

# Transport and Environment Committee

10.00am, Thursday, 12 November 2020

## Vision for Water Management

Executive/routine	Executive
Wards All	All
Council Commitments	<a href="#">1, 2, 15</a>

### 1. Recommendations

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- 1.1 It is recommended that Committee:
  - 1.1.1 approve the Water Management Vision and objectives; and
  - 1.1.2 recognise the value of managing the implementation of the objectives through the Edinburgh and Lothians Strategic Drainage Partnership.

**Paul Lawrence**

Executive Director of Place

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# Report

## Vision for Water Management

### 2. Executive Summary

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- 2.1 The City of Edinburgh Council has recognised Climate Change as a key challenge now and into the future, set a target for Edinburgh being carbon neutral by 2030, and has developed a sustainability programme to work towards achieving this target.
- 2.2 This report proposes an overarching Vision for Management of Water, looking at how the city can adapt to this challenge. Adaptation is required to ensure the city will be resilient to the changes projected from all sources: rivers, coast, surface water and underground surface water sewers. One key adaptation is managing the first five millimetres (5mm) of rainfall within every development plot.
- 2.3 The Edinburgh and Lothians Strategic Drainage Partnership is proposed as the mechanism to implement the strategy.
- 2.4 The report also looks at risk and the probabilities of flooding and the limitations of the data, which explains the need to take a precautionary approach when allocating and designing sites for different types of development.

### 3. Background

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- 3.1 The climate is changing. Climate trends predict that we will experience warmer and wetter winters. Summers are expected to become hotter and drier, and occurrences of extreme rainfall events are expected to increase. Sea levels around our coast are predicted to rise, with an increase in storm surges during bad weather. Despite the overall trend there will still be cold, dry winters, and cool, dry summers, as there is variability in the summers and winters we see today.
- 3.2 This has been widely recognised internationally and the United Nations set [Sustainable Development Goals](#); thirteen of which link to water issues. The UK Committee on Climate Change also highlights flooding issues as one of the top risks to the country.
- 3.3 At a more local level the [Edinburgh Adapts Climate Change Adaptation Action Plan](#) contains twenty-two actions that are linked to this Water Management Strategy, including actions on planning, the built environment and blue-green infrastructure

solutions. The Edinburgh Climate Change Commission also states that Edinburgh should become resilient to climate change, embed a collaborative approach to problem solving and be open to all best practice.

- 3.4 The Vision has been developed to fit within the Council's [Edinburgh 2050 Vision](#). This way of working collaboratively will create a fairer society as the city plans for a future with reduced risk of flooding for all homes and businesses.
- 3.5 Integrating design for water and flooding with the urban landscape (blue-green infrastructure) delivers multiple benefits, including:
  - 3.5.1 People - providing greener and more attractive places for people to live, work and visit, making communities happier, healthier and more prosperous. Green spaces also help reduce the urban heat effect and make communities more resilient to heatwaves, which is important in a changing climate where extreme weather such as heatwaves are expected to happen more frequently;
  - 3.5.2 Biodiversity – providing green and blue networks for our wildlife to thrive;
  - 3.5.3 Water quality including physical condition – access to a clean and natural water environment is important to the health and well-being of people and wildlife;
  - 3.5.4 Flood risk (river, coastal and surface water) - making space for water in times of floods makes our communities more resilient. This is important in a changing climate where extreme weather such as floods are expected to happen more frequently. The development of coastal parks and greenspaces can reduce flooding and erosion caused by rising sea levels; and
  - 3.5.5 Interactions with the sewer network (e.g. surface water flows into sewer and other inflows e.g. where watercourses enter the sewer network and coastal influence) - reducing water inflows into the sewer network can help free up capacity for new development making our communities more prosperous, help reduce sewer flooding and help reduce spills to the water environment, improving water quality.
- 3.6 Council officers and external agencies, whose remit considers water, want to work together to get the best possible future for the city. One of the many steps required to achieve this aim is to have an overarching vision and objectives to guide operational plans and actions.

### **Motion from Council - Flooding**

- 3.7 On 20 August 2020 the following adjusted motion from Councillor Corbett on flooding was approved:
  - 3.7.1 To note the exceptional weather events overnight on 11/12 August 2020;
  - 3.7.2 To note that such events were predicted to become more frequent as a result of climate breakdown;
  - 3.7.3 To warmly thank staff for outstanding efforts in dealing with flooding and other weather-related consequences;

