



Eastern Green Link 2 - Marine Scheme

Environmental Appraisal Report Volume 2

Chapter 4 - Approach to Environmental Appraisal

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4. Approach to Environmental Appraisal

4.1 Introduction

This chapter describes the methodology used to undertake an appraisal of potential environmental impacts associated with the Marine Scheme and to address any environmental concerns identified. It outlines the key stages of the environmental appraisal (EA) process and the approach taken to identifying and evaluating the potential impacts and effects associated with the Marine Scheme, both alone and in-combination with other plans and projects.

The Marine Scheme has three distinct phases: installation, operation and maintenance, and decommissioning. This Environmental Appraisal Report (EAR) considers the impacts of each of these three phases on the receiving environment.

4.1.1 Environmental Appraisal Guidance

Whilst the Marine Scheme is not Environmental Impact Assessment (EIA) development, this EA accompanies and provides information to support, consent applications required by the Marine Scheme and has been undertaken in accordance with relevant EIA best practice.

This appraisal takes into account (but is not limited to) the guidance provided in the following documents:

- The Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment, 2004;
- IEMA Environmental Impact Assessment Guide to: Delivering Quality Development (2016);
- National Planning Practice Guidance: Environmental Impact Assessment (2014) (last updated May 2020); and
- The UK Chartered Institute of Ecology and Environmental Management (CIEEM): Guidelines for Ecological Impact Assessment in UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2019).

4.2 Environmental Appraisal Methodology

4.2.1 Overview

The EA methodology follows a systematic approach to identification of the potential impacts of the Marine Scheme on physical, biological, and human receptors and appraisal of subsequent effects, in a robust and transparent manner.

The development of the Marine Scheme has followed best practice, integrating environmental considerations into the project design throughout the appraisal process. This has included, for example, route development and optimisation work informed by both desk studies and baseline surveys, which allowed avoidance or reduced effects on known environmental constraints.

The appraisal process has identified potentially significant adverse environmental effects and, where necessary, has prescribed project specific mitigation measures to avoid, reduce or offset adverse environmental effects or to maximise environmental benefits. These will be incorporated into post-consent refinement of the Marine Scheme. The appraisal process involved the steps illustrated below in Figure 4-1.

