loss. Plans for the relocation of people also need to be established and be clear for all affected.

5.2.1.3 Monitoring

Monitoring of coastal change is a key aspect of sustainable shoreline management, both in terms of informing policy decisions and in establishing the effectiveness of policies and quantifying any impacts. Consequently, the establishment and implementation of a regular monitoring programme is a key action that should be progressed for the entire coastline but with particular focus on those areas of greatest risk.

5.2.1.4 SMP Review

The management policies set in an SMP are based on the understanding of coastal processes and risk at the time the plan is developed and as such SMP’s should be considered “live” documents and hence be subject to regular review (typically every 10 years) to ensure that they remain relevant to the ever-changing coastal environment. In this way changing knowledge of the effects of climate change, and new data / knowledge of coastal processes and the associated risks can be incorporated ensuring that the SMP policies remain relevant and applicable to the Dumfries & Galloway coastline. Hence the establishment of a periodic review cycle is a key action to be included within the recommendations of the SMP.

5.3 Summary of Shoreline Management Plan Actions

A summary of the actions identified to implement the SMP policies along with the target timescales, short, medium or long term and priority, high, medium or low is presented below.

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Communication	**Awareness Raising**	All but PU 34	Create awareness of potential increased flood and erosion risk because of climate change to minimise societal impact and cost.	D&G Council / SEPA / Scottish Government	**H**		
	Update Planning Policy	All	Ensure development plans etc. reflect the management policies proposed for each section of the D&G coastline. Consider introduction of "No Development Zones" as necessary.	D&G Council	**H**		
Monitoring	**Monitor Climate Change Impact**	4	Monitor impact of climate change to inform potential move to alternative policy of MR.	D&G Council	**H**		
		7, 20, 31, 32, 33	PU 7, the frequency and severity of coastal events should be monitored to inform the decision about a move from HTL to MR. PU 32 Monitor the effects of climate change on risk to the road infrastructure to inform / support potential move to MR.	D&G Council / Asset Owners	**H**	**H**	
	Monitor Coastal Processes	12	Monitor the impact of coastal processes to inform management requirement for A75.	Asset Owners	**H**	**H**	
	Monitor the evolution of the coastline	All	Monitor the evolution of the coastline to inform the need for localised policy and future revisions of the SMP. For PU 3 this will inform change from HTL to MR and future of the SMP. For PU 5 to establish where action other than NAI is required and to inform future update of SMP.	D&G Council	**H**	**H**	

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Monitoring	**Monitor the evolution of the coastline**	23	Monitor response of coastline to sea level rise and risk to properties to inform future policy.	D&G Council	**M**	**M**	
	Monitor the Condition of Defences	21, 23, 24	Monitor defence structures to inform decision as to future integrity if assets and need for management measures.	D&G Council / Asset owners	**H**		
		2, 3, 4, 6, 9, 10, 12, 15, 16, 17, 18, 25, 26, 27, 28, 31, 32, 34	Monitor the condition of existing defence structures to inform maintenance or upgrade.	Asset Owners / D&G Council	**H**	**H**	
		13	Monitor the condition of the existing defence structures to inform maintenance or upgrade.	D&G Council / Asset owners	**M**	**M**	
		14	Monitor the condition of the existing defence structures to inform maintenance or upgrade.	Asset owners	**L**	**L**	
	Monitor Habitat Response	22	Monitor the response of habitats to inform future decision as to the need for management measures.	D&G Council / NatureScot	**H**	**H**	**H**
	Monitor risk to Road Infrastructure	8, 17, 24	PU 8 monitor the risk from erosion to the A710 at Sandyhills and A716 (PU 24) to inform need for management.	D&G Council	**H**	**H**	

