



ECO2.5

Environmental risks

Objective

The objective is to protect the residents and users of the district from the effects of natural disasters and to promote the resilience of the district.

Benefits

The following benefits can be achieved for companies, municipalities and/or users:

- Increased safety for residents and users of the district against natural disasters
- Avoidance of follow-up costs for subsequent protection against natural disasters (e.g. temporary flood protection dams, technical modifications, dismantling of buildings and/or infrastructure)
- Maintaining the value of buildings, traffic and open spaces

Contribution to sustainability goals



CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS (SDG) OF THE UNITED NATIONS

CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY

	CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS (SDG) OF THE UNITED NATIONS	CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY
 Significant	11.5 Impact of disasters 11.b (Means of implementation) - Strategies for adaptation to climate change 13.1 Resilience and adaptability	
 Moderate	1.5 Reduction of vulnerability to climate-induced extreme events	



Outlook

Adapted to the DGNB system application for buildings, the content is also oriented towards international conditions. Various platforms are being developed for applications in Germany, also with regard to adaptation to climate change. In the medium term, further results are to be included in the criterion.

Share of the total score

	SHARE	WEIGHTING FACTOR
City Business	2.9 %	2
Commercial Event	3.3 %	2
Industry	2.5 %	2



ASSESSMENT

Only the three most relevant environmental risks and radon must be evaluated. The selection must be exemplified (see description of the method).

Intermediate steps in the evaluation are possible for the individual risks on the basis of the rather rough risk classes, but in some cases these must then be rounded up or down accordingly in order to be able to assign the points to the description.

The subsequent evaluation is carried out quantitatively using the published risk maps, which determines the degree of hazard of the planning area. For sites in endangered locations, implemented compensation measures can be credited up to the maximum score for the criterion under consideration. Depending on the environmental risk, compensation measures must take into account the urban/regional context or existing infrastructure (e.g. water drainage in the event of heavy rainfall must not lead to flood situations in neighbouring areas). The compensation measures are a qualitative assessment of specific measures. 100 points can be achieved in the criterion.

NO. INDICATOR	POINTS
1 Earthquake	
City Business Event Industry Commercial	max. 30
1.1 Hazard level for earthquake (Germany)	
City Business Event Industry Commercial	max. 30
Not classified as a relevant environmental risk: Classification and measures are regulated according to DIN EN 1998-1/NA (version 2011-01) and corresponding allocation to the earthquake zones.	
Hazard level for earthquakes (international)	
Hazard level (Earthquake Intensity, Hazard, 475 Year Event)	
■ High (> 8)	5
■ Average (> 5)	10
■ Low (< 5)	20
■ Very low (< 1)	30
1.2 Compensation measures for earthquakes	
City Business Event Industry Commercial	max. 8
There is a regional early warning system for earthquakes as well as a concept for the district regarding which measures have to be taken in this case.	+2
There are specially designated earthquake-proof shelters.	+2
A risk analysis has been conducted for the district.	+2
The protective measures proposed in a risk analysis have been implemented.	+2



NO.	INDICATOR	POINTS
2	Volcanic eruption	
	City Business Event Industry Commercial	max. 30
2.1	Hazard level for volcanic eruption	max. 30
	City Business Event Industry Commercial	
	<ul style="list-style-type: none"> ■ Last volcanic eruption more than 20 years ago 10 ■ Last volcanic eruption more than 50 years ago 20 ■ Last volcanic eruption more than 100 years ago or no volcanic eruption 30 	
2.2	Compensation measures for volcanic eruption	
	City Business Event Industry Commercial	max. 8
	There is a regional early warning system for volcanic eruptions as well as a concept for the district regarding which measures have to be taken in this case.	+2
	The district is located at a site that is not normally directly affected by lava and/or debris.	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2
3	Avalanches	
	City Business Event Industry Commercial	max. 30
3.1	Hazard level for avalanches	
	City Business Event Industry Commercial	max. 30
	<ul style="list-style-type: none"> ■ Red (highly endangered area; in the event of an avalanche, it is to be expected that buildings will be destroyed) 0 ■ Blue (rare avalanches; constructional measures are to be taken, danger especially in outdoor areas) 10 ■ Yellow (low hazard) 20 ■ White (no or negligible hazard) 30 	



NO.	INDICATOR	POINTS
3.2	Compensation measures for avalanches (with direct effect on the district) City Business Event Industry Commercial	max. 8
	Structural avalanche protection (e.g. supporting structures, avalanche dams, -galleries or object protection to stop avalanches)	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2
4	Storms City Business Event Industry Commercial	max. 30
4.1	Hazard level for storm (Winter Storm, Hazard, 50 Year Event) City Business Event Industry Commercial	max. 30
	■ > 50 m/s	0
	■ > 25 m/s	20
	■ < 25 m/s	30
4.2	Compensation measures for storms (with direct effect on the district) City Business Event Industry Commercial	max. 8
	There are no adjoining large open spaces without vegetation and water areas.	+2
	90% of all surrounding buildings have no more than 4 floors (the wind load on a facade increases exponentially with its height).	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2