- 3.7.4 To note widespread concern from residents that poorly maintained and choked street gullies contributed to floodwater pooling in public areas and into residents' properties;
  - 3.7.5 To note the report from the Centre of Ecology and Hydrology in 2019 that Edinburgh had lost 282 hectares of green land since 1990 which otherwise acted as a soak for rain and surface water;
  - 3.7.6 To therefore agree to a report within three cycles, including dialogue with Scottish Water, on what steps could be taken to mitigate the scale of flooding in the future;
  - 3.7.7 To note reports of a number of drains which had had recent repairs failed leading to serious flooding of properties and request that the dialogue with Scottish Water include details of plans on how such heavy rainfall could be accommodated within the drainage system so that the historic buildings of the city could be protected; and
  - 3.7.8 To note the importance of maintaining and therefore the unblocking of street gullies to ensure the city could cope with the exceptional weather events have experienced recently and given the likely increase in frequency recognise the importance of ongoing winter maintenance and preparedness.
- 3.8 The Water Management Vision and objectives set out in this report are an important step towards mitigating the scale of flooding in the future and have been developed with input from Scottish Water (SW) and the Scottish Environment Protection Agency (SEPA).
- 3.9 Edinburgh's 64,000 road gullies (drains) are an important part of the overall drainage network which contributes to the successful management of surface water on the road and footpath network. It should be noted though that a gully, even when newly installed, will have a limited capacity and if the sewer into which the gully runs is at capacity then the capacity of the gully will be nil. In fact, in some instances the gully can act as a relief, allowing water to spill out of a surcharging sewer and onto the road. During the extreme weather of August 2020 and July 2019 there were multiple examples of surcharging manholes and gullies across Edinburgh due to capacity issues out with the Council's control. It should therefore be noted that there is a limit to the volume of water a gully can convey and in peak events gullies can be overwhelmed even when fully functioning.
- 3.10 Drainage systems can often be complex and multifunctional and therefore it is important to understand the root cause of any issue, which can often involve a variety of Council services and/or external parties.
- 3.11 The importance of ongoing cyclical maintenance to proactively prevent the build-up of silt in the gully pot preventing the efficient conveyance of water into the sewer network is recognised. A process of actively reviewing historic maintenance routes is underway to better reflect the makeup and use of Edinburgh roads network to ensure that the cyclical maintenance can be delivered as efficiently as possible. An example of this is better understanding the challenges presented by parked cars preventing access and amending the routes accordingly to improve efficiency. Also, to help realise improved efficiency, three new gully vehicles are on order and are

due to arrive in early 2021. This will improve vehicle reliability and increase output, ultimately improving performance

## **4. Main report**

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### **Why do we need a vision and objectives?**

- 4.1 A vision and objectives are required to ensure all developments are mitigating and designing for climate change. This includes new developments going through the planning process, permitted developments, and transport projects.
- 4.2 The Vision (Appendix 1) will provide the direction and a common understanding across all the work within the Council and has been developed with input from SW and SEPA.
- 4.3 The Vision is “to develop a long-term and sustainable approach to river, coastal and storm water management across the city and its environs, respecting the city’s unique historic heritage. This will involve all stakeholders and address the flooding and water quality risks associated with our changing climate as a result of changes in rainfall and sea level rise.”

### **Understanding Risk of Flooding**

- 4.4 One driver behind the strategy is the true understanding of risk. Flood modelling is not an exact science. The models used are only as good as the data inputted, which has recently changed and can be incomplete. They also rely on the skill of the modeller to interpret the outputs. An explanation of risk for coastal, fluvial and pluvial risk is also provided.

### **Edinburgh and Lothians Strategic Drainage Partnership (ELSDP)**

- 4.5 The mechanism to deliver the Vision is through empowering the ELSDP to make decisions in relation to the implementation of the different work streams, whilst maintaining an overview of all the existing and proposed work in the Council that relates to water issues. This will allow different work streams to be co-ordinated and ensure opportunities for shared working both internally and externally can be maximised.
- 4.6 For example, internal projects that relate to the Vision include:
  - 4.6.1 The Integrated Catchment Study (joint study Scottish Water and local authorities);
  - 4.6.2 Water of Leith Model update (Flood Prevention);
  - 4.6.3 Niddrie Burn Flood Study (Flood Prevention);
  - 4.6.4 Strategic Flood Risk Assessment for the Local Development Plan – to understanding risk of housing sites to fluvial, coastal, surface water flooding issues (Development Plan team);
  - 4.6.5 Proposed policies for managing flooding, flood risk and green infrastructure (Development Plan team);

- 4.6.6 The proposed 'Green/Blue Network' project (Spatial Planning team);
  - 4.6.7 The proposed 'Edinburgh Sustainable Rainwater Management design guidance' documents. This is an additional section to the existing Edinburgh Design Guidance (Landscape Specialist);
  - 4.6.8 The new Ecological Coherence Plan and Edinburgh's Thriving Green Spaces (part of the Future Parks Accelerator project) (Parks, Greenspace and Cemeteries);
  - 4.6.9 Ongoing work undertaken for the Council by the University of Glasgow, raising awareness of coastal flooding and erosion risks from sea level rise on Edinburgh's coast;
  - 4.6.10 'Edinburgh's Million Tree Initiative' (Parks, Greenspace and Cemeteries);  
and
  - 4.6.11 Significant pieces of work being undertaken in SEPA and SW and Scottish Natural Heritage (SNH).
- 4.7 The most efficient way to co-ordinate this work is through the ELSDP.
- 4.8 For a diagram of the relationship of these pieces of work see the Vision Document.

## **5. Next Steps**

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- 5.1 The next steps will be to expand on the Vision, working closely with SEPA, SW and SNH, reporting into the ELSDP. The aim is to report back to Committee on progress next year.
- 5.2 Future Work already identified includes:
  - 5.2.1 Continuing with all related Council projects;
  - 5.2.2 Promoting the objectives of the vision within the council;
  - 5.2.3. Further exploring ways of funding both a co-ordinator for the partnership funding projects and also long term funding for the maintenance of built schemes;
  - 5.2.4 Creating an on-line illustrated version and communications plan; and
  - 5.2.5 Providing input into the next 'Edinburgh Adapts' plan.