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Monitoring	**Monitor risk to Road Infrastructure**	17	Monitor the risk to the B7063 to inform decision as to the future integrity of this asset.	D&G Council	**H**		
		21	Monitor the risk to the A747 to inform decision as to the future integrity of this asset and the need for management measures.	D&G Council		**M**	**M**
	Monitor the risk to cultural heritage	16, 17, 18, 19, 20, 21, 27, 28, 32	Monitor the potential risk to cultural heritage sites.	Asset Owners	**M**	**M**	
Adaptation & Resilience	**Allow the shoreline to function naturally**	1, 3, 5, 13, 14, 18, 28, 35	No new coastal defence measures are to be implemented in this policy unit. The shoreline should be allowed to function naturally.	All Parties	**H**		
		7, 8, 9, 10, 11, 12, 15, 16, 17, 19, 21, 22, 23, 26, 27, 29, 30, 31			**H**	**H**	**H**
		4			**M**	**M**	**M**
	Optimise Adaptation & Resilience	1,3, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 26, 27, 28, 30, 31	Share information, knowledge and guidance, i.e., Local Resilience Partnerships (LRPs).	D&G Council / SEPA / Scottish Government	**H**		
		2,4, 18			**M**		
		32			**M**	**M**	

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Adaptation & Resilience	**Optimise Adaptation & Resilience**	25, 29	Share information, knowledge and guidance, i.e., Local Resilience Partnerships (LRPs).	D&G Council / SEPA / Scottish Government		**M**	
		11			**L**		
	Preparation for coastal flooding and erosion	1,3, 5, 7, 8, 10, 12, 13, 14, 15, 16, 17, 19, 21, 22, 24, 26, 27, 28, 30, 31	Prepare for flood and erosion risk because of climate change to minimise societal impact and cost. Examples may include relocation of property in the most extreme cases to better locations. Smarter adaptation and resilience building & natural flood management measures are suggested.	D&G Council / SEPA / Scottish Government	**H**		
		2, 4, 6, 18, 23			**M**		
		32			**M**	**M**	
		25, 29				**M**	
		11			**L**		
Policy Unit Studies	**Detailed FRS**	16, 18, 20	Assess coastal flood processes to inform selection of appropriate future management measures. Risk to assets and need for localised implementation of recommended alternative policy of MR to be established.	D&G Council	**H**		
		23	Assess coastal processes to inform selection of appropriate future management measures, quantify risk to assets and identify need for management measures or localised implementation of MR.		**H**	**H**	
		13, 31	Assess risk to assets and need for further management measures or localised implementation of the recommended alternative policy of managed realignment.	Asset owners / D&G Council	**M**		

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Policy Unit Studies	Detailed FRS	34	Assess coastal flood and erosion risk and feasibility of HTL / ATL options.	Asset owners		**M**	
		2, 3, 4, 7, 25, 27, 28, 32, 33	Assess coastal flood and erosion risk and feasibility of management options. PU 4, this will this inform the feasibility of HTL / MR options. At PU 7, with the incorporation of wave over-topping risk.	Asset owners / D&G Council	**M**	**M**	
		1, 8, 9, 10, 12, 17	Detailed flood risk assessments required to quantify risk to assets and identify need for further management measures or localised implementation of the recommended alternative policy of managed realignment. For PU 8, assessment required to quantify risk to A710 and identify need for management measures or localised implementation of the recommended alternative policy of HTL. PU 17, assessment required to quantify risk to public roads and identify need for further management measures or localised implantation of recommended alternative policy of managed realignment for the B7063.	D&G Council / SEPA / NatureScot	**L**		
		15, 22, 26, 30	Assess risk to assets and identify need for further management measures or localised implementation of the recommended alternative policy of MR.	D&G Council / SEPA / Scottish Government / Asset owners	**L**	**L**	

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Policy Unit Studies	**Detail FRS**	21	Assess coastal flood and erosion risk and feasibility of MR options.	Asset owners		**L**	
	Contamination assessment Cairn Point	34	The HTL / ATL policy at Cairn Point has been assigned on a precautionary principle due to the former military and ship breaking use of the hinterland and the risk of erosion to releasing potentially contaminated material into the marine environment. Quantification of any contamination would enable future consideration of a change in policy to MR or possible NAI.	Site Owner		**H**	

