

## Appendix 12 Cumulative Effects Assessment

The SEA Directive requires that the cumulative and synergistic effects of the plan are assessed. The identification and assessment of cumulative and synergistic effects is often undertaken using a receptor based approach. This means assessing effects by receptor groups e.g. population, biodiversity etc rather than defining effects by an SEA Objective.

Cumulative effects can occur when several developments have insignificant effects but when combined together they result in a significant effect or several individual effects of plan (e.g. air pollution, biodiversity losses) have a combined effect. Synergistic effects occur when effects interact to produce a total effect greater than the sum of the individual effects.

<b>Receptor Topic</b>	<b>Likely Cumulative Effect overall</b>
<b>Biodiversity (flora and Fauna)</b>	Beneficial effect
<b>Population and Health (combined)</b>	Beneficial effect
<b>Soil (including peat and geodiversity)</b>	Beneficial effect
<b>Water</b>	Positive and Negative effect
<b>Air</b>	Beneficial effect
<b>Climatic Factors</b>	Positive and negative
<b>Material Assets (including waste and natural resources)</b>	Positive and Negative
<b>Cultural Heritage (including architectural and archaeological heritage)</b>	Positive and Negative
<b>Landscape and Built Environment</b>	Beneficial effect

The assessment of cumulative effects has demonstrated that the LDP will have a large number of benefits environmentally, socially and economically in Shetland. Some recommendations have been made through the SEA process to further strengthen the plan, particularly from an environmental perspective, owing to the high quality environment found in Shetland that must be protected.

The identification and assessment of cumulative and synergistic effects is usually undertaken adopting a receptor-based approach. This essentially means considering the impacts on a topic by topic basis e.g. biodiversity, landscape etc. rather than defining impacts by SEA Objective. The matrix below presents the potential effects that could be realised as a result of the implementation of the LDP by receptor topic. The receptor topics include the SEA Directive topics but also cover wider social and economic topic areas where appropriate. An indication is provided of the likely direction of the impacts through a simple scoring system shown below together with some explanatory commentary highlighting how specific aspects of the LDP could lead to such cumulative effects. Furthermore related topic areas that could be affected and any key mitigation measures or recommendations that were considered by the plan-makers have been included.

## Scoring of effects

<b>Beneficial effect</b>	<b>+</b>
<b>No effect</b>	<b>0</b>
<b>Uncertain effect</b>	<b>?</b>
<b>Adverse effect</b>	<b>--</b>
<b>Positive and negative effects</b>	<b>+ / -</b>

### Assessment of the cumulative effects of the LDP Policies – Topic analysis

Receptor Topic	Likely Cumulative Effect overall	Commentary and reference to LDP policies	Links to Other Receptor Topics	Mitigation
<b>Biodiversity (flora and Fauna)</b>	<b>Beneficial effect</b>	<p><b>Positive cumulative effects on biodiversity resources as a result of a number of policies seeking to both protect and enhance the natural environment of Shetland.</b></p> <p>Throughout the LDP there is a very strong commitment that any new development within Shetland either employment, housing, recreational or retail should not adversely affect the natural environment of the Islands. There is some potential for some types of developments across Shetland to result in the cumulative loss of biodiversity resources. However, a number of policies in the LDP are worded such that impacts should not be adverse . The Natural Heritage policies (NH1 –NH6) safeguard against this occurring, Whilst Policies <b>XX</b> address the protection of Shetland’s natural resources There are also appropriate biodiversity or environmental safeguarding clauses included throughout policies in other sections of the LDP. Across Shetland there are a number of nature conservation sites protected by European legislation which must be afforded the highest levels of protection and so the requirements of Policies NH1, 2 and 3 are critically important.</p>	Population, human health, water resources, air quality, landscape, water resources, climatic factors, economy, geology and soils, material assets, cultural heritage, economy	No mitigation required

		<p>Whilst the protection of designated sites at both a national, regional and local level is very important, it is essential to recognise the value of non-designated resources that are critical to the connectivity and stability of the designated sites. These features are also protected by the Natural Heritage Policies in the LDP.</p>		
<p><b>Population and Health (combined)</b></p>	<p><b>Beneficial effect</b></p>	<p><b>Clear commitment throughout the LDP to protecting and enhancing the natural environment, as well as allowing limited development (affordable housing, employment development) in suitable locations and the provision of new community facilities. Health is affected by a range of factors and so there should be long-term cumulative benefits upon this receptor group.</b></p> <p>Community Facilities Policies CF 1 and 2 of the LDP focus on promoting healthy and sustainable communities that will contribute to improving the health and well-being of residents of Shetland</p> <p>Housing Policy H3 and 4 support the development of housing to meet the needs of the Shetland communities including the provision of affordable housing. Whilst the</p>	<p>All SEA Directive topics and related factors such as housing, deprivation and the Shetland's living environment.</p>	<p>No mitigation measures required</p>