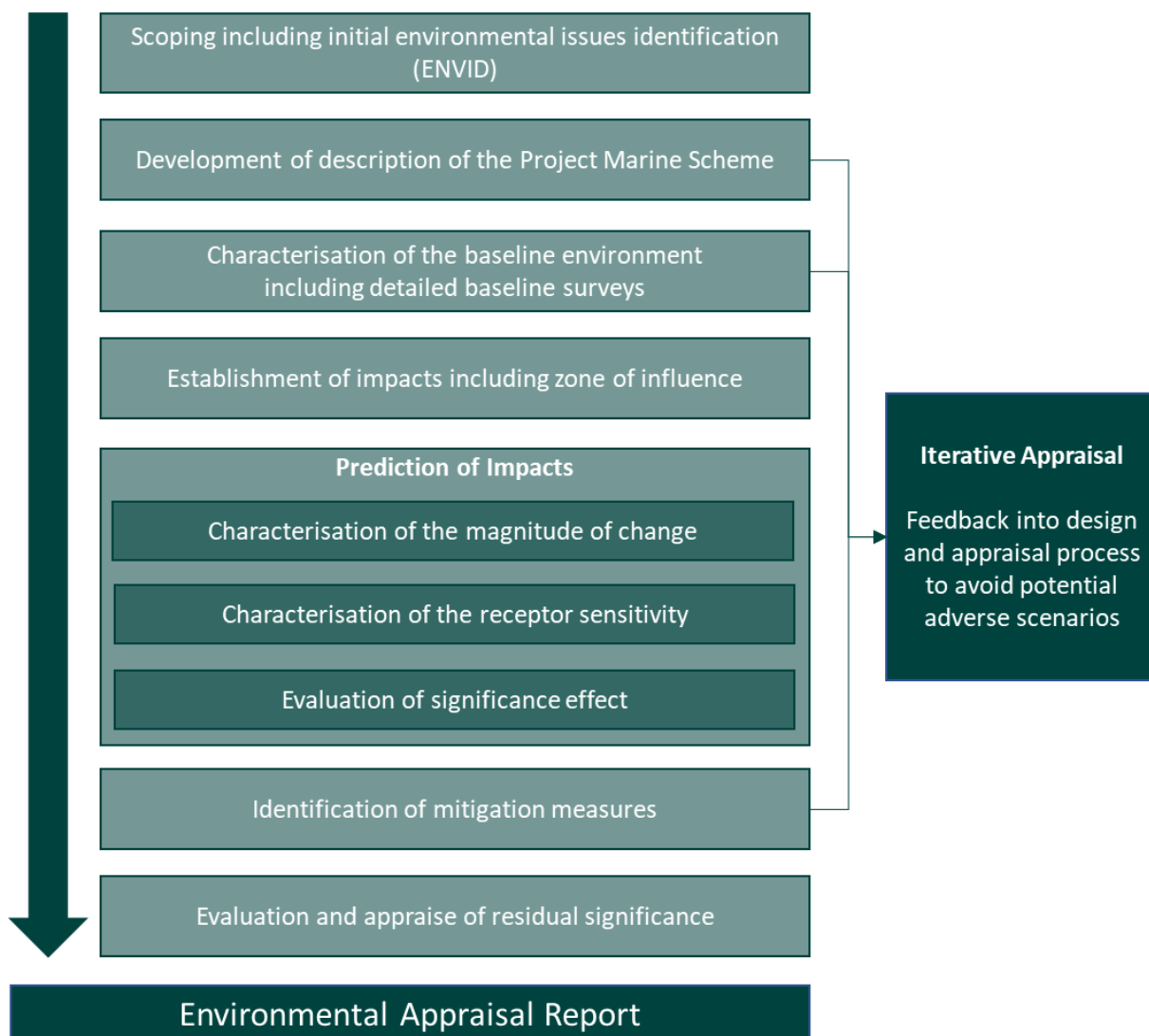


Figure 4-1: Overview of the Environmental Appraisal Process

4.2.2 Scoping and Environmental Issues Identification

4.2.2.1 Environmental Issues Identification

Early and systematic consideration has been given to the potential for interactions to occur between the Marine Scheme and known environmental sensitivities within the study area.

These interactions have been recorded through an Environmental Issues Identification (ENVID) matrix, presented as part of the non-statutory scoping report submitted to both the Marine Management Organisation (MMO) and the Marine Scotland Licensing Operations Team (MS-LOT) on 06 July 2021.

Where interactions with the potential to result in significant effects on the receiving environment are not expected (for example as a result of no pathway being identified between the effect and receptor, specific design parameters or embedded mitigation) these integral environmental design features have been identified. The ENVID also contains a short annotation where possible interactions were considered, but deemed unlikely to occur, and therefore are not considered further.

4.2.2.2 Scoping

Potential pathways between potential effects and receptors that were identified in the ENVID process were considered further using a qualitative approach and provided to MMO and MS-LOT within the scoping report. The scoping report used the conceptual approach known as the 'source-pathway-receptor' model, identifying the source (i.e., the origin of a potential impact), the pathway (i.e. the means by which the effects of the activity could impact a receptor) and the receptor that may be impacted. The

scoping report identified key environmental receptors, detail of the potential interactions between the Marine Scheme and the receptors identified, and an appraisal of the potential for significant impacts as a result of that interaction. Discussion also set out the approach to appraisal that was followed (e.g., qualitative, quantitative and any impact modelling (e.g., noise propagation, sediment distribution patterns etc)).

The scoping report set out the scope of and approach to the appraisal which has been undertaken. Feedback was also sought from the MMO, MS-LOT and other key stakeholders with an interest in the Marine Scheme. The responses are provided in Chapter 6: Consultation and Stakeholder Engagement.

4.2.3 Characterisation of the Baseline Environment

To appraise the potential impacts of the Marine Scheme it was necessary to characterise the physical, biological, and human environmental baseline conditions. The technical study areas linked to the Zone of Influences for the potential effects of the Marine Scheme for characterisation was defined within Chapter 2: Project Description and these are separately described in the technical appraisal Chapters 7 to 15 of this EAR.

Characterisation of the baseline for each technical discipline was developed using some or all of the following information:

- Review of primary baseline studies (field survey);
- Review of additional specialist baseline studies (desk-based technical reviews);
- Detailed review of all secondary sources (i.e., existing documentation and literature); and
- Stakeholder consultation.

Key data sources used to establish the baseline for each technical discipline are described in Chapters 7 to 15 of this EAR, which includes a summary of limitations. The following limitations or assumptions should be noted for all technical disciplines:

- Third party and publicly available information is assumed correct at the time of publication;
- Baseline conditions are accurate at the time of physical surveys but due to the dynamic nature of the environment, conditions may change before or during the installation and operation phases of the Marine Scheme (although the effects of the natural variation are included in the appraisal); and
- The Marine Scheme area will not be subject to force majeure events resulting in a significant shift from the existing baseline.