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Policy Unit Studies	**Wave Overtopping Study**	4, 7, 12, 16, 18, 20, 23, 25, 28, 32	Powfoot (PU 4), Carsethorn (PU7), Isle of Whithorn (PU18), Port William (PU 20) have been reported to be subject to wave over-topping. A detailed assessment of wave over-topping potential and the evaluation of the risk associated with this should be undertaken. Similarly, for PU 12, a detailed assessment of wave over-topping potential and the evaluation of the risk to the A75 at Skyreburn should be undertaken. An assessment of wave conditions should be undertaken for PU 20 and PU 23 in Luce Bay. Similarly, Stranraer (PU 32) is subject to significant wave action therefore, a detailed assessment of wave over-topping potential and the evaluation of the risk associated with this should be undertaken.	SEPA / D&G Council / Asset Owners	**H**		
		10, 21, 27, 31, 33, 34	Balcary Point (PU 10) has been reported to be subject to wave over-topping therefore, a detailed assessment of wave over-topping potential and the evaluation of the risk associated with this should be undertaken. Similarly, for PU 21 and Port Logan (PU 27). Within PU 31 wave over-topping may add to the risk to the A718 therefore, again a detailed assessment of wave over-topping potential and the evaluation of the risk associated with this should be undertaken.		**M**		

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Policy Unit Studies	Coastal Processes Study	15	Detailed assessment of coastal processes required to determine suitability of MR.	Asset Owners	H	H	
		25	Detailed assessment of coastal processes required to inform selection of appropriate future management measures.	D&G Council	M	M	
Habitat Creation	Managed Realignment	13	Consider realignment of defences at Janefield and parkland south of Kirkcudbright to enable growth of saltmarsh / reed beds.	D&G Council	M	M	
		14	Consider realignment of raised embankments at Cally to enable growth of saltmarsh / reed beds and provide flood storage.		M	M	M
	Habitat Enhancement	22	Consider options to replace hard defence structures with dune management.	Asset owners		M	M
Asset Management	Maintain existing defences	27, 28	Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences.	Asset owners	H	H	H
		32			H	H	
		2, 4, 16, 18, 20, 23, 25, 32	Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences. This should not allow the expansion of any defence assets.	Asset owners / D&G Council	H	H	
		1, 3, 6, 7	Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences.	Asset owners	M	M	
		33		Asset Owners	M		
		8, 9, 10, 12, 13		D&G Council / Asset owners	L		
		14, 15, 17, 21, 22, 26, 30, 34	Subject to appropriate consents being granted defence owners should be allowed to maintain existing defences.	Asset owners / D&G Council	L	L	

Type	Action	Policy Unit	Description	Involved Parties	Target Timescale (years)		
					0 to 20	20-50	50-100
Asset Management	**Maintain existing defences**	17		D&G Council	**L**	**L**	
	Coastal protection scheme	2, 4, 23	Implement feasible measures based on feasibility study.	Asset owners	**M**	**M**	
		16, 18, 20, 25, 27, 28, 31, 32, 33, 34		D&G Council / Asset owners		**M**	
		1, 3, 6, 7, 8, 9, 10, 30, 31	Implement feasible measures based on feasibility study. For PU 8, this particularly concerns the protection of the A710.	Asset owners	**L**	**L**	
		12, 13, 14, 15, 22, 17, 26	Implement feasible measures based on feasibility study.	D&G Council / Asset owners		**L**	

6 STRATEGIC ENVIRONMENTAL ASSESSMENT

6.1 Introduction

A Strategic Environmental Assessment (SEA) and Habitats Regulations Assessment (HRA) have been undertaken in parallel with the development of the SMP. The SEA has been prepared in accordance with the Environmental Assessment (Scotland) Act 2005, which implements European Union Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment. The full detail of the SEA is provided in a separate document "SEA Environmental Report". The purpose of this Environmental Report was to provide a formal and transparent assessment of the likely significant impacts on the environment arising from the implementation of the SMP, including consideration of reasonable alternatives.