## **6. Financial impact**

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- 6.1 There is no immediate financial impact.
- 6.2 The ELSDP will need to consider the potential appointment of a coordinator/fundraiser within the Council to develop and implement the work and seeking additional external funding where required. This strategic role may be introduced in the Flood Prevention or Planning team and may be funded by external

funding (if secured). The appointed individual would also need to consider long term funding for the maintenance of schemes.

- 6.3 Financial benefit will arise from this work as adaptation for climate change is considered from the outset of projects, saving time (and money) on negotiation where currently opportunities may be missed because it is considered too late in the design process.
- 6.4 Existing resource is expected to cover the cost of advertising online.
- 6.5 Existing projects have attracted external funding (outlined below) and there are further opportunities to increase this funding:
  - 6.5.1 The new Green/Blue Network Project and master-planning guidance is being funded externally by Sustrans and SEPA; and
  - 6.5.2 The new Sustainable Water Management Guidance has also been funded by externally by Sustrans.

## **7. Stakeholder/Community Impact**

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- 7.1 Many members of SW and SEPA have had a significant role in the preparation of this work, and together with the Council will have a key role in helping to deliver its actions.
- 7.2 In the context of taking the work forward the Council is currently preparing a replacement Local Development Plan, City Plan 2030. It will have an important part to play in helping to implement the objectives alongside the planned growth of the city over the next 10 years. The Council has recently published and consulted on its Choices for City Plan 2030. The document sets out 16 choices to guide the preparation of the City Plan 2030 and a series of proposals under each choice. Choice 1 seeks to make Edinburgh a sustainable, active and connected city. One of the suggested proposals that will assist in achieving this is the identification of areas that can be used for future water management within a green/blue corridor to enable adaption to climate change. As a result, the City Plan 2030 provides not only an opportunity to implement part of the vision but the means by which to work and engage with key stakeholders as part of the process. The Choices Document for City Plan 2030 indicated that the first choice would concern Green Infrastructure and Climate change.
- 7.3 All the objectives help create sustainable development and adaption to climate change. Any projects that affect business or residents that result from the strategy will have consultation built into their project programme.

## **8. Background reading/external references**

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- 8.1 [Edinburgh Adapts Climate Change Adaptation Action Plan and Progress reports](#)
- 8.2 [Edinburgh Climate Change Commission](#)

- 8.3 [SUDsnet – understanding Sustainable urban drainage](#)
- 8.4 [Climate change](#)
- 8.5 [Climate Change Summary for Scotland](#)
- 8.6 [Local Flood Risk Management Plan](#)
- 8.7 [Reducing emissions in Scotland - 2020 Progress Report to Parliament](#)

## **9. Appendices**

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- 9.1 Appendix 1: Vision for Water Management in the City of Edinburgh Council.

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# Vision for Water Management in the City of Edinburgh

Draft: August 2020



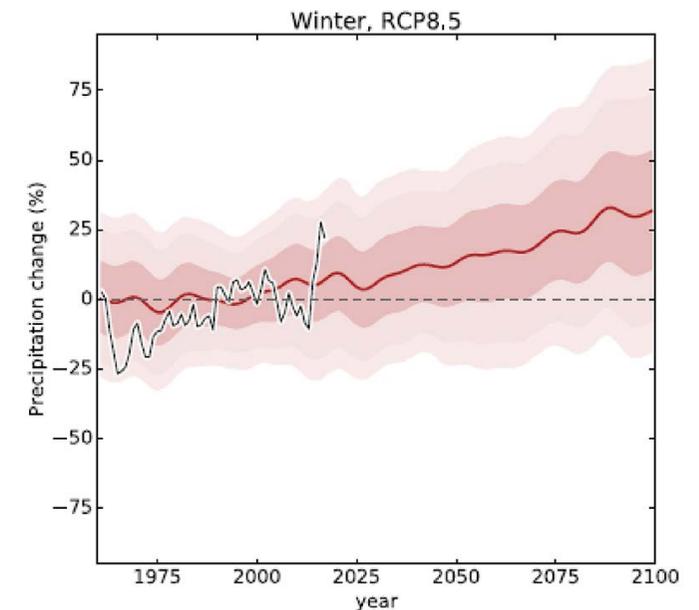
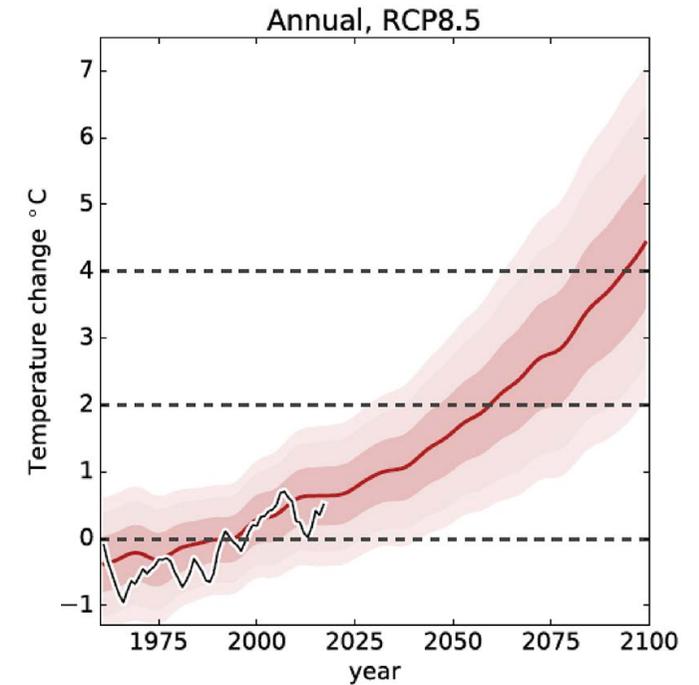
## The climate is changing

Climate trends predict that we will experience warmer and wetter winters. Summers are expected to become hotter and drier, and occurrences of extreme rainfall events are expected to increase. Sea levels around our coast are predicted to rise, with an increase in storm surges during bad weather. Despite the overall trend there will still be cold, dry winters, and cool, dry summers, as there is variability in the summers and winters we see today.

