

Caerphilly Local Flood Risk Management Strategy

Strategic Environmental Assessment / Sustainability Appraisal

Document 2 – Environmental Report

October 2012

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Appendix 9 – Reassessment of Amended Detailed Objectives

Glossary Of Terms

SEA.....	Strategic Environmental Assessment
SA.....	Sustainability Appraisal
SEA Regs	The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004
National Strategy	National Strategy for Flood and Coastal Erosion Risk Management in Wales (November 2011)
EAW.....	Environment Agency Wales
CCW	Countryside Council for Wales
CCBC.....	Caerphilly County Borough Council
Caerphilly LFRMS.....	Caerphilly Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority, an authority charged with producing a LFRMS
Scoping Report	Strategic Environmental Assessment of the Caerphilly Local Flood Risk Management Strategy – Scoping Report
RRPPP	Strategic Environmental Assessment of the Caerphilly Local Flood Risk Management Strategy – Review of Relevant Plans Programmes and Policies
EC / EU.....	European Community/Union
SEA Directive.....	Directive 2001/42/EC on the assessment of the affects of certain plans and programmes on the environment
Habitats Directive.....	Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora
HRA	Habitat Regulations assessment (Incorporating Appropriate Assessment) of the Caerphilly Local Flood Risk Management Strategy
Natura 2000	Sites designated under European Legislation to protect their biodiversity, i.e. SPAs, SACs, Ramsar Sites
SPA.....	Special Protection Area – Designated protection are for birds
SAC	Special Area of Conservation – designated protection area for biodiversity
Ramsar site.....	Designated protection area for wetland habitats
Strategy Objectives.....	Objectives contained in the LFRMS setting out the anticipated outcomes of the Strategy.
SEA Objectives.....	Key issues identified in the Scoping Report, which relates to the issue of flooding, and that form the basis of the framework for assessing the alternative approaches to the Caerphilly LFRMS
SEA Indicators	More detailed issues that, when grouped together, comprise the SEA Objective and form the basis of the

	framework for assessing the Objectives of the Caerphilly LFRMS
Assessment Framework	A series of Indicators that are used to assess the likely effects of the Caerphilly Local Flood Risk Management Strategy
ATs	Assessment Tests - Questions used to assess and quantify the effects of the strategy, derived from the SEA Objectives and SEA Indicators
LDP	Caerphilly County Borough Local Development Plan (Adopted November 2010)
Alternative Approaches.....	The reasonable alternatives to the strategy that the council have adopted to meet the requirement to reduce flood risk.
Overarching Objectives.....	High level LFRMS Objectives taken from Paragraph 169 of the National Strategy
Detailed Objectives.....	Detailed LFRMS Objectives that set out what the strategy seeks to achieve.

1 Introduction

Background to The Local Flood Risk Management Strategy

- 1.1 The Flood Risk Regulations came into force in December 2009 and the Flood and Water Management Act became law in April 2010. Under this legislation Caerphilly Council Borough Council (CCBC) has been identified as a Lead Local Flood Authority (LLFA) that carries a number of key responsibilities.
- 1.2 The purpose of the Flood Risk Regulations is to transpose the European Commission (EC) Floods Directive (2007/60/EC), on the assessment and management of local flood risk, into domestic law in England and Wales and to implement its provisions.
- 1.3 In particular it places duties on the LLFAs to prepare a number of documents including: -
 - Preliminary Flood Risk Assessment Report - October 2011 (Completed October 2011)
 - Flood Hazard and Flood Risk Maps (Deadline for completion June 2013)
 - Flood Risk Management Plans (Deadline June 2015)
- 1.4 In addition CCBC must develop, maintain, apply and monitor a strategy for local flood risk management. The Caerphilly County Borough Council Local Flood Risk Management Strategy (LFRMS) is being prepared to satisfy the requirements set out in the Flood and Water Management Act 2010.
- 1.5 The Flood and Water Management Act identifies the following 9 issues that must be addressed in the Strategy:
 - i) The Risk Management Authorities in the Local Authority's area;
 - ii) The flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area;
 - iii) The objectives for managing local flood risk;
 - iv) The measures proposed to achieve those objectives;
 - v) How and when the measures are expected to be implemented;
 - vi) The costs and benefits of those measures, and how they are to be paid for;
 - vii) The assessment of local flood risk for the purpose of the strategy;
 - viii) How and when the strategy is to be reviewed; and
 - ix) How the strategy contributes to the achievement of wider environmental objectives.
- 1.6 The scope of the strategy is set out in the legislation and flood risk, relevant to the strategy, is defined as being flood risk from:
 - i) Ordinary watercourses (*including lakes, ponds or other areas of water, which flow into an ordinary watercourse not forming part of a river*).
 - ii) Surface runoff (*rainfall or other precipitation which is on the surface or ground and has not entered a watercourse drainage system or public sewer*); and
 - iii) Ground water (*water that has percolated into the ground, which can collect in the widespread former mine workings throughout the county borough, that*

discharges to the surface through springs and arisings located lower down the catchment).

- 1.7 All LLFA in Wales are required to develop, maintain, apply, and monitor the application of a strategy for local flood risk management in their area (Local Strategy). They must also prepare and publish a summary of the Local Strategy, including guidance about the relevant information. The Act also makes provision for each LLFA to prepare guidance on the implementation of the strategy.

Background to Strategic Environmental Assessment

- 1.8 The European Union passed a Directive in 2001 (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment. This Directive, commonly known as the Strategic Environmental Assessment Directive (SEA Directive) has been interpreted by the UK and Welsh Governments to meet national needs. In Wales the Welsh Government's publication 'The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004' (The Regulations) sets out the Welsh perspective.
- 1.9 Environmentalists have argued for some time that the environment has played too small a part in decision-making in plans and policies. It was held that whilst both economic and social issues could be reversible, those decisions made affecting the environment were often irreversible. As an aid to addressing this concern the aim of the Strategic Environmental Assessment (SEA) process is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development. The SEA Directive goes as far as indicating the issues that should be included within any appraisal:
- Landscape.
 - Flora and fauna.
 - Biodiversity.
 - Climate change.
 - Human health.
 - Water.
 - Soil.
 - Population.
 - Air.
 - Cultural heritage.
 - Material Assets.
- 1.10 All of the issues should be included in an assessment. These are not intended to be inclusive and flexibility is allowed with regard to local circumstance, however the interconnectivity between the topics is a requirement. For the purposes of this SEA four of the topics listed above, namely Biodiversity - Flora & Fauna and Population - Human Health have been combined into two topics.
- 1.11 Guidance also sets out the screening criteria in order to identify which plans and processes require strategic environmental assessment. The Regulations require that the council determine whether SEA is required for any plan, policy or

programme it produces. Chapter 1 of the Scoping Report sets out this determination, which concluded that SEA is required for the Caerphilly LFRMS.

- 1.12 Caerphilly County Borough Council is the 'Responsible Authority' for the preparation of the SEA and the LFRMS. The Directive makes it mandatory for CCBC to consult with the Environment Agency (Wales) (EAW), the Countryside Council for Wales (CCW) and Cadw in setting the scope of the SEA, which is set out in the Scoping Report. In accordance with Regulation 12 the council formally consulted with the statutory bodies, CCW, EAW and Cadw, on the Draft Scoping Report on 6 August 2012, for a 5-week period ending 12 September 2012. Comments were received from CCW and EAW and the comments made by these bodies have been addressed in the background document "Report of Consultation – Statutory Consultee Involvement". This report outlines the comments received and the council's response to them, including any changes made to the Scoping Report in light of the comments. The Environmental Report uses the Scoping Report as amended by the statutory consultee involvement process, i.e. the Revised Scoping Report, as its starting point.
- 1.13 The SEA regulations require that an Environmental Report is prepared, which should identify, describe and evaluate the likely significant effects on the environment of;
- Implementing the plan or programme,
 - Reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme.
- 1.14 The level of detail required is not prescribed. However guidance indicates additional primary research is not necessary and only a limited number of indicators should be used to monitor the Strategy. To meet its objective the SEA must identify indicators that are reactive, relevant and appropriate to undertake a robust and meaningful assessment of the Strategy. As such the SEA will set out an appropriate and relevant set of indicators for the assessment process.

Consultation

- 1.15 The SEA Regulations require that an SEA be subject of consultation for a period of not less than 28 days. The Environmental Report, the Scoping Report, along with the Report of Consultation – Statutory Consultee Involvement, and the Habitat Regulations Assessment of the LFRMS will be the subject of a six-week consultation period that will coincide with the consultation period for the LFRMS itself. During this period comments can be made on all of the documents. Details of the consultation period are set out in the LFRMS document.

Background to Strategic Environmental Assessment of The Local Flood Risk Management Strategy

- 1.16 The main purpose of SEA is to ensure that environmental considerations are included in the decision-making processes for the preparation of plans, programmes and policies that will provide a framework for making development decisions. As a result the SEA Regs require that any plan, programme or policy, which is likely to have significant environmental impacts, be subject to SEA.
- 1.17 Local Development Plan (LDP) procedures require that both SEA and Sustainability Appraisal (SA) be undertaken in conjunction with each other. It is accepted that the

LFRMS does not fall within the scope of the LDP regulations, but there are significant similarities and synergies between SEA and SA, in addition to Welsh Government and CCBC objectives relating to promoting sustainable development, that undertaking both together would realise a more comprehensive assessment and provide added value to the process. An SEA/SA has already been undertaken for the LDP during its preparation and this sets out an appropriate structure and methodology for subsequent assessments to utilise. Consequently the council has decided to undertake the SEA of the LFRMS using the same methodology and format as that used for the LDP, and, consequently, the SEA will incorporate SA of the strategy as well.

- 1.18 The requirements for SEA cover a wide range of tasks and it would be confusing and inappropriate to include all of the information in one document. Consequently the SEA of the LFRMS will be set out in three separate documents, which are outlined below:

Document 1 – Revised Scoping Report

- 1.19 The first part of the SEA process is to establish the baseline level, or scope, for the state of the environment. This will inform the assessment framework for assessing the LFRMS and will provide the baseline against which it can be assessed. The backbone of this report is the series of SEA Objectives and SEA Indicators set out under the broad SEA topic areas of Population & Human Health, Air Pollution, Cultural Heritage & Landscape, Geology & Soils, Biodiversity, Material Assets and Climatic Factors. The SEA Objectives and SEA Indicators are used as the basis for assessing the likely potential effects of the LFRMS.
- 1.20 It is also a requirement of the SEA process that a review of current legislation and guidance at European, National, Regional and Local levels is undertaken to identify any requirements or matters that either the Strategy, or its SEA, should incorporate. This review, called The Review of Relevant Plans, Programmes and Policies, is included within the Scoping Report as Appendix 1.
- 1.21 The Scoping Report has been subject of consultation with the statutory bodies for SEA, namely CCW, EAW and Cadw, in accordance with Regulation 12 of the SEA regulations. The Scoping Report has been amended in respect of the comments made by the statutory bodies.

Document 2 - Environmental Report (This document)

- 1.22 This document sets out the methodology and findings of the assessment of the LFRMS. In particular this document sets out:
- The methodology used in assessing the LFRMS;
 - The findings of the assessment;
 - Matters for further consideration;
 - Areas for consideration of mitigation;
 - An overall assessment of the likely effects of implementing the LFRMS.
- 1.23 This document sets out the findings of both the assessment of alternative approaches and the assessment of the strategy objectives, as required by the SEA Directive. The assessments are part of an iterative process as part of the preparation of the LFRMS. It is not, however, the role of the SEA to assess the

strategy once it is complete, as the aim of the SEA process is to bring environmental considerations into the decision-making processes in preparing plans, programmes and policies.

- 1.24 The LFRMS includes an appendix that addresses the comments made through the SEA process and identifies any changes made to the strategy in respect of them. The Environmental Report also considers whether the changes made to the strategy are sufficiently significant to warrant reassessment.
- 1.25 It is proposed to make amendments to the LFRMS in response to the SEA comments. The proposed amendments have been considered through the SEA process, with a view to identifying whether the amendments would lead to significant changes in the content of the LFRMS that could lead to significant environmental effects, which have not been considered to date. This assessment, which is set out in Appendix 4 of this report, identifies that two of the LFRMS Objectives need to be reassessed due to the potential to realise significant environmental effects which have not been considered through the SEA assessment process.

Document 3 - Habitats Regulations Assessment

- 1.26 In addition to the SEA, The EU Habitats Directive also requires that any plan programme or policy, which is likely to have significant impacts on Sites designated under European Legislation (to protect their biodiversity (Natura 2000)), should be subject of an assessment of their likely significant impacts. This is termed the Habitats Regulations Assessment (HRA). Whilst HRA is not part of SEA, and is prepared under separate legislation to the SEA, it is often included within the suite of documents that comprise the overall SEA documentation and this has been done in the case of the Caerphilly LFRMS.

2 Assessment Methodology

Reasonable Alternatives

- 2.1 The SEA Directive and SEA Regs require that consideration is given to both the likely significant effects of implementing the strategy and the likely significant effects of any reasonable alternatives to the strategy. Identifying reasonable alternatives is a problematic element of the SEA as there is no definition of what “alternative”, for this purpose, means. For a detailed development plan alternatives may relate to wordings for policies, different strategic sites or other specific matters. For higher level documents it may be appropriate to consider different courses of action or approach to the matter at hand.
- 2.2 In terms of the LFRMS the document seeks to set the over-arching approach to addressing flood risk and as such is a higher level document. As a result the council has determined to consider alternative approaches to realising the overall aim of the LFRMS, which is to reduce the risk of flooding, as its reasonable alternatives and these have been assessed as part of the SEA process.
- 2.3 The council identified 3 broad options for delivering flood risk reduction, namely:
- Option A – Community Involvement. This option seeks engagement with the public as flood risk partners. This option involves making the public aware of the flood risk in their locality to enable them to understand the nature of the risk and take personal ownership through implementation of Community Flood Plans. It is essential that the public realise that flood risk cannot be eliminated in its entirety and, depending on the likely severity of the flooding, this option would seek to employ early warning to residents to enable them to move to a safe part of their homes or to move to a safe location. This option reduces the risk of flooding, but does not reduce the hazard.
 - Option 2 - Reduction of the Flood Hazard. This option seeks to reduce the peak runoff from a given storm and/or reduce the total runoff from a given catchment. This is achieved through soft engineering solutions such as land management, changing agricultural practices and establishing additional attenuation of floodwater through providing natural features such as swales. This option reduces the volume and intensity of the runoff. This in turn could reduce the depth of flooding and the depth and velocity of flows downstream thus reducing flood risk. In essence this option seeks to reduce risk by reducing the severity of the flooding event.
 - Option 3 - Enhancement of the Flood Defence System. This option seeks to enhance existing flood defences where they are found to be inadequate to protect communities. Measures to achieve this include, where appropriate, increasing the height of existing earth, concrete and wall defences, and the construction of new defences around communities without them. In addition to this existing culverts could be made more effective through the construction of new intake grids and enlargement of the culverts themselves. This option seeks to reduce risk by physically protecting communities from potential flooding.
- 2.4 The three options represent the three methods of addressing the issue of reducing flood risk. The LFRMS can seek to achieve its aim of reducing flood risk by implementing one or more of the three options. The permutations between the three options provide alternative approaches to the strategy, which constitute

reasonable alternatives, satisfying the requirements of the SEA Directive. The LFRMS has put forward 7 alternative approaches from the options, namely

- Alternative Strategy 1 – Option A only
- Alternative Strategy 2 – Option B only
- Alternative Strategy 3 – Option C only
- Alternative Strategy 4 – Option A then Option B
- Alternative Strategy 5 – Option A then Option C
- Alternative Strategy 6 – Option B then Option C
- Alternative Strategy 7 – Option A then Option B then Option C (*adopted strategy for LFRMS*)

2.5 It should be noted that, when considering the potential effects of the alternative strategies in identifying the 7 alternative approaches a hierarchy was applied to the options in terms of implementation, with Option A being the highest priority, Option B the second and Option C the last. In implementing the alternatives the highest priority option would be implemented first, the next highest priority would only be implemented where the higher priority option had not been successful and, in the case of alternative 7, the last option would be implemented where the previous two had not been successful.

