Guidance on consideration of material assets in Strategic Environmental Assessment

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1. Consideration of material assets in Strategic Environmental Assessment (SEA)

1.1 SEA legislation includes 'material assets' as a topic to be addressed in SEA but does not include a definition of what this topic might encompass; consequently it is interpreted in a number of different ways. Consideration of material assets in SEA is usually taken to cover a wide variety of assets and resources including some or all of the following:

- Built assets e.g. infrastructure relating to energy / heat generation and distribution, heat and energy efficiency and management, flood protection, water supply and waste water management, transport, telecommunications, waste management and pipelines; land in relation to developed land / settlements, vacant, derelict and contaminated land; buildings and facilities such as housing, healthcare facilities, schools, greenspace, core paths, cycle paths; manufactured goods; and

- Natural assets e.g. minerals (such as sand, gravel, rock, and slate), watercourses (supporting natural drainage and flood prevention processes), natural flood management processes, forestry and woodlands, agricultural land and associated elements such as field boundaries (e.g. hedges, stone walls).

1.2 This guidance focusses on the consideration of those aspects of material assets which fall within SEPA's remit, largely those relating to:

- infrastructure capacity; and
- resource efficiency in relation to heat, energy and waste.

1.3 Responsible Authorities should satisfy themselves that they have addressed all relevant material asset issues, including any which lie within the remit of Historic Environment Scotland or Scottish Natural Heritage.

2. Existing environmental problems and potential significant effects

2.1 The main challenges associated with material assets are those generated by our increasing demands for goods and services and the environmental implications for their manufacture or use together with their management and / or disposal when we are finished with them. These challenges include:

- an increasing demand for heating, cooling, energy, and water;
- challenges to the ability of existing infrastructure to support new requirements;
- an increase in the requirement to reuse and recycle wastes which require management and disposal mechanisms; and
- the need for greater understanding of the limitations of natural systems to provide regulating services e.g. for dealing with air or water pollution and flooding.

2.2 Identifying and understanding existing challenges relevant to material assets will help the Responsible Authority assess whether a PPS is likely to have significant effects on material assets. Table 1 below sets out examples of current environmental problems in relation to material assets within SEPA's remit, their potential causes, and the likely significant effects which a PPS could have on these existing problems.

2.3 In general a PPS which proposes built development is likely to have an effect on material assets. For example a proposal for a development which requires energy (heating, lighting, etc.) or water (drinking water, industrial processes, etc.) may have a negative effect on the availability of these resources for existing users; a proposal that generates waste may have a negative effect in terms of the requirement for additional waste management facilities to be established. Positive effects may result where previously developed or contaminated land is brought back into use or where additional capacity in essential infrastructure is brought about by a development proposal e.g. where improvements to water services are achieved through a developer requirement.

Table 1 – Existing environmental problems relating to material assets, their potential causes and examples of likely significant effects

Existing problems relating to infrastructure	**Causes of existing problems**
Capacity of existing infrastructure - in some areas infrastructure is already over-stretched, in others there is increasing demand on existing infrastructure which has no / limited ability to meet these demands.	Increasing demand for resources such as water and waste water treatment, heat and energy, and waste management created by new built development is not met with the necessary investment / sustainable management practices to meet these new demands.
Co-location - built development proposed in the vicinity of existing infrastructure (e.g. waste or energy infrastructure) may limit the ability of this infrastructure to be expanded to meet future demand,	Pressure for built development can create problems where sensitive receptors (e.g. housing) are proposed in the vicinity of certain existing infrastructure (e.g. energy generation / transmission or transport

