Addressing Resilience and the Climate Emergency in Belfast

Richard McLernon, Climate Programme Manager City

Belfast

Merchant town

Shipping history

Built around the rivers

Land reclaimed from Belfast Lough

Rivers culverted and managed

City is low-lying

The need for resilience in Belfast

2020
COVID-19
The global pandemic struck the people of Belfast in the Spring of 2020. As of 14 November 2020, 223 people had lost their lives due to COVID-19.

2018
Fire at Bank Buildings
On 28 August a fire destroyed Bank Buildings, a listed building in the heart of Belfast city centre and its retail district. 14 businesses within the cordon were unable to reopen for over four months. Pedestrian and vehicle access across the city centre was affected causing a significant drop in footfall in the area.

2017/18
Major storms
Ex-Hurricane Ophelia in 2017, Storms Ali and Calum in 2018

There were a range of storms bringing high winds in 2017 and 2018 and causing electricity outages and damage to infrastructure. Schools, businesses and public services were affected.

2012/13
Flag protests and civil unrest
Following a vote to change the number of days the Union Flag is flown at Belfast City Hall, there followed a period of almost daily protests. There were resulting impacts for the performance of the local economy.

2014
Coastal flooding
The threat of tidal inundation to Belfast city centre and over 4000 homes across the city led to the deployment of 45,000 sandbags and the pre-planned closure of basements and businesses in the Harbour area. Millions of pounds of damage was caused to infrastructure around the coastline of NI.

2012
Flooding
Flooding occurs on an annual basis affecting properties and infrastructure. There was significant flooding in 2012, 2009, 2008 and 2005 with thousands of homes being internally flooded.

2010/11
The big freeze
Five weeks of extremely low temperatures led to widespread impacts on infrastructure including homes, schools and businesses. Frozen pipes cracked during the thaw causing so many leaks that mains water supplies were significantly depleted. 40,000 premises lost water supplies and over 60,000 premises became subject to rotational supplies.

SHOCKS AND STRESSES

FUTURE PROOFED CITY
BELFAST
RESILIENCE
STRATEGY

SHOCKS


Infrastructure capacity


Public health


Cyber resilience


Condition of existing housing stock


Flooding and extreme weather events


UK Exit

STRESSES


Economic recovery capacity

Climate change


Mental ill-health


Poverty and inequality


Housing supply in the city

Use of prescription drugs


Population change


Segregation and division


Governance and financing of risk


Carbon intensive systems

FUTURE PROOFED CITY

Our governance structure

Belfast Agenda

A sustainable city shared and loved by all its citizens

Resilience Strategy

After public consultation and assesment, our ambittions goal is for: **Belfast to transition to an inclusive, net zero-emissions, climate resilient economy in a generation**

Delivered by

Resilience and Sustainability Board

Advised by

PCAN | BELFAST CLIMATE COMMISSION

Produce

City wide climate adaptation and mitigation plan

Belfast

City wide

Our own climate adaptation and mitigation plan by 2021

Supported by

All-party climate working group

Supported by

Climate Plan Programme Board (BCC Officers)

Approval process

SP&R

Council

Belfast City Council

RESILIENT BELFAST: 2020

FUTURE PROOFED CITY
BELFAST
RESILIENCE
STRATEGY

We have identified three 'multiple problem solvers' - where we tackle several shocks or stresses at once.

A strategic focus on each of these areas will build the city's resilience, over time. They are:

CLIMATE ADAPTATION AND MITIGATION

PARTICIPATION OF CHILDREN AND YOUNG PEOPLE

CONNECTED, NET ZERO-EMISSIONS ECONOMY

FUTURE PROOFED CITY
BELFAST
RESILIENCE
STRATEGY

CLIMATE ADAPTATION AND MITIGATION

1. New city-wide structures to collaborate on climate action
2. Delivery of Recommendations in Belfast's Mini Stern: A Net Zero Carbon Roadmap for Belfast
3. Climate change risk assessment
4. Belfast City Council Climate Adaptation and Mitigation Plan
5. Belfast Harbour - Green Port
6. Queen's University Environmental Solutions Centre
7. Sustainable District
8. Belfast Region City Deal
9. One Million Trees
10. Local Development Plan: a Critical Lever for Resilience
11. Sustainability and Food

Climate - City

- Starting point for climate at city level – Belfast Resilience Strategy, Belfast Net Zero Carbon Roadmap, Belfast Climate Risk Assessment, Belfast Heat Pack and Vulnerability Index
- City Structures – Belfast Resilience and Sustainability Board, Belfast Climate Commission
- City targets – 66% reduction on scope 1 and 2 emissions by 2025, 80% by 2030, 100% by 2050, 1 million trees by 2035, CDP – A rating

Observed climate change to date in NI and Belfast

Sea level Rise

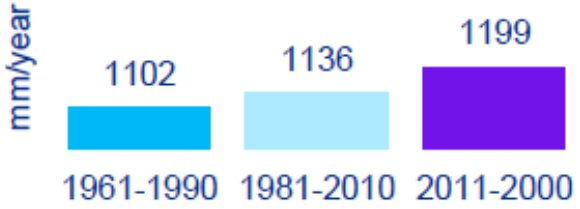
Sea levels around the UK have risen by 16.5 cm since 1901

31.3°C

Highest temperature on record recorded on July 21st 2021 at Castlederg, Tyrone

Rainfall

Average annual rainfall has increased by 7% for the most recent decade when compared with the 1961-1990 baseline.



58mm (2.3 inches) of rain fell in 90 minutes in Central Belfast on July 28th 2000

0.8°C

Average temperatures increase for the most recent decade when compared to a 1961-1990 baseline.