The Assessment Framework

2.6 The purpose of the SEA is to consider the significant environmental effects resulting from the implementation of a plan, programme or policy, or in this case a Strategy. In order to identify and consider such effects, it is necessary to set benchmarks against which the effects can be quantified. These benchmarks are set out in the Scoping Report as SEA Objectives and SEA Indicators and are derived from the issues facing the environment of the county borough during the LFRMS period. The Scoping Report groups the SEA Objectives and SEA Indicators into 9 topic headings, which relate to the topic areas identified in the SEA Directive.

2.7 The SEA Objectives are over-arching issues covering wide areas of the environment. As such they are more appropriate for considering effects on a broad scale. Consequently they lend themselves to the consideration of the strategy as whole, rather than any specific underlying strategy objectives. The SEA Objectives, therefore, have been used to assess the alternative approaches to the Strategy, as they are at the appropriate scale for the task.

2.8 The SEA Indicators are more detailed and specific issues that represent a specific detailed part of a SEA Objective. The more detailed nature of the SEA Indicators makes them suitable for considering the more specific and detailed effects arising from the Strategy Objectives. The SEA Indicators, therefore, have been used as the basis to assess the strategy objectives.

2.9 It should be noted, however, that the SEA Objectives and SEA Indicators are not themselves suitable to use for assessment as they are essentially drafted as issues with relevant targets. In order to establish the framework for assessment, the SEA Objectives and SEA Indicators need to be amended to ask a specific question that can elucidate a quantified response from the element being tested. These questions are termed Assessment Tests (ATs) and have been identified as part of the

assessment process. Appendix 1 identifies the SEA Objectives and the respective ATs that have been used to assess the Alternative Approaches to the Strategy, whilst Appendix 2 identifies the SEA Indicators and respective ATs that have been used to assess the Strategy

The Approach To The Assessment

- 2.10 The approach used to assess both the Alternative Approaches and the Strategy Objectives is basically the same, namely each alternative or objective is considered against each relevant AT, identifying whether the strategy or objective will have a positive, negative or neutral effect on that AT. The SEA Regulations, however, not only require the nature of the effect to be identified, but also the significance, in terms of scale, of the effect to be quantified as well.
- 2.11 The SEA Assessment process needs to record the results of the assessments and, as such, are required to relate the nature and scale of effects in its recording mechanisms. Established good practice for recording SEA Assessment results is the traffic light approach, which identifies the nature and scale of effects through the use of symbols and colours. The assessment of the LFRMS has used the symbology set out in Table 1 below, to reflect the results of the assessment process.

Assessment Test Responses		
Negative	- -	The Alternative/Objective delivers significant negative effects on the Assessment Test, which cannot be overcome by mitigation and could undermine the Strategy
	-	The Alternative/Objective delivers negative effects in respect of the Assessment Test, which could be overcome with mitigation.
Neutral	O	The Alternative/Objective has little or no anticipated impact, either positive or negative.
	+ / -	The Alternative/Objective delivers both positive and negative effects, which are sufficiently significant to warrant positive and negative recording, but together realise no overall effect.
Positive	+	The Alternative/Objective delivers positive effects that go part way to meeting the Assessment Test.
	+ +	The Alternative/Objective delivers significant positive effects that contribute significantly towards meeting the Assessment test.

Table 1

- 2.12 All of the assessments were undertaken by a panel with a minimum of 3 assessors, from differing backgrounds, which included a drainage engineer to provide relevant information to inform the consideration of the Strategy. It is important to note that, in undertaking the assessment element of SEA, in depth consideration of the potential effects relating to any AT will identify both positive and negative effects. Such detailed consideration could lead to an overly complicated and potentially skewed set of results. Consequently the Panel considered the overall potential for effect to provide meaningful results that could assist in preparing the LFRMS.

3 The Assessment of Alternative Strategies

- 3.1 This section of the Report sets out the findings of the assessments of the Strategy and its alternative approaches. A summary of the assessment of effects for each Alternative Strategy are set out in table form in Appendix 3.
- 3.2 In considering the results of any of the assessments, it is important to note that SEA is a strategic level assessment that must take a broad view in drawing its conclusions. Consequently in considering each assessment the overall effect must be considered. All actions will have positive and negative effects, and it is the balance of these that is important. Therefore it is important to note that a double negative effect recorded against a particular AT does not mean that the alternative strategy or objective being assessed is flawed and requires major change, it may be balanced or even outweighed by the level of positive effects meaning the overall effect is positive.
- 3.3 As outlined in Chapter 2 above, the alternative strategies have been developed from the three different approach options that can be employed to realise the aim of LFRMS, which is to reduce flood risk. A total of 7 alternative strategies have been identified in the LFRMS from the three options. Where more than one option has been included in a strategy a hierarchical phasing of the options has been employed, i.e. options lower down the hierarchy are only employed where higher level options have not succeeded. It should be noted that such a phased approach means the effects realised by the subsequent phases of any of the strategies will be muted due to the limited area covered by the strategy measures, as areas protected under higher phases would not be subject to lower phase measures. It must be noted that the alternative strategies do not include options that run concurrently and the issues raised by this position and the implications for the SEA are addressed in the conclusion to this chapter.
- 3.4 The alternative strategies have been assessed against the Assessment Tests derived from the SEA Objectives, which are set out in Appendix 1.

Alternative Strategy 1 – Option A only

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- 3.5 This strategy seeks to engage with, and empower, the public to act in respect of flood risk issues. The strategy seeks to enable the public to implement local flood defence measures and, where this is insufficient, to provide advance warnings to enable the public to move to safer areas through moving to higher rooms or even evacuation to safe areas. This Strategy does not seek to protect property via formal flood defences, nor reduce the incidence or severity of the flooding by attenuating potential floodwater.
- 3.6 The assessment realises 1 double positive result for reducing the severity of flood events (which in the assessment has been taken to be in respect of people). In support of this only 3 single positive results have been realised relating to enabling people to take site-by-site protective measures. Conversely there are 5 single negative results relating to the magnitude of flood events and effects on land outside of areas where people live (it is an implication that people will protect their property, the vast majority of which is in urban areas).

- 3.7 The significant element arising from this assessment is the large number of neutral effects that have been realised across the whole of the Assessment Tests. The neutral results can be explained by looking at the ethos of the strategy, which is effectively to inform and enable people to protect their property to a point, but after that remove the population to reduce the risk to life, i.e. the alternative does not seek to stop the flood event, merely seeks to protect individual properties or remove people away from flooded areas. As a result this alternative does little to alter the status quo (in terms of the likely incidence or scale and severity of flooding). As a result there is little that can impact upon the assessment tests resulting in the large number of neutral effects.
- 3.8 Where effects have been identified, these have been in respect of Assessment Tests that are impacted by localised action, thus changing the status quo, e.g. localised defences will focus floodwater to other areas causing potential damage.
- 3.9 Whilst the majority of the effects are neutral, there are positive and negative effects that influence the overall effect of the strategy. Whilst a double positive effect was realised for reducing flood event severity, this relates to localised flood defences protecting individual properties and would not be a widespread effect. Conversely the negative effects would be realised over wider areas and, even though the significance of the effects are lower than the double positive effect, they affect a larger area and, as such, would outweigh the positive effects. As a result it is concluded that this alternative is slightly negative in overall effect.

Alternative Strategy 2 – Option B only

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- 3.10 This strategy seeks to intervene in the flood process with the aim of reducing the peak flow of surface run-off, which will reduce the level of floodwater and reduce the severity of the flood incident. The Strategy seeks to achieve this through the use of green engineering solutions such as SuDS and the creation of attenuation areas by the creation of features such as swales. It is important to note that this strategy does not seek to protect land or property through flood defences
- 3.11 The fact that the strategy seeks to intervene in the water cycle means that more direct and identifiable effects will be realised, when compared to other strategies that do not seek to intervene. This is reflected in the fact that only 9 neutral effects were realised and many of these relate to climatic factors which this strategy does not seek to address.
- 3.12 This assessment realises 3 double positive results, based on interventions in floodwater due to attenuation. Attenuating flows reduces flood severity and magnitude and will also improve water quantity, by reducing the flashiness of the river catchment, resulting in more even and consistent flows. A further 5 single positive results are also realised for improving material asset performance and protecting land and building through reduction in flood levels rather than physical defences.
- 3.13 Conversely only 4 negative results are realised, all of which relate to constraints on land imposed by establishing flood management measures. One positive/negative effect was also identified relating to protection of soils, with positive effects being realised from reduction of flood levels assisting in reducing soil erosion, whilst

negative effects are realised from soils lost to beneficial use when included within engineering solutions.

- 3.14 Overall the strategy realises significantly stronger and higher levels of positive effects than negative ones. As such, this alternative is considered to result in positive effects.

Alternative Strategy 3 – Option C only

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- 3.15 This strategy seeks to reduce flood risk by reducing the numbers of properties and people at risk to flooding by protecting land and property through maintaining and enhancing physical flood defences. The strategy seeks to bolster existing flood defences, through increasing existing and creating new, complimentary defences. The strategy reduces risk to people and property by protecting developed areas and directing floodwater to other areas. The strategy does not seek to influence the level of flooding.
- 3.16 In undertaking this assessment the assessment panel adopted the assumption that the flood defences would be focussed on the areas where the concentrations of people and property were highest, namely existing settlements. The corollary of this is that the settlement areas would be protected at the expense of those areas outside the settlements, predominantly countryside areas. The assessment effects reflect this assumption.
- 3.17 This strategy realised 3 double positive effects in respect of reducing flood severity, protecting important installations (key flood indicators) and enabling the efficient use of land, through promotion of brownfield development by protecting urban areas. In support of this 6 further single positive effects were realised in relation to localised reduction in flood magnitude, and the protection of future development land within settlements. The positive effects are based upon the beneficial impacts the strategy will have in the urban areas, so the extent of the effects is restricted.
- 3.18 Conversely the assessment realised 2 double negative effects in relation to the quantity of water in rivers by directing floodwater away from settlements and into watercourses and increased resource consumption related to the engineering operations related to the construction and maintenance of flood defences. In addition to these single negative effects were realised in relation to the overall consequences on biodiversity of redirecting floodwater away from settlements and increasing CO2 emissions related to increased engineering works.
- 3.19 Only 8 neutral effects were realised and this reflects the strategy’s approach of intervention in the flood event, which naturally produces more direct effects. This is also supported by polarised nature of the predicted effects, with significant positive and negative effects being realised. One positive/negative effect was also identified relating to protection of soils, with positive effects being realised from protection of rural areas from construction of engineering solutions, whilst negative effects are realised from soils lost due to scouring in rural areas from redirected floodwater.
- 3.20 The positive results realised from this assessment do outweigh the negative ones, although the balance must be tempered by the knowledge that 2 significant negative effects are also realised. Overall the assessment is positive, but if this

alternative is chosen it is likely to require significant mitigation to overcome some of the more negative effects, and could realise significantly greater positive effects if measures to reduce the magnitude of flooding were incorporated. It is recommended that green measures for reducing run-off flow be included in this Strategy.

Alternative Strategy 4 – Option A then Option B

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- 3.21 This strategy seeks, as the first step, to reduce flood risk by enabling the public to protect their properties to a point, then remove people from areas of risk where this is not possible. Then in areas where the first step has not worked the strategy will seek to employ green measures to reduce peak flow run-off through attenuation. The steps are phased, with step 2 only proceeding after the implementation of step 1, and in areas where the step 1 measures have not realised their desired outcomes.
- 3.22 The assessment realised one double positive effect in relation to the reduction in the severity of flood events. The assessment also realised 5 single positive effects relating to the localised protection of properties and the knock-on effects of that, reflecting the restricted nature of intervention in this strategy.
- 3.23 Conversely the strategy realises 5 single negative effects in relation to flooding affecting land that has not been subject of localised protection, which constrains potential use or development.
- 3.24 Eleven neutral effects were recorded and this is reflective of the passive nature of the first phase of the strategy.
- 3.25 The element to consider for this strategy is how the recorded effects for this assessment differ from the original effects recorded for Option A (refer to Alternative Strategy 1 above). The only difference in results is an increase in single positives from 3 to 5, with a corresponding reduction in neutral effects from 13 to 11. Whilst the overall effects are slightly more positive, it should be remembered that the results for Option B, the second phase of the strategy, realised 3 double negative effects and 6 single negative effects and only 4 single positive effects, which is one less than Option A and the results of this assessment. It is clear, therefore, that whilst the inclusion of Option B within this strategy has a positive effect, the full positive potential of this option has been diluted by the use of the hierarchical phased approach.
- 3.26 Overall the assessment is broadly neutral and realises a balanced position between positive and negative effects, although the implications in respect of constraining future development may well be very significant in the long term. In terms of comparison with the assessment for Option A, this assessment realises only slightly more positive effects, but these are insufficient to sway the position that the overall effect of the policy is neutral.