6.1.1 Screening for SEA

On behalf of the Dumfries & Galloway Council, RPS carried out an SEA Screening for the SMP to demonstrate how:

- Dumfries & Galloway Council is the Responsible Authority for the development and implementation of the SMP.
- The Responsible Authority determined that the SMP required an SEA, as the likelihood exists for significant environmental effects to arise as a result of implementation of the Plan. The Plan falls within Section 5(3) of the Environmental Assessment (Scotland) Act 2005.
- The Responsible Authority has identified that the SMP sets the framework for future shoreline works along the Dumfries & Galloway coast, that there is the potential for significant impacts as a result of the scale and duration of effects and that sensitive receptors along the Dumfries & Galloway coast include SACs, SPAs, SSSIs and LNRs.

Responses to the SEA Screening from the Scottish Environment Protection Agency (SEPA), Scottish Government, Scottish Natural Heritage and Historic Environment Scotland are included within SEA Environmental Report.

6.1.2 Scoping for SEA

The SEA Scoping for the Plan took place from October 2019 - March 2020. A Scoping Report was produced for this, the purpose of which was to provide sufficient information on the Plan to enable the environmental consultees to form an opinion on the appropriateness of the scope, format, level of detail, methodology for assessment and the consultation period proposed for the Environmental Report.

An SEA Scoping Report for the Plan was circulated to the following statutory consultees in March 2020:

- Scottish Environmental Protection Agency;
- NatureScot (formerly Scottish Natural Heritage), and
- Historic Environment Scotland.

The Scoping Report was also made publicly available via the Dumfries & Galloway Council website.

6.1.3 Appropriate Assessment (AA)

The Habitats Directive (Council Directive 92/43/EEC) on the conservation of natural habitats and of wild fauna and flora obliges member states to designate, protect and conserve habitats and species of importance in a European Union context. Article 6(3) of the Habitats Directive requires that "*Any plan or project not directly connected with or necessary to the conservation of a site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation*

objectives." This Directive was initially transposed into Scottish Law through the Habitats Regulation 1994 as amended in 2004, 2007, 2008, 2011 and 2012. Any proposed plan or project that has the potential to result in a significant effect on a designated European site will require an AA. Case law has determined that the likelihood need not be great, merely possible, and that the precautionary principle must apply as set out in European Commission Guidance and as required by CJEU case law (i.e. C 127/02 '*Waddenzee*').

Consequently, an Appropriate Assessment (AA) for the SMP was carried out in parallel with the SEA process. The output of this was a Habitats Regulations Appraisal (HRA) Record, which was prepared to influence the draft Plan and to provide NatureScot with information on the draft Plan, the process undertaken for the HRA and to establish whether or not the SMP was likely to have a significant effect upon any European sites(s). The findings of the HRA have been integrated into the SEA Environmental Report and subsequently into this Plan.

6.2 Methodology

An SEA Environmental Report was produced to assess the environmental impacts of the measures proposed as part of the SMP and to provide environmental guidance to ensure that the Plan is more sustainable. This in conjunction with the Plan level HRA which assesses the potential for the proposed measures to impact upon the integrity of any European sites in view of their conservation objectives has been central to the development of the SMP.

The SEA and HRA processes were integrated within the SMP development process with assessment of the likely environmental issues associated with each viable policy, and the scale of potential impacts, as well as the potential for social issues of implementing these policies undertaken during the development and selection of policies and actions. The preferred policy approaches were those which had the best environmental outcomes, unless these were considered technically unfeasible or would lead to significant social effects. Where a preferred policy was selected to avoid significant adverse effects on social grounds, consideration was given to implementing a preferred environmental policy (such as Managed Realignment) in a later epoch, giving time for the population in this area to adjust to coastal change, and for later options to be more fully investigated. Alternative primary or localised policies for PUs were identified during this process, providing either a more socially, or a more environmentally beneficial alternative to the preferred policy, or altering the epoch during which a policy would be applied. Stakeholder and public consultation on the preferred policies for the SMP was undertaken, and these were reviewed and refined, where necessary.