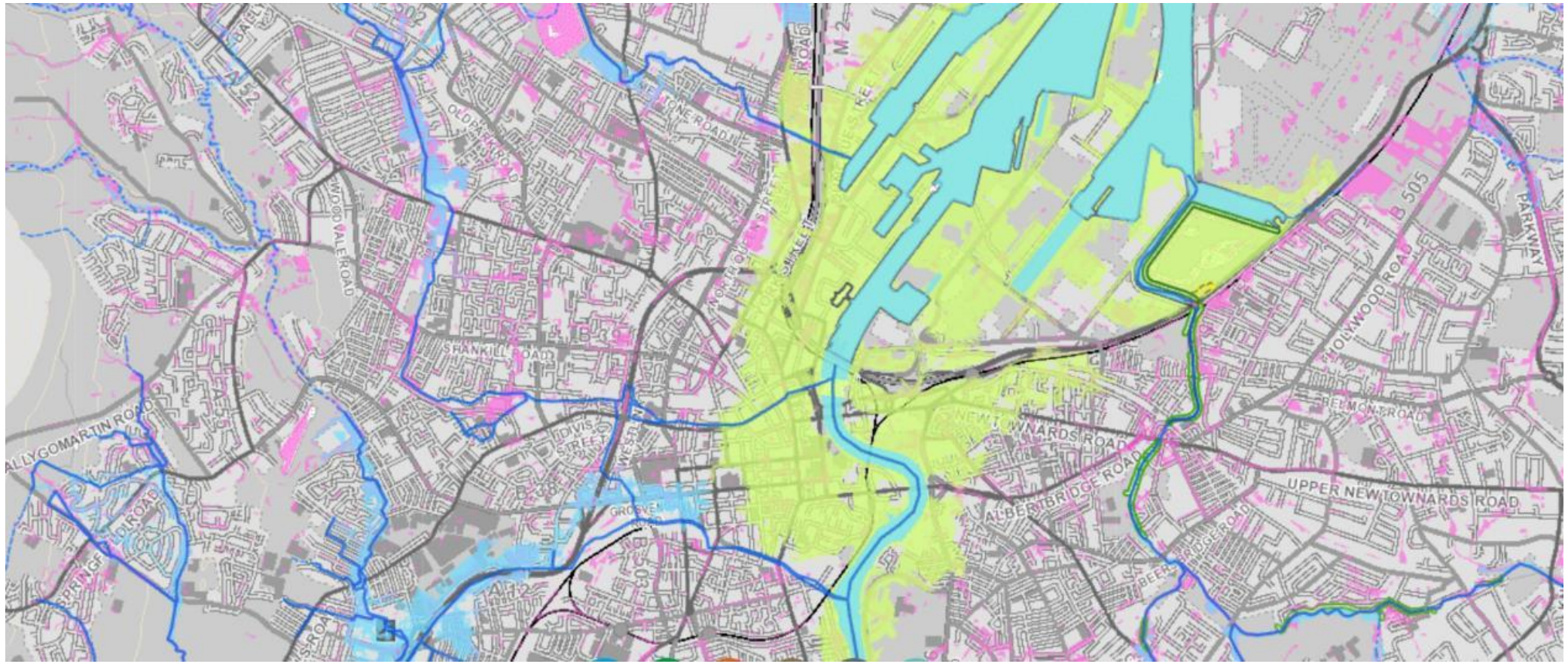
For Belfast harbour, the 5 highest tidal surges have been recorded since 1994.

Large proportions of Belfast City Centre are between 1 and 2m below extreme tide level.

6,000 properties currently considered at significant coastal flood risk.

Coastal Flooding / Sea Level Rise

Up to 94cm sea level rise in Belfast by 2100 if we don’t adapt



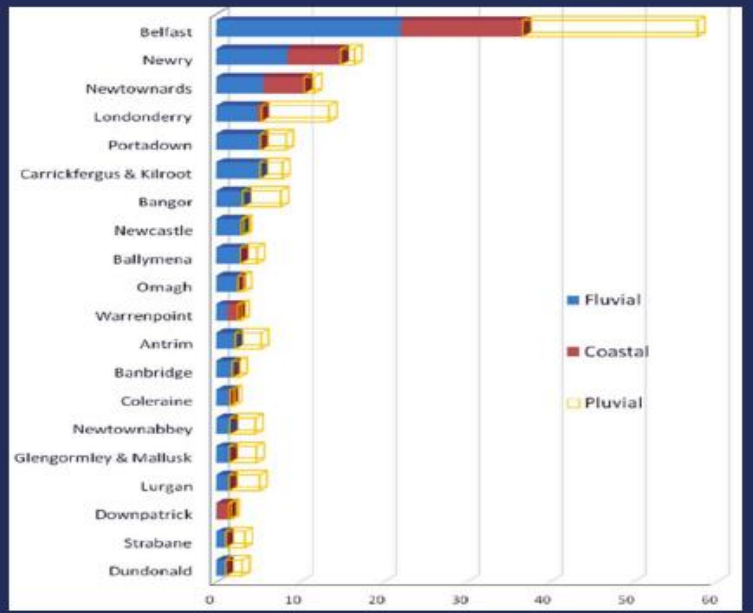
DfI Flood Maps, climate change scenario

Flood History

Strategic Context

- 20 Significant Flood Risk Areas in Northern Ireland
- Belfast at greatest risk

- Coastal Flooding (Storm Surge)
- Fluvial Flooding (Rivers)
- Pluvial Flooding (Flash floods & Surface Water)