Alternative Strategy 5 – Option A then Option C

++	1	+	3	○	12	+ / -	0	-	5	--	1
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- 3.27 This strategy seeks, as the first step, to reduce flood risk by enabling the public to protect their properties to a point, then remove people from areas of risk where this is not possible. Then in areas where the first step has not worked the strategy will maintain and enhance existing flood defences to protect people and property. The steps are phased, with step 2 only proceeding after the implementation of step 1, and in areas where the step 1 measures have not realised their desired outcomes.
- 3.28 The assessment has realised one double positive effect in relation to the reduction in the severity of flood events as a result of the combination of localised flood measures from Option A and direct flood defences from Option C. In addition to this 3 single positive effects have been realised in relation to protection of cultural heritage and historic assets and reduction in contamination, all of which are a result of the localised flood defence measures.
- 3.29 The assessment also realised 1 double negative effect in relation to the quantity of water in rivers. This strategy does not seek to control flow or reduce peak flow, but seeks to protect property on a localised and then generalised manner. This results in increased volumes of water in watercourses during peak periods due to the lack of attenuation and the water being directed away from settlements. This is supplemented by 5 single negative effects relating to impacts on biodiversity, soils geological sites, and key indicators, due to the defensive measures, and increases in ecological footprint from implementing engineering works.
- 3.30 The assessment realised a significant level of neutral effects with 12 being recorded. This would normally point to a strategy that has little impact. However the significance of the positive and negative effects render this position unlikely.
- 3.31 The element to consider for this strategy is how the recorded effects for this assessment differ from the original effects recorded for the Option A (refer to Alternative Strategy 1 above). The only difference in results is an increase in double negatives, from 0 to 1, with a corresponding reduction in neutral effects from 13 to 12. Without doubt this assessment realises a more negative overall outcome than that realised for implementing Option A. The positive effects identified in the assessment of Option B (refer to Alternative Strategy 2 for the findings) have been lost as a result of the watering down of the part 2 measures due to the hierarchical phasing. This precludes any potential offsetting of the negative effects and these are manifested in the assessment results.
- 3.32 The high level of neutral effects would normally be associated with a strategy that has little overall effect. However the significance of the positive and negative effects would be unlikely to lead to a balancing out of overall effect. Given this the negative effects slightly outweigh the positive effects so the overall outcome of the assessment can only be considered to be slightly negative in effect.

Alternative Strategy 6 – Option B then Option C

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- 3.33 This strategy seeks, as the first step, to reduce flood risk by employing green measures to reduce peak flow run-off through attenuation. Then in areas where the first step has not worked the strategy will seek to maintain and enhance existing flood defences to protect people and property. The steps are phased, with step 2

only proceeding after the implementation of step 1, and in areas where the step 1 measures have not realised their desired outcomes.

- 3.34 The assessment has realised 5 single negative effects, relating to constraints on land imposed by establishing flood management measures, impacts upon landscape and increased ecological footprint and CO₂ emissions. No double negative effects have been realised.
- 3.35 By contrast 8 single positives effects have been realised, relating to protection of the cultural and historic environment, improvements to water quantity and reduction in flood magnitude, and protection of key sites and material assets. In addition to this 1 double positive effect has been realised relating to the reduction in flood severity.
- 3.36 Only 8 neutral effects were realised and this reflects the fact that the strategy is composed of two separate elements, both of which seek to intervene in the water cycle. One positive/negative effect was realised and this, again, related to the protection of soils
- 3.37 The element to consider for this strategy is how the recorded effects for this assessment differ from the original effects recorded for the Option B (refer to Alternative Strategy 2 above). There are a number of differences across the board between the two assessment results, with a decrease in double positive effects from 3 to 1, an increase in single positives from 5 to 7, a decrease in neutral effects from 9 to 8 and an increase in single negative effects from 4 to 5. This assessment clearly realises a more negative set of effects than that realised by Alternative Strategy 2. This is undoubtedly linked to the hierarchical phasing of the Options, which results in the positive elements of the second phase being watered down by its limited area and implementation. Conversely, due to the opposing natures of the two Options involved in this Strategy, the negative effects of Phase 2, reinforces the negative elements of Phase 1 bringing about the a more negative overall assessment.
- 3.38 Despite the fact that the assessment results are more negative that recorded for Alternative Strategy B, the positive effects still outweigh the negative effects and overall it is considered that the Strategy will realise slightly positive effects.

Alternative Strategy 7 – Option A then Option B then Option C

++	1	+	7	○	11	+ / -	0	-	3	--	0
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- 3.39 This strategy seeks, as the first step, to reduce flood risk by enabling the public to protect their properties to a point, then remove people from areas of risk where this is not possible. Then in areas where the first step has not worked the strategy will seek to employ green measures to reduce peak flow run-off through attenuation. Then in areas where steps 1 and 2 have not worked the strategy will seek maintain and enhance existing flood defences to protect people and property. The steps are phased, with step 2 only proceeding after the implementation of step 1, and in areas where the step 1 measures have not realised their desired outcomes, and step 3 only proceeding after the implementation of step 2, and in areas where the step 2 measures have not realised their desired outcomes.

- 3.40 The assessment has realised 1 double positive effect in relation to the reduction in the severity of flood events. In addition to this the assessment realised 7 single positive results relating to protection of material and historic assets and cultural heritage, flood magnitude and key indicators, reducing contamination and water quantity. All the positive effects are realised as a result of cumulative effects of the three options, rather than any particular individual options providing specific positives.
- 3.41 The assessment has also realised 3 single negative results relating to protecting landscapes, effects on soil and biodiversity. These effects are primarily realised through a combination of Step 1 measures being reinforced by Step 3 measures. The Step 2 measures, which could balance out the negative effects, are muted by restricting implementation in terms of scope and area and, as such, are not significant enough to balance out the negative effects.
- 3.42 The element to consider for this strategy is how the recorded effects for this assessment differ from the effects recorded for the Option A (refer to Alternative Strategy 1 above). The only differences in results is an increase in single positive effects from 3 to 7 and a reduction in single negatives from 5 to 3, with an associated reduction in neutral effects from 13 to 11. Without doubt this assessment realises a more positive overall outcome than that realised for implementing Option A.
- 3.43 Despite the 11 neutral effects, the assessment realises a large number of positive effects that clearly outweigh the small number of negative effects. Consequently it can only be concluded that this strategy would realise positive effects.

Conclusions

- 3.44 All of the assessments realise a significant proportion of neutral effects, with even the assessments with the lowest number of neutral effects realising over 33% neutral effects. This reflects the fact that the LFRMS relates specifically to flood risk and, as such, has a limited sphere of influence that would naturally realise a high number of neutral effects. Further to this the alternative strategies, other than Alternative Strategy 7, include only some of the methods to address the flood risk issue and this limits the sphere of influence further.
- 3.45 It should be noted, however, that there are a large number of secondary effects identified throughout the assessments. These represent effects that the implementation of the strategy will have, but the effects are not of sufficient scale or magnitude that they would constitute a significant effect in SEA terms. Consequently these are identified as neutral effects, with noted secondary effects, in the assessments. The secondary effects are both positive and negative, although the negatives are outweighed by the positives and, therefore, the overall assessments are generally slightly more positive than the direct effects would indicate. In addition to this mitigation can also be used to reduce and even avoid negative effects, although such mitigation is best identified through the Local Flood Plans where detailed actions are set out.
- 3.46 In terms of the Options that comprise the Alternative Strategies, it is clear that Options B and C realise far more positive and neutral effects than Option A. This is a result of the fact that both Option B and Option C seek to intervene in the flood event cycle, Option B by seeking to attenuate potential floodwater, and Option C by

directly protecting people and property with flood defences. Direct action proposed by any plan, programme, policy or strategy is more likely to realise a definitive effect due to direct impacts upon the environment. Option A, through seeking to remove people from risk, rather than seeking to address the flooding, is a more indirect approach that is less likely to impact upon the environment generally and, as would be expected, realises a higher proportion of neutral effects.

- 3.47 The alternative strategies that have been put forward through the LFRMS are composed of one or more of the three Options for action that have been identified. Given the differing nature of the Options it would normally be expected that the alternatives utilising more than one Option would benefit from the strengths of both Options, whilst the weaknesses are unlikely to be compounded, i.e. the positive effects of one Option can balance negatives from the other whilst it is unlikely that two Options would share similar negative effects due to their different natures. As a result the expectation would be that the combination alternatives would realise significant more positive results than the single Option results. However this is not the case and the reasons why the results are not as expected are twofold.
- 3.48 Firstly the LFRMS adopts a phasing approach in respect of the constituent Options in a combination strategy, based upon an Options hierarchy. This means that, for Alternative Strategies 4 to 7, the constituent Options are implemented consecutively, not concurrently, with the second Option only being implemented after the first Option measures have been implemented and only in areas the aims of the first Option have not been realised. The effect of this approach is that the positive effects that could be realised from the lower Options are diluted, because the physical area across which they are implemented is severely constrained. This dilution means that many of the beneficial effects become insignificant and as such do not counter any negative effects from the higher Option. This approach severely impedes any potential beneficial cumulative benefit that could be derived from using two or three Options.
- 3.49 Secondly the LFRMS sets out a hierarchy for the Options, which dictates the order that the Options are to be implemented. The hierarchy places Option A at the top of the hierarchy and Option C at the bottom. The LFRMS justifies the use of the hierarchy based upon the potential to implement the Options, particularly in respect of the associated costs of implementation. Option A is the highest because it can be implemented at low costs and relatively easily, whilst the other two options would require significant levels of finance to implement their respective measures. It should be noted that Options B and C realise significantly more positive SEA assessment results than that realised by Option A. Given that Option A is the highest in the hierarchy, this approach does not maximise the potential for positive effects by allowing Options with higher levels of positive effect to be implemented first.
- 3.50 The hierarchy dictates the order that the Options are implemented. For SEA purposes it is a requirement that the SEA consider “reasonable alternatives” and it could be argued that the options, when implemented under a different phasing system, could realise other reasonable alternatives that should be the subject of SEA assessment. The LFRMS concludes that, due to finance and other factors, that alternative phasing of the Options would not be feasible and would, therefore, not be realistic. As a result the SEA has only assessed the alternatives set out in the LFRMS, as the SEA is required to assess the strategy and its reasonable alternatives. In any event if alternative phasing is implemented it would mean that

the more positive Options would be implemented first providing a more positive commencement to any strategy. With the low level of negative effects being realised throughout the assessments, it is concluded that any approaches using a different hierarchy and phasing would realise more positive results than the alternatives assessed as part of this SEA.

3.51 When combined, the hierarchy and the phasing reduce the potential for counterbalancing effects across the Options in the Alternative Strategies, reducing the positive overall effects of the Options. The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.

3.52 In addressing alternative Strategies the SEA needs to consider and identify the strategy that would realise the most benefit in terms of effects on the environment. This requires a comparative analysis to be undertaken. Table 2 below sets out the results of each assessment and the assessment results are set out in Appendix 3. Alternative Strategy 2 has emerged as the most beneficial alternative due to a high level of double positive effects. It is noticeable that Alternative Strategy 3 has higher positive scores than Alternative Strategy 2. However Alternative Strategy 3 also realises 2 double negative effects as well, which pulls its overall results down and is ranked only sixth. Alternative Strategy 7 has an equally positive result as alternative Strategy 2, but lacks the number of double positives and, as such, is ranked second. Alternative Strategy 6 has an equal positive result to Alternative Strategy 7, but has more negative effects and so is ranked third. Alternative Strategy 4 has the same level of negative effects as Alternative Strategy 6, but does not match the level of positive effects, and so is ranked fourth. Alternative Strategy 1 is ranked fifth with a balanced set of positive and negative effects, whilst Alternative Strategy 5 is ranked seventh realising a markedly negative overall assessment.

Strategy	AS1 Option A	AS2 Option B	AS3 Option C	AS4 Option A Then Option B	AS5 Option A Then Option C	AS6 Option B Then Option C	AS7 Option A Then Option B Then Option C
Assessment Results	●	● ● ●	● ● ●	●	●	●	●
	○ ○ ○	○ ○ ○	○ ○ ○	○ ○ ○	○ ○ ○	○ ○ ○	○ ○ ○
		○ ○	○ ○ ○	○		○ ○ ○	○ ○ ○
			○ ○ ○			○	○
	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●
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Rank	5th	1st	6th	4th	7th	3rd	2nd
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Table 2

- 3.53 Table 2 identifies Alternative Strategy 2 (Attenuation of peak flows through green engineering) as the optimum strategy and the SEA would, therefore, recommend that it be adopted as the strategy for the LFRMS. However, the SEA and its recommendations are meant to inform the preparation of the strategy and, as such, the LFRMS is not required to abide by the SEA recommendations. It is entirely acceptable for the strategy to adopt a different strategy provided there is justification to do so. In this case the strategy has chosen to use Alternative Strategy 7, utilising all three Options in order, as the basis for the strategy. This alternative is only marginally less positive than the recommended alternative, being ranked below it due to the fact that it did not realise as many double positive effects. In reality the first 3 ranked alternatives are very similar in the level of overall positive effect and the strategy could use any of these three alternatives without raising issues of using a less sustainable and environmentally beneficial strategy.

4 Assessment of the Local Flood Risk Management Strategy

4.1 The aim of the LFRMS is to reduce flood risk with areas at risk of flooding from surface water run off, as opposed to fluvial flooding. To do this the strategy has been structured into a hierarchy of objectives setting out what the strategy seeks to achieve. The LFRMS has adopted the four objectives from the Welsh Government's document "National Strategy for Flood and Coastal Erosion Risk Management in Wales" (National Strategy) as Overarching Objectives. The Overarching Objectives are:-

- Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion
- Raising awareness of and engaging people in the response to flood
- Providing an effective and sustained response to flood events
- Prioritising investment in the most at risk communities

4.2 Grouped under the four overarching objective the LFRMS sets out 19 Detailed Objectives that set out what this Strategy seeks to achieve. The Detailed Objectives are:

- Reduce the number of people exposed to the risk of flooding.
- Reduce community the number of residential and commercial properties affected by the risk of flooding.
- Reduce the number of people exposed to risk of flooding of significant depth and velocity.
- Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.
- Protect and improve Natural 2000 Sites
- Protect and improve Sites of Special Scientific Interest (SSSIs)
- Protect and improve Sites of Importance for Nature Conservation (SINCs).
- Contribute to the delivery of the CCBC Biodiversity Action Plan
- Minimise damage to known historic sites
- Provide systems to give early warning of potential flooding to individuals and communities.
- Provide efficient systems for the management and maintenance of surface assets.
- Reduce economic damage
- Endeavour to reduce cost of management
- Creating natural channels and water bodies with minimal modification
- Improve water quality
- Provide Flood Risk management Plans for each area subject to flood risk
- Ensure that measures are sustainable
- Ensure CCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities
- Ensure that investment decisions for the implementation of flood risk management schemes are made on a consistent, defensible basis and are subject to cost benefit analysis.

- 4.3 The Detailed Objectives are the backbone of the strategy, providing the direction for the strategy and identifying what the end position would be after its implementation. Given that the SEA is required to consider the significant environmental effects of the implementation of the strategy, and that the Detailed Objectives set out what is being sought to be achieved through implementing the strategy, the Detailed Objectives are the appropriate vehicle for the SEA assessment, i.e. the Detailed Objectives will be assessed against the relevant Assessment tests to identify and consider any significant environmental effects.
- 4.4 Whilst the Detailed Objectives set out the anticipated end product of the implementation of the Strategy, they do not set out how the end product is to be delivered. It should be noted that the LFRMS is meant to be broad overarching strategy addressing flood risk, which will be supplemented by Local Flood Plans that will provide detailed actions for addressing flood risk on the ground. As such in setting out the Detailed Objectives the Strategy has met its requirements for setting the Framework against which detailed proposals can be developed. From a SEA perspective the assessment of the Detailed Objectives would be an assessment of the end position, which would provide a very strategic view of the effects of the implementation of the Strategy. Such an assessment would raise the question of whether further SEA would need to be carried out on the Local Flood Plans as the detailed actions and their implications have not been assessed.
- 4.5 The Caerphilly LFRMS, however, has gone further in its approach by identifying Measures, which are the types of action that can be undertaken to deliver the Detailed Objectives. The LFRMS identifies 43 Measures, which have been aligned to the specific Detailed Objective that they will contribute towards delivering. Appendix 8 of the LFRMS sets out the Measures and the Detailed Objectives the Measures relate to. In aligning the measures to the Detailed Objectives, it becomes clear how the LFRMS will deliver the anticipated outcomes outlined in the Detailed Objectives. It also provides a more comprehensive framework for the SEA to assess, which will make the SEA assessment more robust and is likely to remove the need for assessment at the Local Flood Plan level. Consequently, in assessing the Detailed Objectives, the assessments have considered the likely significant effects of both the outcomes set out in the Detailed Objectives and the measures which contribute to their delivery.