The SEPA National Flood Risk Assessment 2018 estimates that in Edinburgh, there are currently 28,200 homes, business and services at risk of flooding from all sources in the 200-year flood event (rivers, the sea and surface water) and, due to climate change this could increase by 37% to 38,800 by the end of century.

In order to adapt the city and ensure all developments are mitigating and designing for climate change we need a common understanding across all the work within the council developed with input from Scottish Water (SW) and Scottish Environment Protection Agency (SEPA).

*the Committee on climate change has advised the UK to prepare for a 4C rise as shown in the graphs.*



The vision sets out how the City of Edinburgh Council will adapt to the challenges of climate change with respect to the management of water.

## Our vision is;

To develop a long-term and sustainable approach to river, coastal and storm water management across the city and its environs, respecting our unique historic heritage. This will involve all stakeholders and address the flooding and water quality risks associated with our changing climate as a result of changes in rainfall and sea level rise.



**We must think about and value water, keep water above ground and use it creatively to deliver multiple benefits.**

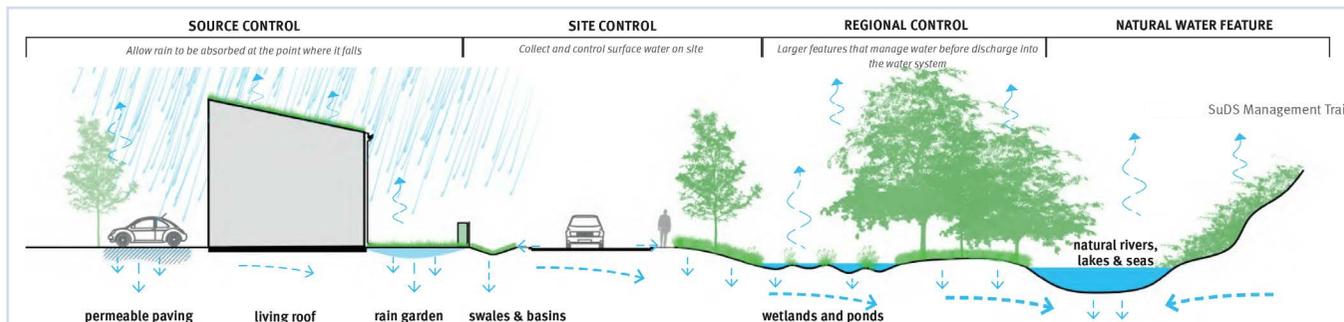
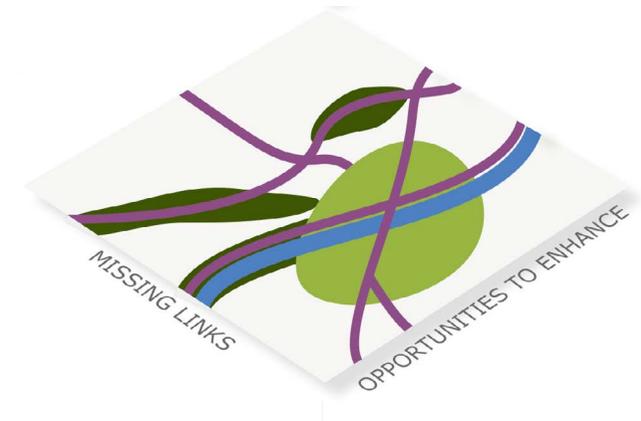


**The objectives can be summarised as follows:**

- Improve the understanding of the current drainage network across the city, and current and future flood risk from all sources (river, coastal and surface water).
- Develop integrated drainage and surface water management plans across the city.
- Interpret the current guidance from SEPA concerning water management, flood risk and erosion as applied to our city.
- Support sustainable growth by taking a precautionary approach to locating different types and densities of development in locations according to risk of the flooding from all sources, utilising the hills and valleys of the city.
- Plan for the conveyance, attenuation and storage of storm water safely above ground for reuse and dispersal.



- Require all new development (and retrofit) to manage the first 5mm of rainfall at a plot level where appropriate and adhere to the SuDS Management train so run-off is managed in stages as it drains through and from a site.
- Ensure a citywide approach to water management utilising an interconnected green/ blue network which will be developed and embedded into the Local Development Plan.
- Work with all stakeholders to remove and reduce stormwater in the existing combined sewer network
- Do all the above whilst enhancing ecology, connectivity and social cohesion, creating beautiful and healthy places and respecting the unique heritage of the city.