NO.	INDICATOR	POINTS
5	Floods	
	City Business Event Industry Commercial	max. 30
5.1	Hazard level for floods	
	City Business Event Industry Commercial	max. 30
	<ul style="list-style-type: none"> ■ Very high (danger of flooding between 10 and 50 years) 0 ■ Medium (danger of flooding every 50 to 100 years) 10 ■ Low (danger of flooding less often than every 100 years) 20 ■ No danger of flooding 30 	
5.2	Compensation measures for floods (with direct effect on the district)	
	City Business Event Industry Commercial	max. 12
	Flood protection concept according to usage requirements	+2
	(Temporary) structural measures for flood protection (e.g. dam)	+2
	Safety distance of the ground floor (> 15 cm) above the level of a flood which statistically occurs every 50 years	+2
	Enlargement of the retention areas within the project area	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2
6	Heavy rain	
	City Business Event Industry Commercial	max. 30
6.1	Hazard level for heavy rain	
	City Business Event Industry Commercial	max. 30
	Approach according to KOSTRA-DWD-2010R as far as available in the federal state:	
	<ul style="list-style-type: none"> ■ Rainfall quantities ≥ 36 mm / 1 hour or ≥ 50 mm / 6 hours (environmental warning) Return time of 10 years 10 ■ Rainfall quantities ≥ 32 mm / 1 hour or ≥ 45 mm / 6 hours (Significant weather warning) Return time of 10 years 20 ■ Rainfall quantities ≥ 28 mm / 1 hour or ≥ 40 mm / 6 hours 30 ■ Heavy rainfall due to assignment to hazard maps in the project is not possible because not available 0 	



NO.	INDICATOR	POINTS
6.2	Compensation measures for heavy rain (with direct effect on the district) City Business Event Industry Commercial	max. 6
	There is a report on heavy rainfall with site-specific statements on precipitation levels and rainfall as a function of precipitation duration and annularity (return interval), (e.g. according to KOSTRA-DWD-2010R).	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2
7	Hail	max. 30
	City Business Event Industry Commercial	
7.1	Hazard level for hail City Business Event Industry Commercial	max. 30
	Through assignment to "Hail zones" of hazard maps (BBK Bund)	
	<ul style="list-style-type: none"> ■ Zone High ■ Zone Increased ■ Zone Moderate ■ Zone Low 	0 10 20 30
7.2	Compensation measures for hail City Business Event Industry Commercial	max. 6
	A risk analysis has been carried out for the district.	+3
	The protective measures proposed in a risk analysis have been implemented.	+3



NO. INDICATOR	POINTS
8 Landslide/soil subsidence	
<div style="display: flex; justify-content: space-between; align-items: center;"> City Business Event Industry Commercial max. 30 </div>	
8.1 Hazard level for landslide/soil subsidence	
<div style="display: flex; justify-content: space-between; align-items: center;"> City Business Event Industry Commercial max. 30 </div> <ul style="list-style-type: none"> <li style="margin-bottom: 10px;"> Endangered due to the sloping location (inclination greater than 20 degrees) or the location in a mining region or civil engineering measures (underground railway construction or similar) 0 Not endangered 30 	
8.2 Compensation measures for landslide/soil subsidence (with direct effect on the district)	
<div style="display: flex; justify-content: space-between; align-items: center;"> City Business Event Industry Commercial max. 24 </div> <p>Analysis and assessment of soil properties by involving the competent authority for geology and mining in cooperation with geologists familiar with the area. The following issues need to be analysed:</p> <ul style="list-style-type: none"> Research mapping material with tunnels and shafts Research of historical tunnels Groundwater levels (maximum levels) Slope instability Cartographic examination of the topography, morphology, geological layers and source horizons Infiltration and moisture penetration of the soil on slopes Soil karstification as a risk <p>Constructional protection measures, e.g.:</p> <ul style="list-style-type: none"> Installation of drainages, either on the surface or deep into the subsoil (e.g. drainage anchors) Preventive installations in the endangered subsoil - analogous to torrent and avalanche control Short-term stabilisation of moving slopes by concrete and steel reinforcement Extensive covering of critical slope areas by tarpaulins to prevent further rainwater ingress <p>A risk analysis has been carried out for the district. +2</p> <p>The protective measures proposed in a risk analysis have been implemented. +2</p>	<div style="display: flex; justify-content: space-between; align-items: center; margin-bottom: 10px;"> +10 </div>



NO.	INDICATOR	POINTS
9	Storm surge/tsunami City Business Event Industry Commercial	max. 30
9.1	Hazard level for storm surge/tsunami City Business Event Industry Commercial By assignment to the tsunami or storm surge hazard map	max. 30
	■ Very high risk	10
	■ Medium risk	20
	■ Low risk	30
9.2	Compensation measures for storm surge/tsunami City Business Event Industry Commercial	max. 8
	There is a regional early warning system for storm surge/tsunamis as well as a concept for the surrounding district regarding which measures have to be taken in this case.	+2
	The surrounding district is located at a site that is normally not directly affected by storm surge/tsunami (e.g. mountain top).	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2



NO.	INDICATOR	POINTS
10	Temperature extremes	
	City Business Event Industry Commercial	max. 30
10.1	Hazard level for special climatic extremes according to the ESPON map by assignment to the hazard map for extreme temperatures	
	City Business Event Industry Commercial	max. 30
	■ High risk	10
	■ Medium risk	20
	■ Low risk	30
10.2	Compensation measures for temperature extremes	
	City Business Event Industry Commercial	max. 8
	Structural measures to mitigate the extremes	+2
	Organisational measures to mitigate the extremes	+2
	A risk analysis has been carried out for the district.	+2
	The protective measures proposed in a risk analysis have been implemented.	+2