and may lead to an increase in complaints / concerns from the occupants / users of the new development. Demand for new infrastructure may result in negative effects on other SEA topics.	infrastructure). Location of new infrastructure may impact on local biodiversity, landscape character, air or water quality including through cumulative effects.
Example of typical effects of a PPS on this problem *Major positive* ++ Action very likely to lead to an increase in investment in infrastructure to enable it to meet the demand created by the proposal and future-proof it for further development proposals in the future. *Minor positive* + Action very likely to lead to an increase in investment in infrastructure to meet the demand created by the proposal. *Minor negative* – Action very likely to lead to no investment in infrastructure and infrastructure becomes over-stretched so that new demand is not met satisfactorily. *Major negative* - - Action very likely to lead to no investment in existing infrastructure and infrastructure becomes over-stretched so that neither existing nor proposed new demand can be met leading to system collapse with resultant negative effects (e.g. on air or water quality). .	
Existing problems relating to resource efficiency Resources (e.g. water, heat, energy, land) are not being used most efficiently which results in an unnecessary loss of resources. Waste management and disposal mechanisms are required to deal with waste.	**Causes of existing problems** Increasing demand for resources is not met with the necessary uptake of sustainable use / management practices required to ensure resource efficiency. No clear infrastructure providers for heat (over and above the gas network). Demand for consumer goods is rising and the “throw away culture” of producers and consumers leads to a diverse range of “waste” products which require to be managed.
Example of typical effects of a PPS on this problem *Major positive* ++ Action very likely to lead to a large increase in resource efficiency e.g. an overall large reduction or a series of smaller	

reductions, in demand for heat and / or energy, or reduction in waste generation.

Minor positive + Action very likely to lead to some increase in resource efficiency e.g. an overall moderate reduction in demand for heat and / or energy, or reduction in waste generation.

Minor negative – Action very likely to lead to an overall moderate decrease in resource efficiency e.g. a moderate increase in demand for heat and / or energy, or increase in waste generation.

Major negative - - Action very likely to lead to an overall large decrease or a series of smaller decreases in resource efficiency e.g. a large increase in demand for heat and / or energy, or increase in waste generation.

2.4 Significance of effects is set out using a scoring system ranging from a “major positive” effect to a “major negative” effect. As an example using these significance criteria, if the magnitude of the effect is large but the receptor that experiences the effect is not particularly sensitive, then the significance of the effect is likely to be less. Responsible Authorities may wish to use these criteria as the basis of developing an assessment method that suits the PPS being assessed.

2.5 Neutral, mixed and uncertain effects

- Neutral effects - an action which is unlikely to have any beneficial or negative effects on any existing material assets problem. Neutral scoring should only be used where it is very likely that the effect on the current environmental 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 material assets 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.

2.6 Where a PPS has the potential to have significant effects on another EU Member State these effects are known as Transboundary effects. For example waste generated in one Member State may result in disposal or treatment of these waste materials in another Member State where significant environmental effects may result.

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 – examples of SEA material assets objectives are set out in Table 2 below.

Table 2 - Examples of SEA material assets objectives and assessment questions

Headline objective	Sub-objectives	Example assessment questions
To promote the sustainable use and management of material assets	• To promote sustainable use and management of existing infrastructure e.g. water, heat, energy or flood protection infrastructure. • To promote the alignment of future infrastructure / resource provision (e.g. water, waste water management, heat infrastructure) with planning activities (e.g. land allocations for development). • To meet the objectives of the Zero Waste Plan. • To meet the objectives of Scotland's Energy Strategy and associated Local Heat and Energy Efficiency Strategies. • To meet the objectives of the Scotland's Energy Strategy and Scotland's Energy Efficiency Programme.	• Will the PPS promote waste minimisation at construction, operation and de-commissioning phases? • Will the PPS ensure that heat infrastructure provision will accommodate the requirements associated with the proposed development? • Will the PPS ensure that waste water management capacity will be increased to accommodate the requirements associated with proposed development?

	• To meet heat demand through maximising the efficiency of heat networks and the energy efficiency of developments.	

4. Baseline information

4.1 Sufficient data about the current and likely future state of the environment 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 sources of baseline information and trends set out in Table 3 below cover the material assets issues which we would typically expect to see presented (depending on the scope and purpose of the PPS) at the Scoping or Environmental Report stage. These include:

- spatial data and information on built assets, including current state and capacity e.g. energy generation and transmission, waste water treatment facilities;
- heat map information;
- spatial data on location and capacity of existing waste management facilities;
- data on waste quantities currently generated and managed.