6.2.1 Assessment Methodology

The proposed measures were assessed in terms of their potential positive and negative impacts and the significance of these impacts on the environment against the SEA objectives. The purpose of this was to predict and evaluate, as far as possible, the environmental effects of the Plan, highlighting any significant environmental problems and / or benefits that were likely to arise from the implementation of the Plan.

The SMP was assessed via a baseline led assessment. This method involves the assessment of each option available in the enactment of the SMP against each of the following topics:

- Biodiversity, Flora & Fauna (BFF)
- Population & Human Health (PHH)
- Geology, Soils and Land use (S)
- Water (W)
- Climatic Factors (C)
- Material Assets & Infrastructure (MA)
- Cultural, Architectural & Archaeological Heritage (H)

- Landscape & Visual Amenity (L)

Each alternative available in the SMP was assessed in the short, medium and long term for likely effects, the significance of the effects, and whether they were positive or negative effects. Other impacts that were assessed for significance were secondary effects, cumulative effects, synergistic effects, temporary and permanent effects, and the inter-relationship of effects. The scenario of "The Evolution of the Environment without the SMP" was also assessed in the same format. This is considered the Do-Nothing Scenario, whereas the previous SMP would continue to be the long-term SMP for the area with no updates.

6.2.2 SEA Objectives

The proposed scenarios for consideration were assessed in the SEA against the Strategic Environmental Objectives (SEOs) to examine the potential for likely significant environmental effects associated with the SMP. The SEA Objectives, Sub-Objectives, Indicators and Targets used are given in Table 6-1.

Criteria	Objective
Biodiversity, Flora & Fauna	Avoid damage to, and where possible enhance, the biodiversity, flora and fauna in the vicinity of the shoreline.
Population & Human Health	Protect the public from risk of flooding and coastal erosion and avoid significant social effects on the population.
Geology, Soils and Land use	Avoid damage to, and where possible enhance, areas of geological importance and existing functional soil and land resource.
Water	Protect and enhance the state of the water environment.
Climatic Factors	Adaptation to potential climatic change.
Material Assets & Infrastructure	Protect material assets and infrastructure from risk of flooding and coastal erosion.
Cultural, Architectural & Archaeological Heritage	Protect or, where appropriate, enhance historic environment features and their settings.
Landscape & Visual Amenity	Protect, and where possible enhance, the landscape and seascape character and visual amenity of the Dumfries & Galloway shoreline.

Table 6-1 Summary of SEO's

6.2.3 Assessment

The SEA assessment was relatively strategic, with the aim of reporting likely impacts at the coastal cell and sub-cell level to reflect the scale at which the options are being planned. The assessment of the policies considered the potential types of actions that may be implemented to meet the shoreline management policy and assessed them against the SEOs. In order to simplify the assessment process and avoid repetition during assessment within each CPU, potential SMP policies were initially assessed generically for their potential effects against SEOs. This initial assessment of SMP policies for each CPU included a high-level assessment of the likely effects of implementing the preferred and alternative policies for each SEA topic.

The output of the assessment for each CPU included the key plan issues in the area, the key environmental issues in the area by topic, a summary of potential effects (positive and negative) by topic, the potential for in-combination and cumulative effects and the key conclusions. A summary of

potential overall in-combination and cumulative effects of the SMP with other plans, programmes or developments was also provided.

6.3 Summary Conclusions of SEA and AA

Generally, there was found to be the potential for slight to moderate negative environmental effects from policies comprising the maintenance or upgrading of coastal defences on the wider environment. There is potential for more significant effects on BFF from HTL policies in some areas, including within CPU 2, owing to the presence of designated and sensitive habitats that could be affected either directly or indirectly, or for disturbance of designated species during the construction / maintenance phase. In CPU 4, a policy of MR through relocation of at-risk properties has potential for significant positive effects (through protection) but also significant negative social effects on the population. In the medium to long term, there is generally potential for moderate to significant positive effects from implementation of SMP policies, owing to the increased management of flood and erosion risk for the protection of people, property, water quality, heritage features and infrastructure, as well as through enabling natural coastal processes to continue for the shoreline through a policy of NAI, or MR involving relocation of assets at risk.