NO.	INDICATOR	POINTS
11	Forest fires	
	City Business Event Industry Commercial	max. 30
11.1	Hazard level for forest fires	
	City Business Event Industry Commercial	max. 30
	<ul style="list-style-type: none"> ■ Last forest fire more than 10 years ago in the immediate vicinity of the district 10 ■ Last forest fire more than 20 years ago in the immediate vicinity of the district 20 ■ Last forest fire more than 50 years ago or no forest fires in the immediate vicinity of the district 30 	
11.2	Compensation measures for forest fires	
	City Business Event Industry Commercial	max. 8
	There is a regional early warning system for forest fires as well as a concept for the district, which measures have to be taken in this case. +2	
	The district is located at a site that is normally not directly affected by forest fires. +2	
	A risk analysis has been carried out for the district. +2	
	The protective measures proposed in a risk analysis have been implemented. +2	
12	Radon	
	City Business Event Industry Commercial	max. 10
12.1	Even low soil air concentrations may be sufficient to cause an increased indoor air concentration in a house (see Section 123 StrlSchG)	
	City Business Event Industry Commercial	max. 10
	The following procedure is evaluated:	
	<ul style="list-style-type: none"> ■ Radon soil air concentration is determined in a risk assessment for each plot +5 ■ Appropriate measures are taken in the district to prevent or significantly impede the entry of radon from the building ground (see § 123 StrlSchG) +5 	



SUSTAINABILITY REPORTING AND SYNERGIES

Sustainability reporting

NO.	KEY FIGURES/KPI	UNIT
KPI 1	Classification of environmental risks according to the evaluation (indicators 1 - 12)	[-]

Synergies with DGNB system applications

- **DGNB NEW BUILDINGS:** Indicators 1 -11 and 14 are consistent with the contents of the SITE1.1 Local environment criterion.



APPENDIX A - DETAILED DESCRIPTION

I. Relevance

City Business Event Industry Commercial

Hardly a week goes by in which the media do not report about a natural disaster in the world. Germany is also increasingly affected by such disasters, especially storms and floods. The social, economic and ecological damage caused by such disasters is enormous and cannot be quantified.

II. Additional explanation

The number of natural disasters has been rising sharply worldwide in recent years (see Fig. 1). The social, economic and also ecological damage caused by such disasters is enormous and cannot be quantified.

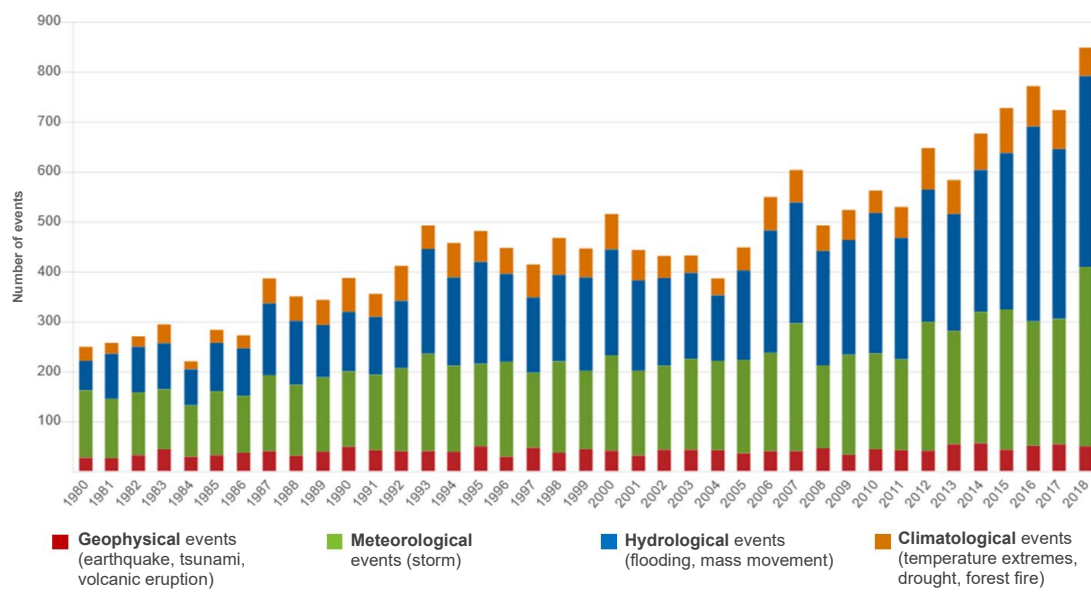


FIGURE 1 Number of natural disasters worldwide 1980 - 2018, source: Own presentation according to Munich RE: "NatCat Service, As of: 28/05/2019 | <https://natcatservice.munichre.com/>

The objective is not to build in endangered areas and, where possible, to return parts of our landscape to their natural state (e.g. renaturation of floodplain landscapes to prevent flooding). However, due to the limited availability of settlement areas, it will be difficult in the future to completely avoid settlement growth in endangered areas. For this reason, organisational and also structural measures must be taken to protect people in these areas.

Natural hazards depend on the geographical conditions of the location and are generally not influenceable in intensity and frequency and are difficult to predict.