4.2.4 Establishing Potential Impacts

The appraisal methodology has been developed to incorporate the principles of the IEMA publication Guidelines for Environmental Impact Assessment (2004) as well as the ‘source-pathway-receptor’ model as used for scoping. For consistency, the terms interaction, impact and effect, as defined in Table 4-1 below have been used throughout the appraisal.

Table 4-1: Definition of Interaction, Impact and Effect

Terms	Definition
Interaction	The link between an activity and the receptor. There must be an interaction for an effect to occur.
Impact	The action that occurs as a result of an identified interaction. The predicted change in the baseline environment.
Effect	An observable consequence of impacts, usually measurable. Effects only occur when an activity or environmental impact is present within an environment that is sensitive to it.

The prediction of potential impacts was undertaken to determine what could happen to each environmental receptor as a consequence of the Marine Scheme and its associated activities. A diverse

range of potential impacts were considered within the appraisal, and it was appropriate to use a range of prediction methods including quantitative, semi-qualitative and qualitative across different technical subjects. The definitions used to describe impacts are given in Table 4-2.

Table 4-2: Impact Definitions

Terms	Definition
Direct impact	Impacts that result from a direct interaction between the Marine Scheme activities and the receiving environment.
Indirect impact	Impacts on the environment, which are not a direct result of the Marine Scheme / Marine Scheme activities, often produced away from the activity or as a result of a complex pathway.
Cumulative impact	Impacts that result from incremental changes caused by other present or reasonably foreseeable actions together with the Marine Scheme (European Commission 1999). Generally considered to be the same impact but from different projects e.g., underwater noise from two separate projects combining to affect marine mammals.
Beneficial impact	An impact that is considered to represent an improvement on the baseline condition or introduces a new desirable factor (IEEM 2010).
Adverse impact	An impact that is considered to represent an adverse change from the baseline condition or introduces a new undesirable factor (IEEM 2010).

4.2.4.1 Establishing Impact Zones of Influence

For each potential impact, the 'Zone of Influence' (Zoi) which is the spatial extent over which the activities are predicted to have an impact on the receiving environment was established. This varied for different activities, and stages of the Project (installation, operation and maintenance, and decommissioning) and depending upon the receptor being considered.

Establishing the Zoi for activities and receptors was undertaken quantitatively where possible, based on the Project Description, project experience, appropriate professional judgement and literature reviews.

Potential for impacts on receptors which occur outside the Zoi and which cannot or are unlikely to travel into the zone (e.g. benthic communities) were screened out as a result of the ENVID process undertaken as described in Section 4.2.2.1, or have subsequently been excluded as part of the appraisal process. Conversely, mobile species and other mobile receptors such as other sea users which can travel into the Zoi, and may therefore be impacted by the Marine Scheme, were screened in.

4.2.4.2 Embedded Mitigation

The Marine Scheme has been developed through an iterative process which involved seeking to avoid or reduce potential environmental effects through the appropriate routing and siting of the Project infrastructure. This represents the first opportunity to mitigate potential impacts and effects. Mitigation measures which form part of the design for which consent is sought are an inherent part of the Marine Scheme design and have been considered as the 'base case' throughout the appraisal as described in Chapter 2: Project Description.

In addition, where clear obligations on The Installation, Operation and Maintenance and Decommissioning Phases of the Marine Scheme are set out within regulation or statutory authority guidance documents, the appraisal has assumed that these are adhered to as part of the Marine Scheme design. These obligations are identified as appropriate within Chapters 7 to 15 of this EAR.

4.2.5 Prediction of Impacts

An impact is defined where an interaction occurs between a project activity and an environmental or social receptor. The appraisal process ranked impacts according to their significance determined by considering magnitude of change and receptor sensitivity as described in the following sections.

4.2.5.1 Magnitude of Change

Magnitude of change is determined based on the parameters presented in Table 4-3, which were assigned a magnitude of high, medium, low or negligible based on the criteria presented in Table 4-4, and accounting for the implementation and delivery of the embedded mitigation measures.

Table 4-3: Definition of Magnitude of Change Parameters

Terms	Definition
Scale of change	The scale of change refers to the degree of change to or from the baseline environment caused by the impact being described.
Spatial extent	The spatial extent refers to the degree of change to or from the baseline environment caused by the impact being described.
Duration and frequency	The duration is the period within which the impact is expected to last prior to recovery or replacement of the feature. Frequency refers to how often the impact will occur.