Table 3 – Sources of baseline information and trends	
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. (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.	www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/

The **national heat map** is a way to visualise opportunities**,** to assess who needs heat (**demand**) and where sources of heat might come from (**supply**), and how these can be **connected** in an efficient way to reduce the cost of heat supply and the carbon intensity of heat generation.	www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185/Heat/HeatMap
Flood Risk Management Strategies and **Local Flood Risk Management Plans** – partnership strategies to focus action in the areas with the greatest risk of flooding. Provides details on proposed actions, funding and delivery timescales.	http://apps.sepa.org.uk/FRMStrategies/
Flood maps and **Flood Risk Management Strategies** contain information on the causes and consequences of flooding.	www.sepa.org.uk/environment/water/flooding/
Scottish Water **Strategic Asset Capacity and Development Plan** – including availability of water and waste water treatment capacity tables.	www.scottishwater.co.uk/business/connections
The Living With Environmental Change **Infrastructure report card** looks at the potential physical impacts of climate change on infrastructure which provides services important for our safety, health and economic development.	www.nerc.ac.uk/research/partnerships/lwec/products/report-cards/infrastructure/

5. Other plans, programmes and strategies

5.1 Links to other plans, programmes and strategies relevant to the topic of material assets can be found at:

- www.environment.gov.scot/our-environment/people-and-the-environment/waste-and-resources/
- www.gov.scot/energy/

Table 4 – Key PPS and their associated provisions relevant to material assets

PPS title	Key provisions	Relevant SEA material assets objectives
Scotland's Energy Strategy 2017	Sets out the Scottish Government's vision for the future energy system in Scotland and describes the ways in which the Scottish Government will strengthen the development of local energy, protect and empower consumers, and support Scotland's climate change ambitions while tackling poor energy provision.	To meet the objectives of the Scotland's Energy Strategy and Scotland's Energy Efficiency Programme.
The Waste Management Licensing (Scotland) Regulations 2011	Provisions to authorise the treatment, keeping or disposal of waste in or on land – also relates to closed landfills.	To meet the objectives of the Zero Waste Plan
Flood Risk Management (Scotland) Act 2009	Provisions to manage sources and pathways of floodwaters by restoring and enhancing wetlands, rivers, peatlands and other natural features and characteristics to ensure a sustainable approach to flood risk management.	To promote sustainable use and management of existing infrastructure.
Flood Risk Management Strategies and Local Flood Risk Management Plans	Coordinates efforts to tackle flooding in Scotland and sets the national direction of future flood risk management helping to target investment and coordinate action across public bodies. The 14 local plans provide detail on proposed actions, funding and timescales.	To promote sustainable use and management of existing infrastructure. To promote the alignment of future infrastructure / resource provision with planning activities.
Scottish Planning Policy (2014)	Contains a presumption in favour of development that contributes to sustainable development including reducing waste, facilitating its	All

	management and promoting resource recovery. Also notes the role of planning in influencing patterns of production and consumption in order to contribute to a low carbon future. Resource efficiency is included as one of the six qualities of a successful place with reference to natural resources, climatic factors, flooding, heat and waste management. Provides support for heat networks, heat recovery and heat mapping to facilitate co-location of developments which can benefit from each other e.g. co-location of heat users in the vicinity of activities which produce heat as by-product. Supports planning for zero waste, promotes minimising use of primary materials and the efficient use of secondary materials, and promotes sustainable management of waste and resource recovery. Promotes safeguarding of flood storage and conveying capacity and locating development away from functional flood plains and the protection of land with the potential to contribute to managing flood risk e.g. through natural flood management, managed coastal realignment, washland or green infrastructure creation, or as part of a scheme to manage flood risk.	
National Planning Framework 3 (2014)	Takes forward the spatial aspects of the Scottish Government's Economic Strategy with a focus on supporting sustainable economic growth and the transition to a low carbon economy. Recognises waste as a resource and an opportunity rather than a burden. Supports a catchment-scale approach to sustainable flood risk management.	All