The methodology takes into account the respective probability of occurrence and the possible severity of the effect. However, compensation measures are also taken into account.



III. Method

City Business Event Industry Commercial

The probability of occurrence of natural disasters is taken into account for the evaluation. In the case of some natural disasters, compensation measures may be taken into account. The criterion is assessed using the following indicators:

- Environmental risk 1 - highest relevance (30 points)
- Environmental risk 2 - second most relevant (30 points)
- Environmental risk 3 - third most relevant (30 points)
- Radon (10 points)

The first step is to determine the regional relevance of the natural environmental risks listed below for the district (scoping procedure). This requires the three most relevant environmental risks to be identified using the methods described. The selection must be justified. This procedure is intended to reduce the effort involved (evaluation of an avalanche risk in lowlands, flood risk far from water bodies or heavy rainfall events). The following environmental risks are considered:

Indicator 1: Earthquake

Earthquakes are measurable vibrations of the earth body. Strong earthquakes can destroy houses and buildings, trigger tsunamis and landslides and kill people in the process. In Germany the probability of strong earthquakes is relatively low, but in certain areas it is quite possible.

For Germany, the Center for Disaster Management and Risk Reduction Technology (CEDIM) publishes an earthquake risk map (CEDIM Risk Explorer, Hazard Maps, 475 year event) on its website. Based on the EMS 98 (European Macroseismic Scale), it classifies locations throughout Germany into different hazard levels that reflect a possible earthquake intensity.

If available, more detailed hazard maps can also be used in principle. For districts outside Germany, the risk maps of the European Spatial Design Observation Network (ESPON) can be used (earthquake hazard map).

TABLE 1 EMS intensity

EMS INTENSITY	DEFINITION OF THE INTENSITY	DESCRIPTION OF THE MAXIMUM EFFECT
0 - 5	Not perceptible – strong	Buildings are shaken, hanging objects oscillate strongly, small objects are moved.
5 - 6	Strong – slight damage to buildings	Slight damage is caused to buildings in poorer condition (e.g. cracks in the walls, falling off plastering).
6 - 7	Slight damage to buildings	Moderate damage occurs to buildings of solid construction (e.g. small cracks in walls, plaster falling off, chimney parts falling down).
7 - 8	Severe damage to buildings	Serious damage occurs in buildings of simple design (e.g. gable parts and roof cornices collapse).
> 8	Destructive	Well-built ordinary buildings show severe damage (e.g. collapse of load-bearing structures).

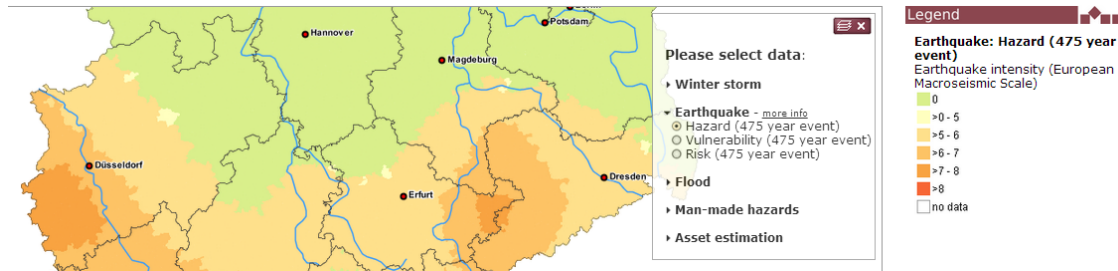


FIGURE 2 Hazard levels, source: CEDIM (URL: www.cedim.de)

Indicator 2: Volcanic eruption

Volcanic eruptions represent a serious environmental risk in some regions of the world. In Europe, the risk of being affected by volcanic eruptions is assessed using the risk maps of the European Spatial Design Observation Network (ESPON, Volcanic Hazard Map). If available, more detailed hazard maps can also be used.

Indicator 3: Avalanches

An avalanche is a large mass of snow or ice that detaches itself from mountain slopes and slides or falls towards the valley. Avalanches that cause major damage to property, people or the environment are counted as natural disasters. The danger of avalanches is particularly high in the Alpine foothills.

The degree of hazard and measures for avalanche protection are evaluated. The degree of hazard is determined on the basis of the regional and current avalanche hazard map (combination of intensity and probability of occurrence) of levels 0 (none, white), 1 (low, yellow), 2 (rare, blue) to 3 (significant, red), which are published by the respective municipalities, if regionally relevant.

In principle, the evaluation should be carried out with local detailed avalanche maps. If these are not available, the ESPON database can be used (Avalanche Hazard Map).