		<p>provision of such housing and meeting the affordability needs of the residents is likely to be a gradual process, in the long-term it could benefit the vibrancy of local communities and lead to a more balanced population structure within Shetland. Linked to the provision of housing is the need for community facilities which is addressed in Community Policies CF1 and 2.</p> <p>One of the factors affecting quality of life and human health is the quality of the built and natural environment. The protection, enhancement and management of the natural environment is supported by Natural Heritage Policies NH1 to 6. Other policies focussed on the need to protect areas of open space through Housing Policy 6: Amenity Space and Community Facilities Policies 1 and 2 can collectively help to protect the quality of the natural environment offering indirect benefits to human health.</p> <p>In supporting the local economy the LDP addresses the need for there to be appropriate land available to support economic development within Shetland whilst at the same time ensuring that such development respects and does not compromise Shetland's environment. Improving the availability of employment opportunities is likely to benefit the population of Shetland in the</p>		
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		long-term. Economic Development Policies ED1 to 3 are likely to offer indirect cumulative benefits as well as enabling appropriate developments to occur which could generate greater prosperity for Shetland's population.		
<b>Soil (including peat and geodiversity)</b>	Beneficial effect	<p><b>Clear commitment throughout the plan to the protection and enhancement of soils, peat and geodiversity.</b></p> <p>Shetland contains an important soil and peat resource together with a wealth of geology and geomorphology. Whilst the LDP strategy provides for more housing development in Shetland the soil, peat and geological sites of importance are situated in areas outside of settlements and are considered unlikely to be adversely affected.</p> <p>Natural Heritage policies NH4 and 5 commit to protecting soils, peat and geodiversity. There could be a localised loss of soil resources and functions including infiltration capacity associated with the loss of small greenfield areas within settlements. However, there is a clear commitment in the General Development Policy 1 to sustainable development in relation to any development proposals.</p>	Water resources, biodiversity, flora and fauna, landscape, cultural heritage.	No mitigation required
<b>Water</b>	Positive and Negative effect	<p><b>Clear focus in the LDP upon directing development away from flood risk locations and upon protecting the quality of surface and groundwater sources. Sustainable</b></p>	Biodiversity, flora, fauna, human health, housing,	The need for a greater emphasis upon avoiding flood risk has been