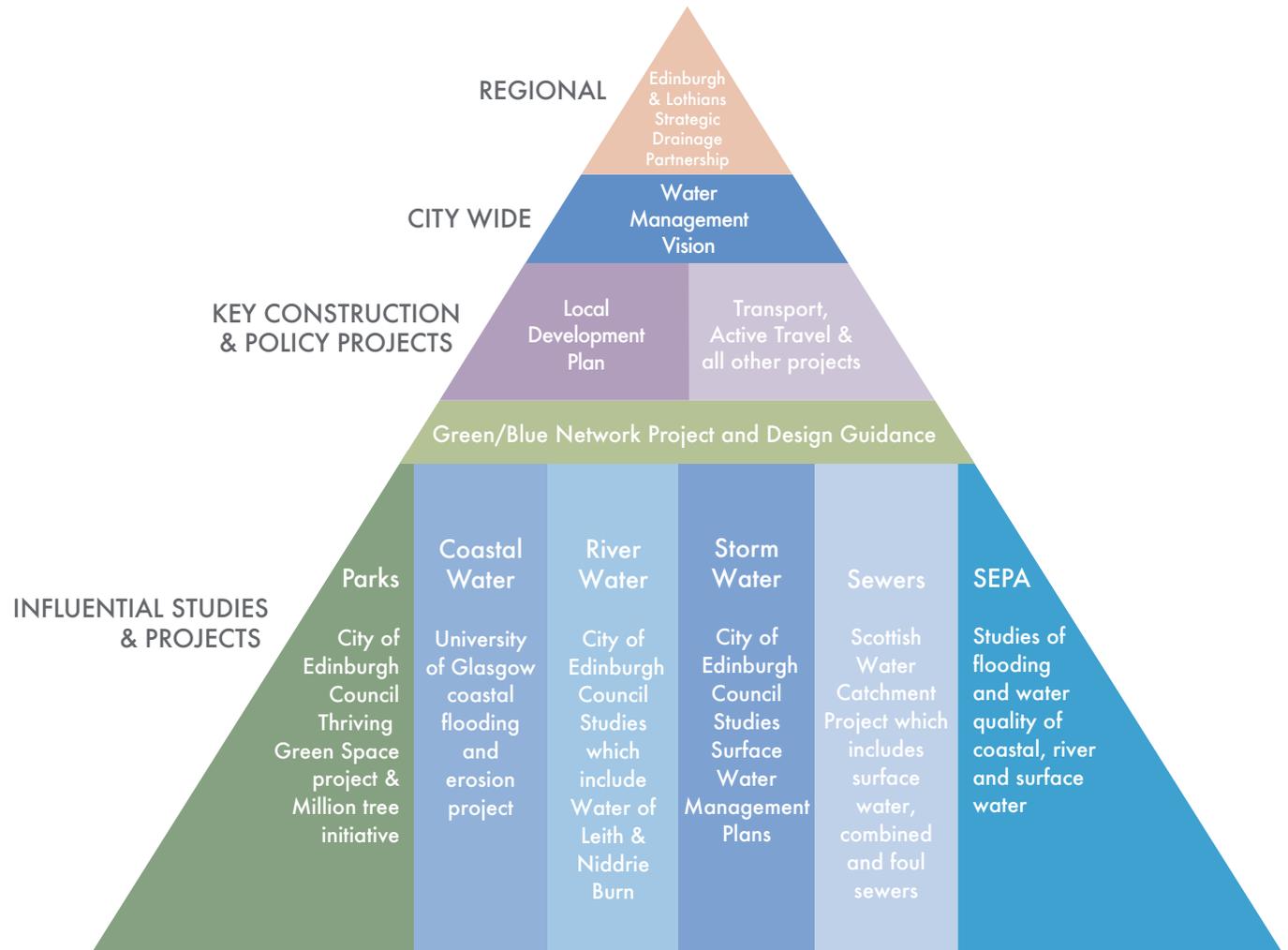
Source: Edinburgh Sustainable Rainwater Management Guidance CEC

The strategic approach will be facilitated by the Edinburgh and Lothians Strategic Drainage partnership.

The key themes and members of the partnership are:



The objectives will influence new projects and developments in the council.



This new way of working will enable the development of a city that is adaptive and resilient to climate change, that is also beautiful and biodiverse delivering a healthier, thriving and compact city with a higher quality of life for all residents.

The idea is to deliver transformational change in the way that water is valued and managed in the city.

This will require a change in the way development (new developments, re-developments, and public realm, infrastructure and roads projects), are designed, agreed, constructed and maintained. It will also require a change to the way open space is currently used.



Source: Dusty Gedge:  
Solar Green Roof, Standard Chartered, London

## Delivery and Implementation

This will challenge the council and its partners to seek new ways of funding capital and revenue work to consider climate adaptation. It will promote the use of new green infrastructure budgets to expand the green blue network and ensure adequate funds for long term maintenance. The potential for a dedicated fundraiser position jointly delivered by Scottish Water and the Council will be pursued.

## Partnership Projects

There will be opportunities to develop capital funding for some schemes using partnership money from Scottish Water and funding partners like Sustrans. In all capital work where the council or developers have funding partners, the council would strive to include long term maintenance in the funding arrangements for areas that council would adopt.

If water has been permanently removed from a Scottish Water Surface Sewer as part of a project, then potentially an on-going arrangement with Scottish Water for the adopted areas using a Section 7 agreement would be used.