Consideration Of The Assessment Results

- 4.6 The approach taken to assessing the LFRMS was to assess each Detailed Objective in turn to identify their significant impacts. Each of these assessments is considered below, with the summary of the assessment findings. It should be noted, however, that the role of the SEA is to consider the effects at a strategic level and the results for any specific Detailed Objective, even if they are negative, should not be considered in isolation. Consequently the assessment results of the Detailed Objectives are only considered briefly, to outline the main issues that the assessments have raised. Then the results considered under the groupings of the Overarching Objectives and finally the results are considered comprehensively for the strategy as a whole. This will provide the overall strategic assessment along with assessments of its component parts, which can indicate where potential changes or mitigation should be considered. The assessment results for the Detailed Objectives are set out in Appendix 5.

The Detailed Objectives

4.7 As outlined above there are 19 Detailed Objectives and the assessments results for them are set out below in order. It should be noted that the recorded results from the assessments count all results from the short, medium and long time periods.

Objective 1 - Reduce the number of people exposed to the risk of flooding.

++	8	+	36	○	70	+ / -	3	-	18	--	0
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4.8 This objective seeks to reduce the risk to people (not property) by providing mechanisms for early warning and action and, in instances where action would not be effective, evacuation to safe areas. The assessment assumed that the objective did not seek to prevent flooding, merely reduce the risk to people. Overall the assessment of this objective reaches a favourable positive effect for the implementation of the Strategy. It is recommended, however, that consideration be given to the issue of creation of new flood defence features within the measures set out in section 6.16.

Objective 2 - Reduce the number of people exposed to the risk of flooding.

++	11	+	35	○	70	+ / -	0	-	19	--	0
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4.9 This objective seeks to protect property through flood defences, which intervenes in the flood event to direct water away from land upon which development is located. The assessment assumes that the defences will be focussed on urban areas, where the majority of property is located. Overall the positive results significantly outweigh the negative results and, as such, it can only be concluded that this objective realises positive benefits for the implementation of the strategy. No changes are recommended to be made to the Objective

Objective 3 - Reduce the number of people exposed to risk of flooding of significant depth and velocity.

++	11	+	35	○	70	+ / -	0	-	19	--	0
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4.10 This objective seeks to reduce the magnitude of the flooding primarily through control of surface water run-off that will, in turn, reduce the severity and depth of flooding. The positive and negative results all but balance out (only a slight positive slant can really be identified). Given this the assessment realises a neutral overall result. As such the effectiveness of this objective will be realised in combination with other objectives. No changes are recommended to be made to the Objective

Objective 4 - Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.

++	3	+	12	○	107	+ / -	0	-	13	--	0
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4.11 This objective seeks to protect critical infrastructure from flood events and, where this is not possible, establish plans to ensure that services can continue. The assessment assumes an element of intervention in the flood event and that measures are specifically targeted at the critical services, at the expense of others. Overall there is little identified impact of this part of the strategy and, given that the objective relates to a specific and narrow area this would be expected. No changes are recommended to be made to the Objective

Objective 5 - Protect and improve Natural 2000 Sites

++	9	+	9	○	111	+ / -	0	-	3	--	3
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- 4.12 This objective seeks to protect Natura 2000 sites, of which there is only 1 in the county borough) utilising development plans, habitat monitoring and land management. The assessment assumes that the aim of the objective is to reduce to an absolute minimum the impact that flooding, or flood defence measures, will have on such sites. Overall the assessment realises little significant effect, although double positives and double negatives have been realised. When considered as a whole the assessment can be considered to be slightly positive, which reflects the fact that the objective addresses a very specific and narrow issue. No changes are recommended to be made to the Objective

Objective 6 - Protect and improve Sites of Special Scientific Interest (SSSIs)

++	9	+	15	○	105	+ / -	0	-	3	--	3
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- 4.13 This objective seeks to protect Sites of Special Scientific Interest (of which there are 13 in the county borough) utilising development plans, habitat monitoring and land management. The assessment assumes that the aim of the objective is to reduce to an absolute minimum the impact that flooding, or flood defence measures, will have on such sites. Overall the assessment realises little significant effect, although double positives and double negatives have been realised. When considered as a whole the assessment can be considered to be slightly positive, which reflects the fact that the objective addresses a relatively specific and narrow issue. No changes are recommended to be made to the Objective. No changes are recommended to be made to the Objective.

Objective 7 - Protect and improve Sites of Special Scientific Interest (SSSIs)

++	12	+	15	○	96	+ / -	0	-	9	--	3
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- 4.14 This objective seeks to protect Sites of Importance for Nature Conservation (of which there are 190 currently designated within the county borough) utilising development plans, habitat monitoring and land management. The assessment assumes that the aim of the objective is to reduce to an absolute minimum the impact that flooding, or flood defence measures, will have on such sites, which cover a significant area of the county borough. Overall the assessment realises little significant overall effect, although double positives and double negatives have been realised. When considered as a whole the assessment can be considered to be slightly positive. No changes are recommended to be made to the Objective

Objective 8 - Contribute to the delivery of the CCBC Biodiversity Action Plan

++	9	+	21	○	96	+ / -	0	-	9	--	0
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- 4.15 This Objective seeks to assist in delivering the aims of the CCBC BAP through utilising development plans, habitat monitoring, land management and the potential to create new habitats through flood engineering works. A positive assessment of the objective, with negative implications for agricultural land protection, soft engineering and SUDS. This is through the 'push' of flood development to agricultural land, and although the latter can be beneficial, it is a site dependant impact. Overall the assessment realises a slightly positive effect, although this is not sufficient to record it as a positive overall effect. No changes are recommended to be made to the Objective

Objective 9 - Minimise damage to known historic sites

++	0	+	15	○	114	+ / -	3	-	3	--	0
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- 4.16 This Objective seeks to protect historic assets, i.e. buildings known to be of historic importance, through providing mechanisms for early warning, action and possibly evacuation, as well as maintaining existing flood management structures and defences. The Objective does not address conservation areas or historic landscapes as a known asset, whereby their wider designation would increase the impacts of this objective. Overall the assessment realises a slightly positive effect, although this is not sufficient to record it as a positive overall effect. The inclusion of all elements of the historic environment, namely Conservation Areas and Historic Landscapes, within the Objective could realise a more positive outcome. It is recommended that the Objective be amended to incorporate all elements of the historic environment including Conservation Areas and Historic landscapes.

Objective 10 - Provide systems to give early warning of potential flooding to individuals and communities.

++	3	+	15	○	114	+ / -	3	-	0	--	0
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- 4.17 This objective seeks to reduce the risk to people (not property) by providing mechanisms for early warning and action and, in instances where action would not be effective, evacuation to safe areas. The assessment assumed that the objective did not seek to prevent flooding, merely reduce the risk to people. Overall the assessment realises a positive effect, whilst recording no outright negative effects. No changes are recommended to be made to the Objective.

Objective 11 - Provide efficient systems for the management and maintenance of surface assets.

++	9	+	15	○	115	+ / -	0	-	3	--	3
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- 4.18 This objective seeks to reduce the incidence and level of flooding through improving flood infrastructure maintenance and establishment of system asset management plans. The low number of significant effects realised in this assessment reflects that the purpose of this Objective is to improve current management and maintenance of existing flood infrastructure, which is likely to only have a minor impact flood risk generally. Overall the objective realises no significant effects, with the few single positive and negative effects that have been identified cancelling each other out. No changes are recommended to be made to the Objective.

Objective 12 - Reduce economic damage

++	9	+	15	○	115	+ / -	0	-	3	--	3
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- 4.19 This Objective seeks to Reduce economic damage through proactive consideration in development plans, establishing advance warning systems and improving maintenance of existing flood infrastructure. Overall the Objective realises a positive result. It is recommended that the Objective be amended to include the issue of invasive species within its remit

Objective 13 - Endeavour to reduce cost of management

++	6	+	15	○	111	+ / -	0	-	3	--	0
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- 4.20 This Objective seeks to reduce the cost of maintaining and managing flood infrastructure by trying to reduce the amount of infrastructure required through using advance warning systems, relocation of at risk land uses, using SuDS instead of hard infrastructure and utilising appropriate land management and maintenance regimes. Overall the Objective realises a positive result with the positive effects significantly outweighing the negative ones. No changes are recommended to be made to the Objective.

Objective 14 - Creating natural channels and water bodies with minimal modification

++	3	+	25	○	86	+ / -	3	-	18	--	0
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- 4.21 The Objective seeks to reduce flood risk through increasing the number of natural channels and water bodies through monitoring erosion and habitats, the creation of SuDS, effective channel maintenance and active management of existing assets. Overall the assessment realises a slightly positive effect, although this is not sufficient to record it as a positive overall effect. It is recommended that the list of Measures be amended to include a measure relating to soil protection/management and that all objectives be reviewed to determine whether they should link to the measure.

Objective 15 - Improve water quality

++	12	+	11	○	112	+ / -	0	-	0	--	0
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- 4.22 The Objective seeks to improve the quality of water through developing SuDS, effective flood infrastructure and land management, monitoring habitats and erosion and proactive consideration through development plans. Overall the Objective realises a relatively strong positive effects, although that is not surprising given the main thrust of the Objective. No changes are recommended to be made to the Objective.

Objective 16 - Provide Flood Risk management Plans for each area subject to flood risk

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- 4.23 The Objective seeks to ensure that flood risk management plans are provided for all at risk areas. The objective seeks to utilise measures from the Studies Assessments and Plans set. Overall the assessment is positive, realising no counter negative effects. It is recommended that the Objective be amended to include measures relating to soil management/protection and maximising soft engineering solutions.

Objective 17 - Ensure that measures are sustainable

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- 4.24 The Objective seeks to ensure that measures used to reduce flood risk are as sustainable as possible using proactive approaches through the LDP, creation of SuDS, environmental enhancement and appropriate channel maintenance. Overall the Objective realises a positive outcome, with no negative effects being realised. No changes are recommended to be made to the Objective.

Objective 18 - Ensure CCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities

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- 4.25 The Objective seeks to ensure that the council works collaboratively with risk partners and adjacent authorities through land management and partnership working measures. The assessment realises no effects because the Objective is an administrative action. It is recommended that the Objective be deleted from the Strategy as it is an administrative action rather than an Objective.

Objective 19 - Ensure that investment decisions for the implementation of flood risk management schemes are made on a consistent, defensible basis and are subject to cost benefit analysis.

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- 4.26 This Objective seeks to establish a priority for investing in flood schemes to make them consistent and cost efficient. Overall the Objective realises positive effects. It is recommended that both the Overarching and the Detailed Objective are amended by splitting them into two separate Objectives, one relating to targeting at-risk communities and the other requiring schemes to be subject to cost/benefit analysis.

The Overarching Objectives

- 4.27 The National Strategy sets out four high-level objectives for addressing and managing flood risk. The LFRMS has adopted these Objectives as the overarching framework from which the strategy had been developed. The National Framework Objectives have been set out in the strategy as Overarching Objectives. The Overarching Objectives have then been broken down into component parts to form the Detailed Objectives that set the framework for the strategy and which have been assessed above.
- 4.28 Whilst the LFRMS is not the vehicle for assessing the National Framework Objectives, and it is not intended to undertake such assessment in this SEA. However, it is important that the SEA considers the cumulative effect of the Detailed Objectives based around their appropriate groupings, which are the Overarching Objectives. The Overarching Objective groupings are set out below in Table 3:

Overarching Objective		Detailed Objectives
1	Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion	1 to 9
2	Raising awareness of and engaging people in the response to flood	10 to 13
3	Providing an effective and sustained response to flood events	14 to 18
4	Prioritising investment in the most at risk communities	19

Table 4

- 4.29 The SEA will consider each of the Overarching Objective groupings in turn by amalgamating the respective assessment results to compile an overall position for the grouping. The amalgamated results for Overarching Objectives 1 – 3, along with their component assessment results, are set out in Appendices 5 – 7 respectively. It should be noted that Overarching Assessment 4 is comprised of only one Detailed Objective, number 19, and the assessment results for that Detailed Objective has already been included in Appendix 4.

4.30 To consider the group effect all of the assessment results from the component Objectives will be considered together. From this group consideration overall effects will be identified and recorded. It should be noted that the SEA requires that only significant effects should be identified in the assessment. For the Overarching Objective assessments it means that, in order to be identified as a significant effect, a number of the Detailed Objectives will need to have the recorded same or more significant effects in their assessments. The number of component Detailed Objectives differs between the Overarching Objectives and, as a result, no definitive threshold has been set. The commentary on the assessments, set out below, will identify what the threshold was set for each Overarching Objective grouping.

Overarching Objective 1 - Reducing the impacts on individuals, communities businesses and the environment;

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4.31 This Objective seeks to directly address the flood impacts on people through proactive approaches to reducing flood risk to people and property, and protecting key assets. This Overarching Objective principally seeks to reduce risk by putting in the policy and procedural framework for delivering the reduction of flood risk including establishing Flood Risk Plans and policies for effective land use and management and efficient and effective flood infrastructure maintenance. The LFRMS has included the following Detailed Objectives under this Overarching Objective:-

- Reduce the number of people exposed to the risk of flooding.
- Reduce community the number of residential and commercial properties affected by the risk of flooding.
- Reduce the number of people exposed to risk of flooding of significant depth and velocity.
- Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.
- Protect and improve Natural 2000 Sites
- Protect and improve Sites of Special Scientific Interest (SSSIs)
- Contribute to the delivery of Biodiversity Action Plan
- Contribute to the delivery of Merthyr Tydfil Biodiversity Action Plan
- Minimise damage to known historic sites

4.32 The consideration of this group, given that the group has 9 component Detailed Objectives, has used three related effects as the threshold for identifying overall effects (this can be made up of three single or one single and one double effect). The assessment for this group realises 4 double positive effects in relation to landscape improvement, biodiversity protection and enhancement and proactive and efficient maintenance of flood infrastructure. In addition to this 12 single positive effects have been realised for protection of historic sites and community assets as well as increasing local responsibility for flood defences and maintenance.

4.33 By contrast only one double negative effect, relating to using soft engineering measures, and one single negative effect, relating to protection of agricultural land, have been realised, which reflect the defence basis of the policy (as opposed to addressing floodwater reduction).