		<p><b>Urban Drainage Systems (SUDS) are supported together with strict water disposal standards. New development has the potential to increase water resource demand.</b></p> <p>New development within in Shetland is likely to increase water demand. Main settlements and villages obtain their water from small, local reservoirs. These are currently at sustainable levels and the relatively modest levels of growth in Shetland, are considered unlikely to result in a cumulative adverse impact upon the water supply. To understand the potential cumulative effects associated with new development and water demand it is important to consider ‘Improving the quality of Scotland’s water environment Orkney and Shetland Area Management Plan 2010–2015’ that focuses on water quality, supply and demand. It considers how water demand will change in the future and implements actions to address this demand which may include leakage repair or possible changes to proposed abstractions or other appropriate measures.</p> <p>There are no particularly polluting developments proposed as part of the LDP. Water &amp; Drainage Policy WD1 states that development should be directed away from flood risk. Waste water disposal and SUDs are covered within Policies WD2 and WD3.</p>	<p>economy, population, material assets, cultural heritage, soils.</p>	<p>considered in the Plan after consultation with SEPA. A Strategic Flood Risk Assessment has been undertaken and the Plan has strict flood avoidance criteria contained in Water and Drainage Policy WD1. The Policy consistent current SEPA flood risk guidance.</p>
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Air	Beneficial effect	<p><b>Positive in the long-term owing to the focus upon reducing travel distances and promoting more sustainable modes of transport.</b></p> <p>Transport is a key factor which impacts upon air. Despite the high dependency on the car in Shetland, air quality is good. Whilst the LDP includes policies which would enable housing, employment, retail, tourism and recreational development which could lead to greater use of cars as a result of a larger population, the level of growth proposed is very low. Furthermore, emphasis on the need for new developments to be accessible by means other than the private car is outlined in Transport Policy TRANS 1</p> <p>General Development Policies seek to ensure that development is sited appropriately in Shetland in view of existing accessibility by public transport and the availability of facilities. Lerwick is the main local service centre where most development is likely to be focussed and is well supported by the public transport network. Rural transport infrastructure and inter island transport is important also. The reduction in reliance on the private car in the long-term is not foreseen likely, however the impacts of transport pollution on air quality in Shetland is not significant. The LDP does encourage alternative modes of transport and travel alternatives in</p>	Biodiversity, flora, fauna, human health, population, economy, housing,	<p>The Council has limited control over public transport or the development of the road network. Overcoming issues relating to car traffic are likely to require long-term action and will need the buy-in of a number of stakeholders and also the action of individuals. This is something the LDP has only limited control over</p> <p>The LDP renewable policy has been strengthened to emphasise the need to reduce reliance on fossil fuels.</p>
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		TRANS 1 but this will be affected by people's individual behaviour. Renewable Energy Policy RE1 emphasises support for renewable energy development which will contribute to reducing greenhouse gas emissions by achieve national Co <sup>2</sup> reduction targets and improving air quality in the long term.		
<b>Climatic Factors</b>	Positive and negative	<p><b>Combination of positive and negative effects in relation to tackling climate change issues.</b></p> <p>Tackling climate change and associated risks is a major consideration for all development proposals is central to the LDP's commitment to Sustainable Development. This is outlined in General Development Policy GP1 – Sustainable Development</p> <p>There is a strong commitment to transport integration and inter island links in the LDP. Shetland residents depend on cars, public transport, ferries and air links on a day- to- day basis. This is a major contributor to local carbon dioxide emissions. The other main contributor is from buildings. To reduce emissions will require wider action (i.e. from other organisations) to help promote a modal shift to sustainable transport options.</p> <p>There is also a focus upon ensuring development is situated away from flood risk</p>	Biodiversity, flora and fauna, water resources, population, human health, soils, economy, housing, air quality, cultural heritage.	<p>More emphasis on Climate change has been introduced into the LDP General Development Policy (GP2) for mitigation purposes</p> <p>The LDP influences the uptake and use of low carbon and renewable energy technologies (Policies GP2 and RE1). It also emphasises the use of public transport options to try and reduce future carbon dioxide emissions,</p>

		<p>areas. The risk of flooding through climate change is addressed under Water &amp; Drainage Policy WD1 - Flooding Avoidance. The policy stipulates that proposals to build below the 5 metre contour (5 metres above Ordnance Datum, Newlyn) or in other areas shown to be at risk of flooding from any source or from coastal erosion will not be permitted. A Flood Risk Assessment or other information must be provided which demonstrates that the development itself is not at risk of flooding and does not increase flood risk to surrounding properties and/or land.</p> <p>The LDP seeks to reduce emissions from new development through General Development Policy GP2 with an emphasis on low and zero carbon generating technology. General Development Policy GP3 - All Development : Layout and Design outlines that the shaping of Shetland's future communities will be influenced by implementation of the requirements of the Climate Change (Scotland) Act 2009.</p> <p>The benefits of the above policies are likely to have medium to long lead-in times and so are likely to be realised in the long-term. The LDP's General Development Policies should help to mitigate the risk of cumulative effects from development proposals.</p>		<p>however the Council has limited powers over public transport or the development of the road network within Shetland.</p> <p>Need for and energy efficiency policy has been addressed through strengthening the Renewable energy Policy (RE1)</p> <p>Prevention of flooding caused by climate change is covered in policies GP2 and WD1 – Flooding Avoidance</p>
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<b>Material Assets (including waste and natural resources)</b>	Positive and Negative	<p><b>Increased waste generation as a result of new development (albeit on a very small scale). However, there is a clear commitment in the LDP to providing waste management and recycling facilities in appropriate locations.</b></p> <p>Any new development is likely to increase demand for natural resources, generate greater amounts of waste and increase energy consumption. However, the LDP includes various safeguards. Waste policy W1 – Waste Hierarchy gives support for waste management facilities which fulfil the requirements of national and local waste strategies, or plans, and take account of the waste hierarchy and the best practicable environmental option (BPEO). Policy W2 Waste Management Facilities restricts location of Waste management activities and</p>	Biodiversity, flora and fauna, cultural heritage, landscape, housing, soils and geology, water resources.	No mitigation measures required.

