Guidance on consideration of human health in Strategic Environmental Assessment

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1. Consideration of human health in Strategic Environmental Assessment

1.1 The physical environment can influence health directly (e.g. through air quality or water pollution) and more widely through how people interact with the natural and built environment (e.g. enjoying well-designed public and / or green spaces within our towns and cities). The impact of environmental factors such as climate, geography, geology, topography and environmental hazards on health is termed the environmental burden of disease, much of which (in theory) could be preventable. The focus of activity to reduce the environmental burden of disease is to work towards minimising the adverse health impacts of poor quality environments and also maximising the positive benefits associated with living in good environments.

1.2 Guidance on the implementation of the SEA Directive http://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf states in Paragraph 5.26 that:

> *The notion of human health should be considered in the context of the other issues mentioned in paragraph (f*) [i.e. biodiversity, fauna, flora, soil, water, air, material assets, climatic factors, population, cultural heritage and landscape] *and thus environmentally related health issues such as exposure to traffic noise or air pollutants are obvious aspects to study.*

1.3 The Statutory Guidance on the General Purpose of the Scottish Environment Protection Agency and its Contribution towards Sustainable Development requires SEPA to carry out its functions in a way that *contributes to the health and wellbeing of the people of Scotland*. It states in Section 3.4 that:

> *SEPA's approach should consider Scotland's natural environment as underpinning the health and wellbeing of communities …. protecting and enhancing the quality of water, land and living resources is essential in supporting Scottish communities.*

1.4 The focus of this guidance on human health and SEA is on those aspects which fall within SEPA's remit as set out in its general purpose referred to in the previous paragraph.

1.5 This guidance is based on the World Health Organisation (WHO) definition of health i.e. *health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.* Health is influenced by a range of factors that are 'fixed' (e.g. age, ethnicity and genetics). But there are other external factors which influence health e.g. wider socio-economic and cultural conditions as well as the physical and social environments in which people live, learn and work. These factors all affect our health; the unequal distribution of health-creating and health-harming environments can lead to health inequalities. This guidance is concerned with those health effects which are related to environmental factors (e.g. air, soil, water, climatic factors and material assets) which fall within SEPA's remit.

1.6 Responsible Authorities should satisfy themselves that they have addressed all

relevant human health issues, including any which lie within the remit of Historic Environment Scotland or Scottish Natural Heritage. Guidance on those aspects of human health related to SEA topics which fall outwith SEPA's remit should be sought from the other SEA Consultation Authorities or the Scottish Government SEA Team.

2. Existing environmental problems and potential significant effects

2.1 The health of Scotland's people has improved over a few generations. Historically, the emphasis on improving health was to create environments free from infectious diseases, pollutants and chemical hazards. Today, we are increasingly recognising the key role that the natural and built environment has to play in influencing human health and sense of wellbeing, and in reducing health inequalities.

2.2 Plans, programmes and strategies (PPS) which could affect environmental factors influencing health include those which promote policies or proposals which:

- result in new or change existing emissions to air, soil, or water;
- influence the risk to people and property from flooding;
- result in changes to existing land use;
- influence the location of built development of any type, including the creation of potentially unacceptable risks for adjacent communities;
- influence the risk of exposure of communities to certain types of development / activity e.g. through determining location of activity;
- influence greenhouse gas emissions.

2.3 Table 1 below sets out examples of how human health interacts with the other SEA topics which fall within SEPA's remit (i.e. air, soil, water, material assets, and climatic factors), the causes of existing environmental problems and their potential effects on human health.

Table 1 – The causes of existing environmental problems and their potential effects relating to human health for SEA topics which fall within SEPA's remit

Air

While air quality is generally good in Scotland further improvements are needed to reduce the adverse effects caused by air pollution particularly in urban areas. There are 'pollution hotspots' in Scotland where Air Quality Management Areas (AQMAs) have been declared. With a reduction in large-scale industry the influence of transport, agriculture and other non-industrial sources continue to be significant sources of air pollution.