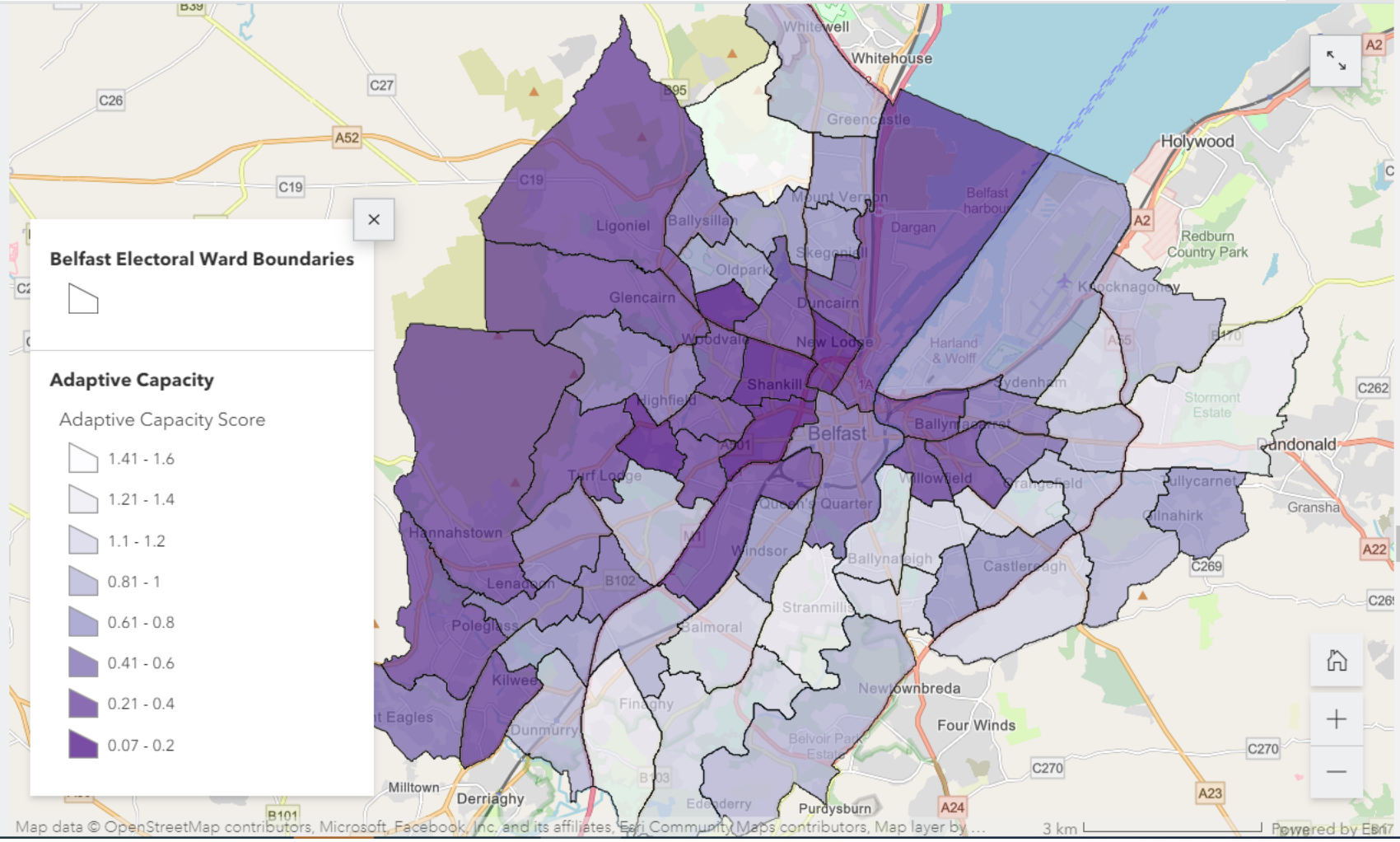
The Belfast Heat Map

Adaptive Capacity

The indicators used for adaptive capacity in Belfast's HVI are:

Level of deprivation: High levels of deprivation may prevent people being able to adapt to high temperatures such as having the means to purchase cooling equipment or travel to cooler spaces. If a ward has a low deprivation index value (between 0-1) then the level of deprivation is high in that ward.

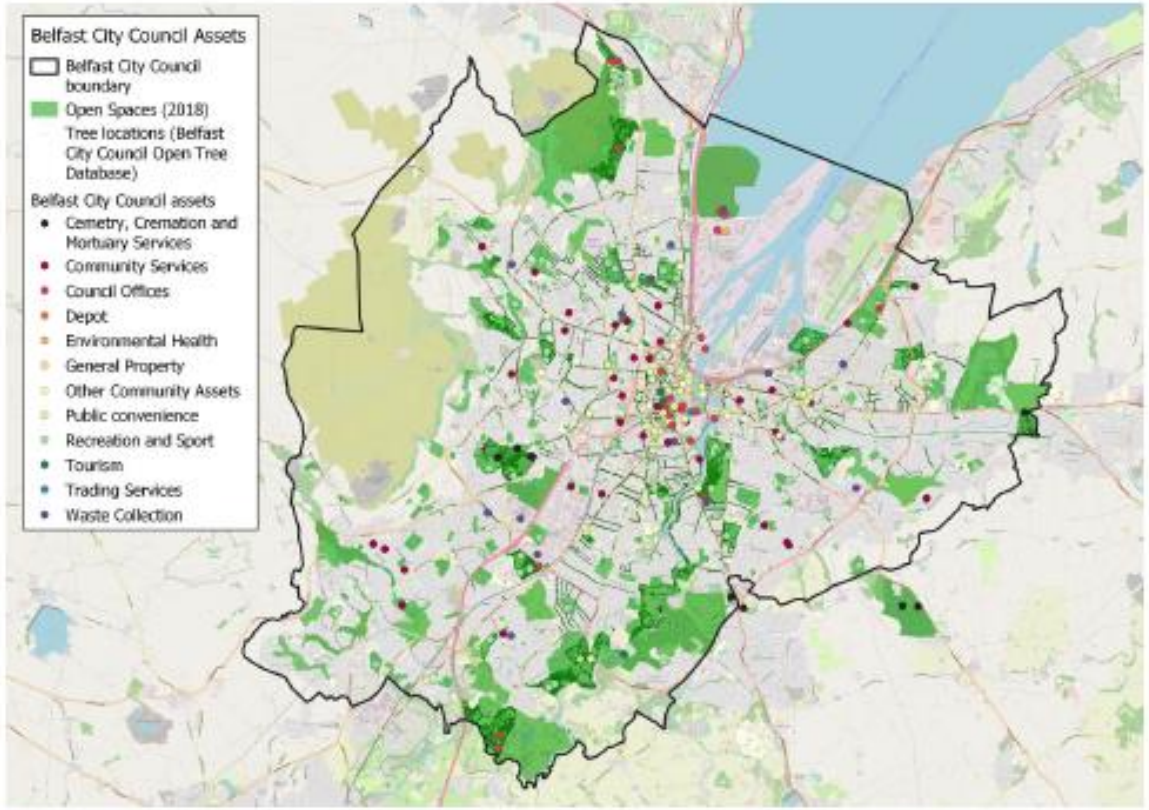
Proportion of publicly accessible green space: Green space acts to cool its surroundings and can offer residents an area of respite to high indoor temperatures. This indicator is given as a value between 0-1, equvalent to the percentage i.e. 0.02 = 2% of ward area is green space.