Scottish Government Infrastructure Investment Plan 2015 Progress Report 2017	Sets out why, how and what strategic, large scale investments the Scottish Government intends to take forward over the next 20 years for transport, education, health, water, waste management, sports, business, flood prevention and regeneration. Annual progress reports are published.	To promote sustainable use and management of existing infrastructure. To promote the alignment of future infrastructure / resource provision with planning activities.
EU Waste Framework Directive (Directive 2008/98/EC)	Identifies the waste hierarchy and requires member states to establish an integrated and adequate network of waste disposal installations, and for member states to have a national waste management plan or plans. The Zero Waste Plan (ZWP) performs this duty, and Development Plans will be required to comply with the ZWP in addition to the national planning framework.	To meet the objectives of the Zero Waste Plan. To promote sustainable use and management of existing infrastructure.
Scotland's Zero Waste Plan (2010)	Aims to reduce the amount of waste we produce and ensure that materials / energy are recovered prior to final disposal.	To meet the objectives of the Zero Waste Plan. To promote sustainable use and management of existing infrastructure.
Making things last: a circular economy strategy for Scotland	Aims to build a strong economy, protect Scotland's resources, and support the environment. It sets out the Government's proposed actions to build a more circular economy in which materials are kept in high value for as long as possible.	To meet the objectives of the Zero Waste Plan.
Safeguarding Scotland's Resources – Blueprint for a More Resource Efficient and Circular	The Scottish Government's programme to reduce waste and create a more productive and circular economy. It forms part of the Zero Waste	To meet the objectives of the Zero Waste Plan.

Economy	agenda and the Government's economic strategy.	
Climate Change Plan: third report on proposals and policies 2018-2032 (RPP3)	The Scottish Government's third report on proposals and policies (RPP3) for meeting its climate change targets. It sets out how Scotland can deliver its statutory annual targets for reductions in greenhouse gas emissions for the period 2018-2032 set through the Climate Change (Scotland) Act 2009.	All
The Heat Policy Statement: Towards Decarbonising Heat: Maximising the Opportunities for Scotland	The Scottish Government's future policy direction and policy objectives to reduce the need for heat, supply heat efficiently and use renewable and low carbon heat. It sets out key aspects of how we use, distribute, and store heat, and how heat is generated.	To promote sustainable use and management of existing infrastructure To meet heat demand through maximising the efficiency of heat networks. To promote the alignment of future infrastructure / resource provision with planning activities.
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.	All
Scottish Climate Change Adaptation Programme (SCCAP)	Aims to increase the resilience of Scotland's people, environment and economy to the impacts of a changing climate.	All

Progress Report 2018	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 environmental effects identified by the assessment. The best form of mitigation is avoidance; mitigation should therefore start with the avoidance of negative effects on existing material assets as a first choice in the decision making process. For example in relation to waste this would include avoiding the creation of new waste streams. In relation to infrastructure capacity this could include avoiding the need to generate heat for a housing development by creating a heat network using an existing generator of excess heat (e.g. an industrial process).

6.2 Other examples of mitigation include setting a requirement for additional assessments or actions to be taken at the next level of planning or project management e.g.

- requiring that a waste management strategy be put in place to ensure that the waste hierarchy is followed;
- requiring that the feasibility for a heat network be investigated to ensure efficient use of resources;
- requiring that the capacity of existing infrastructure is assessed to ensure that it is capable of servicing a proposed project.

6.3 Opportunities for enhancement should be explored for any neutral, uncertain and minimal effects identified. Such measures should aim to result in improvement of material assets (e.g. increasing capacity of existing infrastructure) or an increase in their sustainable use e.g. recovery, re-use or recycling of waste materials.

7. Monitoring

7.1 The information gathered as a result of monitoring the environmental effects of the PPS enables the Responsible Authority to track the environmental 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 5 below provides some examples of indicators relevant to monitoring significant effects of a PPS on material assets. 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.

Table 5 – Examples of SEA indicators

SEA material assets objective	Example of monitoring indicators
To promote sustainable use and management of existing infrastructure e.g. water, heat, energy and flood protection infrastructure.	• Number of proposed developments connecting into existing infrastructure which has the capacity to support the proposed development. • Number of proposed development connecting into existing heat networks. • Number of proposed developments unable to progress due to lack of capacity in existing infrastructure.
To promote the alignment of future infrastructure / resource provision (e.g. water and waste water management) with planning activities (e.g. land allocations for development).	• Number of SDP / LDP policies which take explicit account of water resource management plans. • Number of SDP / LDP policies which focus on low carbon or heat and energy efficiency. • Number of SDP / LDP policies restricting allocations of land for development due to water resource provision / waste water treatment capacity. • Number of consents granted that are conditional on water resources issues being resolved.
To meet the objectives of the Zero Waste Plan.	• Amount of waste generated and disposed of annually (by disposal route e.g. % of waste recycled, composted etc.). • Proportion of construction and demolition waste that is reused and recycled. • Proportion of aggregates used that are from secondary sources or are recycled aggregates.