## New Development

Further detailed work will be undertaken to identify the most appropriate approach to obtaining developer contributions for green infrastructure

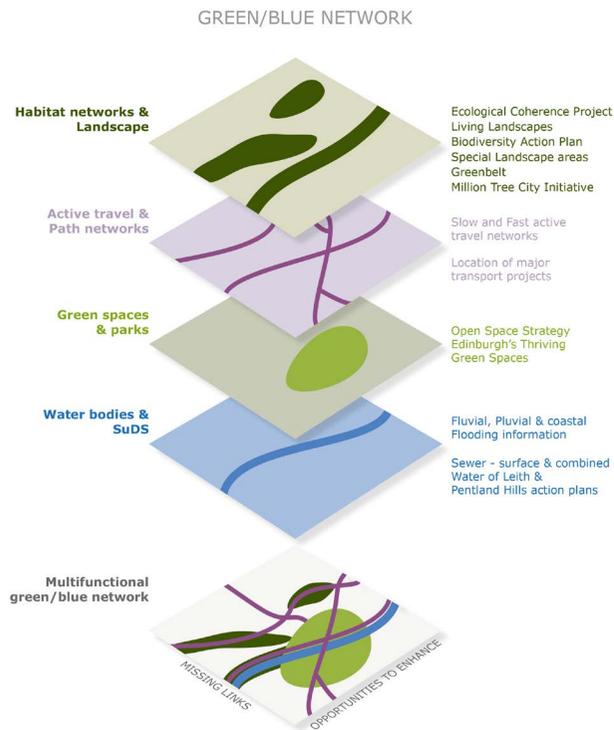
arising from new developments. This is likely to link to a new policy concerning overland flows and intensity of rainfall in the Local Development Plan to relevant water shed areas.

When the council is the acting as Roads Authority and implementing capital transport projects, water management will be implemented where possible depending on the scope and scale of the project.

With regards to roads, it might be more appropriate to use them as conduits for water to lead to safe, open green areas as opposed to attenuation within a project boundary, particularly in older parts of the city.

An education programme will be set up, looking at educating the residents and businesses of Edinburgh about water and climate change and expectations of how the city will look in the future. For example, it will be necessary to manage expectations of how the city's existing infrastructure can cope with rainfall with a return period much greater than what the roads, drainage and sewers were ever designed for. Even infrastructure designed to modern design standards cannot cope with the intensity of storms which are being experienced more and more often. Therefore, plans will be put in place to take that water safely away into greenspace, both private and public, where it will subside after the storm. It will also be explained that policy is not to take the water underground as this may cause sewer flooding elsewhere in the city.

Example of new projects that are taking forward the ideas of the vision.



In short: We need to understand what is happening now with water in the city and prepare for a future which has beautiful places, is rich in biodiversity, that is adaptable to our changing climate.



Biodiverse roof, 202 Bishopsgate London. Source: Dusty Gedge



Example of a SUDS pond. Source: ReaburnFarquharBowen.



**Glossary :**

- Attenuation** - Reduction of peak flow and increased duration of a flow event.
- Combined Sewers** - A sewer designed to carry foul sewage and surface runoff in the same pipe.
- Conveyance** - Movement of water from one location to another.

## Understanding risk

The chance of a flood event can be described using a variety of terms. Floods are often defined according to their likelihood of occurring in any given year. The most commonly used definition in planning is the ‘1 in 200 year flood’. This refers to a flood level or peak that has a one in a hundred, or 0.5%, chance of being equalled or exceeded in any year.

Other terms that express the same idea, such as 0.5% **annual exceedance probability** (or 0.5% AEP), are preferred because they avoid the common misconception that a ‘1 in 100 year flood’, for example, can only occur once every 100 years; or that you are ‘safe’ for another 100 years after you experience such an event. In reality, the chance of experiencing different sized flood events in a given period of time can be estimated mathematically (see Table 1). If you lived for 70 years in a location that had a 1% chance of flooding in any one year (that is, it would only flood if a ‘1 in 100 year flood’ occurred), then there would actually be a 50% chance, or one in two odds, of you experiencing at least one flood during that 70 year period.