The Stage 1 screening appraisal of the HRA assessed the potential for the SMP to result in Likely Significant Effect (LSE) on any European site, either alone or in-combination with other plans and projects. This concluded that a Stage 2 HRA should be undertaken as the SMP is not directly connected with or necessary to the management of any European site and LSE on seven European sites could not be excluded at the screening stage, alone or in-combination with other Plans and projects. A Stage 2 appraisal for HRA of the policies comprising the SMP on the European sites that were screened in at Stage 1 was undertaken. This recognised that the SMP, as a strategic-level plan, does not determine the precise location or nature of any development project, and that implementation of the preferred policies of the SMP will be subject to further study. At this strategic level, implementation of the preferred SMP policies in a number of locations was considered to have the potential to result in significant effects on European sites, and it was therefore necessary to outline mitigation for these. For each European site, avoidance and mitigation measures were outlined to prevent potential adverse effects on the integrity of the European sites concerned. The HRA Record concluded that, subject to securing the prescribed mitigation, the SMP will not adversely affect the integrity of any European site, either alone or in-combination with other relevant plans or programmes. Further assessment should be undertaken at project level, when detailed information on preferred shoreline management measures are known. The findings of the HRA were integrated into the SEA Environmental Report.

6.4 Mitigation

Mitigation measures have been recommended in the SEA Environmental Report and the HRA Record where potential negative effects are likely to result from a proposed measure for shoreline management. These mitigation measures aim to prevent, reduce and as fully as possible offset any significant adverse effects on the environment due to the implementation of the Plan.

The principal mitigation recommendation was that the predicted negative effects should be considered further during the next stage of policy development, when details of the physical shoreline management measures (e.g. visual appearance and alignment of any hard engineering works) can be optimised through detailed feasibility studies and design in order to limit identified impacts on sensitive receptors. Where feasible, natural flood management and soft / green engineering methods should be incorporated into the detailed planning to reduce the negative environmental impacts of a scheme.

Further environmental studies based on the detailed design and construction methodology should be undertaken as appropriate. These studies may involve, but are not limited to marine, aquatic and terrestrial ecology surveys, ornithological and bat surveys, fish surveys, landscape and visual assessments, WFD assessments, geotechnical investigations and heritage surveys. Further AA, to meet the requirements of the Habitats Directive, of the preferred policy detailed design and construction methodology will be required at the project level, where potential impacts have been identified in the SEA and accompanying HRA for the SMP.

The proposed plan level mitigation measures by potential environmental effect and HRA specific plan level mitigation measures, are listed in Appendix F and should be implemented and further developed at the detailed design stage and project level study stage.

6.5 Monitoring

The SEA Directive requires that the significant environmental effects of the implementation of a SMP are monitored in order to identify, at an early stage, unforeseen adverse effects and in order to undertake appropriate remedial action. Plan level monitoring and reporting should take place in advance of development of the next cycle of the SMP. Proposed monitoring indicators, data and potential data sources for the SMP are given in Table 6-2, based on the Targets and Indicators established in the SEA Environmental Report. This monitoring should be undertaken during the feasibility, design and construction phases of any resulting works. This monitoring will identify the positive and negative effects on the environment of implementing the SMP, enabling early mitigation of any unwanted adverse effects and improving future iterations of the SMP. Detailed monitoring for specific policies proposed will need to be re-scoped in consultation with the appropriate authorities at the detailed feasibility and design stages. This agreed detailed monitoring should then be undertaken before, during and after construction, where and when appropriate.