4.34 This group shows a markedly positive outcome, realising positive effects for nearly 20% of the the total number of Detailed Objective assessment tests, and over 30% for the results of the group assessment. This is in contrast to the negative effects which realise only 8% of the total Detailed Objective assessment tests and less than 10% on the group assessment. In particular, the group assessment realises a high level of double positive effects which reinforces the positive nature of the Overarching Objective. Normally when considering results across a group the variety of effects that are identified leads to a balancing out of the more significant effects. However, in this instance this has not happened. Given this, and the overall high level of positive effects this Overarching Objective will realise a positive overall effect.

Overarching Objective 2 - Raising awareness of and engaging people in the response to flood:

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4.35 This Objective seeks to address flood risk by increasing awareness within the general public and engaging people in providing measures to respond to flood events. This will be achieved through publicity and information dissemination regarding the direct flood risk to the public and how the public can adapt to the risk, and improving property resilience to flood events. The LFRMS has included the following Detailed Objectives under this Overarching Objective:-

- Provide systems to give early warning of potential flooding to individuals and communities.
- Provide efficient systems for the management and maintenance of surface assets.
- Reduce economic damage
- Endeavour to reduce cost of management

4.36 The consideration of this group, given that the group has just 4 component Detailed Objectives, has used two related effects as the threshold for identifying overall effects (this can be made up of two single or one double effect). The assessment for this group realises 2 double positive effects in relation to increasing the number of people taking action and reducing the number of properties that flood. In addition to this 4 single positive effects have been realised for reducing ecological footprint, protecting community assets and critical services and reducing the incidence of flooding due to blocked culverts.

4.37 By contrast the group assessment realises no negative effects, which reflects that this Objective does not propose significant intervention measures, which would normally be expected to realise significant positive and negative effects.

4.38 This group assessment has realised an unusual result, in that no negative effects have been identified, with the detailed assessment tests themselves only realising just over 3% of the total as negative effects. On the positive side the group has realised positive effects for 7.5% of the total results, with the Detailed Objective assessment tests realising a little over 12%. The lack of negative effects and the presence of positive effects must mean that the Objective realises a positive outcome. However, the low level of positive effect means that the overall result of the group assessment can only be considered to be slightly positive. One important factor to note is that the Overarching Objective realises positive effects for a key

sustainability indicator, namely reduction in ecological footprint, which could have significant cumulative and synergistic positive effects in assisting in reducing the incidence of flooding.

Overarching Objective 3 - Providing an effective and sustained response to flood events

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4.39 This Objective seeks to address the issue of responses to flood events, including flood risk by increasing awareness within the general public and engaging people in providing measures to respond to flood events. Issues addressed under this Overarching Objective include establishing emergency plans and procedures, ensuring appropriate response times and facilitating rapid recovery. The LFRMS has included the following Detailed Objectives under this Overarching Objective:-

- Creating natural channels and water bodies with minimal modification
- Improve water quality
- Provide Flood Risk management Plans for each area subject to flood risk
- Ensure that measures are sustainable
- Ensure CCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities

4.40 The consideration of this group, given that the group has 5 component Detailed Objectives, has used two related effects as the threshold for identifying overall effects (this can be made up of two single or one double effect). The assessment for this group realises 4 double positive effects in relation to promoting soft engineering solutions, protecting assets, transport routes and ecological quality of rivers. In addition to this 6 single positive effects have been realised for promoting SuDS and permeable surfaces, protecting biodiversity and reducing ecological footprint

4.41 Conversely the group assessment has realised no negative effects, although two positive/negative effects have been identified for reducing flooding to properties and increasing properties eligible for insurance cover.

4.42 This group assessment has also realised the unusual result of no negative effects having been identified, although in this case the Detailed Objective assessment tests realise a significantly higher level of negative effects at 7%. On the positive side the group assessment has realised positive effects for over 22% of the total results, with the Detailed Objective assessment tests realising 45% positive effects. The lack of negative effects and the presence of positive effects must mean that the Objective realises a positive outcome. The high level of double positive effects indicates that the overall effect is quite strong, although the low number of single positives undermines this a little. Overall the Overarching Objective realises a positive effect.

Overarching Objective 4 - Prioritising investment in the most at risk communities

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4.43 This Objective seeks to address the issue of how available funding will be allocated to measures aimed at reducing the risk of flooding, through establishing a national

framework for allocating resources and maximising alternative sources eligible to fund flood risk measures. The LFRMS has included the following Detailed Objective under this Overarching Objective:-

- Ensure that investment decisions for the implementation of flood risk management schemes are made on a consistent, defensible basis and are subject to cost benefit analysis.

4.44 This Overarching Objective includes only one Detailed Objective, the assessment results of which have already been considered in paragraph 4.26 above. It is not intended to reiterate the findings set out in Paragraph 4.26, suffice it to say that overall results that the Overarching Objective will have positive effects.

Overarching Objectives Conclusion

4.45 With 2 Objectives realising no group negative effects and all four Objectives realising group positive effects it can only be concluded that the LFRMS will have an overall positive effect when delivering the Overarching Strategies.

The Local Flood Risk Management Strategy

++	5	+	10	○	26	+ / -	2	-	2	--	0
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4.46 The consideration of the strategy as a whole has been undertaken in the same way as the consideration of the Overarching Objectives. To consider the overall effects an overview of the assessments of the Detailed Objectives, which are the basic components of the strategy, is taken. In considering whether cumulative effects are sufficiently significant to warrant identification at strategy level, a threshold of four related effects has been used.

4.47 The strategy has realised 5 double positive effects, related to increased landscape management and residents taking action, reducing the number of properties flooded and floods caused through blocked culverts and protecting critical services. Supporting this the assessment realised 10 single positive effects relating protection of landscape, historic sites, community assets and biodiversity, reduction in ecological footprint, increasing ecological status and reducing pollution.

4.48 By contrast the only 2 single negative effects were realised and these relate to impact on agricultural land and maximising the use of SuDS. The second issue, maximising SuDS, is a critical issue for the LFRMS as it is a key measure to deliver reductions in peak run-off flows. A negative effect in this regard could imply a failure on the part of the LFRMS. It should be noted that, at the current time, the council do not, as a matter of course, adopt SuDS in the same way that conventional drainage systems are. The council’s position meant that it could not be guaranteed that SuDS would be adopted and that, as such, it was counterproductive to the aim of maximising use of SuDS and therefore realised negative effects. It is acknowledged, however, that this position may change in the near future due to the likely publication of new legislation and guidance. If the position does change, and it is a requirement that the council adopt SuDS, the assessment result would revert to a double positive effect.

4.49 The assessment also realised two positive/negative effects in respect of protecting historic sites and promoting the use of soft engineering solutions. In terms of the first issue, protecting historic sites, the assessment realises 3 positive and 3 positive/negative effects. It could be argued that, with the 3 positive effects, this

assessment test should be considered to be positive. However, this would possibly undervalue the significance of the negative effects and it was considered prudent to ensure that the negative aspects were raised in respect of the issue, so a positive/negative effect was identified.

- 4.50 The second issue, promoting soft engineering solutions, was identified because the group realised 3 double positive effects and 3 double negative effects. The diversity and severity of the effects relate to Objectives that relate to the attenuation of run-off water (related to Approach B) and the bolstering of existing flood defences (related to Approach C). The fact that the effects are so significant, and that they balance out, means that only a positive/negative effect could really be identified, despite the fact that they are likely to cancel each other out.
- 4.51 Overall the strategy realises strong positive effects that easily outweigh the minor negative effects and therefore it is concluded that the implementation of the strategy will realise positive effects on the environment.

Consideration of SEA Based Changes to the LFRMS

- 4.52 As major part of the SEA proces is to feed recommendations into the decision making processes for the preparation of the LFRMS. The SEA has identified a number of issues in assessing the strategy and amendments to the strategy have ben considered as result. Appendix 8 sets out the SEA recommendations and priovides the decisions taken in respect of each recommendation.
- 4.53 Changes have been made to the LFRMS as a result of the SEA recommendations. It is incumbent on the SEA to consider whether the proposed changes amend the strategy significantly enough to raise the potential for additional significant effects that have not been considered by through the SEA process. Where such amendments have been made they would need to be subject of further SEA assessment to fully consider the potenital effects. In order to identify whether additional assessment work was required the proposed changes have been screened to ascertain their significance. The findings of the screening are also included in the table in Appendix 8.
- 4.54 The screening of the changes identified that 2 of the objectives had been amended significantly and required further assessment to fully consider the potential effects. The two obejctives identified were Objective 1 and Objective 19

Objective 1 - Reduce the number of people exposed to the risk of flooding.

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- 4.55 The change proposed for this objective was to broaden the scope of the measures from management of defence structures and channel and culvert maintenance to include construction of new structures and infrastructure. This change inserted th epotential for new construction that previously was not present, which could give rise to new significant effects. Therefore the Objective has been subject of reassessment.
- 4.56 This objective seeks to reduce the risk to people (not property) of flooding, and now through additions made a result of the SEA includes the creation of new assets. 11 double positive results were realised, relating to SuDS (albeit for medium and long term only) blocked culverts people taking action, with the number of properties

flooding increasing from a single positive, which is an increase on the previous 8. This is supported by 30 single positives, a small reduction on the previous 36 (this is an affect of one test only as one test was increased to a double positive). The positive affect is also increased on 41 and 42 whereby the affect is greater than the previous assessment, however as these are not directly mentioned a double positive cannot be awarded.

- 4.57 By contrast 15 single negatives were scored, a reduction on the previous 18 single negatives. Again no double negative results were realised. The assessment did realise nine positive/negative results relating to designated land, a result of the differentiation of protection from and displacement of flooding.
- 4.58 Overall the assessment of this objective reaches a favourable positive effect, with the changes increasing this impact over a wider area.

Objective 19 - Ensure investment decisions are prioritised in the most at risk communities on a consistent, defensible basis and are subject to cost benefit analysis

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- 4.59 The change proposed for this objective was to introduce a focus for the Objective onto areas most at risk of flooding. The inclusion of this element provides a spatial focus to the Objective that it previously did not have. As such the Objective changes from a general to a location specific one. This affects the area across which the Objective is considered and could well realise more specific and significant effects than it had originally. Therefore the Objective has been subject of reassessment.
- 4.60 The assessment scored 6 double positives, this is again realised in the reduction in the number of properties flooded, although a reduction to a single positive is noted in critical areas flooded, although the increase from single positive occurs in insurance cover. Single positives increase from 18 to 21, with different areas realising benefits/losses. A new measure is found in residents taking appropriate action, information being a cost effective option.
- 4.61 Conversely negative impacts increased from 3 to 9, with designated areas being affected. It has been assumed in the assessment that a sequential approach to at risk communities will occur in the implementation of this policy. The prioritisation of most at risk communities has increased the impact of the policy, increasing both negative and positive outcomes. A number of these impacts are to be expected through a targeted objective. Others may be changed through the content of the cost benefit analysis undertaken during each project.
- 4.62 Although the weight provided in the cost/benefit analysis will alter the impact of the objective affect, no further changes to the strategy are required.

Conclusions from the Reassessments

- 4.63 The changes to the Objectives have realised some movement in the effects realised by each Objective. However, whilst movement has occurred, the overall positive nature of the assessment results have been maintained. It cannot be said with any conviction that the changes have realised any significant positive improvement and by similar reason it cannot be said that there has been any

significant worsening of the results. Consequently the it is considered that the changes have had little overall impact upon the strategy, although the overall assessment of the strategy has become slightly more positive.

5 SEA Conclusions and Recommendations

- 5.1 The SEA has assessed the strategy and its component Objectives against an assessment framework derived from identifying the main environmental and sustainability issues facing the county borough over the LFRMS period. The assessment of the strategy has been rigorous and, through the assessment process, recommendations for changes to the LFRMS have been made. The recommendations were as follows:
- Alternative Strategy 3 (Option C) - It is recommended that green measures for reducing run-off flow be included in this Strategy.
 - Alternative Strategy 4 (Options A & B) - The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.
 - Alternative Strategy 5 (Options A & C) - The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.
 - Alternative Strategy 6 (Options B & C) - The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.
 - Alternative Strategy 7 (Options A & B & C) - The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.
 - Objective 1 It is recommended, however, that consideration be given to the issue of creation of new flood defence features within the measures set out in section 6.16.
 - Objective 9 It is recommended that the Objective be amended to incorporate all elements of the historic environment including Conservation Areas and Historic landscapes.
 - Objective 12 It is recommended that the Objective be amended to include the issue of invasive species within its remit
 - Objective 14 It is recommended that the list of Measures be amended to include a measure relating to soil protection/management and that all objectives be reviewed to determine whether they should link to the measure.
 - Objective 15 It is recommended that the Objective include the measures related to contaminated land, as reduction in flooding to these areas would reduce the risk of water pollution.
 - Objective 16 It is recommended that the Objective be amended to include measures relating to soil management/protection and maximising soft engineering solutions.
 - Objective 18 It is recommended that the Objective be deleted from the Strategy as it is an administrative action rather than an Objective.
 - Objective 19 It is recommended that both the Overarching, and the Detailed, Objective are amended by splitting them into two separate Objectives, one relating to targeting at-risk communities and the other requiring schemes to be subject to cost/benefit analysis.
- 5.2 These recommendations have been considered and some changes to the LFRMS have been made as a result of them. The changes made to the LFRMS have been subject to screening for further SEA assessment and two amended Objectives were

identified for reassessment, namely Objective 1 and Objective 19. These were again rigorously tested against the assessment framework.

- 5.3 The SEA assessments identify that the LFRMS will realise significant positive effects in its implementation, with little recorded significant negative effects. As a consequence the SEA recommends that no further amendments be made to the strategy and considers that the implementation of the strategy will have positive benefits for the environment as a whole.

Appendix 1 – SEA Objectives and Assessment Tests

Issue	Objective	Assessment Test	
Resource Consumption	To reduce the average resource consumption of each resident.	1	Will the Approach assist in reducing resource consumption
Housing	To maintain and improve access to suitable affordable housing.	2	Will the Approach facilitate the provision of affordable housing
Business	To ensure a sufficient range of employment sites are available	3	Will the Approach facilitate the provision of a range of employment sites
Well-Being	To allow all residents easy access to leisure facilities	4	Will the Approach facilitate access to leisure facilities
Air Quality	To reduce Air Pollution Emissions	5	Will the Approach assist in reducing air pollution emissions, especially from traffic
	To improve air quality in AQMA	6	Will the Approach assist in improving air quality in the designated AQMA
Landscape	To protect the landscape value of the most important landscapes in the county borough and maintain a clean and accessible environment to encourage a greater sense of belonging.	7	Will the Approach help protect important landscapes
Culture	To protect the cultural identity of the county borough	8	Will the Approach help protect the cultural identity of the county borough
Historic Assets	To protect important historic assets	9	Will the Approach help protect important historic assets
Water Quantity, Quality and Use	To improve the quality and quantity of the water in our rivers and to reduce water consumption	10	Will the Approach improve the quality of water in rivers
		11	Will the Approach improve the quantity of water in rivers
		12	Will the Approach reduce water consumption
Flood	To minimise the number of flood events on Key Flood Risk Indicators	13	Will the Approach help reduce the number of events on key flood indicators

Issue	Objective	Assessment Test	
Soils	To make the most efficient use of land and to reduce contamination and safeguard soil quantity, quality and permeability.	14	Will the Approach facilitate the most efficient use of land
		15	Will the Approach reduce contamination
		16	Will the Approach safeguard soil quality, quantity and permeability
Geology	To protect geologically important sites.	17	Will the Approach protect geologically important sites
Biodiversity	To protect and enhance the biodiversity of the county borough	18	Will the Approach help protect the biodiversity of the county borough
Climate Change	To reduce the total amount of CO ₂ produced within the county borough each year	19	Will the Approach assist in reducing CO ₂ emissions in the county borough
Climate Change Adaptation	To reduce the severity and magnitude of flood events	20	Will the Approach reduce the severity of flood events
		21	Will the Approach reduce the Magnitude of flood events
Material Assets	To improve the performance of material assets within the county borough	22	Will the Approach assist in improving the performance of material assets.