To meet heat demand through maximising the efficiency of heat networks.	• Number of new developments connected to new or existing zero / low carbon heat networks. • Number of existing dwellings / businesses connected to new zero / low carbon heat networks. • Capacity of new zero or low carbon heat networks created.

8. Interaction with other topics / cumulative effects

Table 6 – Cumulative effects

Cumulative effect	Examples
Time crowding - frequent and repetitive effects	Frequent and numerous additional demands for heat during cold periods leads to infrastructure capacity being overstretched and ultimate system failure
Time lag - long delays between cause and effect	Historic waste management operations (e.g. landfill) lead to water / soil contamination.
Space crowding - high spatial density of effects	Concentration of large amounts of people or industrial activities in one area leads to pressure on resources and infrastructure.
Cross-boundary - effects occur some distance away from the source	Nuisance created by infrastructure e.g. visual / noise / odour.
Synergistic - effects resulting from multiple sources or combined effects different in nature from the individual effects	Multiple point source pollution events of different natures combine within a catchment to create a unique pollution event downstream. Multiple small-scale heat or energy infrastructure which do not require regulation may result in combined effects; the synergistic implications of these multiple sources of pollution will not be routinely captured as non-regulated infrastructure does not require monitoring.

Indirect - secondary effects resulting from a primary activity	Transport related secondary effects (e.g. nuisance or air quality) result from waste management activity.
Nibbling - incremental effects	Frequent small additions to already overloaded infrastructure e.g. sewage or public water supply can progressively affect the quality / functioning of whole supply and management systems.

Table 7 - Interaction of material assets with other SEA topics

SEA topic	**Existing material assets problems and interactions with other SEA topics**	
	Infrastructure capacity	Resource efficiency and waste
Biodiversity, fauna & flora	Overstretched infrastructure may result in pollution incidents e.g. if waste water treatment capacity is exceeded which may affect biodiversity, fauna or flora. Creation of new infrastructure can lead to loss of biodiversity. Natural flood plains can improve biodiversity.	Waste management activities may result in a loss of biodiversity due to requirement for land for waste management facilities. Increase in biomass energy demand may result in loss of biodiversity due to requirement for land for biomass production. Use of recycled aggregates may reduce need for quarrying / mining of new materials and resulting in avoidance of potential negative effects of these activities on biodiversity.
Climatic factors	Climate change may lead to increase in frequency / scale of infrastructure failure e.g. waste water treatment works failure due to flooding, energy system failure due to excessive heat or storm events.	Producing / transporting / disposing of goods all result in emissions which contribute to climate change – efficient use of resources should result in fewer emissions.

Air	New energy infrastructure may contribute to reducing air pollution if it replaces fossil fuels with energy generated from renewable sources.	A reduction in waste production, and therefore treatment, may contribute to improvement in air quality due to a reduction in nuisance e.g. odour or noise. Greater energy efficiency may lead to reduced energy / heat demand and therefore less combustion of fuel resulting in an improvement in air quality.
Soil	Built infrastructure may affect soil e.g. soil sealing may increase if there is a demand for additional infrastructure.	A reduction in waste going to landfill may have a positive effect on soils as less land is required for waste disposal activities.
Water	Demand for water e.g. drinking water or agricultural irrigation may outstrip supply.	Resource efficient systems may require less water to operate e.g. through efficient recycling systems.
Population & human health	Water treatment infrastructure can contribute to improvements / maintenance of good human health.	A reduction in waste generation or energy use leads to a reduction in the requirement for associated infrastructure e.g. waste treatment facilities or energy plants. There may be a subsequent reduction in the exposure of people to nuisance (e.g. noise or odour) from such infrastructure which can impact on human health.
Landscape	Demand for new infrastructure / increased capacity may result in effects on landscape.	Efficient use of resources may mean less requirement for new infrastructure thereby avoiding additional effects on landscape e.g. wind turbines, pylons, roads.
Cultural heritage	Demand for new infrastructure / increased capacity may affect cultural heritage assets or their setting.	Efficient use of resources means fewer requirements for new infrastructure which may affect cultural heritage assets or their setting.