Criteria	Objective		Sub-Objective		Indicators	Proposed Data Sources
Biodiversity, Flora & Fauna	**1**	Avoid damage to, and where possible enhance, the biodiversity, flora and fauna in the vicinity of the shoreline.	**A**	Avoid detrimental effects to, and where possible enhance, International and European designations for protected species and their key habitats.	Area and condition of SAC, SPA, and Ramsar designation. Numbers of protected species.	NatureScot & Marine Scotland reporting and action plans.
			B	Avoid damage to or loss of, and where possible enhance, national and local nature conservation sites and protected species, or other known species of conservation concern such as Priority Marine Features.	Area and condition of SSSI, LNRs, MCAs, MPAs and local conservation designations. Numbers of protected species.	NatureScot & Marine Scotland reporting and action plans. Dumfries & Galloway Council – Local Development Plans.
Population & Human Health	**2**	Protect the public from risk of flooding and coastal erosion and avoid significant social effects on the population.	**A**	Protect the public from risk of flooding and coastal erosion.	Population at risk from flooding and erosion.	SEPA reporting. Dumfries & Galloway Council – Flood Risk Management Plans. Scotland Census Data.
			B	Avoid significant negative social effects on the public.	Population displaced by flooding and erosion.	Scotland Census Data. SMP Data.
Geology, Soils & Landuse	**3**	Avoid damage to, and where possible enhance, areas of geological importance and existing functional soil and land resource.	**A**	Maintain or improve areas of existing functional soil and land resource.	Areas of functional soil and land resource at risk from flooding and erosion.	NatureScot erosion reporting. NatureScot landcover mapping. Dumfries & Galloway Council – land use

Criteria	Objective		Sub-Objective		Indicators	Proposed Data Sources
						zoning in Local Development Plans.
			B	Avoid damage to or loss of, and where possible enhance, national geological conservation sites.	Areas of Geological SSSI.	NatureScot reporting.
Water	**4**	Protect and enhance the state of the water environment.	**A**	Protect and enhance the state of the water environment.	Coastal morphology and waterbody status.	SEPA – River Basin Management Plans / WFD reporting.
Climatic Factors	**5**	Adaptation to potential climatic change.	**A**	Adaptation of shoreline management to potential climatic change.	Interaction with potential climate change influenced flood extents / wave overtopping and severe weather events.	SEPA reporting. Dumfries & Galloway Council – Flood Risk Management Plans.
Material Assets & Infrastructure	**6**	Protect material assets and infrastructure from risk of flooding and coastal erosion.	**A**	Protect material assets and infrastructure from risk of coastal flooding and erosion.	Material assets and infrastructure at risk from flooding and erosion.	SEPA reporting. Transport Scotland. Scottish Water. Dumfries & Galloway Council reporting.
Cultural, Architectural & Archaeological Heritage	**7**	Protect or, where appropriate, enhance historic environment features and their settings.	**A**	Avoid loss of, or damage to, heritage features.	International, National and local designated heritage structures, sites and monuments.	Dumfries & Galloway Council reporting. Historic Environment Scotland reporting. Canmore Database.
			B	Minimise effects on the setting of heritage features		
Landscape & Visual Amenity	**8**	Protect, and where possible enhance, the landscape and	**A**	Protect, and where possible enhance, the landscape and	Landscape character assessments.	Dumfries & Galloway Council – Local Development Plans.

Criteria	Objective		Sub-Objective		Indicators	Proposed Data Sources
		seascape character and visual amenity of the Dumfries & Galloway shoreline.		seascape character and visual amenity of the Dumfries & Galloway shoreline.	Seascape assessments. Designated landscapes and views, such as NSAs	NatureScot landcover mapping.

Table 6-2 Environmental Monitoring of the SMP

7 NEXT STEPS

The SMP does not finish here, there is still much to do to implement the shoreline management strategies put forward and to maintain this Plan. Some of these activities are outlined in the following sections, completion of which will facilitate the effective application of sustainable coastal defence management in the future.

7.1 Application of the SMP in Spatial Planning

The risk management policies set out in the SMP cannot be implemented through engineering or coastal defence management alone. It is important that the policies of the SMP are appropriately considered and reflected in regional and local spatial planning. This will ensure that long term coastal flooding and erosion risks are considered in the planning process.