Health effects range from chronic (long-term) disease and premature death to lesser symptoms affecting a large percentage of the population and contributing to greater use of medication, more days of restricted activity, more visits to GPs and A&E, and more hospital admissions.

Air quality is affected by pollution released into the atmosphere through human activities including transport, energy generation, industry, waste management and

agriculture, and through natural sources.

See SEPA's SEA air topic guidance for further details of effects on human health.

Soil

As a key element of our environment the quality of soil and its potential degradation can have major implications for air and water quality as well as our climate and biodiversity. Soil degradation can affect the wider environment - for example, the loss of organic matter in soils can increase the amount of greenhouse gases (GHGs) in the atmosphere, contributing to climate change.

The most significant pressures on Scottish soils are currently climate change and changes in land use and land management practices, including built development. These overarching pressures result in a range of processes that damage soil quality such as loss of organic matter, soil sealing and soil loss, soil contamination, changes in soil biodiversity, erosion and landslides, and compaction and structural degradation.

See SEPA's SEA soil topic guidance for further details of effects on human health.

Water

Essential for our health and that of habitats and ecosystems, water supports wetland habitats and species, human activity including industries such as aquaculture and power generation, and provides us with drinking water. Overall Scotland's water environment is in a good condition but a wide range of problems exist at local levels including risk to human health from flood events and poor quality private water supplies.

The most significant pressures on water are currently diffuse and point source pollution, abstraction / impoundment, poorly located, designed or maintained private water supplies, physical pressures, flooding, and invasive non-native species.

See SEPA's SEA water topic guidance for further details of effects on human health.

Material assets

Built and natural assets are a key part of our environment, they include infrastructure for energy, heat, flood protection, water supply, and waste and waste water management. In some areas the capacity of some material assets to deal with demand is being over-reached e.g. waste water management systems and energy generation which can affect human health and wellbeing.

Increasing demand for goods and services puts pressure on existing material assets and causes an increasing demand for resources together with the need for waste management and disposal mechanisms.

See SEPA's SEA material assets topic guidance for further details of effects on human health.

Climatic factors

Climate change is likely to have a wide range of impacts on human health – some harmful, others potentially beneficial; action is required at all levels in order to meet the challenges these effects will bring. The Research and Innovation for our

Dynamic Environment (RIDE) Forum health report card provides an in-depth analysis of these challenges.

Globally our consumption of power, heat, food, goods and services (including manufactured goods, communications technologies and transport) is continuing to grow giving rise to increasing greenhouse gas emissions which lead to climate change. In 2016 Scotland reported that it had exceeded its 2020 emissions targets six years early however as climate change is a global issue Scotland continues to be affected by climatic factors on a worldwide scale.

See SEPA's SEA climatic factors topic guidance and the Committee on Climate Change report on UK Climate Change Risk Assessment 2017 (including Scotland-specific evidence) for further details.

2.4 The advice set out in the Draft Guidance on Health in Strategic Environmental Assessment recommends (page 58) that significance of effects in relation to human health be attributed according to the characteristics of the population which will be affected i.e.:

> *Assessment of health within SEA should focus on identifying those who are particularly vulnerable through age, employment status, different cultures, language and disability*.

2.5 Different health effects will arise among different groups of people and individuals exposed to the same risk or hazard. This is because of differences in their exposure to the hazard, their sensitivity and their capacity to respond to events (i.e. their resilience) or to adapt in the long term. Consequently there are a number of different approaches which can be adopted in order to identify potential vulnerability including:

- The Scottish Index of Multiple Deprivation (SIMD) incorporates several different aspects of deprivation and combines them into a single index in order to provide a relative ranking for 6,505 data zones which cover the whole of Scotland. The SIMD can therefore be used as a means to spatially identify vulnerable populations.

- Plotting the location of schools or colleges, residential care, sheltered or supported housing may help to identify populations which may be deemed vulnerable in relation to age or disability.