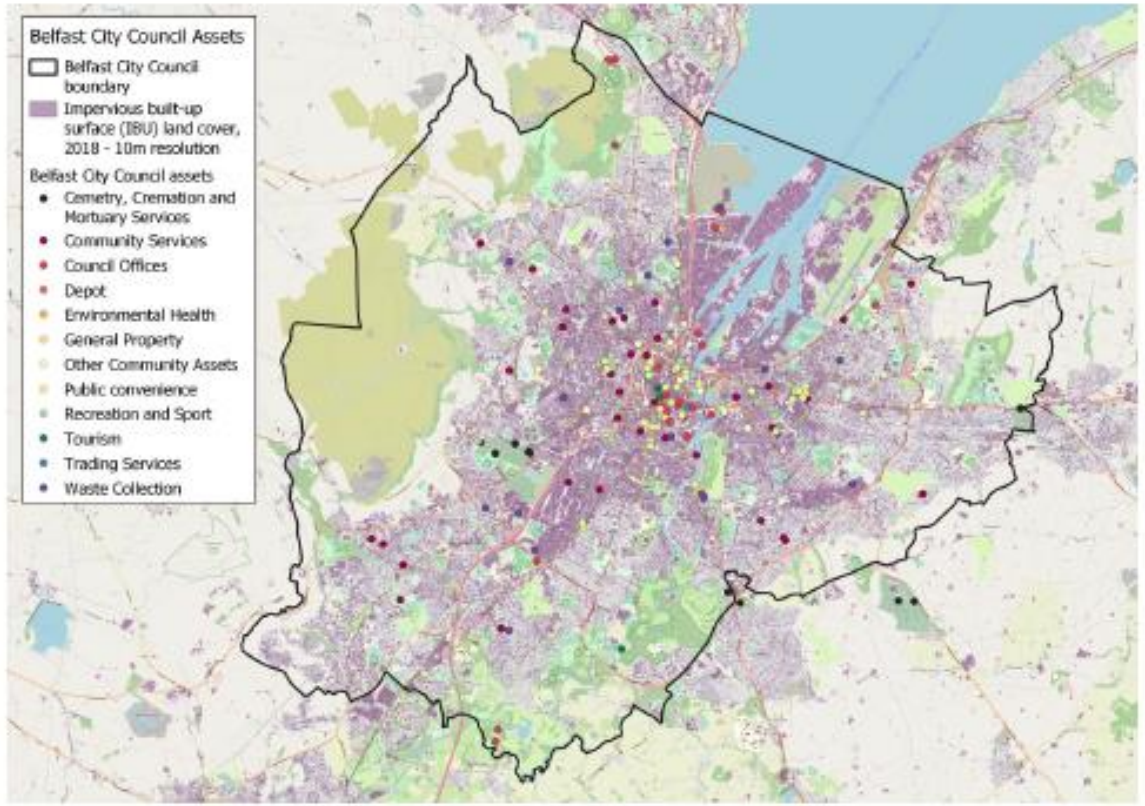
https://storymaps.arcgis.com/stories/d7e3520fbf0e4b23ae06eb665288d2ca

Lack of green space increases the risk

We have employed environmental data to assess factors that can enhance exposure to climate risk.

