Ministerie van Infrastructuur
en Waterstaat

Summary Environmental Impact Report

Colophon

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Content

Summary

1.1 The National Climate Adaptation Strategy and this Environmental Impact Report

The climate is changing. The Earth is warming up, and extreme weather, such as heatwaves, heavy rainfall and long periods of drought, are becoming increasingly frequent. The consequences of this for our living environment, our health, and the economy are considerable, and it is therefore important to adapt the country to our changing climate. The National Climate Adaptation Strategy (NAS) outlines how the Netherlands is doing this.

An evaluation of the current NAS, which dates from 2016, has revealed that, while many regional and local authorities and businesses have started addressing climate risks since then, their efforts are insufficient due to the pace of climate change. It has also become apparent that the central government is not providing enough of a direction or a focus on the country's climate resilience. That is why the central government is introducing a new NAS (NAS '26), which looks ahead to 2100 and sets out long-term ambitions which will enable steps to be taken in the short term to prepare the Netherlands for the necessary changes in the medium term.

The National Climate Adaptation Implementation Programme (*Nationaal Uitvoeringsprogramma Klimaatadaptatie*, NUP KA) was published in 2023 in anticipation of the NAS'26. This programme describes fifteen climate adaptation challenges, divided across four domains, namely: Water, Agriculture, Nature & Environment, People & Culture, and Living & Working. The NAS'26 builds on the NUP KA and is related to other national programmes and projects such as the Delta Programme and Climate Adaptation of the Natural Environment, as well as the National Strategy on Spatial Planning and the Environment (*Nationale Omgevingsvisie*, NOVI). In other words, the NAS will look beyond existing frameworks and will focus on an integrated approach until 2100.

The NAS'26 is a national programme that establishes a framework for future plans or decisions that may have consequences for the environment. Such programmes require the strategic environmental impact assessment (SEIA) procedure to be followed. The environmental impact assessment procedure is a legally mandated instrument which can be used to assess the potential impact of plans and decisions on the physical living environment. The strategic environmental impact assessment supports decision-making by providing insight into the environmental impacts of policy choices and by taking them into account.

In order to weigh up the environmental impacts properly, the strategic environmental impact assessment for the NAS was carried out as a two-phase process, in line with the advice of the Netherlands Commission for Environmental Assessment, with phase 1 involving the preliminary assessment of environmental impacts (Annex 2). In phase 1, the environmental impacts of the adaptation options were broadly identified for each challenge. The generated results were used for the further refinement of the challenges in the NAS and for the creation of strategic alternatives. The emphasis in phase 2 was on making strategic choices and weighing up alternatives compiled from the various policy options. The integrated alternatives assessed in phase 2 go beyond the challenges and offer an integrated solution for making the Netherlands climate resilient.

1.2 'Living Environment Wheel' as the basis for the EIR

The concept of 'physical living environment' was introduced in the Environment and Planning Act (*Omgevingswet*). What has become known as the 'Living Environment Wheel' was developed for the National Strategy on Spatial Planning and the Environment (NOVI), as an integrated instrument to identify the impacts on all relevant themes of the physical living environment. The wheel aligns with the objective of the Environment and Planning Act and organises impacts in an integrated way along the perspectives of a safe and healthy physical living environment, a high level of environmental quality, and good residential and economic environments. Eleven themes comprising a total of over 30 underlying aspects were developed within these frameworks, as shown in the figure below. In this strategic environmental impact report (SEIR), the description of the reference situation and the assessment of the two strategic alternatives were carried out based on the themes and aspects on the Living Environment Wheel.

The assessment in the strategic environmental impact report was conducted in relation to a reference situation for 2050 and 2100, while taking account of autonomous trends and established policy. This reference situation shows that climate change will eventually lead to increasing risks for a wide range of aspects of the physical living environment, such as heat, drought, and flooding, as well as for drinking water supply, biodiversity, and health. The impact assessment of the alternatives is qualitative in nature and was established based on expert judgment, while using available information on climate risks and their impact on various sectors. The degree of uncertainty is high because the alternatives are highly abstract, and the measures and their associated impacts may become evident in the short, medium, and long term. To reflect this, the assessment of the alternatives does not refer to positive or negative effects, but to opportunities and risks.

