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Project Manager Urban Landscapes
Westcountry Rivers Trust

SPONGE 2020: A LOCAL ACTION PROJECT

As we start to feel the effects of climate change, extreme rainfall events are expected to increase. This is creating real challenges for water managers and local authorities. SPONGE 2020, an Interreg 2 Seas project, part-funded by the European Regional Development Fund, is working with local stakeholders to co-create innovative adaptation measures across a range of settings to reduce the impact of climate change and make communities more resilient.

SPONGE
SOMERSET

Westcountry Rivers Trust

SOMERSET County Council

Interreg 2 Seas Mers Zeeën
SPONGE 2020
European Regional Development Fund

LOCAL ACTION PROJECT

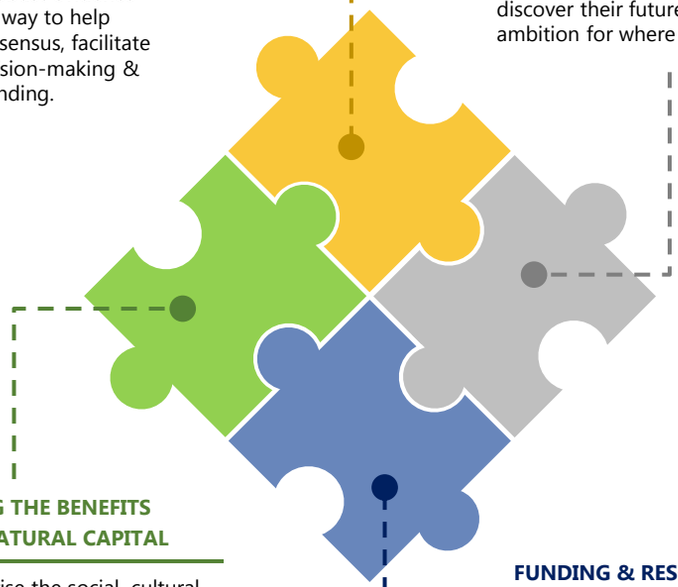
Working with local communities to enhance the value of natural capital in our towns, cities and other urban spaces to improve people's lives, the environment & economic prosperity...

STRATEGIC EVIDENCE & INFORMATION

Present robust evidence in a clear way to help build consensus, facilitate local decision-making & secure funding.

LOCAL CHOICES, PRIORITIES & AMBITIONS

Talk to the local community to discover their future vision and ambition for where they live.



VALUING THE BENEFITS FROM NATURAL CAPITAL

Characterise the social, cultural, environmental and economic benefits provided by natural capital in urban landscapes and estimate potential improvements.

FUNDING & RESOURCES FOR LOCAL ACTION

Support effective stakeholder-led partnerships by increasing engagement, mobilising local delivery organisations and tapping into funding.

In this document, the natural and cultural assets of Taunton are identified and understood within the social and economic setting, and the provision of a variety of environmental benefits are assessed across the urban area. This allows an assessment of where interventions are best targeted. This review then demonstrates examples of community-led interventions already underway to create and enhance assets to provide ecosystem services and improve the urban landscape for the benefit of those living and working in Taunton.

Taunton, by Mark Ferbert via Flickr CC BY-NC-ND 2.0

INDICATORS OF PROVISION

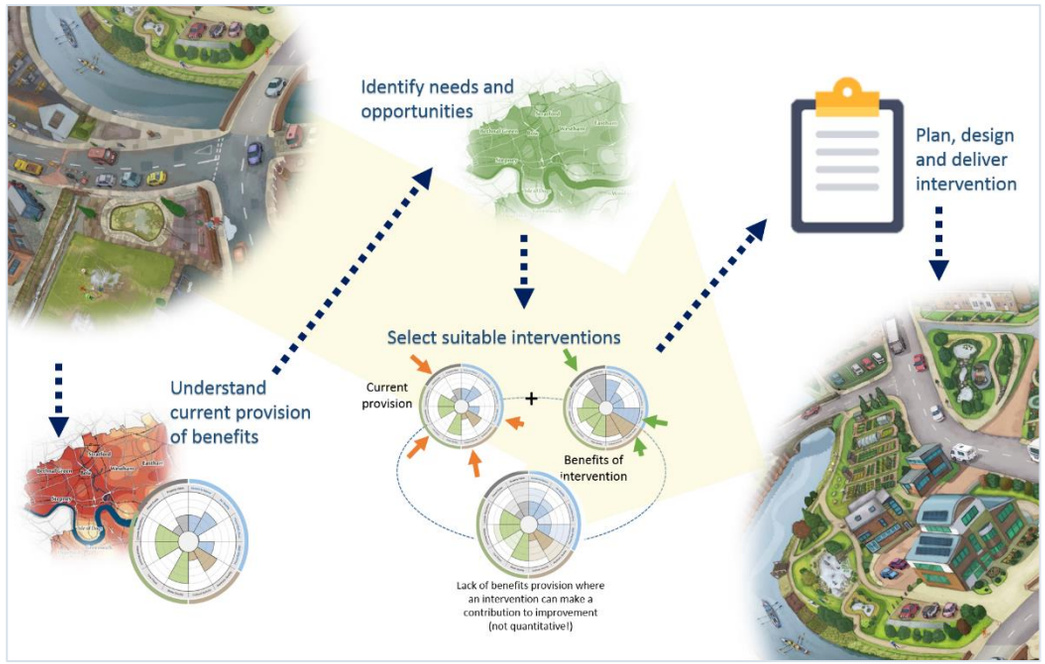
For the Local Action Project we have developed a simple, but consistent, framework for the assessment of natural capital - and ecosystem services-derived benefits in urban landscapes.