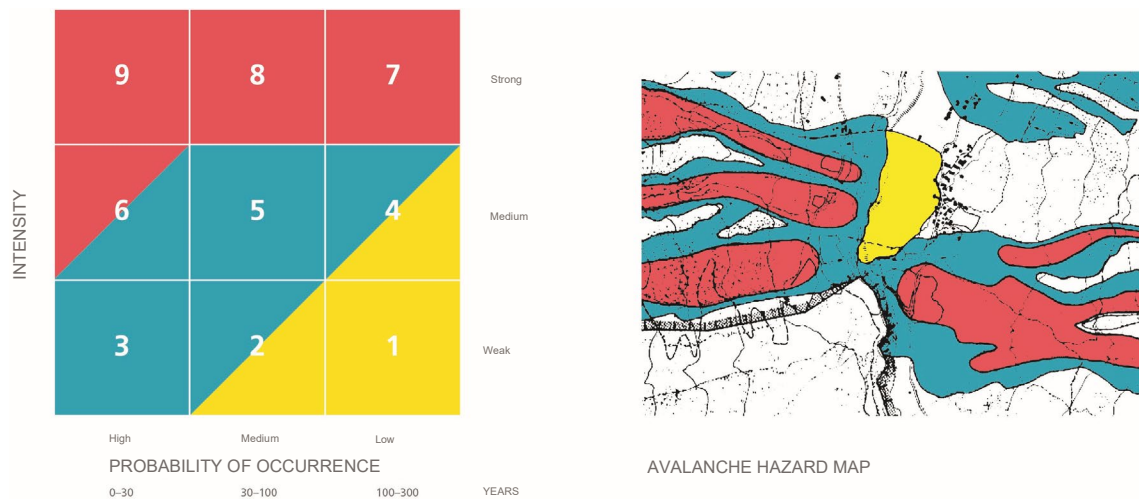


FIGURE 3 Probability of occurrence, source: SLF, Davos



TABLE 2 Hazard to the areas

AREAS	HAZARD
White	No or negligible hazard
Yellow	Low hazard
Blue	Rare avalanches (structural measures have to be taken, hazard especially in outdoor areas, therefore building permits are linked to conditions and evacuation plans for the residents are required)
Red	Highly endangered area (in the event of an avalanche, buildings may be destroyed; in the red area, no new building zones may be released. Furthermore, no buildings and facilities may be erected or extended)

Indicator 4: Storms

Storms are defined as winds with speeds of at least 20.8 m/s (74.9 km/h) or 9 Beaufort. Direct storm damage mainly affects the covering of roofs or other wind transport; in densely wooded areas, damage caused by fallen trees (storm-damaged timber) is an additional factor. Indirect damage is also significant, for example through the deposition of sand on agricultural land during a sandstorm or hail damage.

The risk of storm damage and measures to increase storm safety are evaluated. The storm damage risk is determined using the online tool CEDIM Risk Explorer (hazard maps, winter storms with wind speeds, 50-year event). It is recommended to take the data directly from CEDIM, as the coloured areas can be more clearly distinguished there by enlarging the map (possibly several times). The exact wind speed in m/s is displayed when clicking once on the planning location and can then be evaluated according to the table below.

If available, more detailed hazard maps can also be used in principle. For districts outside Germany, the risk maps of the European Spatial Design Observation Network (ESPON) can be used (Storm Hazard Map).

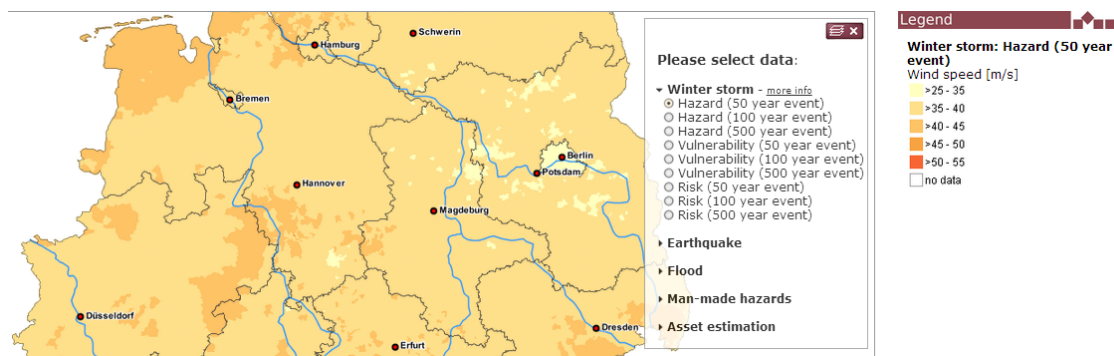


FIGURE 4 Storm damage risk map, source: CEDIM (URL: www.cedim.de)

TABLE 3 Wind damage

MEDIUM WIND SPEED	DEFINITION	DESCRIPTION OF THE MAXIMUM EFFECT
21 - 24 m/s	Storms	Minor damage to houses (roof tiles are removed)
25 - 28 m/s	Severe storm	Wind breaks trees, major damage to buildings
29 - 32 m/s	Hurricane-like storm	Wind uproots trees, spreads storm damage
> 33 m/s	Hurricane	Serious devastation

Indicator 5: Floods

Floods are generally natural events. They become a catastrophe (flood disaster) when human values are affected. In the course of progressive land use, more and more areas exposed to flood hazards are being used. Thus, the threat of flooding has increased, despite constantly improving flood protection over centuries.

The flood hazard and the protective measures are evaluated. The flood hazard is determined on the basis of the flood hazard map of the respective federal state. Four flood scenarios are presented in the maps: Floods with high probability (HQ 10-50), floods with medium probability (HQ 100), extreme events with partial failure of flood protection facilities (HQ 200) and no flood hazard.

In principle, the evaluation should be carried out using local detailed flood maps. If these are not available, the ESPON database can be used (Flood Recurrence Map, Precipitation Contributing to Flood Risk).