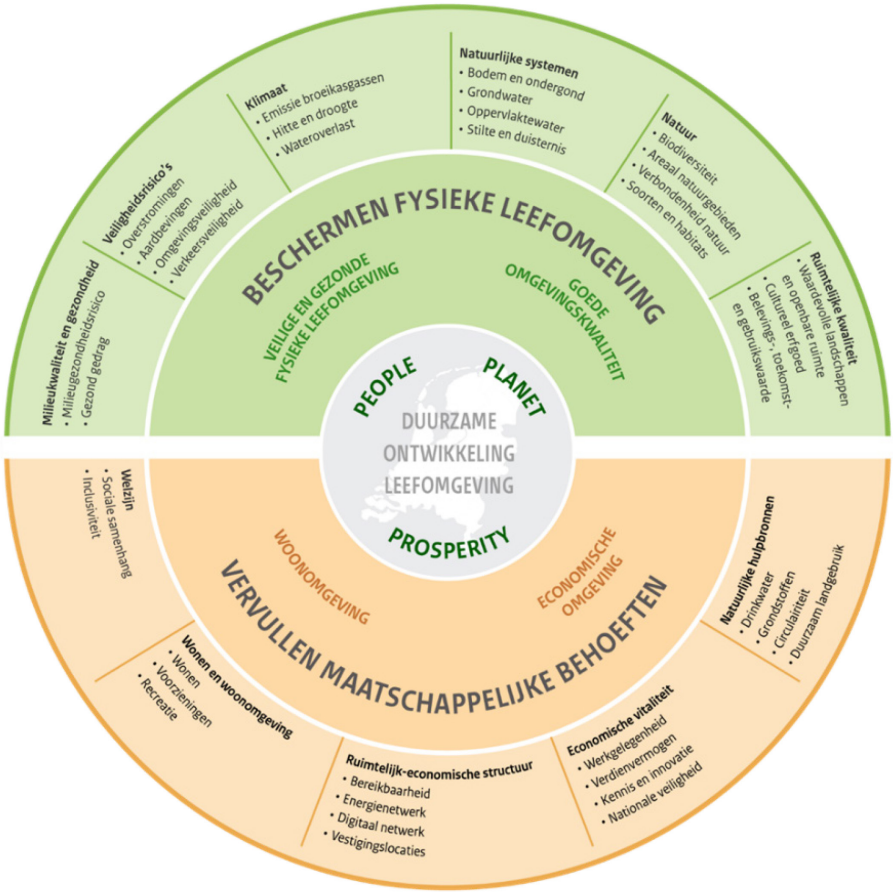

Figure 1 The Living Environment Wheel. Source: EIR Spatial Planning Memorandum, 2025.

1.3 Intensification or transformation; identifying opportunities and risks

The alternatives are integrated and conceivable future scenarios for the NAS'26 that constitute a spatial translation of possible policy options, made up of a 'package of measures'. The alternatives were drawn up based on the preliminary assessment and multiple external recommendations and reports. These assessments and recommendations revealed a dichotomy between optimising the existing system (*intensification*) and adapting functions to the water and soil system (*transformation*). This dichotomy has been summarised in two strategic approaches. The *intensification alternative* focusses on preserving functions and current land use through technical upscaling and sectoral measures, such as dike reinforcement, increasing drainage and pumping capacity, risk-based standards for flooding, more greenery at local level, and climate-adaptive construction, as well as innovation in agricultural practices. On the other hand, the *transformation alternative* prioritises the water and soil system, adapts functions accordingly, and reduces or relocates them where necessary. The aim of this alternative is to find integrated solutions based on system restoration, such as large-scale investment in soil quality, adapting crops, providing space for water, and avoiding construction or heavy investments in areas of highest risk.