Table 4-4: Magnitude of Change Criteria

Magnitude	Criteria
High	Long term (>5 years) and/or regional level loss; or major alteration to key elements/features of the baseline condition such that post development character/composition of the baseline will be fundamentally changed.
Medium	Medium term (1 to 5 years) loss and/or local level change (greater than the Marine Scheme footprint) or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Low	Short term (<1 year), site specific and/or a minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

4.2.5.2 Receptor Sensitivity

The sensitivity of a receptor is determined based on the parameters presented in Table 4-5Table 4-3, which are assigned a sensitivity of high, medium, low or negligible based on the criteria presented in Table 4-6.

Table 4-5: Definition of Receptor Sensitivity Parameter

Terms	Definition
Vulnerability	The vulnerability of the receptor relates to its capacity to accommodate change i.e., the tolerance/intolerance of the receptor to change.
Recoverability	The ability of the receptor to return to the baseline state before the Marine Scheme impact caused the change.
Importance	The importance of the receptor or feature is a measure of the receptors’ value based on biodiversity and ecosystem services, social value and economic value. Importance of the receptor is also defined within a geographical context, whether it is important internationally, nationally or locally.

Table 4-6: Receptor Sensitivity Criteria

Receptor Sensitivity	Definition
High	<p>Receptor has little or no ability to absorb change without fundamentally altering its character. For example:</p> <ul style="list-style-type: none"> Receptor has low/no capacity to return to baseline conditions within Project life, e.g., low tolerance to change and low recoverability such as a physical feature formed over a geological time scale, or loss of access with no alternatives; The receptor is a designated feature of a protected site, is rare or unique; or Receptor is economically valuable.
Medium	<p>Receptor has moderate capacity to absorb change without significantly altering its character. For example:</p> <ul style="list-style-type: none"> Receptor has intermediate tolerance to change; Medium capacity to return to baseline condition, e.g., between 5 years to 10 years; or The receptor is valued but not protected.
Low	<p>The receptor is tolerant to change without significant detriment to its character. For example:</p> <ul style="list-style-type: none"> Receptor has high tolerance to change, e.g., disturbance to unconsolidated seabed sediments or sandwaves; High capacity to return to baseline condition, e.g., within 1 year or up to 5 years; or The receptor is common and/or widespread.
Negligible	The receptor's character, survival or viability has a high tolerance to change.

4.2.5.3 Effect Significance

Effect significance, as a function of magnitude of change and receptor sensitivity, is ranked as Negligible, Minor, Moderate or Major as presented in Table 4-7.

Table 4-7: Significance Matrix

		Magnitude of Change			
		Negligible	Low	Medium	High
Receptor Sensitivity	High	Negligible/Minor	Moderate	Major	Major
	Medium	Negligible	Minor	Moderate	Major
	Low	Negligible	Negligible	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Negligible/Minor

The appraisal of significance is guided by professional judgement. Any effect classified as Major or Moderate is considered to be significant and requires additional project specific mitigation (as described below) to be implemented, where feasible. Impacts of Negligible or Minor significance are considered as being mitigated, as far as practicable and necessary.

Table 4-8 presents a description of the significance categories.

Table 4-8: Descriptions of Significance Categories

Significance Category	Description ¹	Significant Effect?
Major	<p>A large and detrimental change to a sensitive receptor: likely or apparent exceeding of accepted (often legal) threshold.</p> <p>A large and beneficial change, resulting in improvements to the baseline resulting in previously poor conditions being replaced by new legal compliance or major contribution being made to national targets.</p> <p>These effects may represent key factors in the decision-making process. Potentially associated with site and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features which are unique and which, if lost, cannot be replaced or relocated.</p>	Yes
Moderate	<p>A medium scale change which, although not beyond an acceptable threshold, is still considered to be generally unacceptable. Likely to be in breach of applicable policy rather than a legal statute.</p> <p>These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision making. A positive moderate effect is a medium scale change that is significant in that the baseline conditions are improved to the extent that guideline targets are contributed to.</p>	Yes (typically) but subject to application of professional judgment.
Minor	<p>A small change that, whilst adverse, does not exceed legal or guideline standards. Unlikely to breach applicable policy.</p> <p>A small positive change, but not one that is likely to be a key factor in the overall balance of issues.</p> <p>These effects may be raised as local issues and may be of relevance in the detailed design of a project but are unlikely to be critical in the decision-making process.</p>	No
Negligible	<p>A very small scale change that is so small and unimportant that it is considered acceptable to disregard.</p> <p>Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making irrespective of other effects.</p>	No

For some technical chapters, the approach to appraisal has been adapted because of specific technical requirements or topic specific best practice guidance. Where the approach to the appraisal of impacts differs from the approach outlined in this chapter it is described within the associated technical chapter.