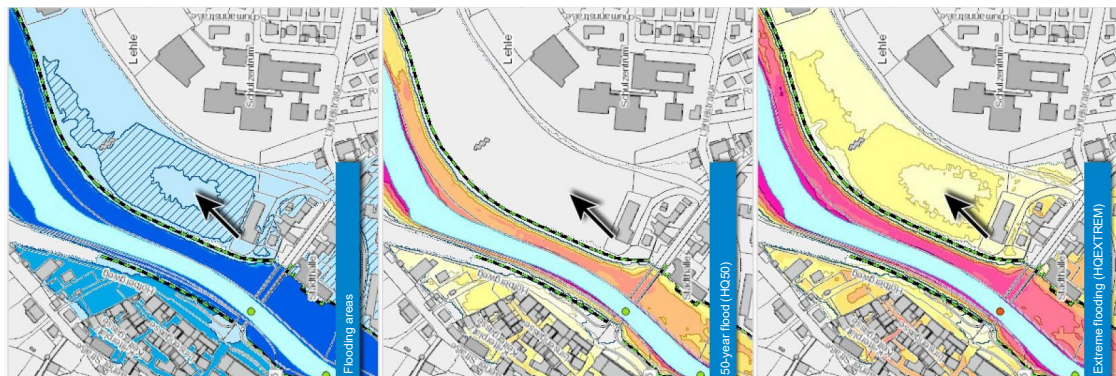


FIGURE 5 Excerpt from the flood hazard map Baden-Württemberg
Source: (<http://rips-dienste.lubw.baden-wuerttemberg.de>)

Indicator 6: Heavy rain

Heavy rainfall events lead to flash floods or flood inundations if rainwater can no longer seep away or be sufficiently absorbed and discharged by the sewerage system or water bodies. This is influenced by the topographic location of the property, its degree of soil sealing, existing rainwater retention systems or the dimensioning of the sewerage system (here, appropriate compensation measures can be taken).

The following factors have a particularly unfavourable effect here:

- Danger to the property from surface runoff from adjacent roads or land
- Ground level entrances or terraces
- Sidewalks, access roads, parking spaces have an incline to the building
- Water can flow from the adjacent street into the underground car park

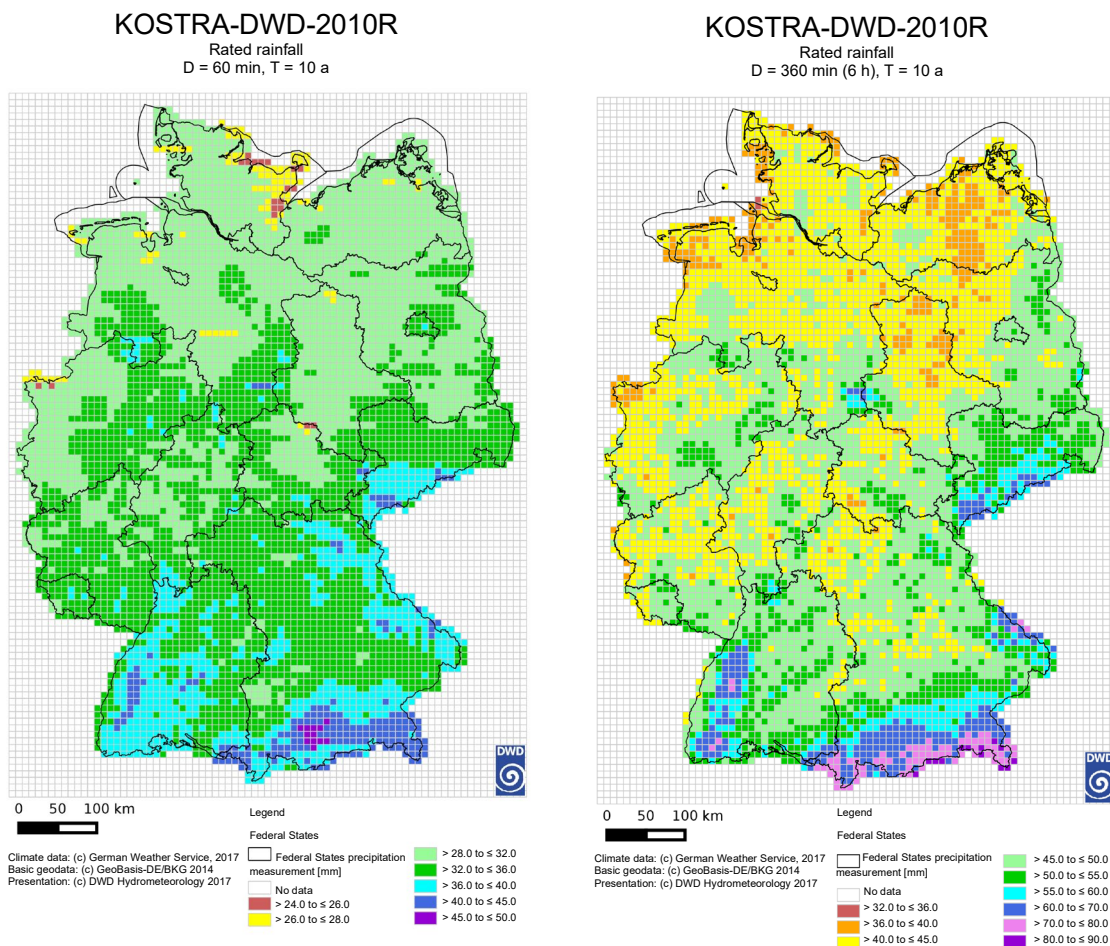


FIGURE 6 Coordinated heavy rainfall regionalisation and evaluation of the DWD (KOSTRA-DWD) 2010R (revision data set) for the duration of one hour (left) and six hours (right) and a return period of 10 years. Source: DWD - Hydrometeorology department