- Plotting the location of regulated industry, heavily used transport routes and interchanges (road, rail, air) or Air Quality Management Areas in relation to proposed land allocations for uses such as housing may help to identify 'hot spots' of potential hazards and ensure that allocation decisions are made in the full knowledge of the potential interaction between the proposed land uses.

- Comparing the potential vulnerability to flooding in relation to different land use proposals / options; a classification of the relative vulnerability of land uses has been devised which groups a range of land uses into five categories (see LUPS-GU24 Land Use Vulnerability Guidance). The classification recognises that certain types of development and the people

who use and live in them are more at risk from flooding than others. This classification helps to focus attention on the relative vulnerability of different developments for their users and is therefore helpful in the risk assessment of land allocations for development.

2.6 A scoring system which ranges from a "major positive" effect to a "major negative" effect in relation to human health could use the following significance criteria:

- *Major positive* ++ An action very likely to lead to an overall reduction, or a series of smaller reductions, in one or more aspect of environmental pollution or flooding in the Plan area. *E.g. major sources of air / soil / water contamination will be removed or vulnerability to flooding will be decreased in the majority of the most polluted or vulnerable areas / populations. For example by re-locating all regulated industry to a non-residential area and re-allocating the existing site to residential development.*
- *Minor positive* + An action very likely to lead to a moderate reduction, or a series of smaller reductions, in one or more aspect of environmental pollution or flooding in the Plan area. *E.g. moderate or minor sources of air / soil / water contamination or vulnerability to flooding will be removed in some of the most polluted or vulnerable areas / populations. For example re-locating one of a number of regulated industries to a non-residential area.*
- *Minor negative* – An action very likely to lead to a moderate increase, or a series of minor increases, in one or more aspect of environmental pollution or vulnerability to flooding in the Plan area. *E.g. contaminants present in air / soil / water or vulnerability to flooding will increase on a small scale in some of the most polluted or vulnerable areas / populations. For example allocating land for future residential development adjacent to an existing regulated industry.*
- *Major negative* - - An action very likely to lead to a severe increase, or a series of lesser increases, in one or more aspect of environmental pollution or flooding in the Plan area. *E.g. significant increase in air / soil / water contaminants or vulnerability to flooding in the majority of the most polluted or vulnerable areas / populations. For example allocating land for a major regulated industrial development adjacent to land zoned for housing.*

2.7 Such an approach to significance will help to ensure that a PPS does not result in shifting environmentally-related health issues from one part of the plan area to another or from one vulnerable population to another and will therefore also help to ensure that the PPS does not actively perpetuate health inequalities. Responsible Authorities may wish to use these criteria (and that set out in 2.8 below) as the basis of developing an assessment method that suits the PPS being assessed.

2.8 Neutral, mixed and uncertain effects of a PPS on human health

- Neutral effects - an action which is unlikely to have any beneficial or negative effects on any existing environmental determinant of health. Neutral scoring should only be used where it is very likely that the effect on the current baseline or trends will be neither positive nor negative. It is possible that a neutral effect may be enhanced through mitigation measures such as policy or project intervention.

- Mixed effects – an action which is likely to result in a combination of positive and negative effects, particularly where effects are considered on sub-issues, areas or criterion. Such mixed effects will be hard to predict, but could be significant in the long-term, or when taken with other effects e.g. cumulative or synergistic.

- Uncertain effects - the effect of an action on any existing environmental determinant of health is not known, or is too unpredictable to assign a conclusive score. Uncertainty may arise where an action covers a range of issues, or where the manner in which the action is implemented is a material factor in the nature of the effects it may have.

2.9 Where a PPS has the potential to have significant environmental effects on another EU Member State these effects are known as Transboundary effects. For example, a PPS which influences air quality in one Member State may result in significant effects in a neighbouring Member State. Transboundary effects can be a particular problem for air and water pollutants which can be transported over long distances, and for climatic factors the effects of which can be experienced at distances far from the original emission source. All of these issues may affect human health.