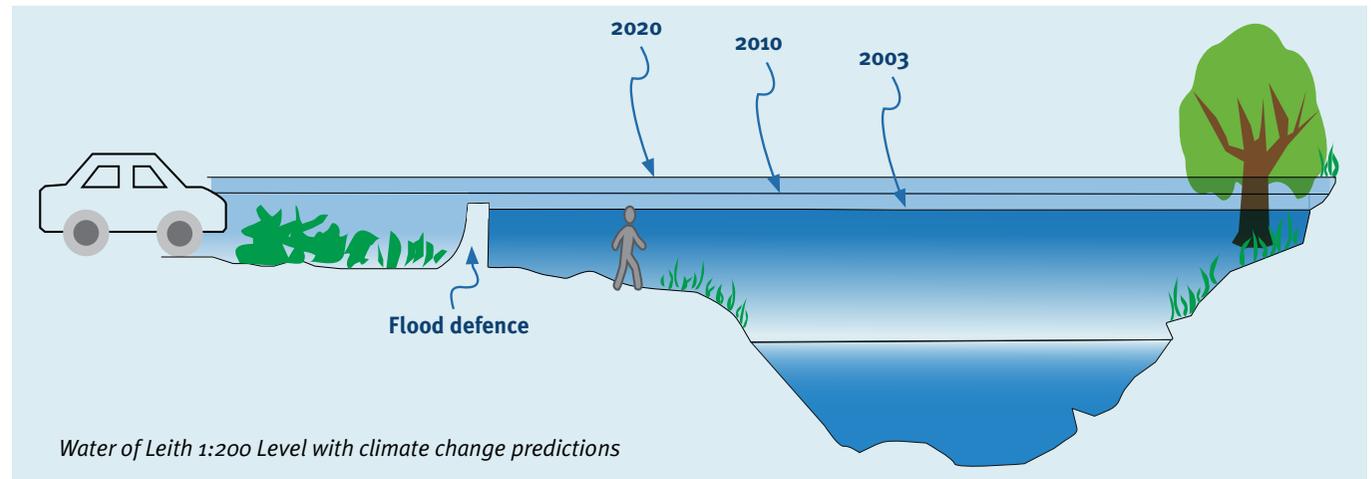
Chance of a flood of a particular size being exceeded in any one year	Chance of experiencing a flood in a 70 year period	
	at least once	at least twice
10% (1 in 10 odds)	99.9%	99.3%
5% (1 in 20 odds)	97.0%	86.4%
2% (1 in 50 odds)	75.3%	40.8%
1% (1 in 100 odds)	50.3%	15.6%
0.5% (1 in 200 odds)	29.5%	4.9%

With climate change we expect these probabilities to rise and flooding currently with a predicted risk of 1:200 to become more frequent.

Recent storms in Edinburgh have been above the 1:200 level.

## Fluvial (Rivers)

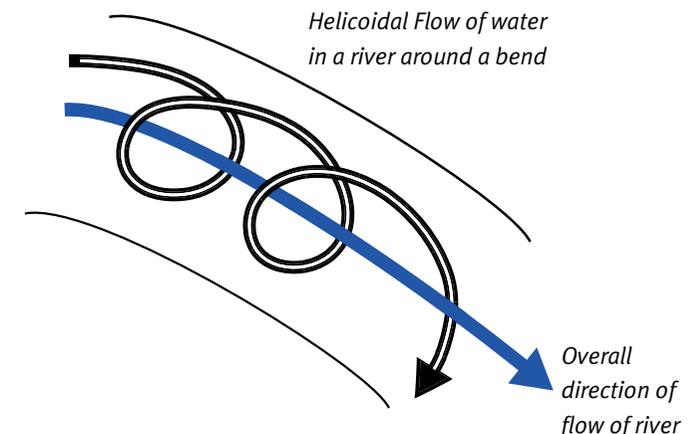
It must also be remembered that our understanding of future flood risk improves all the time. For example, in Fluvial Risk (Rivers) we can look at an example like the Water of Leith flood alleviation scheme. In 2002 there was no requirement to take climate change into account. So the risk of a 1 in 200 flood event level was used to protect existing property. However, the Flood Alleviation Scheme took into account climate change and added a 12% allowance onto the 1 in 200-year level as we realised that the climate was changing (effectively the level of the predicted 1:200 flood was raised). It was believed at that time that a 12% allowance would be sufficient for many years to come. However, based on the latest climate science the recommended allowance first increased to 20% and SEPA's most recent guidance is now to allow for a 40%. SEPA is in the process of updating its climate change guidance to take account of the most recent information from the UKCP18 climate projections. What that means in reality is that the level once thought of providing protection to a 1 in 200 flood event over a development lifespan is no longer thought likely to do so, as in the future flood waters are expected to rise more frequently to the higher level. This trend is likely to continue, *but the extent is unknown*.



We also have to base our understanding on the best information available at any given time and engineers and flood modelling experts use their technical expertise and judgement in interpreting what that means for flood risk. For example:

1. Large floods happen very rarely in any particular location, so scientists have to estimate their predictions assuming the rates are similar, of what could happen based on records of smaller events, or by combining records of similar catchments. More certainty in the outputs of models is achieved through real events and calibration of data. Estimates of the 200-year flood can therefore change as records of water levels increase in length or following large events;
2. Computer models are used to predict the area at risk of flooding. The accuracy of these models is limited by available data such as river bed, drainage network or beach survey data.

3. The movement of water is incredibly complex so simplifications have to be made and modellers have to use their judgement to decide which of the factors which influence flooding are important to include in these models and how they should be included. As large flood events are rare, there is often little information to test how well models perform.

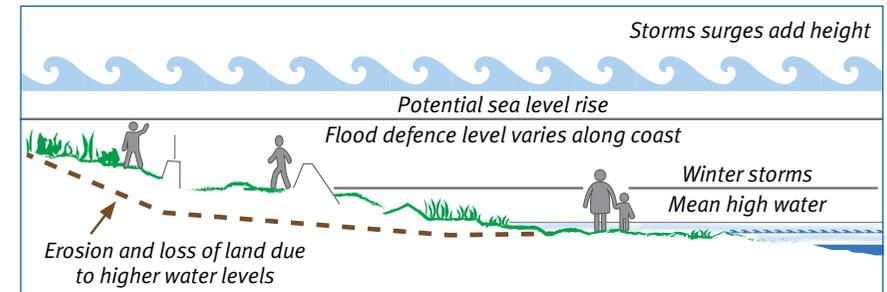


Edinburgh rivers have rural headwaters but then flow into an urban area with lots of impermeable surfaces and a complicated drainage network which modifies the natural catchments. Without adaptation, increasing impermeable surfaces has potential to increase flood flows in our watercourses on top of that caused by climate change. Our understanding of how climate change may affect intense short duration rainfall which is often responsible for flooding in steep or heavily urbanised catchments is not as well developed as our understanding of how climate change may affect longer duration rainfall events which cause flooding of larger rivers. Edinburgh is heavily urbanised, so although the climate allowances and flood maps are based on the best information available, they do not provide a single definite level for acceptable future flood risk. We need to decide our own 'risk appetite' i.e the willingness of us as an authority to accept the risk of flooding for current and future residents of our city.