Indicator 7: Hail

According to the research project “Climate-adapted construction – criteria profile ‘resistance to natural hazards: Wind, heavy rain, hail, snow/humid winters and floods’” of the “Future Construction” research initiative, there are currently still insufficient regulations regarding the resistance of buildings. For this natural hazard, standards and regulations to reduce the risks are essentially not yet present in Germany.

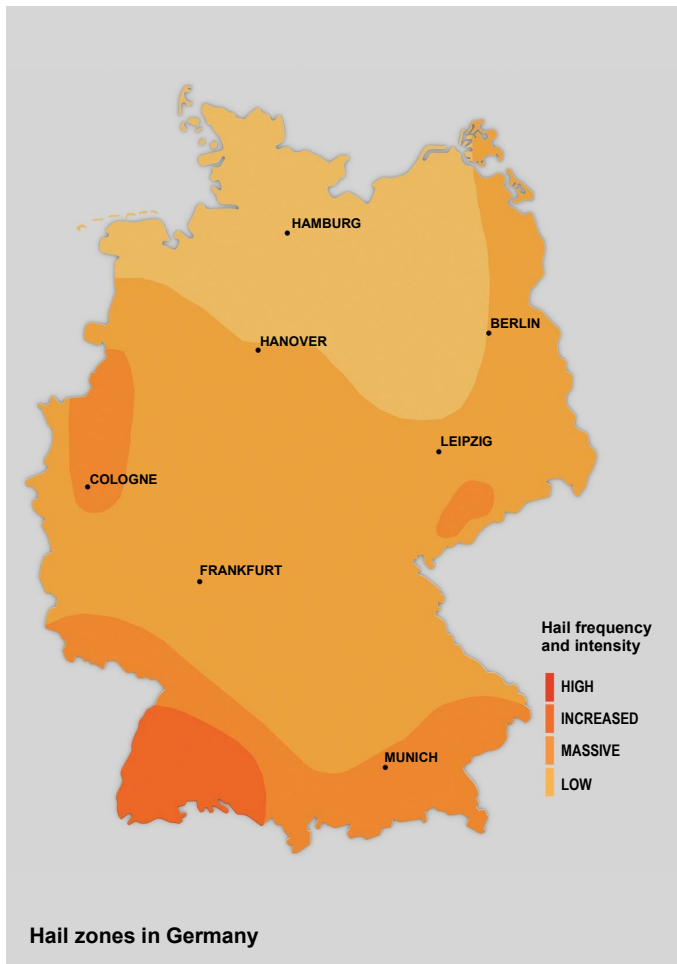


FIGURE 7 Hail zones low – high. Source: BBK Federation (https://www.bbk.bund.de/SharedDocs/Bilderstrecken/BBK/DE/2017/Sturmsicher_bei_Unwetter/PM_Sturmsicher_bei_Unwetter.html)

Indicator 8: Landslide/soil subsidence

A landslide is the sliding of large masses of earth and rock, usually triggered by heavy rainfall (prolonged rain or heavy rain) and the resulting intrusion of water between previously bounded soil layers.

The hazards (e.g. from former mining, hillside location or civil engineering measures) and compensation measures are assessed. For guidance on whether the issue of landslide/soil subsidence could be relevant for the district, the ESPON database can be used (Landslide Hazard Map). If available, more detailed hazard maps can also be used.



Indicator 9: Storm surge/tsunami

Tsunamis and storm surges represent a serious environmental risk in some regions of the world. In Europe, the risk of being affected by tsunamis and/or storm surges is assessed using the risk maps of the European Spatial Design Observation Network (ESPON, Tsunami Hazard Map, Storm Surge Hazard Map). If available, more detailed hazard maps can also be used in principle.

Indicator 10: Temperature extremes

Climate extremes (*heat waves/cold spells*) represent a serious environmental risk in some regions of the world. In Europe, the risk of being affected by climate extremes is assessed using the risk maps of the European Spatial Design Observation Network (ESPON, Extreme Temperature Hazard Map). If available, more detailed hazard maps can also be used in principle.

Indicator 11: Forest fires

Due to the increasing number of long dry periods, the danger of forest fires is rising. In Europe, the risk of being affected by forest fires is assessed using the risk maps of the European Spatial Design Observation Network (ESPON, Wildfire Hazard Map, Length of Dry Spell Affecting Forest Fires). If available, more detailed hazard maps can also be used in principle.

Indicator 12: Radon

Even low concentrations of soil air can be sufficient to cause increased indoor concentrations in a house. Therefore, the new Radiation Protection Law stipulates that anyone constructing a building with recreation rooms or workplaces must take appropriate measures to prevent or significantly impede the entry of radon from the building ground. This applies if the measures required for moisture protection according to the generally recognised rules of technology are observed. In radon precautionary areas, which the federal states must define by 2021, more extensive measures must then be implemented (§ 123 StrlSchG). These further measures are briefly mentioned in the Radiation Protection Ordinance. The Radiation Protection Law and Ordinance came into force on 31/12/18.