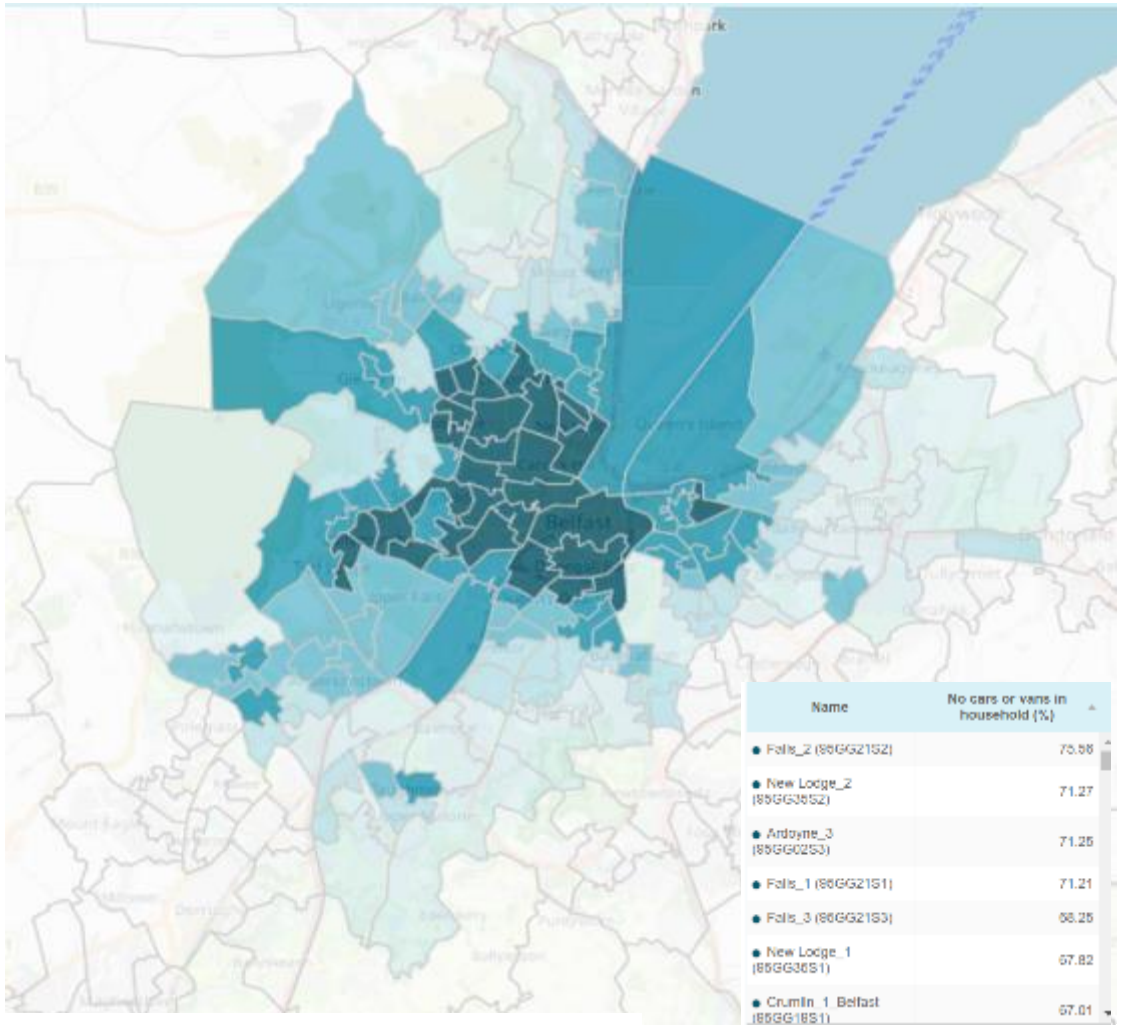


Trees and open space serve to decrease exposure to extreme heat and provide for areas of reprieve (Source: BCC Open and Linked Data)