Appendix 2 – SEA Indicators and Assessment Tests

Issue	Indicator	Assessment Tests	
Resource Consumption	Ecological footprint of each resident (GHa/person)	1	Will the Objective assist in reducing the ecological footprint of residents
Housing	The number of residential dwellings ineligible for insurance cover	2	Will the Objective assist in reducing the number of residential dwellings ineligible for insurance cover
	Average house price compared to average earnings	3	Will the Objective assist in reducing the ratio of house prices to earnings
	Provision of Affordable housing	4	Will the Objective facilitate the provision of affordable housing
Business	Percentage of people of working age in employment	5	Will the Objective assist in increasing the percentage of people of working age in employment
	Vacancy levels of industrial and commercial units	6	Will the Objective assist in reducing vacancy levels of industrial and commercial units
	Business start up rates	7	Will the Objective facilitate business start ups
Well-Being	Provision of formal sports and leisure facilities	8	Will the Objective facilitate the provision of formal sports and leisure facilities
	Numbers of allotments	9	Will the Objective the provision of allotments
Air Quality	Reduce the net out-commuting levels in the county borough	10	Will the Objective assist in reducing net commuting flows
	Improve the accessibility by public transport of key services (including employment opportunities).	11	Will the Objective facilitate accessibility by public transport to key services
	Implement actions from AQMA action Plan	12	Will the Objective assist in implementing the AQMA Action Plan
Landscape	Numbers of flood water management related developments that are in a designated landscape area	13	Will the Objective assist in protecting designated landscape areas
	Numbers of flood water management related developments that are in a designated historic area	14	Will the Objective assist in protecting designated historic areas
	Area of land under agreed management for landscape improvement or protection	15	Will the Objective help increase land under agreed management for landscape improvement or protection

Issue	Indicator	Assessment Tests	
Culture	Protection of community assets	16	Will the Objective assist in protecting community assets
Historic Assets	Numbers of flood water management related developments that affect a designated historic site	17	Will the Objective help minimise flood water management related developments that affect a designated historic site
Water Quantity, Quality and Use	Percentage of river lengths good Ecological status	18	Will the Objective assist in improving the ecological status of rivers
	The number and volume of Environment Agency licensed abstractions	19	Will the Objective maintain or reduce the number and volume of EA Licensed abstractions
	Number of Environment Agency recorded pollution incidents	20	Will the Objective assist in reducing the number of pollution incidents
Flood	Percentage of development in flood risk area approved contrary to EA advice.	21	Will the Objective assist in reducing the percentage of development in flood risk area approved contrary to EA advice
	Number of residents of flood risk areas taking appropriate action.	22	Will the Objective increase the number of residents of flood risk areas taking appropriate action
	Number of properties flooded	23	Will the Objective reduce the number of properties flooded
	Amount of approved development within C1 and C2 as defined by TAN 15	24	Will the Objective assist in reducing the amount of approved development within C1 and C2 as defined by TAN 15
	Area of greenfield development incorporating non-permeable surfacing	25	Will the Objective minimise the area of greenfield development incorporating non-permeable surfacing
Soils	Water management related development resulting in net loss of agricultural land of grades 1, 2 and 3A.	26	Will the Objective protect agricultural land of grades 1, 2 and 3A
	Number of known main contaminated sites flooded	27	Will the Objective reduce the number of known main contaminated sites flooded
	Number of restorative/remediation schemes at aggregates/minerals sites and mine workings including water management measures	28	Will the Objective assist in increasing the number of restorative/remediation schemes at aggregates/minerals sites and mine workings including water management measures
	% of construction activities (relating to this Strategy) with a soil management plan in place	29	Will the Objective maximise the percentage of construction activities (relating to this Strategy) with a soil management plan in place

Issue	Indicator	Assessment Tests	
Geology	Water management related development on land designated as RIGs or geological SSSIs	30	Will the Objective minimise flood water management related development on land designated as RIGs or geological SSSIs
Biodiversity	Percentage of selected BAP species stable or increasing	31	Will the Objective assist in increasing the percentage of selected BAP species stable or increasing
	Monitoring of specific species (GCN, dragon and damsel fly, water vole, otter and riverflies)	32	Will the Objective assist in increasing numbers of specific, monitored, water related species
	Condition of monitored sites (sites to be confirmed).	33	Will the Objective assist in protecting monitored sites
	Area of biological SSSI or SAC lost to flood management development	34	Will the Objective minimise area of biological SSSI or SAC lost to flood management development
	No net loss of area of land identified as LNR or SINC as a result of flood management development.	35	Will the Objective minimise area of LNR or SINC lost to flood management development
	Use of soft engineering flood measures.	36	Will the Objective seek to maximise the use of soft engineering flood measures
	Increase the area of land affected by invasive species under active management	37	Sites of floodwater management development that have invasive plant species control measures in place prior to works.
Climate Change	Tonnes of CO ₂ emitted per year per person	38	Will the Objective assist in reducing CO ₂ emissions in the county borough
Climate Change Adaptation	Number of SuDS adopted	39	Will the Objective maximise the number of adopted SuDS
Material Assets	Number of instances of flooding due to blocked culverts	40	Will the Objective minimise the instances of flooding due to blocked culverts
	Number of CSO (sewers) overflows	41	Will the Objective assist in minimising the number of CSO overflows
	Number of Sewer floods	42	Will the Objective assist in minimising the number of sewer overflows
	The number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures.	43	Will the Objective minimise the number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures

Issue	Indicator	Assessment Tests	
	% of new development located within an at risk location	44	Will the Objective assist in reducing the percentage of new development located within an at risk location
	The length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures	45	Will the Objective assist in reducing the length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures.

Appendix 3 – Assessment of the Alternative Strategies

Assessment Test Options		AS1 A	AS2 B	AS3 C	AS4 A & B	AS5 A & C	AS6 B & C	AS7 A & B & C
	Will the Approach assist in reducing resource consumption	O	O	--	O	-	-	O
2	Will the Approach facilitate the provision of affordable housing	O	-	+	-	O	-	O
3	Will the Approach facilitate the provision of a range of employment sites	O	-	+	-	O	-	O
4	Will the Approach facilitate access to leisure facilities	O	O	+	O	O	O	O
5	Will the Approach assist in reducing air pollution emissions, especially from traffic	O	O	O	O	O	O	O
6	Will the Approach assist in improving air quality in the designated AQMA	O	O	O	O	O	O	O
7	Will the Approach help protect important landscapes	O	-	O	-	O	-	-
8	Will the Approach help protect the cultural identity of the county borough	+	+	O	+	+	+	+
9	Will the Approach help protect important historic assets	+	+	+	+	+	+	+
10	Will the Approach improve the quality of water in rivers	O	O	O	O	O	O	O
11	Will the Approach improve the quantity of water in rivers	O	++	--	+	--	+	+

Assessment Test Options		AS1 A	AS2 B	AS3 C	AS4 A & B	AS5 A & C	AS6 B & C	AS7 A & B & C
12	Will the Approach reduce water consumption	O	O	O	O	O	O	O
13	Will the Approach help reduce the number of events on key flood indicators	-	+	++	+	-	+	+
14	Will the Approach facilitate the most efficient use of land	O	-	++	-	O	O	O
15	Will the Approach reduce contamination	+	O	O	+	+	O	+
16	Will the Approach safeguard soil quality, quantity and permeability	-	+ / -	+ / -	O	-	+ / -	-
17	Will the Approach protect geologically important sites	-	O	O	O	-	O	O
18	Will the Approach help protect the biodiversity of the county borough	-	+	-	O	-	+	-
19	Will the Approach assist in reducing CO ₂ emissions in the county borough	O	O	-	O	O	-	O
20	Will the Approach reduce the severity of flood events	++	++	++	++	++	++	++
21	Will the Approach reduce the Magnitude of flood events	-	++	+	-	O	+	+
22	Will the Approach assist in improving the performance of material assets.	O	+	+	O	O	+	+

Overarching Objective 1
Reducing the impacts on individuals, communities businesses and the environment;

		1	2	3	4	5	6	7	8	9		Overarching Objective 1
		Reduce the number of people exposed to the risk of flooding.	Reduce community the number of residential and commercial properties affected by the risk of flooding.	Reduce the number of people exposed to risk of flooding of significant depth and velocity.	Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.	Protect and improve Natural 2000 Sites	Protect and improve Sites of Special Scientific Interest (SSSIs)	Contribute to the delivery of Biodiversity Action Plan	Contribute to the delivery of Merthyr Tydfil Biodiversity Action Plan	Minimise damage to known historic sites		
13	Will the Objective assist in protecting designated landscape areas	○	+	-	○	+	+	++	+	-		+
14	Will the Objective assist in protecting designated historic areas	+/-	+	○	○	○	+	+	○	+/-		+
15	Will the Objective help increase land under agreed management for landscape improvement or protection	+	+	+	○	++	++	++	+	○		++
16	Will the Objective assist in protecting community assets	+	+	○	+	○	○	○	○	+		+
17	Will the Objective help minimise flood water management related developments that affect a designated historic site	+	+	○	○	○	○	○	○	+		+
18	Will the Objective assist in improving the ecological status of rivers	○	○	○	○	○	○	+	+	○		○
19	Will the Objective maintain or reduce the number and volume of EA Licensed abstractions	○	○	○	○	○	○	○	○	○		○
20	Will the Objective assist in reducing the number of pollution incidents	+	+	+	○	○	○	○	○	○		+
21	Will the Objective assist in reducing the percentage of development in flood risk area approved contrary to EA advice	○	○	○	○	○	○	○	○	○		○
22	Will the Objective increase the number of residents of flood risk areas taking appropriate action	++	○	+	○	○	○	○	○	+		+

Overarching Objective 1
Reducing the impacts on individuals, communities businesses and the environment;

		1	2	3	4	5	6	7	8	9		Overarching Objective 1
		Reduce the number of people exposed to the risk of flooding.	Reduce community the number of residential and commercial properties affected by the risk of flooding.	Reduce the number of people exposed to risk of flooding of significant depth and velocity.	Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.	Protect and improve Natural 2000 Sites	Protect and improve Sites of Special Scientific Interest (SSSIs)	Contribute to the delivery of Biodiversity Action Plan	Contribute to the delivery of Merthyr Tydfil Biodiversity Action Plan	Minimise damage to known historic sites		
23	Will the Objective reduce the number of properties flooded	+	++	○	○	○	○	○	○	+		+
24	Will the Objective assist in reducing the amount of approved development within C1 and C2 as defined by TAN 15	○	○	○	○	○	○	○	○	○		○
25	Will the Objective minimise the area of greenfield development incorporating non-permeable surfacing	+	+	+	○	+	+	+	○	○		+
26	Will the Objective protect agricultural land of grades 1, 2 and 3A	-	-	-	○	○	○	-	-	○		-
27	Will the Objective reduce the number of known main contaminated sites flooded	○	+	○	○	○	○	-	○	○		○
28	Will the Objective assist in increasing the number of restorative/remediation schemes at aggregates/minerals sites and mine workings including water management measures	○	○	○	○	○	○	○	○	○		○
29	Will the Objective maximise the percentage of construction activities (relating to this Strategy) with a soil management plan in place	○	○	○	○	○	○	○	○	○		○
30	Will the Objective minimise flood water management related development on land designated as RIGs or geological SSSIs	-	-	-	○	○	++	○	+	○		○
31	Will the Objective assist in increasing the percentage of selected BAP species stable or increasing	○	○	○	○	+	+	++	++	○		++

**Overarching Objective 1
Reducing the impacts on individuals, communities businesses and
the environment;**

		1	2	3	4	5	6	7	8	9		Overarching Objective 1
		Reduce the number of people exposed to the risk of flooding.	Reduce community the number of residential and commercial properties affected by the risk of flooding.	Reduce the number of people exposed to risk of flooding of significant depth and velocity.	Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.	Protect and improve Natural 2000 Sites	Protect and improve Sites of Special Scientific Interest (SSSIs)	Contribute to the delivery of Biodiversity Action Plan	Contribute to the delivery of Merthyr Tydfil Biodiversity Action Plan	Minimise damage to known historic sites		
43	Will the Objective minimise the number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures	+	+	○	++	○	○	○	○	○		+
44	Will the Objective assist in reducing the percentage of new development located within an at risk location	+	+	○	○	○	○	○	○	○		○
45	Will the Objective assist in reducing the length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures.	○	○	○	+	○	○	○	○	○		○

Appendix 6 – Overarching Objective 2 – Assessment Results

Overarching Objective 2						
Raising awareness of and engaging people in the response to flood						
		10	11	12	13	
		Provide systems to give early warning of potential flooding to individuals and communities.	Provide efficient systems for the management and maintenance of surface assets.	Reduce economic damage	Endeavour to reduce cost of management	Strategy as A whole
1	Will the Objective assist in reducing the ecological footprint of residents	○	○	+	+	+
2	Will the Objective assist in reducing the number of residential dwellings ineligible for insurance cover	+	○	○	○	○
3	Will the Objective assist in reducing the ratio of house prices to earnings	○	○	○	○	○
4	Will the Objective facilitate the provision of affordable housing	○	○	○	○	○
5	Will the Objective assist in increasing the percentage of people of working age in employment	○	○	○	○	○
6	Will the Objective assist in reducing vacancy levels of industrial and commercial units	○	○	○	○	○
7	Will the Objective facilitate business start ups	○	○	○	○	○
8	Will the Objective facilitate the provision of formal sports and leisure facilities	○	○	○	○	○
9	Will the Objective the provision of allotments	○	○	○	○	○
10	Will the Objective assist in reducing net commuting flows	○	○	○	○	○
11	Will the Objective facilitate accessibility by public transport to key services	○	○	○	○	○
12	Will the Objective assist in implementing the AQMA Action Plan	○	○	○	○	○
13	Will the Objective assist in protecting designated landscape areas	○	○	○	○	○
14	Will the Objective assist in protecting designated historic areas	+/-	○	○	○	+/-
15	Will the Objective help increase land under agreed management for landscape improvement or protection	○	○	○	○	○
16	Will the Objective assist in protecting community assets	+	+	+	+	+

Overarching Objective 2
Raising awareness of and engaging people in the response to flood