Although the two alternatives represent two extremes, the aim of both of them is to create a climate-resilient Netherlands. They will result in a different interpretation and form of climate resilience and a different distribution of activities and functions.

The alternatives outline future pathways to 2100 and sometimes push back the boundaries to go beyond the objectives of the NAS'26. While some choices are addressed in this NAS, others will only become relevant sometime in the future. Assessing 'extremes' enables a broad range of environmental impact information to be identified and used as a basis for the choices that have to be made in relation to the NAS'26.

1.3.1 *Intensification*

Broadly speaking, *intensification* often presents clear opportunities in the short term, as existing infrastructure and spatial patterns are protected and optimised. In the context of flooding, efforts to increase drainage and storage capacity, along with locally adapted climate-resilient design, help to reduce risks. In urban areas, creating green areas helps to alleviate heat stress and improve the quality of the environment, whilst in the agricultural context, damage can be mitigated through sustainable and adaptive farming practices. At the same time, structural risks build up as the climate pressure increases. Dependencies persist as far as drought and groundwater are concerned, whilst vulnerabilities, fragmentation and pressure on the natural system continue to exist in relation to nature and soil. Furthermore, the effectiveness of purely technical measures will become increasingly uncertain after 2050 as climate risks increase. In the long term, these measures are no longer expected to be sufficient in all cases. To sum up, it would appear that there are opportunities in the short to medium term, but that the level of vulnerability will increase in the long term as the limitations of the system become evident. The figures below present a complete overview of all the opportunities and risks of the *intensification* approach in 2050 and 2100. The translation of these figures can be found in table 1 on page 9 of this summary.