The radon map of Germany can only be used for initial assessments. It is not possible to determine the radon soil air concentration on a plot-exact basis.

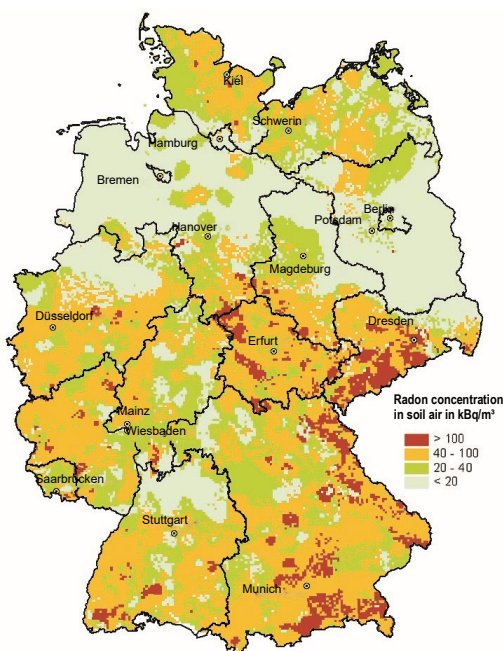


FIGURE 8 Radon concentration in soil air at one metre depth, source: Federal Office for Radiation Protection



Compensation measures - all indicators

In some cases, compensation measures for individual environmental risks are taken into account; these are described in more detail in the assessment section.

Note on environmental risks identified in ESPON/CEDIM maps:

In countries not covered by ESPON/CEDIM maps, the auditor is obliged to identify alternative sources of risk data. The sources of the risk data and the adjustment of the evaluation (scaling) must be agreed in advance with the DGNB office.



APPENDIX B - DOCUMENTATION

I. Required documentation

City **Business** **Event** **Industry** **Commercial**

The following represent a selection of possible documentation forms. On the basis of the submitted supporting documentation, the selected evaluation of the individual indicators must be comprehensively and plausibly documented or the intention to do so must be explained.

This documentation applies to all schemes. Depending on the scheme, different types of documentation may also be relevant; these are explicitly mentioned.

TABLE 4 Overview of documentation with abbreviations

SUPPORTING DOCUMENTS	ABBREVIATION
Qualified declaration of intent to implement the compensation measures and disaster control plan	A
Documentation of relevant expert reports/documents :	B
<ul style="list-style-type: none"> ■ B1: Expert opinion/risk analysis regarding whether the project area is affected by the respective risk and evaluation (if available) ■ B2: Presentation and explanation of the compensation measures and the disaster control plan 	
Photo documentation of the implemented measures	C
<ul style="list-style-type: none"> ■ Site plan with markings: Location of the project area on risk maps and evaluation (if available) 	D



TABLE 5 Documentation per indicator

INDICATORS

INDICATORS	City	Business	Event	Industry	
	Commercial			VZ	Z
	PHASE 1	PHASE 2	PHASE 3		
1. Earthquakes	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
2. Volcanic eruption	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
3. Avalanches	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
4. Storms	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
5. Floods	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
6. Heavy rain	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
7. Hail	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
8. Landslide/soil subsidence	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
9. Storm surge/tsunami	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
10. Particular climate extremes	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
11. Forest fires	A, B, C, D	B, C, D	B, C, D	A, B, D	B, C, D
12. Radon	A, B, C, D	B, C, D	B, C, D	A, B	B, C, D



APPENDIX C - LITERATURE

I. Version

Change log based on version 2020

PAGE	EXPLANATION	DATE
------	-------------	------

II. Literature

- FOEN - Federal Office for the Environment Switzerland: www.bafu.admin.ch/naturgefahren.
- Avalanche maps of cities and municipalities (if relevant).
- ZÜRS Zoning systems for floods, backwater and heavy rain.

Industry Commercial

- Risk maps of the CEDIM Risk Explorers Germany, Karlsruher Institut für Technologie
- Avalanche maps of cities and municipalities (if relevant)
- ZÜRS Zoning systems for floods, backwater and heavy rain
- Location analysis with concrete statements on the criterion
- Burk, Peter: Construction planner, development and crisis regions, Fraunhofer Informationszentrum Raum und Bau (Ed.), 1998
- Einwirkungen auf Tragwerke DIN EN 1991-1-4/NA [2010-12]
- Disaster control plans can be created online and kept up to date (www.kats-plan.de)

Internet sources

- Risk maps of the CEDIM Risk Explorer Germany (www.cedim.de).
- Risk maps of the ESPON European Spatial Design Observation Network (www.espon.eu).

Industry Commercial

- <http://kats-plan.de.dedi888.your-server.de/Home/Willkommen-beim-KatS-Plan.html>
- http://www.vpi-bw.com/ingenieure/freudenstadt/FDS_2005-33-03.pdf
- <http://www.gfz-potsdam.de/portal/gfz/home>
- <http://www.bafu.admin.ch/naturgefahren/>
- <http://cedim.gfz-potsdam.de/>
- http://www.cedim.de/img/content/sturmschaden_bild6.jpg