3. SEA objectives

3.1 SEA objectives can be used to develop a systematic, rigorous and consistent framework with which to assess environmental impacts. The level of detail appropriate for the SEA objectives will depend on the characteristics of the PPS being assessed and the potential significance of its environmental effects. Where appropriate, "headline" SEA objectives can be broken down into sub-objectives or assessment criteria.

3.2 In order to address the areas of human health which fall within SEPA's remit and depending on the content and purpose of the plan being assessed consideration of effects on health may either be integrated with other SEA topics or considered as an independent topic. Table 2 below provides some examples of objectives which could be used where health is considered as an independent topic. Table 3 looks at integrating consideration of health into other SEA topics.

Table 2 - Examples of SEA human health objectives and assessment questions

Headline objective	Sub-objectives	Example assessment questions
To protect and improve human health and wellbeing through improved environmental quality	• To reduce risks to human health arising from poor air quality. • To reduce the risks to human health arising from poor soil quality. • To reduce the risks to human health arising from poor water quality. • To reduce the risks to human health arising from flooding. • To reduce the risks to human health arising from the effects of climate change.	• Will the PPS affect any aspect of the environment which contributes to human health and wellbeing e.g. air, water or soil quality, greenhouse gas emissions or the risk of flooding? • Will the PPS affect an individual's ability to improve their own health and wellbeing e.g. through allocation of land for development?

3.3 The process of developing SEA objectives for use in an assessment often highlights the complex interrelationships which exist between the individual SEA topics. For example there is a close relationship between water and biodiversity, fauna, and flora, there are also close connections between water, human health and climatic factors. Depending on the PPS undergoing assessment it may be beneficial to develop a small set of objectives which address the SEA topics in a more integrated manner. This is particularly the case when developing objectives for health as the effects being assessed for SEA purposes are largely related to the quality of the individual environmental aspects described in the other SEA topics. Such an approach may also help to streamline the assessment.

3.4 Table 3 below provides some examples of how consideration of health issues within SEPA's remit may be integrated into other SEA topics. It shows examples of objectives for other SEA topics and highlights how they may be interpreted to incorporate a health aspect. Where health considerations are integrated into other topics the methodology and presentation of assessment findings should clearly show how these effects have been considered.

Table 3 – Consideration of health in other SEA topics

Topic	Example SEA objective	Relationship with human health and example assessment questions
Air	To reduce emissions of key pollutants to air.	Contributes to reducing exposure to poor air quality and thus reduces likelihood of

		air quality related health effects. • Will the PPS minimise impacts from regulated industry such as dust, noise, vibration and odours?
Soil	To maintain soil quality and soil functions.	Increases viability of natural ecosystems which filter pollutants and thereby contributes to a better quality living environment. Contributes to reducing release of greenhouse gases from disturbance of soils, especially peat-rich soils. • Will the PPS promote the sustainable use and management of peat-rich soils?
Water	To reduce water pollution.	Contributes to reducing exposure to poor quality water e.g. bathing waters or drinking water which can affect health through direct ingestion of contaminants. • Will the PPS support initiatives which contribute to improving bathing water quality?
Material assets	To maintain material assets e.g. flood defences and drainage infrastructure.	Contributes to reducing the risk to health which may occur as a result of infrastructure failure or lack of capacity. • Will the PPS promote improvements to waste water management infrastructure?
Climatic factors	To adapt to the effects of climate change.	Reduces the risk to health of climate change related events e.g. hotter, drier summers, increased storm events and flooding. • Does the PPS support delivery of renewable / low carbon energy systems?

4. Baseline information

4.1 Sufficient data about the current and likely future state of health in relation to environmental determinants should be collected to allow the Responsible Authority to predict and evaluate the potential effects of the PPS. However, where such information is not available, any data gaps and difficulties should be listed in the Environmental Report. The gathering of new data may be appropriate to include as recommendations in the Environmental Report, Post Adoption Statement or Monitoring proposals.