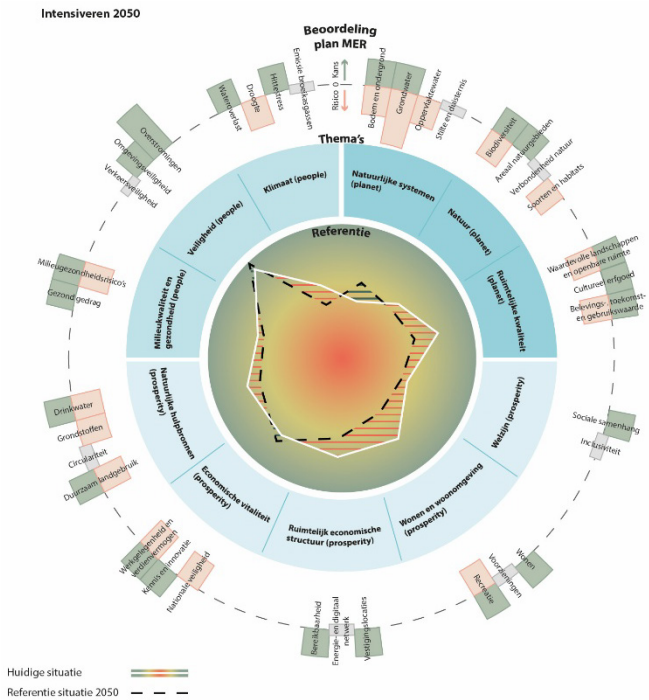

Figure 2 Opportunities and risks of the intensification alternative in 2050

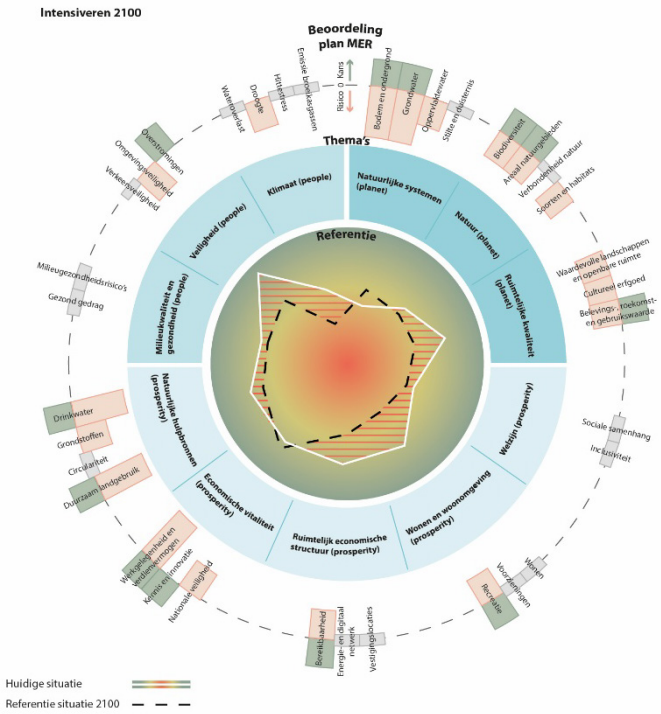

Figure 3 Opportunities and risks of the intensification alternative in 2100

1.3.2 *Transformation*

Broadly speaking, it is evident that the *transformation* alternative offers clear opportunities, particularly in the long term. This approach involves soils no longer being intensively exploited, but instead being enhanced through sustainable soil management, the rewetting of peat meadows, the extensification of agriculture, and the prevention of soil sealing thereby helping to restore the soil's water-retaining capacity, as well as biodiversity and fertility, which in turn improves drought resilience. Transformation also creates significant opportunities to reduce heat stress in the long term, by focussing on greening, open urban structures, water retention, and the restoration of natural processes. As far as drinking water is concerned, *transformation* means ensuring the long-term security of water sources by reorganising the landscape, promoting infiltration, and reducing dependence on vulnerable systems. Significant opportunities can be created for nature and biodiversity by connecting ecosystems and improving living conditions for characteristic species. At the same time, this approach entails short-term risks for existing land uses, such as agriculture, built-up areas, and infrastructure, which may need to be relocated or adapted. It is also uncertain what the impact on amenities and leisure activities might be, although nature conservation offers significant potential benefits in this regard. The assessment shows that the *transformation* approach will present both opportunities and risks between now and 2050, but that by 2100 the benefits will outweigh the risks, with significant positive impacts on soil quality, drinking water availability, ecology, spatial quality, and environmental safety, provided that measures are carefully implemented. The figures below present a complete overview of all the opportunities and risks of the transformation approach in 2050 and 2100. The translation of these figures can be found in table 2 on page 10 of this summary.