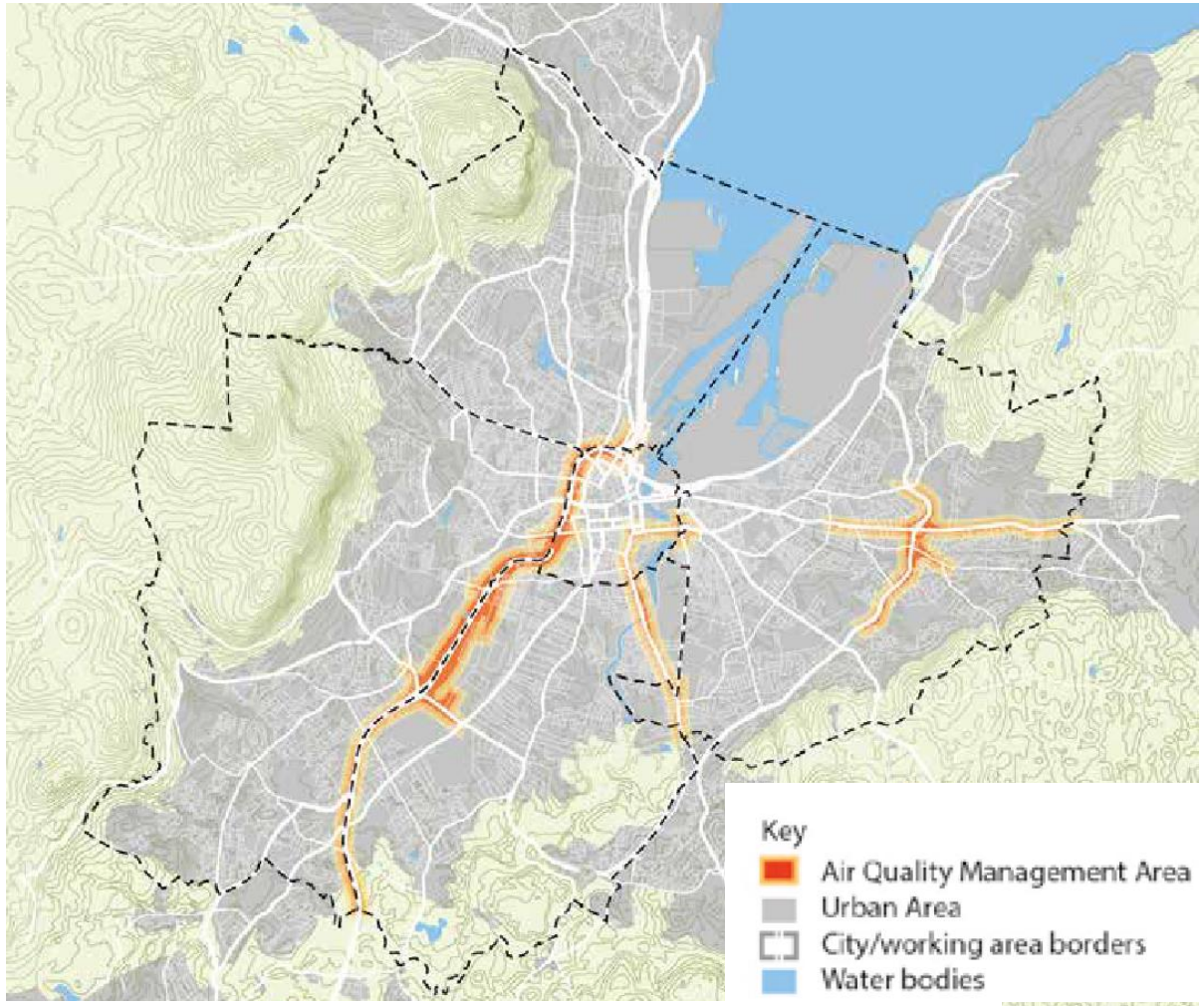


Impervious surfaces serve to exacerbate flood risk by increasing overland flows and causing pooling (Source: Copernicus Land Monitoring Service)

Congestion and too much space being given over to cars is contributing to the problem



No car or van available in household, Census 2011



Air pollution in Belfast

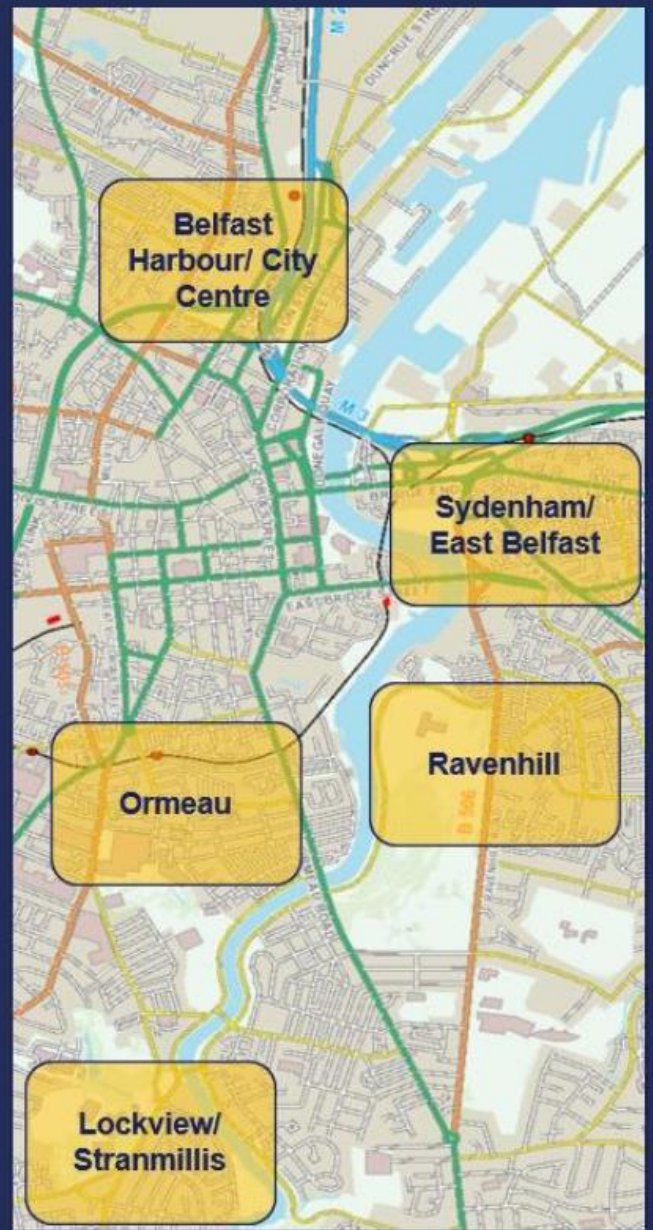
Deprived communities and those who are the most vulnerable in society will be hit the hardest by climate-related hazards such as flooding and extreme heat.

(Denton, 2002; Zsamboky et al., 2011; Kuffer et al., 2021)

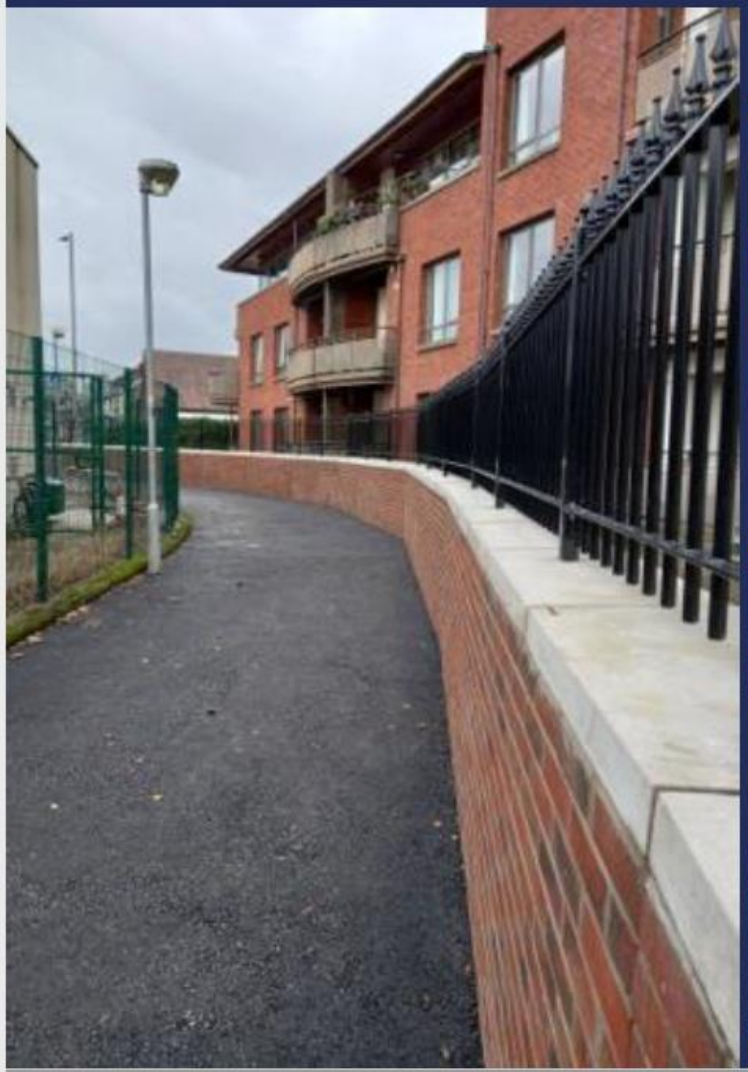
So what can we do about it?