4.2 The significance of the effects of a PPS on human health is related to the vulnerability of the population that will be affected to the risk that is presented. The most valuable sources of baseline information and trends in this respect are therefore those which identify the spatial location of vulnerable populations and / or the spatial location of potential environmental risks or hazards. It should be noted that vulnerable populations are not always spatially clustered; not everyone located near to an environmental risk will be affected by it. Similarly a PPS which is not 'place-based' may affect a scattered population who are deemed vulnerable in relation to characteristics which are not related to a specific location. We would expect to see information which considers vulnerability to identified environmental risks (e.g. air, soil or water quality, flooding, etc.) included at the Scoping or Environmental Report stage; Table 4 below lists some sources of information which may be useful in compiling an environmental baseline.

Table 4 – Sources of baseline information and trends	
The **Scottish Pollutant Release Inventory** (SPRI) – the database and map of annual mass releases of specified pollutants to air, water and land from SEPA regulated industrial sites.	www.sepa.org.uk/environment/environmental-data/spri/
Information on **Special Sites** categorised under Part IIA of the Environmental Protection Act 1990 in relation to contaminated land.	www.sepa.org.uk/regulations/land/contaminated-land/special-sites-in-scotland/
Waste Discover Data tools present waste data interactively as a series of tables and charts which can be filtered as required. The data can also be downloaded to Excel. There are four tools: (1) Household waste Discover Data tool which provides data for household waste generated and managed; (2) Waste from all sources Discover Data tool which provides data for waste generated and managed from all sources (not just household waste); (3) Scottish waste sites and capacity Discover Data tool which provides information on the numbers and types of licensed / permitted waste management facilities in Scotland, the tonnages of waste they handle in a given year and, where available, their licensed / permitted capacities, an interactive map showing the location of these sites, and a summary of waste inputs to and outputs from individual waste facilities by EWC code and tonnage on a quarterly / annual basis.	www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/

(4) Scotland's material recovery facility Discover Data tool which reports sampling data provided by operators of certain Material Recovery Facilities (MRFs) in Scotland. Other data available in Excel format are: • Annual summaries of waste landfilled in Scotland • Annual summaries of waste incinerated in Scotland • Annual summaries of commercial and industrial (business waste) generated in Scotland.	
Flood maps and **Flood Risk Management Strategies** contain information on the causes and consequences of flooding.	www.sepa.org.uk/environment/water/flooding/
The **Scottish Index of Multiple Deprivation** identifies small area concentrations of multiple deprivation across all of Scotland in a consistent way. It helps enable effective targeting of policies and proposals to take account of concentrations of multiple deprivation.	www.gov.scot/Topics/Statistics/SIMD
The **Scottish Public Health Observatory** provides a clear picture of the health of the Scottish population and the factors that affect it, including access to data and published reports.	www.scotpho.org.uk/
The **on-line profiles tool** provides profiles for all Scottish local authority areas using a range of measures. It includes a health and wellbeing profile which highlights the variation in health between areas and helps identify priorities for health improvement.	ScotPHO Online Profiles Tool
Information and trends covering the **interactions between people and the environment,** the impacts people have on the environment and how the environment affects people.	www.environment.gov.scot/our-environment/people-and-the-environment/

5. Other plans, programmes and strategies

5.1 Links to other plans, programmes and strategies relevant to the topic of environmental determinants of human health can be found at:

- www.scotpho.org.uk/
- www.environment.gov.scot/our-environment/people-and-the-

environment/

- SEPA SEA topic guidance for air, soil, water, material assets, and climatic factors.