4.2.5.4 Project Specific Mitigation

Project specific mitigation refers to measures which have been identified and proposed because of the appraisal and are presented within each of the topic chapters. These seek to further avoid or reduce identified potentially significant environmental effects.

Project specific mitigation may be incorporated into post-consent detailed design development. This may include, for example, micro-routing to avoid sensitive features identified during the appraisal process or use of a specific installation method in favour of an alternative type of tool to reduce environmental impacts.

4.2.5.5 Re-evaluation of Significance and Residual Effects

Following identification of potentially significant effects, additional project specific mitigation measures have been identified (where feasible) and the significance ratings have been re-evaluated to determine their effectiveness. Where further project specific mitigation measures cannot be implemented, a significant effect may remain.

¹ Adapted from Design Manual for Roads and Bridges (DMRB) Volume 11, Section 2, Part 5 HA205/08

Chapters 7 to 15 report the residual effects of their respective appraisals. Residual effects are those which are predicted remain following delivery and implementation of all mitigation measures. Residual effects may be not significant or significant.

Where the need for monitoring is a requirement following the appraisals in order to verify the predicted impacts and the successful application of all mitigation measures, this will be included within the Project’s Environmental Management Plan (EMP).

4.3 Environmental Risk (Accidental/Unplanned Events)

In addition to the above, the appraisal of unplanned events takes account of the likelihood of an event occurring. Table 4-9 presents the criteria for the appraisal of the potential likelihood of an unplanned event.

Table 4-9: Likelihood Criteria

Definition	Indicative Description*
Remote	Never occurred during Applicants’ activities on similar projects but has been known to occur in the wider industry.
Unlikely	Has occurred in the Applicants’ activities on similar projects in the past but as an isolated incident under exceptional circumstance.
Occasional	Has occurred on more than one occasion during the Applicants’ activities in the past.
Likely	Occurs regularly during Applicants’ activities.

Note these descriptions are for guidance only. Professional judgement may be applied in specific circumstances out with these guide descriptions.

Significance of an unplanned impact (Table 4-7) was combined where appropriate with the likelihood of the identified impact occurring (Table 4-9) in order to determine overall risk of an impact occurring, as shown in Table 4-10.

Table 4-10: Risk Matrix

		Likelihood			
		Remote	Unlikely	Occasional	Likely
Impact Significance	Major	Negligible/Minor	Moderate	Major	Major
	Moderate	Minor	Minor	Moderate	Major
	Minor	Negligible	Minor	Minor	Moderate
	Negligible	Negligible	Negligible	Minor	Negligible/Minor

4.4 Cumulative and In-Combination Effects Appraisal Methodology

The term ‘cumulative effect’ refers to effects upon receptors arising from the Marine Scheme when considered alongside other plans and projects and that result in an additive effect with any element of the Project. Cumulative effects can be described as the net effect of both direct and indirect cumulative pressures, from different activities. An individual effect alone may be considered insignificant, but the additive effects of more than one effect, from any number of sources, could result in a significant cumulative effect, either beneficial or adverse.

The cumulative appraisal includes consideration of the terrestrial impacts identified as part of the environmental impact assessment of the English Onshore Scheme and the environmental appraisal of the Scottish Onshore Schemes.

In-combination effects derive from combinations of Scheme-specific impacts which, when acting together, would result in a new or different likely significant effect or an effect of greater significance than one impact would result in when considered in isolation.

4.4.1 Defining the Scope of the Cumulative Appraisal

The Cumulative Appraisal (CA) considers the potential for cumulative effects between other proposed and committed developments, and other components of the Marine Scheme itself, which are anticipated to be brought forward within the same or similar timeframes.

The approach to CA follows the principles and guidelines as set out by the Planning Inspectorate (Planning Inspectorate, 2019) and the MMO Strategic Framework for Scoping Cumulative Effects (MMO 2014) and following the staged approach as summarised in Figure 4-2.

Cumulative and in-combination impacts are presented in Chapter 16: Cumulative and In-Combination Effects of this EAR.