Scheme Details

- Properties Protected - 1500
- Length - 8.5km
- Adaptable to future predicted levels
- Contract cost - £22m
- PV Direct Damage avoided £168m
- Benefit Cost Ratio - 8.1:1



Defence Types



CLIMATE ADAPTATION AND MITIGATION

Belfast One Million Trees

One Million Trees is an ambition across Belfast to plant one million trees by 2035 to support climate adaptation and mitigation across the city.

Delivery Team:

Belfast Hills Partnership

WOODLAND TRUST

National Trust

TCV The Conservation Volunteers

Belfast City Council

The many benefits of trees

Carbon sequestration and storage

Water storage and flood alleviation

Filtration of harmful air pollutants from the air

Provide habitats for wildlife

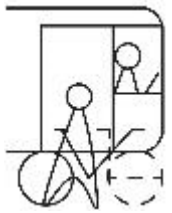
Urban cooling and shading

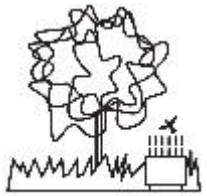
Improve physical and mental health

Contribution to wellbeing by encouraging social interaction and cohesion

Estimated value of £16bn benefits to ecosystem services (Treeconomics, 2022)

UPSURGE – Testing Nature Based Solutions for climate action





Belfast City Council

QUEEN'S UNIVERSITY BELFAST


RIDGEWAY STREET
STRANMILLIS EMBANKMENT
NDHURST DRIVE

FUTURE PROOFED CITY
BELFAST
RESILIENCE
STRATEGY

CONNECTED, NET ZERO-EMISSIONS ECONOMY

20. Sustainable drainage

21. A Zero Emissions city bus fleet by 2030

22. Delivering Belfast's Net Zero Carbon Roadmap: Buildings

23. A Bolder Vision for Belfast

24. Electric vehicle infrastructure

25. Investment in existing NIHE stock

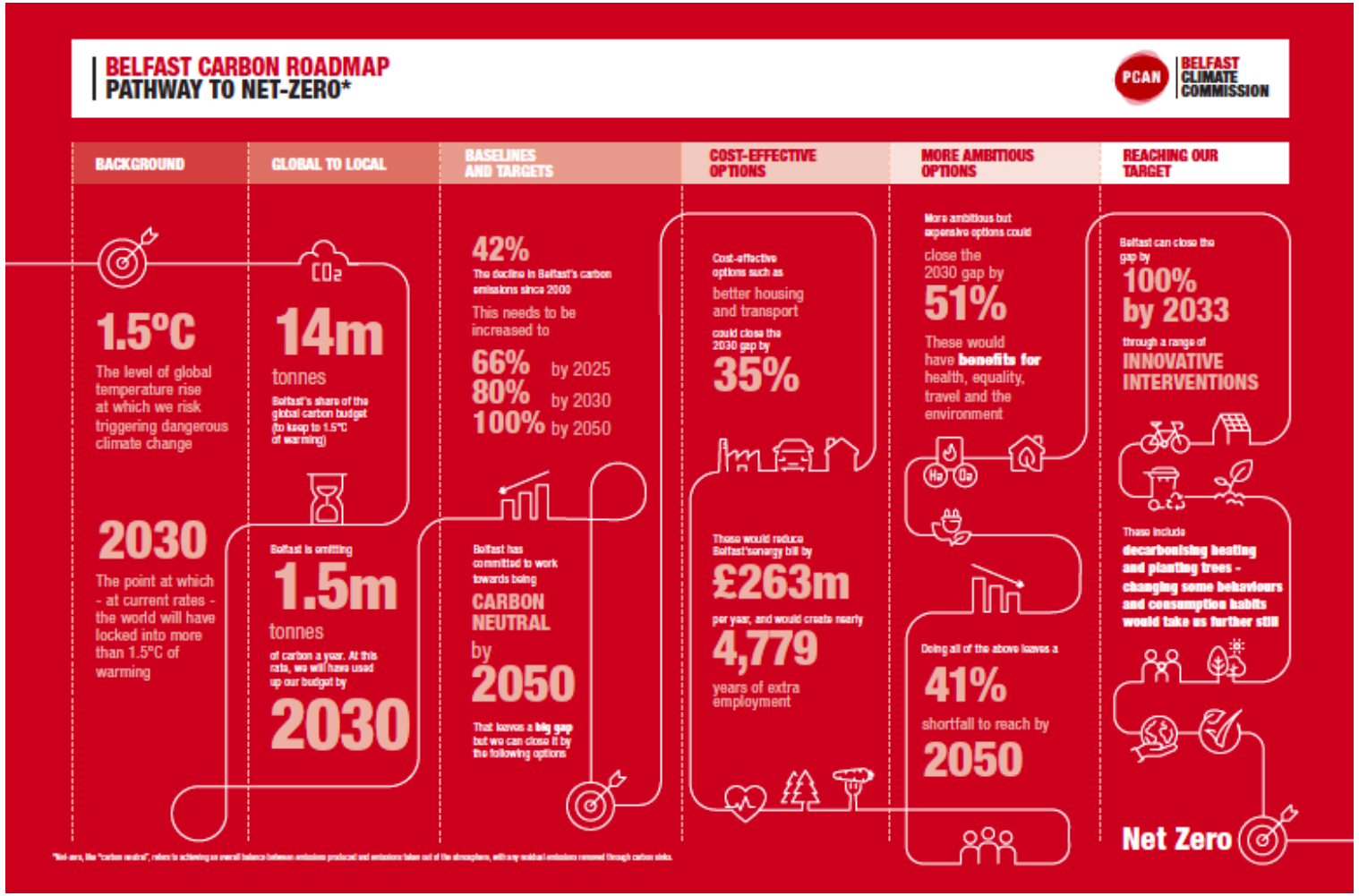
26. Developing a Hydrogen Eco System

28. Training and skills for an inclusive low-carbon economy

29. Innovation and Inclusive Growth Commission

30. Fuel Poverty

CONNECTED, NET ZERO-EMISSIONS ECONOMY



PCAN BELFAST CLIMATE COMMISSION

PCAN PLACE-BASED CLIMATE ACTION NETWORK

PCAN PLACE-BASED CLIMATE ACTION NETWORK

PCAN BELFAST CLIMATE COMMISSION

Belfast's Top 10 Carbon Reduction Options

Rank	Measure	Emissions Reduction Potential (ktCO2e)
1	Insulating Domestic Buildings	1,162
2	Petrol Car to Bicycle Journeys	1,014
3	Upgraded Heating controls in Domestic Buildings	998
4	Petrol Car to Walk Journeys	982
5	Electrical upgrades in Domestic Buildings	811
6	Installing heat pumps in Domestic Buildings	808
7	Petrol Car to EV Journeys	725
8	Petrol Car to Electric Bus Journeys	700
9	Diesel Car to Walk Journeys	675
10	Fabric improvements in Public Buildings	663

Climate - City