Table 5 – Key PPS and their associated provisions relevant to human health

PPS title	Key provisions
Water Environment and Water Services (Scotland) Act 2003	Enabling legislation in Scotland for the Water Framework Directive. Sets out measures for the protection of the water environment. Describes pollution in relation to the water environment in terms of substances resulting from human activity which may give rise to harm, including *harm to the health of human beings*.
Flood Risk Management (Scotland) Act 2009	Introduces a framework to reduce the adverse consequences of flooding; transposes EU Floods Directive; updates legislation on flooding; amends reservoirs legislation. Describes flood risk as *the combination of the probability of a flood and of the potential adverse consequences, associated with a flood, for human health, the environment, cultural heritage and economic activity*.
Cleaner Air for Scotland (2015)	Strategy sets out how the Scottish Government and its partner organisations propose to achieve further reductions in air pollution and fulfil their legal responsibilities.
Public Health etc. (Scotland) Act 2008	Legislation for public health enabling Scottish Ministers, health boards and local authorities to better protect public health in Scotland. Defines *protecting public health* to mean protecting the community or any part of it from (i) infectious diseases, (ii) contamination, or (iii) other such hazards which constitute a danger to human health
2015 Review of Public Health in Scotland	Examines the role of public health systems and their contribution to improving health and reducing health inequalities. Identifies environmental factors as a key determinant to health. Identifies health protection as including ensuring the quality of water, air and the general environment. Advocates addressing environmental determinants of health and health inequalities as a cost-effective approach to improving public health.
Guidance to accompany the Statutory Nuisance Provisions of the Public	Guidance on the implementation of the Statutory Nuisance provisions contained in the Public Health etc. (Scotland) Act 2008 – to be read in conjunction

health etc. (Scotland) Act 2008	with the Environmental Protection Act 1990 and Part 9 of the Public health etc. (Scotland) Act 2008.
Equally Well	A public health strategy for Scotland with a focus on health inequalities. A key principle is reducing people's exposure to factors in the physical and social environment that cause stress, are damaging to health and wellbeing and lead to health inequalities.
Good Places Better Health	The Scottish Government's strategy on health and the environment. The approach recognises that the physical environment has a significant impact on the health of Scotland's people and that action is required to create health-nurturing environments for everyone.
Place Standard – how good is our place?	The Place Standard is a way of assessing places whether the place is well-established, undergoing change or is still being planned. The tool provides a simple framework to structure conversations around place.
Creating Places – a policy statement on architecture and place for Scotland (2013)	Sets out the comprehensive value good design can deliver. The document contains an action plan that sets out the work that will be taken forward to achieve positive change.
Closing the gap in a generation – health equity through action on the social determinants of health	The final report by the World Health Organisation Commission on Social Determinants of Health set up to gather evidence on the action required to promote health equity. The report emphasises the positive impact on health equity, physical and mental health and wellbeing that a well-designed environment can bring.
National Planning Framework 3 (2014)	Vision includes reference to a Scotland where *We live in high quality, vibrant and sustainable places with enough good quality homes. Our living environments foster better health and we have reduced spatial inequalities in well-being*. Highlights the role of green networks, addressing vacant and derelict land and active travel as constituents to enhance health and wellbeing.
Scottish Planning Policy (2014)	Introduces a presumption in favour of development that contributes to sustainable development to be guided by a set of principles which include those relating to improving health and wellbeing. Highlights the role of planning in achieving opportunities to enhance health and wellbeing.

Climate Change (Scotland) Act 2009	Required Scottish Government to set a target for 2050, an interim target for 2020, and to provide for annual targets, for the reduction of greenhouse gas emissions; gave power to Ministers to: impose climate change duties on public bodies; make further provision about mitigation of and adaptation; make provision about energy efficiency, reduction and recycling of waste; and for connected purposes.
Scottish Climate Change Adaptation Programme (SCCAP) Progress Report 2018	Aims to increase the resilience of Scotland's people, environment and economy to the impacts of a changing climate. Annual progress reports are published.

6. Mitigation and enhancement

6.1 Mitigation involves the identification of measures which are envisaged to prevent, reduce and as far as possible offset any adverse effects identified by the assessment.