		10	11	12	13	
		Provide systems to give early warning of potential flooding to individuals and communities.	Provide efficient systems for the management and maintenance of surface assets.	Reduce economic damage	Endeavour to reduce cost of management	Strategy as A whole
17	Will the Objective help minimise flood water management related developments that affect a designated historic site	+	○	○	○	○
18	Will the Objective assist in improving the ecological status of rivers	○	-	○	○	○
19	Will the Objective maintain or reduce the number and volume of EA Licensed abstractions	○	○	○	○	○
20	Will the Objective assist in reducing the number of pollution incidents	○	○	+	○	○
21	Will the Objective assist in reducing the percentage of development in flood risk area approved contrary to EA advice	○	○	○	○	○
22	Will the Objective increase the number of residents of flood risk areas taking appropriate action	++	○	++	++	++
23	Will the Objective reduce the number of properties flooded	+	+	++	+	++
24	Will the Objective assist in reducing the amount of approved development within C1 and C2 as defined by TAN 15	○	○	○	○	○
25	Will the Objective minimise the area of greenfield development incorporating non-permeable surfacing	○	○	○	○	○
26	Will the Objective protect agricultural land of grades 1, 2 and 3A	○	○	-	○	○
27	Will the Objective reduce the number of known main contaminated sites flooded	○	○	○	○	○
28	Will the Objective assist in increasing the number of restorative/remediation schemes at aggregates/minerals sites and mine workings including water management measures	○	○	○	○	○
29	Will the Objective maximise the percentage of construction activities (relating to this Strategy) with a soil management plan in place	○	○	○	-	○
30	Will the Objective minimise flood water management related development on land designated as RIGs or geological SSSIs	○	○	○	○	○
31	Will the Objective assist in increasing the percentage of selected BAP species stable or increasing	○	○	○	○	○

Overarching Objective 2
Raising awareness of and engaging people in the response to flood

		10	11	12	13	
		Provide systems to give early warning of potential flooding to individuals and communities.	Provide efficient systems for the management and maintenance of surface assets.	Reduce economic damage	Endeavour to reduce cost of management	Strategy as A whole
32	Will the Objective assist in increasing numbers of specific, monitored, water related species	O	O	O	O	O
33	Will the Objective assist in protecting monitored sites	O	O	O	O	O
34	Will the Objective minimise area of biological SSSI or SAC lost to flood management development	O	O	O	O	O
35	Will the Objective minimise area of LNR or SINCR lost to flood management development	O	O	O	O	O
36	Will the Objective seek to maximise the use of soft engineering flood measures	O	-	O	O	O
37	Sites of floodwater management development that have invasive plant species control measures in place prior to works.	O	O	-	+	O
38	Will the Objective assist in reducing CO ₂ emissions in the county borough	O	O	O	O	O
39	Will the Objective maximise the number of adopted SuDS	O	O	O	O	O
40	Will the Objective minimise the instances of flooding due to blocked culverts	O	O	+	++	+
41	Will the Objective assist in minimising the number of CSO overflows	O	O	O	O	O
42	Will the Objective assist in minimising the number of sewer overflows	O	O	O	O	O
43	Will the Objective minimise the number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures	+	O	O	+	+
44	Will the Objective assist in reducing the percentage of new development located within an at risk location	O	O	+	O	O
45	Will the Objective assist in reducing the length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures.	O	O	O	O	O

Appendix 7 – Overarching Objective 3 – Assessment Results

Overarching Objective 3 Providing an effective and sustained response to flood events							
	14	15	16	17	18		
	Creating natural channels and water bodies with minimal modification	Improve water quality	Provide Flood Risk management Plans for each area subject to flood risk	Ensure that measures are sustainable	Ensure CCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities	Overarching Objective 3	
1	Will the Objective assist in reducing the ecological footprint of residents	O	O	O	++	O	+
2	Will the Objective assist in reducing the number of residential dwellings ineligible for insurance cover	O	O	+/-	O	O	+/-
3	Will the Objective assist in reducing the ratio of house prices to earnings	O	O	O	O	O	O
4	Will the Objective facilitate the provision of affordable housing	O	O	O	O	O	O
5	Will the Objective assist in increasing the percentage of people of working age in employment	O	O	O	O	O	O
6	Will the Objective assist in reducing vacancy levels of industrial and commercial units	O	O	O	O	O	O
7	Will the Objective facilitate business start ups	O	O	O	O	O	O
8	Will the Objective facilitate the provision of formal sports and leisure facilities	O	O	O	O	O	O
9	Will the Objective the provision of allotments	O	O	O	O	O	O
10	Will the Objective assist in reducing net commuting flows	O	O	O	O	O	O
11	Will the Objective facilitate accessibility by public transport to key services	O	O	O	O	O	O
12	Will the Objective assist in implementing the AQMA Action Plan	O	O	O	O	O	O
13	Will the Objective assist in protecting designated landscape areas	+	O	O	O	O	O
14	Will the Objective assist in protecting designated historic areas	O	O	O	O	O	O

Overarching Objective 3 Providing an effective and sustained response to flood events

	14	15	16	17	18	
	Creating natural channels and water bodies with minimal modification	Improve water quality	Provide Flood Risk management Plans for each area subject to flood risk	Ensure that measures are sustainable	Ensure CCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities	Overarching Objective 3
28	Will the Objective assist in increasing the number of restorative/remediation schemes at aggregates/minerals sites and mine workings including water management measures	+	+	○	○	+
29	Will the Objective maximise the percentage of construction activities (relating to this Strategy) with a soil management plan in place	○	○	○	○	○
30	Will the Objective minimise flood water management related development on land designated as RIGs or geological SSSIs	-	○	○	○	○
31	Will the Objective assist in increasing the percentage of selected BAP species stable or increasing	+	+	○	+	○
32	Will the Objective assist in increasing numbers of specific, monitored, water related species	+	++	○	○	○
33	Will the Objective assist in protecting monitored sites	○	○	+	○	○
34	Will the Objective minimise area of biological SSSI or SAC lost to flood management development	-	○	○	○	○
35	Will the Objective minimise area of LNR or SINC lost to flood management development	-	○	○	○	○
36	Will the Objective seek to maximise the use of soft engineering flood measures	++	++	○	++	○
37	Sites of floodwater management development that have invasive plant species control measures in place prior to works.	-	○	○	○	○
38	Will the Objective assist in reducing CO ₂ emissions in the county borough	○	○	○	+	○
39	Will the Objective maximise the number of adopted SuDS	+	○	○	+	○
40	Will the Objective minimise the instances of flooding due to blocked culverts	-	○	○	○	○

Overarching Objective 3
Providing an effective and sustained response to flood events

	14	15	16	17	18	
	Creating natural channels and water bodies with minimal modification	Improve water quality	Provide Flood Risk management Plans for each area subject to flood risk	Ensure that measures are sustainable	Ensure CCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities	Overarching Objective 3
41	Will the Objective assist in minimising the number of CSO overflows	○	○	○	○	○
42	Will the Objective assist in minimising the number of sewer overflows	○	○	○	○	○
43	Will the Objective minimise the number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures	○	○	++	○	++
44	Will the Objective assist in reducing the percentage of new development located within an at risk location	○	○	○	○	○
45	Will the Objective assist in reducing the length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures.	○	○	++	○	++

Appendix 8 - Consideration of SEA Recommended Changes and Need for Reassessment

Recommendations on Alternative Strategies				
Approach	SEA REcommendations	LF RMS Changes	Consideration For Reassessment	Reassessment Required
1 (Option A)	No changes are recommended	No Change	None	No
2 (Option B)	No changes are recommended	No Change	None	No
3 (Option C)	It is recommended that green measures for reducing run-off flow be included in this Strategy.	Option 3 has been amended to include for the construction of attenuation ponds as follows. <i>“Where appropriate, consideration will be given to the construction of attenuation ponds in order to reduce the peak water flows, lower maximum depths of flooding or to reduce velocities of flood water”.</i>	The inclusion of attenuation measures will help address some of the negative issues produced during the assessment leading to an overall more positive outcome	No
4 (Options A & B)	The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.	The reason why a consecutive approach has been used rather than a concurrent one relates to the use of measures which are likely to require less finance first, and then to consider more expensive options if these fail. In the present climate where funding is likely to be difficult to obtain this strategic concept is considered to be the most likely to succeed. Wording to cover this point has been put into clause 5.9 of The Strategy as follows: <i>“Whilst it is the aspiration of the Strategy to implement the full package of measures together, in reality constraints such as funding, ease of</i>	The revisions provide greater clarity of intent but do not amend the strategy, the initial assessment remains viable	No

Recommendations on Alternative Strategies

Approach	SEA REcommendations	LFRMS Changes	Consideration For Reassessment	Reassessment Required
		<i>implementation etc will require measures to be implemented as stated below</i> ".		
5 (Options A & C)	The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.	<p>The reason why a consecutive approach has been used rather than a concurrent one relates to the use of measures which are likely to require less finance first, and then to consider more expensive options if these fail. In the present climate where funding is likely to be difficult to obtain this strategic concept is considered to be the most likely to succeed.</p> <p>Wording to cover this point has been put into clause 5.9 of The Strategy as follows:</p> <p><i>“Whilst it is the aspiration of the Strategy to implement the full package of measures together, in reality constraints such as funding, ease of implementation etc will require measures to be implemented as stated below”.</i></p>	The revisions provide greater clarity of intent but do not amend the strategy, the initial assessment remains viable	No
6 (Options B & C)	The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.	The reason why a consecutive approach has been used rather than a concurrent one relates to the use of measures which are likely to require less finance first, and then to consider more expensive options if these fail. In the present climate where funding is likely to be difficult to obtain this strategic concept is considered to be	The revisions provide greater clarity of intent but do not amend the strategy, the initial assessment remains viable	No

Recommendations on Alternative Strategies

Approach	SEA REcommendations	LFRMS Changes	Consideration For Reassessment	Reassessment Required
		<p>the most likely to succeed.</p> <p>Wording to cover this point has been put into clause 5.9 of The Strategy as follows:</p> <p><i>“Whilst it is the aspiration of the Strategy to implement the full package of measures together, in reality constraints such as funding, ease of implementation etc will require measures to be implemented as stated below”.</i></p>		
7 (Options A & B & C)	<p>The SEA recommends that Options be implemented concurrently, rather than consecutively, in the strategies to optimise the potential for positive effects.</p>	<p>The reason why a consecutive approach has been used rather than a concurrent one relates to the use of measures which are likely to require less finance first, and then to consider more expensive options if these fail. In the present climate where funding is likely to be difficult to obtain this strategic concept is considered to be the most likely to succeed.</p> <p>Wording to cover this point has been put into clause 5.9 of The Strategy as follows:</p> <p><i>“Whilst it is the aspiration of the Strategy to implement the full package of measures together, in reality constraints such as funding, ease of implementation etc will require measures to be implemented as</i></p>	<p>The revisions provide greater clarity of intent but do not amend the strategy, the initial assessment remains viable</p>	<p style="text-align: center;">No</p>

Recommendations on Alternative Strategies

Approach	SEA REcommendations	LFRMS Changes	Consideration For Reassessment	Reassessment Required
		<i>stated below</i> ".		

Recommendations on Detailed Objectives

Objective	SEA/SA Recommendation	LFRMS Changes	Consideration For Reassessment	Reassessment Required
1	It is recommended, however, that consideration be given to the issue of creation of new flood defence features within the measures set out in section 6.16.	<p>The wording of the Theme title has been changed to include the word “<i>construction</i>” and now reads as follows</p> <p>“<i>Asset Construction, Management and Maintenance</i>”</p> <p>In addition three measures namely 6.16.2 Defence/Structure Management, 6.16.3 Channel Maintenance and 6.16.4 Culvert Maintenance will be re-named to include the words “<i>and new construction</i>”</p>	The objective now also includes the physical construction of maintenance and management infrastructure for flood defence purposes. Other measures to reduce the risk to people remain. The inclusion of additional physical works may significantly alter the scoring of the matrix and as such, as a precautionary measure, reassessment is recommended.	Yes
2	No changes are recommended	No Change	None	No
3	No changes are recommended	No Change	None	No
4	No changes are recommended	No Change	None	No
5	No changes are recommended	No Change	None	No
6	No changes are recommended	No Change	None	No
7	No changes are recommended	No Change	None	No
8	No changes are recommended	No Change	None	No
9	It is recommended that the Objective be amended to incorporate all elements of the historic environment including Conservation Areas and Historic Landscapes.	<p>The objective will be amended to include “<i>conservation areas and historic landscapes</i>” and will read as follows</p> <p>“<i>Minimise damage to known historic sites, conservation areas and historic landscapes</i>”.</p> <p>A new measure will be introduced as</p>	The objective was amended to ensure clarity as to what is included. The assessment took a broad view as to what comprised historic sites. The inclusion of Conservation areas and historic landscapes would not affect the assessment outcome.	No

Recommendations on Detailed Objectives

Objective	SEA/SA Recommendation	LFRMS Changes	Consideration For Reassessment	Reassessment Required
		follows: <i>“6.13.9 – Conservation Areas and Historic Landscapes”</i>		
10	No changes are recommended	No Change	None	No
11	No changes are recommended	No action required but as a clarification the wording of the objective has been amended as follows <i>“Provide efficient systems for the management and maintenance of surface water assets and drainage systems”</i>	Additional wording has been included for clarity. The assessment considered a broad range of systems and assets and as such there is no effect on the assessment.	No
12	It is recommended that the Objective be amended to include the issue of invasive species within its remit	A new measure has been added as follows: <i>“6.15.8 - Control of invasive species”</i>	The inclusion of invasive species strengthens the objective through being more comprehensive and addresses the negative issues associated with the outcome. Not considered to require amended assessment	No
13	No changes are recommended	No Change	None	No
14	It is recommended that the list of Measures be amended to include a measure relating to soil protection/management and that all objectives be reviewed to determine whether they should link to the measure.	A new measure has been included as follows: <i>“6.15.9 – Soil Management Plans”</i> A new measure has already been included for invasive species – see Objective 12 above	The inclusion of soil management plans both strengthens some of the positive outcomes and addresses some limitations to a positive outcome. The inclusion of soil management plans does not significantly affect the assessment of the objective and as such does not require a further assessment.	No