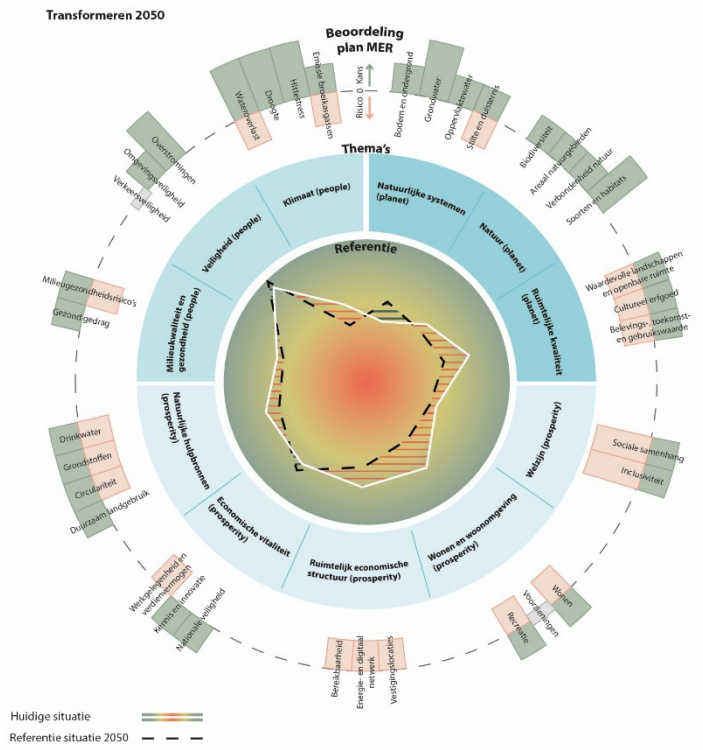

Figure 4 Opportunities and risks of the transformation alternative in 2050

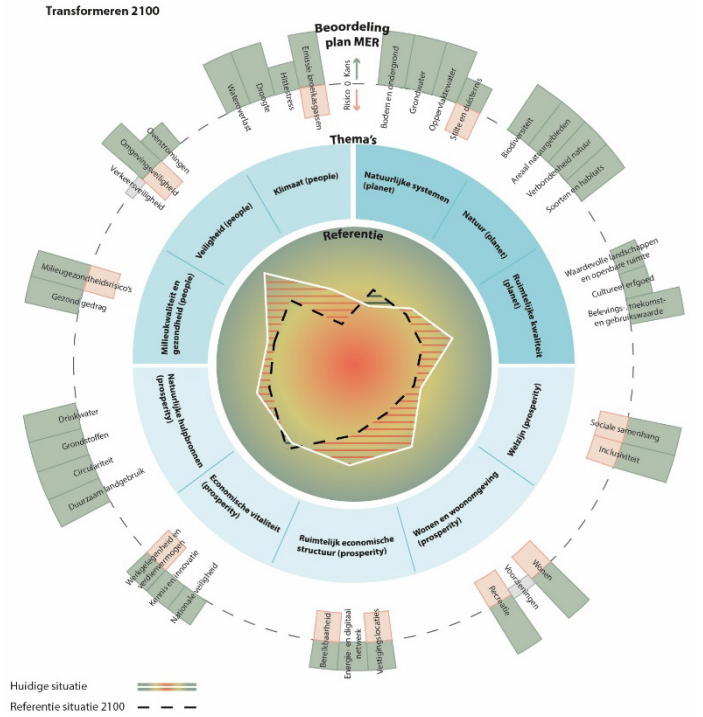

Figure 5 Opportunities and risks of the transformation alternative in 2100

1.4 Insights at strategic level

Decisions will be made to determine where and when there is a preference for intensifying or transforming climate adaptation policy. A number of decision-making principles can be distinguished regarding when intensification is preferred, when transformation becomes essential, and how an adaptive combination of both can be created.

Intensification is particularly suitable in situations where climate pressure remains manageable until approximately 2050 through technical and local interventions. Examples include increasing pumping capacity, urban greening, or irrigation efficiency. This approach is desirable when the preservation of current land use is a major consideration and the spatial impact of measures is limited. *Intensification* also provides time for transformations to be carefully prepared, thereby ensuring that risks remain temporarily under control.

Transformation becomes necessary as soon as natural system limitations start to dominate, such as structural drought on sandy soils, the salinisation of clay soils, land subsidence in peat meadows, or heat stress in cities. It is also essential as soon as dependence on technical systems (such as continuous pumping and freshwater supply) structurally increases vulnerability and costs, or when transformation is inevitable in the longer term, meaning that it is not cost-effective to invest heavily in intensification at that point in time. Moreover, this route offers opportunities to achieve multiple objectives, in the form of water safety, nature quality, health, and spatial quality. Opting for transformation at the right time prevents lock-ins, such as capital-intensive investments in locations that will eventually become unsustainable.

The most robust strategy is an adaptive combination, which means starting now with no-regret intensification measures that are compatible with future transformation, such as urban greening coupled with green-blue infrastructure. At the same time, transformation transition points must be defined on an area-specific basis, so that decisions are made on time and lock-ins are avoided.

1.4.1 Area-specific conclusions

The strategic environmental impact report identifies a number of area types which each having their own climate challenges, namely subsiding peatlands, salinising clay areas, drying sandy soils, warming cities, the main water system, and the Caribbean Netherlands. Each of these areas is subject to different challenges and areas of tension.