		<p>waste related industries to the area around Greenhead, Rova Head and Dales Voe.</p> <p>Development Policy 4: Existing Waste Management Sites and Small-Scale Sites for Household and Inert Waste which permits the development of small scale civic amenity waste sites which could help to encourage effective waste management in the long-term.</p> <p>Policy M1 – Minerals addresses mineral extraction in Shetland and prohibits large scale abstractions unless there are exceptional reasons for permitting such development. However, small scale abstractions will be permitted in suitable locations. Whilst there could be localised temporary benefits associated with such mineral workings e.g. employment and potentially localised environmental effects e.g. dust generation, they will be judged against other policies in the LDP. However, the policy could lead to the loss of mineral resources in Shetland.</p> <p>Any increase in demand for natural resources will have to meet the requirements of Policy GP3 All Development: Layout and Design that stresses the importance of protecting Shetland's natural resources and maintaining or enhancing the landscape character of Shetland.</p>		
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<p><b>Cultural Heritage (including architectural and archaeological heritage)</b></p>	<p>Positive and Negative</p>	<p><b>The LDP contains policies committed to protecting and enhancing cultural heritage resources and also restoring them where appropriate.</b></p> <p>Future development will be permitted in Shetland e.g. for housing, retail, community, recreational, tourism and employment purposes has the potential to impact upon cultural heritage of Shetland if developed in an inappropriate manner.</p> <p>The LDP includes a number of Historic environment (HE) policies addressing the need to protect cultural heritage resources. Policies HE1 presumes in favour of the protection, conservation and enhancement of all elements of Shetland’s historic environment, which includes buildings, monuments, landscapes and areas.</p> <p>HE 2 cover listed buildings and any features of special architectural or historic interest that they possess. HE3 covers development in conservation areas. HE4 protects archaeological resources such as scheduled monuments, designated wrecks and other identified nationally important</p> <p>Within all of the HE policies there is a commitment to the protection of heritage</p>	<p>Living environment, landscape, economy, housing, biodiversity, townscape, soils, material assets.</p>	<p>Policy strengthening within the LDP to address conversion of traditional buildings or modifications to existing dwellings which could lead to the cumulative loss of traditional features and the cultural heritage resources has been done in Policies Historic Environment Policies HE1 and 2</p> <p>General Development Policy (GP2) does not cover Conversion and Change of use of rural buildings or existing dwellings , however it affords protection of buildings or structures of</p>
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		<p>features, to provide sufficient protection of heritage resources.</p> <p>Any development proposal will have to meet certain conditions of the LDP's General Development policies and topic specific policies. During any development of a project there is potential for cumulative loss of unknown heritage resources and archaeological deposits if discovered.</p> <p>However, this issue is addressed clearly through other policies in the plan and so this should not occur.</p>		archaeological, architectural or historic interest
<b>Landscape / Built Environment</b>	<b>Beneficial Effect</b>	<p><b>LDP contains policies that seek to protect and enhance all aspects of the built and natural environment in Shetland that should benefit both landscape, townscapes and seascapes.</b></p> <p>The LDP includes policies which permit housing, employment, retail, recreation and tourism development providing it is consistent with other policies in the LDP. There is the potential for such development to have adverse effects on the landscape and built environment of Shetland.</p> <p>GP3 All Development: Layout and Design supports protecting Shetland's natural resources and maintaining or enhancing the landscape</p>	Biodiversity, cultural heritage, living environment, water resources.	No mitigation required

		<p>character of Shetland.</p> <p>Community Facilities Policy CF2 Open Space commits to Protecting open spaces that contribute to the recreational amenity or environmental quality of Shetland.</p> <p>There are policies within the LDP that permit development in rural areas that have the potential to affect the landscape e.g. housing, economic development. To mitigate against future development impacts all proposals would have to meet the requirements of Policies GD2 and GD3. These policies make reference to protecting features of the landscape and built heritage of Shetland</p> <p>Coastal development is covered in Policy CST 1 – Coastal Development. This focuses on Proposals for developments and infrastructure in the coastal zone (Mean High Water Springs out to 12 nautical miles). Proposals must demonstrate that there will be no significant impact, either individually or cumulatively, on the natural and built heritage, including cultural heritage, resources either in the sea or on land</p>		
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