Recommendations on Detailed Objectives

Objective	SEA/SA Recommendation	LFRMS Changes	Consideration For Reassessment	Reassessment Required
15	It is recommended that the Objective include the measures related to contaminated land, as reduction in flooding to these areas would reduce the risk of water pollution.	The Objective has been amended to include the	None	No
16	It is recommended that the Objective be amended to include measures relating to soil management/protection and maximising soft engineering solutions.	A statement giving priority to soft engineering solutions over hard engineering has been include in Clause 6.9 of The Strategy as follows: <i>“Wherever appropriate soft engineering solutions will be given priority over projects designed using hard engineering. This will apply in particular where new drainage assets and defence structures are built or existing ones modified”.</i>	The principal of the objective remains similar, the amendment providing a hierarchical approach that seeks to utilise soft engineering in preference to hard works. The amendments would provide a more positive score for the assessment however the ability to utilise harder engineering work remain and as such it is not likely to significantly alter the outcome of the assessment.	No
17	No changes are recommended	No Change	None	No
18	It is recommended that the Objective be deleted from the Strategy as it is an administrative action rather than an Objective.	The objective should remain as it is an important part of the implementation of The Strategy	The objective has already been assessed so no further action is required.	No
19	It is recommended that both the Overarching, and the Detailed, Objective are amended by splitting them into two separate Objectives, one relating to targeting at-risk communities and the other requiring schemes to be subject to cost/benefit analysis. The overarching objective and measure would be more appropriate if they were reworded and divided as follows	The wording of the objective has been amended as follows <i>“Ensure investment decisions are prioritised in the most at risk communities on a consistent, defensible basis and are subject to cost benefit analysis.”</i>	Given the objective has become more target specific it is considered appropriate to reassess.	Yes

Recommendations on Detailed Objectives

Objective	SEA/SA Recommendation	LFRMS Changes	Consideration For Reassessment	Reassessment Required
	<p>Ensure that investment decisions for the implementation of flood risk management schemes are made on a consistent, defensible basis.</p> <ul style="list-style-type: none"> • Prioritise investment in the most at risk communities. • Flood risk management schemes are subject to cost benefit analysis 			

Appendix 9 – Reassessment of Amended Objectives

Objective 1		Reduce the number of people exposed to the risk of flooding.				Assessing Officers: PG, DL, OS, MJ, MW	
Assessment Test		Predicted Effect				Comments	
		Nature of Effect	Assessment of Effect			Analysis Any Mitigation Measures Assumptions	
			Additional Effects	Effect Period			
				S/T	M/T	L/T	
1	Will the Objective assist in reducing the ecological footprint of residents			○	○	○	• Secondary negative through physical construction
2	Will the Objective assist in reducing the number of residential dwellings ineligible for insurance cover	Medium Moderate Local Permanent		+	+	+	•
3	Will the Objective assist in reducing the ratio of house prices to earnings	Medium Moderate Local Permanent		-	-	-	•
4	Will the Objective facilitate the provision of affordable housing			○	○	○	•
5	Will the Objective assist in increasing the percentage of people of working age in employment			○	○	○	•
6	Will the Objective assist in reducing vacancy levels of industrial and commercial units			○	○	○	• Secondary positive in respect of site specifics
7	Will the Objective facilitate business start ups			○	○	○	• Secondary positive as new structures
8	Will the Objective facilitate the provision of formal sports and leisure facilities			○	○	○	•
9	Will the Objective the provision of allotments			○	○	○	•
10	Will the Objective assist in reducing net commuting flows			○	○	○	•
11	Will the Objective facilitate accessibility by public transport to key services			○	○	○	•
12	Will the Objective assist in implementing the AQMA Action Plan			○	○	○	•
13	Will the Objective assist in protecting designated landscape areas			○	○	○	• secondary negative as less people min are, and unlikely to be a 'most at risk' community

14	Will the Objective assist in protecting designated historic areas	High Moderate County Permanent	Cumulative Secondary	+/-	+/-	+/-	•	
15	Will the Objective help increase land under agreed management for landscape improvement or protection	Medium Moderate County Permanent	Secondary	○	○	○	•	
16	Will the Objective assist in protecting community assets	Medium Minor Local Permanent	Secondary	+	+	+	•	
17	Will the Objective help minimise flood water management related developments that affect a designated historic site	Low Moderate County Permanent	Secondary	+/-	+/-	+/-	•	
18	Will the Objective assist in improving the ecological status of rivers			○	○	○	• Secondary positive through reducing pollution from flooded property	
19	Will the Objective maintain or reduce the number and volume of EA Licensed abstractions			○	○	○	• Secondary positive from improved water quality	
20	Will the Objective assist in reducing the number of pollution incidents	Medium Minor Local Permanent		+	+	+	•	
21	Will the Objective assist in reducing the percentage of development in flood risk area approved contrary to EA advice			○	○	○	• Secondary positive	
22	Will the Objective increase the number of residents of flood risk areas taking appropriate action	High Major County Permanent		+	+	+	+	•
23	Will the Objective reduce the number of properties flooded	Low Moderate County Permanent	Cumulative Secondary	+	+	+	+	•
24	Will the Objective assist in reducing the amount of approved development within C1 and C2 as defined by TAN 15			○	○	○	•	
25	Will the Objective minimise the area of greenfield development incorporating non-permeable surfacing	Medium Minor Local Permanent		+	+	+	•	

26	Will the Objective protect agricultural land of grades 1, 2 and 3A	Low Minor Local Permanent	Synergistic	+/-	+/-	+/-	<ul style="list-style-type: none"> less flooding in general displacement to less populated areas
27	Will the Objective reduce the number of known main contaminated sites flooded			○	○	○	<ul style="list-style-type: none"> Secondary positive from protection property.
28	Will the Objective assist in increasing the number of restorative/remediation schemes at aggregates/mineral sites and mine workings including water management measures			○	○	○	<ul style="list-style-type: none"> Secondary positive from not requiring land for defences
29	Will the Objective maximise the percentage of construction activities (relating to this Strategy) with a soil management plan in place			○	○	○	<ul style="list-style-type: none">
30	Will the Objective minimise flood water management related development on land designated as RIGs or geological SSSIs	Medium Moderate Local Permanent		-	-	-	<ul style="list-style-type: none">
31	Will the Objective assist in increasing the percentage of selected BAP species stable or increasing			○	○	○	<ul style="list-style-type: none"> Secondary positives for SuDS Secondary negative for prioritising people
32	Will the Objective assist in increasing numbers of specific, monitored, water related species	Low Moderate Local Permanent	Cumulative	-	-	-	<ul style="list-style-type: none"> Based on ethos of the objective.
33	Will the Objective assist in protecting monitored sites			○	○	○	<ul style="list-style-type: none">
34	Will the Objective minimise area of biological SSSI or SAC lost to flood management development	Medium Moderate Local Permanent	Cumulative	-	-	-	<ul style="list-style-type: none">
35	Will the Objective minimise area of LNR or SINC lost to flood management development	Medium Moderate Local Permanent	Cumulative	-	-	-	<ul style="list-style-type: none">
36	Will the Objective seek to maximise the use of soft engineering flood measures			+	+	+	<ul style="list-style-type: none"> Given that soft engineering is a priority of the strategy as a whole

37	Sites of floodwater management development that have invasive plant species control measures in place prior to works.	High Moderate Local Permanent			+	+	+	•					
38	Will the Objective assist in reducing CO ₂ emissions in the county borough				○	○	○	• secondary negative, through new construction.					
39	Will the Objective maximise the number of adopted SuDS	High Major County Permanent	Cumulative Synergistic Secondary		○	+	+	+	+	• Uncertain adoption requirement at start of period gives negative. Once resolved strong positive.			
40	Will the Objective minimise the instances of flooding due to blocked culverts	High Major County Permanent	Cumulative Secondary		+	+	+	+	+	•			
41	Will the Objective assist in minimising the number of CSO overflows	Medium Moderate Local Permanent			+	+	+	•					
42	Will the Objective assist in minimising the number of sewer overflows	Medium Moderate Local Permanent			+	+	+	•					
43	Will the Objective minimise the number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures	Medium Moderate County Permanent	Cumulative Secondary		+	+	+	•					
44	Will the Objective assist in reducing the percentage of new development located within an at risk location	Low Minor Local Permanent			+	+	+	•					
45	Will the Objective assist in reducing the length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures.				○	○	○	• Secondary positive, through new construction that could incorporate this.					
SEA Assessments		++	11	+	30	○	76	+/-	3	-	15	--	0

Comment

This objective seeks to reduce the risk to people (not property) of flooding, and now through additions made a result of the SEA includes the creation of new assets. It is taken that reduction in risk will also include the reduction in flooding itself.

11 double positive results were realised, relating to SuDS (albeit for medium and long term only) blocked culverts people taking action, with the number of properties flooding increasing from a single positive, which is an increase on the previous 8. This is supported by 30 single positives, a small reduction on the previous 36 (this is an affect of one test only as one test was increased to a double positive). The positive affect is also increased on 41 and 42 whereby the affect is greater than the previous assessment, however as these are not directly mentioned a double positive cannot be awarded.

By contrast 15 single negatives were scored, a reduction on the previous 18 single negatives. Again no double negative results were realised. The assessment did realise nine positive/negative results relating to designated land, a result of the differentiation of protection from and displacement of flooding.

Conclusion

Overall the assessment of this objective reaches a favourable positive effect, with the changes increasing this impact over a wider area.

Objective 19	Ensure investment decisions are prioritised in the most at risk communities on a consistent, defensible basis and are subject to cost benefit analysis	Assessing Officers: PG, DL, OS, MJ, MW	

Assessment Test		Predicted Effect					Comments
		Nature of Effect	Additional Effects	Assessment of Effect			
				Effect Period			
			S/T	M/T	L/T	Analysis Any Mitigation Measures Assumptions	
1	Will the Objective assist in reducing the ecological footprint of residents	Medium Minor County Permanent	Cumulative Secondary	-	-	-	S.D measures can be more costly and score poorly on cost/benefit analysis.
2	Will the Objective assist in reducing the number of residential dwellings ineligible for insurance cover	High Minor County Permanent		+	+	+	
3	Will the Objective assist in reducing the ratio of house prices to earnings			○	○	○	
4	Will the Objective facilitate the provision of affordable housing			○	○	○	
5	Will the Objective assist in increasing the percentage of people of working age in employment			○	○	○	
6	Will the Objective assist in reducing vacancy levels of industrial and commercial units			○	○	○	Secondary positive to those units at risk.
7	Will the Objective facilitate business start ups			○	○	○	
8	Will the Objective facilitate the provision of formal sports and leisure facilities			○	○	○	
9	Will the Objective the provision of allotments			○	○	○	
10	Will the Objective assist in reducing net commuting flows			○	○	○	
11	Will the Objective facilitate accessibility by public transport to key services			○	○	○	
12	Will the Objective assist in implementing the AQMA Action Plan			○	○	○	

13	Will the Objective assist in protecting designated landscape areas	High Moderate Local Permanent		-	-	-	
14	Will the Objective assist in protecting designated historic areas			○	○	○	Secondary positive if located in at risk area.
15	Will the Objective help increase land under agreed management for landscape improvement or protection			○	○	○	
16	Will the Objective assist in protecting community assets	High Moderate Local Permanent	Cumulative Synergistic Secondary	+	+	+	
17	Will the Objective help minimise flood water management related developments that affect a designated historic site			○	○	○	
18	Will the Objective assist in improving the ecological status of rivers			○	○	○	
19	Will the Objective maintain or reduce the number and volume of EA Licensed abstractions			○	○	○	
20	Will the Objective assist in reducing the number of pollution incidents	Medium Moderate County Permanent	Cumulative Secondary	+	+	+	•
21	Will the Objective assist in reducing the percentage of development in flood risk area approved contrary to EA advice			○	○	○	• Secondary positive through the combined effect of flooding in minor and major streams
22	Will the Objective increase the number of residents of flood risk areas taking appropriate action	High Moderate Local Temporary Permanent	Secondary	+	+	+	•
23	Will the Objective reduce the number of properties flooded	High Major County Permanent	Cumulative Synergistic Secondary	++	++	++	•
24	Will the Objective assist in reducing the amount of approved development within C1 and C2 as defined by TAN 15			○	○	○	•

25	Will the Objective minimise the area of greenfield development incorporating non-permeable surfacing			○	○	○	•
26	Will the Objective protect agricultural land of grades 1, 2 and 3A			-	-	-	•
27	Will the Objective reduce the number of known main contaminated sites flooded			○	○	○	•
28	Will the Objective assist in increasing the number of restorative/remediation schemes at aggregates/mineral sites and mine workings including water management measures			○	○	○	•
29	Will the Objective maximise the percentage of construction activities (relating to this Strategy) with a soil management plan in place			○	○	○	•
30	Will the Objective minimise flood water management related development on land designated as RIGs or geological SSSIs			○	○	○	•
31	Will the Objective assist in increasing the percentage of selected BAP species stable or increasing			○	○	○	• Depends on weight of ecology in cost/benefit analysis
32	Will the Objective assist in increasing numbers of specific, monitored, water related species			○	○	○	•
33	Will the Objective assist in protecting monitored sites			○	○	○	•
34	Will the Objective minimise area of biological SSSI or SAC lost to flood management development			○	○	○	• Depends on weight of ecology in cost/benefit analysis
35	Will the Objective minimise area of LNR or SINIC lost to flood management development			○	○	○	• Depends on weight of ecology in cost/benefit analysis

36	Will the Objective seek to maximise the use of soft engineering flood measures			○	○	○	• Secondary negative due to the reduced space in urban areas to undertake soft measures.						
37	Sites of floodwater management development that have invasive plant species control measures in place prior to works.			○	○	○	•						
38	Will the Objective assist in reducing CO ₂ emissions in the county borough			○	○	○	•						
39	Will the Objective maximise the number of adopted SuDS			○	○	○	•						
40	Will the Objective minimise the instances of flooding due to blocked culverts	High Moderate county Permanent	Cumulative Synergistic Secondary	+	+	+	•						
41	Will the Objective assist in minimising the number of CSO overflows	High Moderate county Permanent	Cumulative Synergistic Secondary	+	+	+	• due to urban focus of the proposal						
42	Will the Objective assist in minimising the number of sewer overflows	High Moderate county Permanent	Cumulative Synergistic Secondary	+	+	+	• due to urban focus of the proposal						
43	Will the Objective minimise the number of Critical Services in areas at risk of flooding that have not been the subject of Flood Risk Management measures	High Major County Permanent	Cumulative Synergistic Secondary	+	+	+	• depends on location of the service.						
44	Will the Objective assist in reducing the percentage of new development located within an at risk location			○	○	○	• secondary positive, due to the urban site development that will be protected.						
45	Will the Objective assist in reducing the length of primary transport infrastructure in areas at risk of flooding, which are not the subject of Flood Risk Management measures.	High Major County Permanent	Cumulative Synergistic Secondary	+	+	+	• secondary positive, due to the urban site development that will be protected.						
SEA Assessments		++	3	+	27	○	96	+/-	0	-	9	--	0

Comment

The assessment scored 6 double positives, this is again realised in the reduction in the number of properties flooded, although a reduction to a single positive is noted in critical areas flooded, although the increase from single positive occurs in insurance cover. Single positives increase from 18 to 21, with different areas realising benefits/losses. A new measure is found in residents taking appropriate action, information being a cost effective option. Conversely negative impacts increased from 3 to 9, with designated areas being affected.

It has been assumed in the assessment that a sequential approach to at risk communities will occur in the implementation of this policy. The prioritisation of most at risk communities has increased the impact of the policy, increasing both negative and positive outcomes. A number of these impacts are to be expected through a targeted objective. Others may be changed through the content of the cost benefit analysis undertaken during each project.

Conclusion

Although the weight provided in the cost/benefit analysis will alter the impact of the objective affect, no changes be made to the strategy.