6.2 The best form of mitigation is avoidance; mitigation should therefore start with the avoidance of negative effects on human health as a first choice in the decision-making process. For example potential negative effects on health as a result of air quality issues could be avoided by ensuring that new sensitive receptors (e.g. schools or housing) are not located adjacent to existing sources of poor air quality (e.g. a major transport interchange).

6.3 Mitigation proposed to deal with negative effects on other SEA topics may also provide mitigation for effects on human health. For example:

- Water – proposals for sustainable flood risk management will not only mitigate against flooding but in so doing can also mitigate against effects of flooding on health;
- Air – buffer strips proposed along transport corridors or around industrial development for landscape purposes can also help to reduce effects of noise, dust, or poor air quality on health.

6.4 Other examples of mitigation include setting a requirement for additional surveys and assessments to be undertaken at the next level of planning or project management e.g. requesting the consideration of specific health-related issues at the detailed project level.

6.5 Opportunities for enhancement should be explored for any neutral, uncertain and minimal effects identified. Such measures should aim to result in improvements to health by addressing environmental determinants e.g. a decrease in levels of nuisance (noise, odour or dust) through establishment of green corridors and buffer zones. In common with mitigation measures, opportunities for enhancement in relation to health may also be flagged up under the other SEA topics e.g. improvements to water quality may also have positive effects on health e.g. in relation to bathing waters.

7. Monitoring

7.1 The information gathered as a result of monitoring the effects of the PPS enables the Responsible Authority to track the effects of the PPS, gauge the effectiveness of any mitigation measures employed, identify unforeseen effects and manage any uncertainty encountered in the assessment process.

7.2 Table 6 below provides an example of indicators relevant to monitoring significant effects of a PPS on human health. Other more contextual indicators should be identified by the Responsible Authority to monitor for unexpected effects and consider the effectiveness of mitigation and enhancement measures.

7.3 Where consideration of health is integrated into other SEA topics then monitoring indicators for these topics may provide a useful proxy indicator for human health e.g. number of Air Quality Management Areas (particularly if this can be related to the proportion of the plan population who live in AQMAs), bathing water quality, area of derelict or contaminated land within the PPS area, etc.

Table 6 – Examples of SEA indicators

SEA health objective	Example of monitoring indicators
To protect and improve human health and wellbeing through improved environmental quality	• Compliance with criteria set to protect health e.g. air, soil and water regulation.

8. Cumulative effects

Table 7 – Cumulative effects

Cumulative effect	Examples
Time crowding - frequent and repetitive effects	Frequent and numerous occurrences of poor air quality result in negative effects on human health.
Time lag - long delays between cause and effect	Historic landfill operations lead to water contamination result in negative effects on human health.
Space crowding - high spatial density of effects	High concentration of industry in one area creates nuisance resulting in negative effects on human health.
Cross-boundary - effects occur some distance away from the source	Inadequate waste water management results in poor bathing water quality at a location removed from the source.
Synergistic - effects resulting from multiple sources or combined	A plan includes proposals for two different industries, each likely to discharge a different pollutant into the same watercourse. Alone, these pollutants are not

effects different in nature from the individual effects	harmful to human health. Together they result in a chemical reaction creating a new pollutant which is harmful to human health. A plan includes a proposal for a development, which results in low levels of discharge of a pollutant into a watercourse. The pollutant is dispersed by the volume of water and does not have a significant effect on the water environment. The plan also includes a proposal which results in water abstraction from the same watercourse which does not have a significant effect on the water environment. However, together the water abstraction concentrates the levels of pollutant discharged, and thus potentially affects the quality of the water environment which results in harmful effects to human health.
Indirect - secondary effects resulting from a primary activity	Restoration of derelict land for re-development which includes landscape improvements results in an overall improvement to the local living / working environment.
Nibbling - incremental effects	Frequent small additional demands of infrastructure (e.g. waste water treatment) result in system failure which may affect human health.