Where a policy of **no active intervention** or **managed realignment** has been proposed, it is important that development zones are updated accordingly to ensure no inappropriate future development is carried out in areas which have been identified to be at risk due to coastal flooding or erosion. Even in areas where a policy of **hold the line** is recommended it may be necessary to limit the types of development permitted to manage future flood risk or indeed limit its development.

Table 7-1 contains a summary of activities which should be undertaken to ensure the SMP policies are appropriately reflected in regional and local spatial planning.

Activity	Involved Parties
Inform Local Authority Planning Officers of the final SMP recommendations and implications.	Local Authority Officers
Include the SMP as reference material, or as an annex to local development plans.	
Ensure that SMP policies are integrated into Development Control activities to control development and flood risk. Particular attention should be paid to No Active Intervention and Managed Realignment policies.	
Define 'No Development Areas'	

Table 7-1 Recommended Approaches to Update Development Plans

7.2 Broad Scale Activities

In addition to the specific actions outlined in the Action Plan (Section 5), there is also a need for some activities to be progressed which require consideration over the whole SMP area or even beyond the scale of the SMP as summarised in Table 7-2.

Activity	Involved Parties
Formal adoption of the SMP by the Coast Protection Authorities, SEPA, SNH and Historic Environment Scotland.	Dumfries & Galloway Council
Promote the investigation, and implementation, of mechanisms to facilitate the removal of 'at risk' assets. This will facilitate implementation long term No Active Intervention and Managed Realignment policies.	
Develop exit strategies / management plans for the relocation of people and removal of assets when they become at risk from erosion.	
Develop and promote a public communication strategy with regards to potential future coastal issues and SMP recommendations.	
Develop a coastal monitoring strategy for the entire SMP area.	

Table 7-2 Further Activities

7.3 Monitoring

The monitoring of coastal process is fundamental to improving the future understanding and hence management of the Dumfries & Galloway shoreline. There is a need to implement monitoring programmes when and where funding allows. Monitoring can be justified in that it is a means to inform better cost-effective decisions for the future management of the shoreline.

Monitoring progress in implementation of the SMP will be the responsibility of the project steering / technical group. The Action Plan should be published and updated at regular intervals to track progress on each action and to communicate progress to stakeholders. It is important that progress against the actions in the Action Plan is monitored so that any developments which might affect policy, and hence works, are notified. This also enables the need for revision of the SMP to be monitored.

7.4 Further Studies

This SMP has identified knowledge gaps whereby further research or data acquisition may be undertaken to support future decision-making. It is important to recognise the need to conduct appropriate studies and assessment with monitoring activities being significant in enabling and influencing this. The future response of the Dumfries & Galloway shoreline to climate change is uncertain, the dynamics that drive coastal evolution will vary over time and location. Whilst our understanding regarding future sea-level change, coastal erosion and flooding has improved, the science behind this knowledge is constantly changing. One of the hallmarks of scientific knowledge is that it is subject to change as new data is recorded and reinterpretations of existing data is made. This knowledge is key to adapting to future coastal change, as well as building resilience and reducing the vulnerability of coastal communities and protected habitats.

7.5 Management of SMP Until Next Review

This SMP should be recognised as a **live document**, with the policies and strategies reviewed alongside the emergence of new information and updated as necessary. It would be impractical to have a continuous review and change to strategy, the recommended approach must be one by which new information can be incorporated and the implications upon strategy and policy assessed. A periodic

review at specified intervals is recommended, with a maximum span of ten years recommended. The format of this SMP will allow for review and strategic change in policy, at any time should circumstances dictate and for regular assessment of the appropriateness of the policies and actions. It is not possible at this time to set a date for the next review of this SMP, however regular review should be undertaken in order to ensure that policies and the long-term shoreline management policies remains appropriate.

Finally, consultation and engagement has been undertaken throughout each stage of this SMP, to develop an awareness and provide a response and feedback platform. The public should continue to be involved in the future and continue to 'Have a Say'. Communication is key, and it is imperative that at risk communities are informed and become 'sea level wise' by planning now for climate change, with the adoption of flexible adaptive and sustainable approaches being encouraged.

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