- Existing initiatives: Belfast One Million Trees, UPSURGE , UP2030, CoCliCo, Electric Vehicle Infrastructure, Belfast Retrofit Hub, 3CI – Climate Finance, 4C4C – cities for net zero partnership, Shared Island Development Fund – Dublin/Belfast Circular Economy, Cork/Belfast Harbour and Solar PV
- Forthcoming: EV Strategy, Belfast Local Area Energy Plan, Belfast Climate Plan, Belfast Sustainable Food Partnership, District Heating feasibility, Green Hydrogen and Geothermal potential, Solar PV analysis
- Opportunities – Climate Legislation implementation, Energy Strategy implementation, A Bolder Vision

Belfast One Million Trees

One Million Trees is an ambition across Belfast to plant one million trees by 2035 to support climate adaptation and mitigation across the city.

2020-2022

21 partners (and growing!)

63,500 trees planted

Draft Tree Strategy

Valuing Belfast's trees study

Over 10 schools engaged

Established native tree supply

Yoursay online platform

Give a tree a home events

Ancient woodland restoration

Farm plans

Business engagement

Annual city tree count

Delivery Team:

Belfast Hills Partnership

WOODLAND TRUST

National Trust

TCV The Conservation Volunteers

Belfast City Council

UPSURGE

UPSURGE in an EU Horizon 2020 funded research project with 26 partners including Belfast City Council and QUB.

It aims to catalyse nature-based solutions (NBS) in urban environments to support pollution alleviation and regenerative development.

Watch our video (Click play below)

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 101003818

Belfast's role in UPSURGE

Belfast is a demonstrator city that will implement and test out NBSs on a site at Lower Botanic Gardens up to 2025.

Lower Botanic will be the main site with 5 satellite sites across the city sharing knowledge and learning about NBS.

What we will be measuring:

- Social-economic diversity
- Gender
- Contaminated/degraded/eroded soils
- Urban heat island effect
- Ecosystem connectivity
- Mobility
- Air quality
- Health

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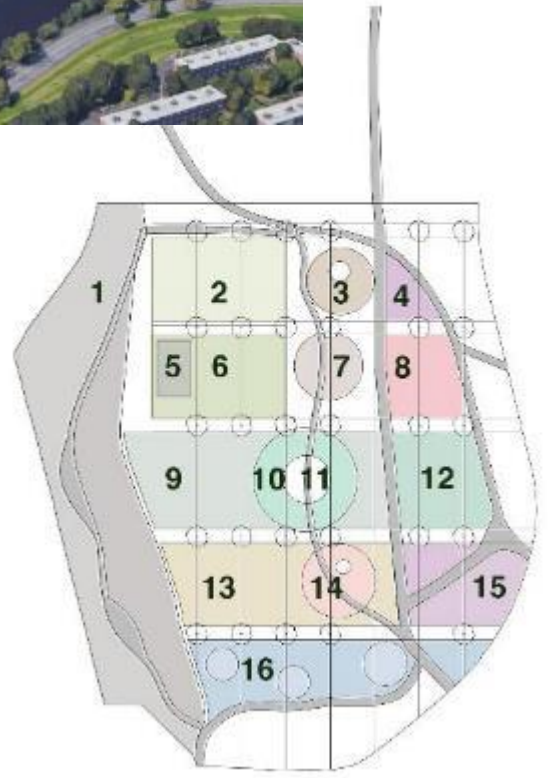
The Plan for Lower Botanic Demonstrator Site

1 rewild & boarded nature walk
2 agroecology community garden
3 community/education space
4 informal marketplace
5 research plots
6 RHS growing space
7 resilient plant show garden
8 cycle shelter and edu-sculpture park
9 meadow
10 miyawaki intensive urban forest
11 forest clearing
12 climate arbortetum + '1 million trees' zone
13 flax field
14 outdoor theatre clearing
15 nature play zone
16 ponds,dipping ponds + water garden



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