Subsiding peatlands are subject to land subsidence, water challenges and carbon emissions and while continuing to focus on low water levels ensures the preservation of functions, it also leads to persistent carbon emissions and damage to homes and infrastructure. Rewetting, on the other hand, offers integrated opportunities, but requires the adaptation of key functions such as agriculture. In salinising clay areas, water demand is high, and the freshwater supply is under pressure. While flushing operations and supply provide temporary relief, the long-term solution is to make decisions on crops, freshwater distribution, and spatial planning. Drying sandy soils are exposed to a combination of water shortages, nature quality, and drinking water availability. While retention, infiltration, and extensification around vulnerable nature areas offer hope for the future, intensive extraction can create lock-ins. In warming cities, the emphasis is on heat stress,

health, and the quality of the living environment. While greening and water in public spaces offer multiple benefits, this approach does require space in an already crowded urban context. In the Caribbean Netherlands, heat, drought, storms, and rising sea levels are even more severe, and essential measures include reforestation, erosion management, and the protection of vital infrastructure.

1.4.2 Cohesion and spillover between area types

A third insight concerns cohesion and spillover between area types. Decisions affecting one area type can cause impacts elsewhere, for example, due to altered freshwater distribution or shifting spatial pressure. Multiple examples demonstrate that a strategy based on 'wholesale intensification' is not scalable. The focus must be on integration, ensuring that benefits and burdens are distributed equally between regions and functions, and that cumulative impacts on People, Planet, and Prosperity remain visible and managed. This calls for area-specific combinations of *intensification* and *transformation* and for clear prioritisation over time. Decisions need to be made to determine what needs to be done now, what can wait, and where it is sensible to stop investing in preservation and instead opt for function adaptation.

1.5 Conclusion and recommendations

The strategic environmental impact report shows that both alternatives are helping to achieve the objective of a climate-resilient Netherlands, but with different time, risk, and spillover profiles. The Netherlands can achieve rapid, sectoral gains through *intensification* until approximately 2050, but faces increasing systemic risks in the period to 2100 (including those caused by sea level rise, desiccation, salinisation, and cumulative spatial claims). *Transformation* requires earlier and more far-reaching choices, such as functional adaptation and water and soil management, but it yields a more robust system with integrated long-term solutions. What is needed is an adaptive combination, in other words, *intensification* where it offers opportunities and does not increase systemic risks, and targeted *transformation* where the limits of the water and soil system become evident and intensification no longer offers a solution. It is crucial to prevent lock-ins and spillover (of risks and resource use between areas and generations).

1.5.1 Recommendations

The strategic environmental impact report has generated a number of recommendations for decision-making in the context of the NAS'26. First and foremost, it is essential to establish clear decision-making principles, meaning *intensification* where possible, and *transformation* where necessary, with the explicit premise that spillover between areas and sectors must be prevented. This principle forms the basis for an adaptive strategy that safeguards both urgency and long-term robustness.

Another recommendation is to focus the primary strategy on tasks directly related to preventing systemic risks and lock-ins. These form the backbone of the policy, to which secondary objectives are linked. This hierarchy creates a clear framework in which investments and measures are first assessed based on their contribution to primary system safety and robustness, after which additional objectives are integrated.

Finally, it is important to plan area-specific transition moments on time and, where possible, link these to replacement tasks. It is important to focus on moments when *intensification* is no longer sufficient and *transformation* is necessary, thereby preventing lock-ins. Major investments in infrastructure, urban restructuring, and

agricultural systems offer natural opportunities for *transformation*. A commitment in the coming years to establishing stop criteria and preparing for major transformation challenges will facilitate a timely transition.