4.5 Transboundary Effects

The Convention on Environmental Impact Assessment in a Transboundary Context (UN, 1991) sets out the obligations of parties to assess the transboundary environmental effect of certain activities at an early stage of planning. It also lays down the general obligations of states to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental effect across boundaries.

The potential for transboundary effects on neighbouring national jurisdictions was considered at scoping stage. Given that the location of the Marine Scheme in UK waters is at its the closest point approximately 170 km to the west of the Dutch EEZ boundary, it is considered unlikely that significant transboundary effects will be identified.

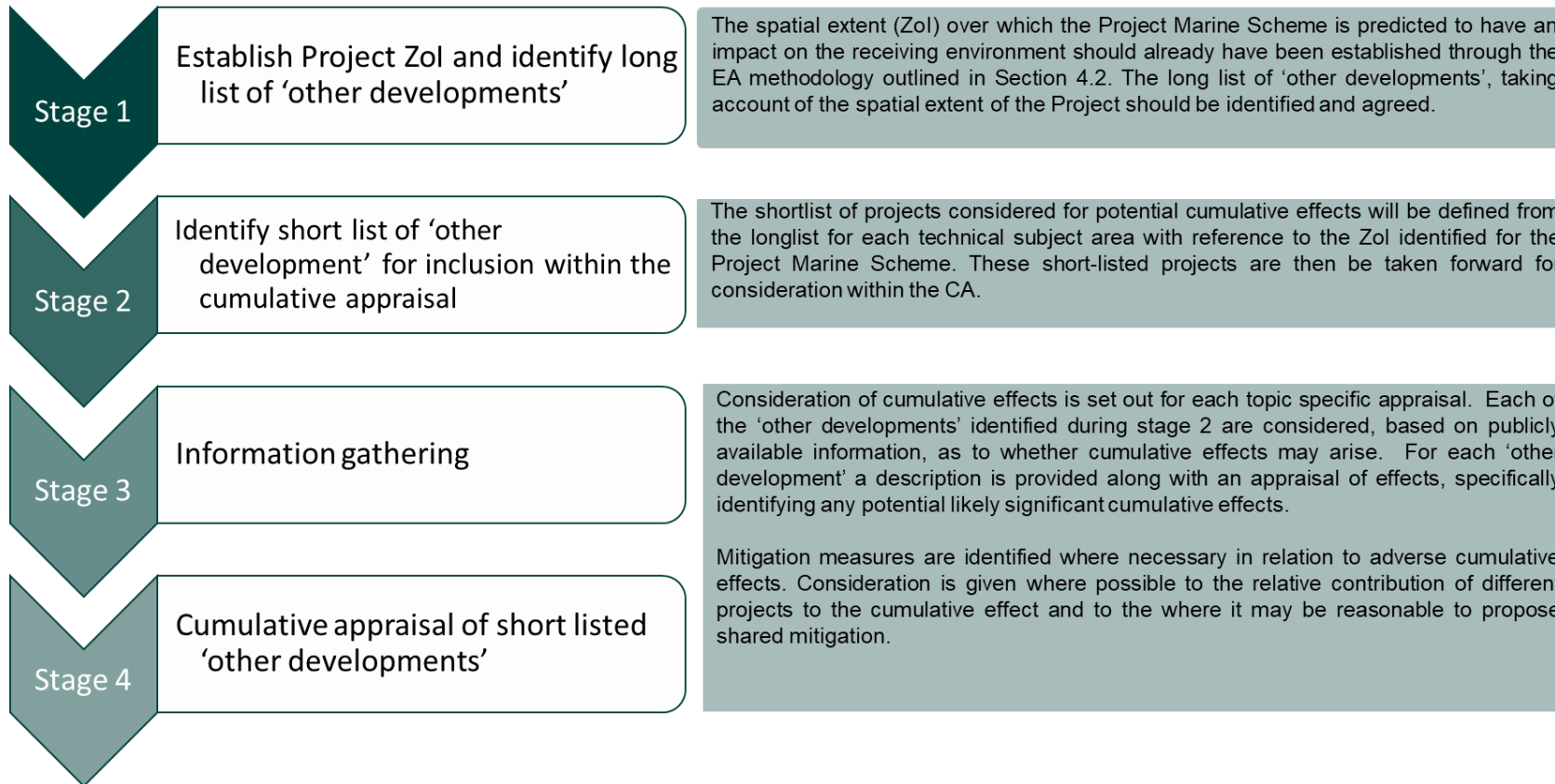


Figure 4-2: Approach to Cumulative Appraisal