## Coastal - Sea Level

Even if emissions are reduced in line with the Paris agreement, sea levels are still expected to rise beyond the end of the century. Sea level rise is likely to increase the risk of coastal flooding and erosion and reduce the space available for the coastal habitats and wildlife. Sea level rise may also affect river and surface water flooding as higher sea levels can cause tide locking of surface water and river outfalls.

The sea level rise allowances in SEPA's land use planning guidance is set at a level which is very unlikely to be exceeded by 2100 but are as likely as not to be exceeded by 2150 under a 'business as usual' high emissions scenario. However, these models do not include the potential collapse of the west Antarctic Ice Sheet, and there is an unquantifiable risk that sea level rise by 2100 could be double that in SEPA's climate change allowances. The adaptation plan for the Thames Estuary already considers a high end scenario of a 3m increase in extreme sea levels by 2100, and the Dutch are now



investigating the impact that 2m of sea level rise would have on their adaptation plans.

For exposed sections of coast, maximum wave heights are often limited by water depth. This means that as sea levels rise wave heights at the coast are likely to get bigger, leading to more flooding, erosion and damage to coastal defences than would be expected by sea level rise alone. Other factors which may increase the risks at coast include changes in storminess. This is generally thought to be negligible compared to Sea Level Rise but it is not known. There could be changes in the way in which tides change around the coast and within firths and estuaries. We don't know whether it will be an issue in the Forth as there is insufficient detailed data to be sure.

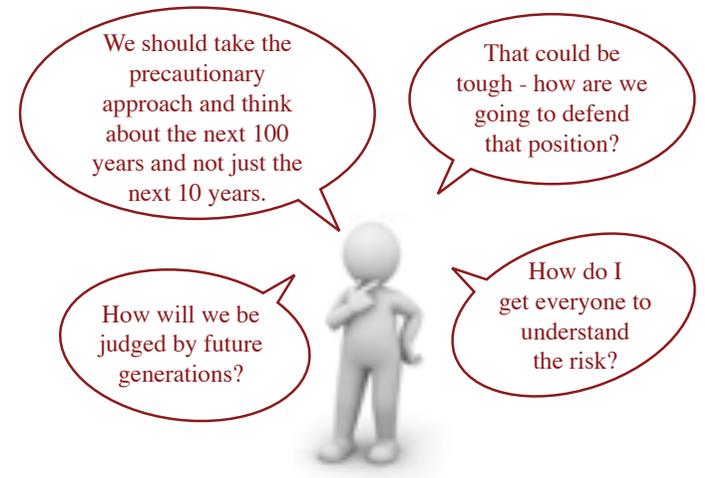


SEPA's flood maps show the risk from extreme still water levels which include storm surges and astronomical tides but not waves. These generally underestimate flood risk as wave overtopping is not included, but they could also overestimate in some areas.

### Pluvial (Surface Water)

The intensity of rainfall will increase due to climate change. For the most part the city is drained through an underground network of gulleys, road drains, sewers and culverted watercourses. These piped systems have a fixed capacity, which can be overwhelmed in periods of very intense rainfall. The volume of rainfall is not able to enter the gulleys and to be drained underground quick enough and can lead to localised pluvial flooding in natural low spots, taking with it pollutants and debris. Current design practice for new development does look at overland flow paths, and managing rainwater above ground in a more sustainable approach. However, we have already seen older areas of the city, which rely on gulleys and underground pipes, being overwhelmed and it is widely acknowledge that, in the future, this will happen more regularly, exacerbated by Climate Change, and the growth of impermeable areas in the urban environment (paving over green space/ gardens).

Therefore, it is sensible to take a **precautionary approach** to all aspects of planning, retrofitting and maintenance concerning water from all sources. Further work will help understand these risks and the action needed to reduce and mitigate them. This will need a sustainable approach to managing rain water across the city involving all flooding, drainage and planning agencies, landowner, developers and communities across the city. New developments are required to consider flood risk from surface water, but there is much more that could be done to make this more sustainable.

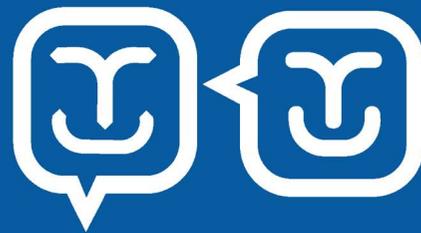


We should take the precautionary approach and think about the next 100 years and not just the next 10 years.

That could be tough - how are we going to defend that position?

How will we be judged by future generations?

How do I get everyone to understand the risk?



**HAPPY TO TRANSLATE**

**[www.edinburgh.gov.uk/its](http://www.edinburgh.gov.uk/its)**

**0131 242 8181**

**Reference 20-6526**