Table 1 - Translation of the *intensification* alternative in 2050 and 2100

Theme:	**Aspect:**	**Score 2050**	**Score 2100**
Environmental Quality and Health	Environmental health risks	Risk and opportunity	Neutral
	Healthy behaviour	Opportunity	Neutral
Safety	Floods	Great opportunity	Opportunity
	Environmental safety	Opportunity	Risk
	Road safety	Neutral	Neutral
Climate	Greenhouse gas emissions	Neutral	Neutral
	Heat	Opportunity	Neutral
	Drought	Risk	Risk
	Flooding	Opportunity	Neutral
Natural systems	Soil and subsoil	Risk and opportunity	High risk and opportunity
	Groundwater	High risk and opportunity	High risk and opportunity
	Surface water	Risk	Risk
	Silence and darkness	Neutral	Neutral
Nature	Biodiversity	Risk and opportunity	Risk and opportunity
	Area of nature reserves	Opportunity	Risk and opportunity
	Connectedness of nature	Neutral	Neutral
	Species and habitats	Risk	Risk
Spatial quality	Valuable landscapes and public space	Risk and opportunity	Risk
	Cultural heritage	Opportunity	Risk
	Experiential value, utility value and future value	Risk and opportunity	Risk and opportunity
Natural resources	Drinking water	Risk and opportunity	High risk and opportunity
	Raw materials	Risk	Risk
	Circularity	Neutral	Neutral
	Sustainable land use	Risk and opportunity	
Economic vitality	Employment and earning capacity	Risk and opportunity	High risk and opportunity
	Knowledge and innovation	Opportunity	Opportunity
	National security	Risk	Risk
Spatial-economic structure	Accessibility	Opportunity	Risk and opportunity
	Energy and digital network	Neutral	Neutral
	Business locations	Opportunity	Neutral
Living and living environment	Living	Opportunity	Neutral
	Facilities	Neutral	Neutral
	Recreation	Risk and opportunity	Risk and opportunity
Well-being	Social cohesion	Opportunity	Neutral
	Inclusiveness	Neutral	Neutral

Table 2 - Translation of the *transformation* alternative in 2050 and 2100

Theme:	**Aspect:**	**Score 2050**	**Score 2100**
Environmental Quality and Health	Environmental health risks	Risk and opportunity	Risk and great opportunity
	Healthy behaviour	Opportunity	Great opportunity
Safety	Floods	Great opportunity	Opportunity
	Environmental safety	Opportunity	Risk and great opportunity
	Road safety	Neutral	Neutral
Climate	Greenhouse gas emissions	Risk and opportunity	Risk and great opportunity
	Heat	Great opportunity	Opportunity
	Drought	Great opportunity	Great opportunity
	Flooding	Risk and great opportunity	Great opportunity
Natural systems	Soil and subsoil	Opportunity	Great opportunity
	Groundwater	Great opportunity	Great opportunity
	Surface water	Opportunity	Great opportunity
	Silence and darkness	Risk and opportunity	Risk and opportunity
Nature	Biodiversity	Opportunity	Great opportunity
	Area of nature reserves	Opportunity	Great opportunity
	Connectedness of nature	Opportunity	Great opportunity
	Species and habitats	Great opportunity	Great opportunity
Spatial quality	Valuable landscapes and public space	Risk and opportunity	Opportunity
	Cultural heritage	Risk and opportunity	Opportunity
	Experiential value, utility value and future value	Risk and opportunity	Great opportunity
Natural resources	Drinking water	Risk and opportunity	Great opportunity
	Raw materials	Risk and opportunity	Great opportunity
	Circularity	Risk and opportunity	Great opportunity
	Sustainable land use	Opportunity	Great opportunity
Economic vitality	Employment and earning capacity	Risk	Risk and opportunity
	Knowledge and innovation	Opportunity	Opportunity
	National security	Opportunity	Opportunity
Spatial-economic structure	Accessibility	Risk	Risk and opportunity
	Energy and digital network	Risk	Opportunity
	Business locations	Risk	Risk and opportunity
Living and living environment	Living	Risk and opportunity	Risk and great opportunity
	Facilities	Neutral	Neutral
	Recreation	Risk and opportunity	Risk and great opportunity
Well-being	Social cohesion	High risk and opportunity	Risk and great opportunity
	Inclusiveness	High risk and opportunity	Risk and great opportunity