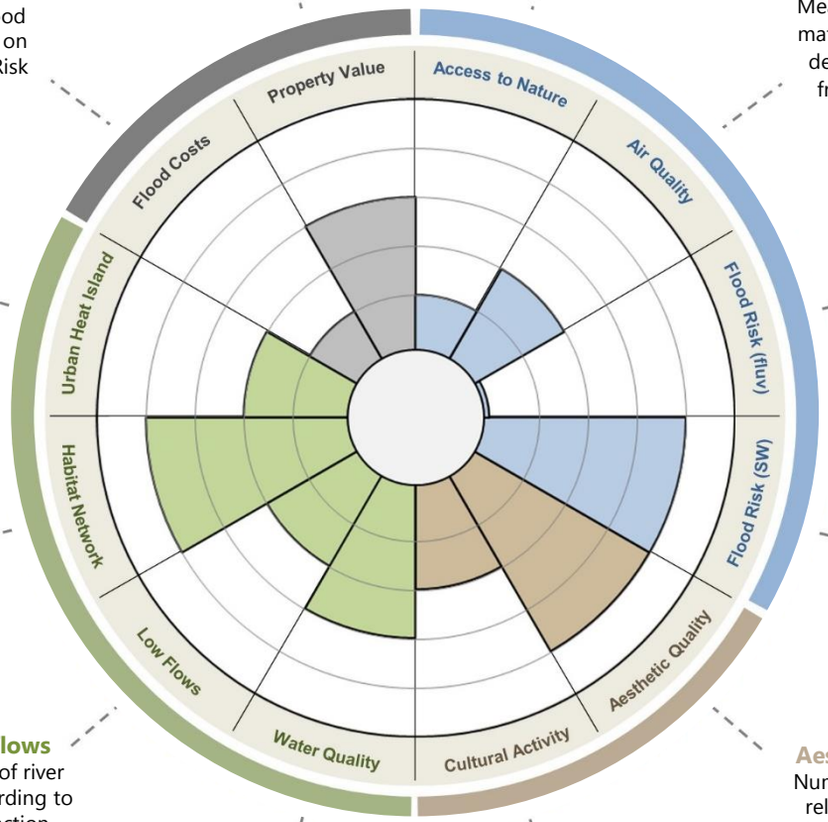
The method uses a series of 12 benefit-indicators, which can be used to:

1) Characterise the benefits people gain from the existing natural capital;
2) Establish the baseline of benefits experienced by people living in specific communities, which can then allow an assessment of where there is a deficiency or need for enhancement, and
3) To understand and predict the level and diversity of benefits which could be gained from the delivery of a series of targeted interventions in the landscape. ➔

The "Benefits Wheel" has two main applications in this toolkit:

1) In the assessment of ***Current Natural Capital*** the Wheel shows the benefits provided by a certain type of intervention or feature. A selection of interventions are shown in this PowerPoint, **but for an assessment of a full range of interventions, see the Local Action Toolkit - Urban Practitioner's 'Toolbox'.**
2) In the ***Strategic Assessment*,** the Wheel represents the current provision of benefits in a specified geographical unit (e.g. a ward), relative to other units in the demonstration area.





Average House Price
Average price for a two-bedroom house in December 2015.

Access to Greenspace
Proportion of people that live within 600 metres (approx. ten mins walk) from an accessible greenspace

Flood Damage Cost (surface water)
Estimated costs incurred due to flood damage from surface water, based on figures in the EA's National Flood Risk Assessment (NaFRA).

Air Quality (PM10)
Mean concentration of particulate matter (PM10) modelled for 2016, derived from background maps from the UK-AIR data archive.

Local Climate Regulation
Urban heat island effect measured using Landsat 8 satellite thermal imaging data.

Flood Risk (Rivers & Sea)
Number of residential properties that have a greater than 1 in 100 year chance of flooding from rivers and/or sea.

Habitats for wildlife
Percentage of landscape area that is described as a priority habitat in Natural England's Priority Habitats Inventory.

Flood Risk (Surface Water)
Number of residential properties that have a greater than 1 in 100 year chance of flooding from surface water.

Drought or low river flows
The water availability value of river waterbody catchments, according to the EA's Catchment Abstraction Management Strategy (CAMS).

Aesthetic value of landscape
Number of nature- or greenspace-related photos taken in the area that have been uploaded to Flickr and tagged accordingly.

Water Quality
Under the Water Framework Directive, the number of urban 'reasons for not achieving good' status identified for each river waterbody.

Cultural Activity
Number of recreational facilities per 1000 people, including places such as allotments & sports clubs.

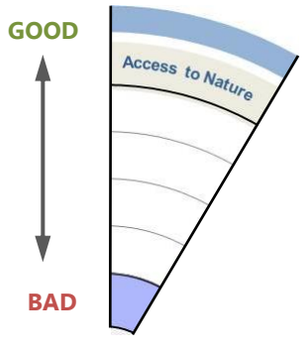
KEY

Four Types of Benefits -
1. **Social**
2. **Cultural**
3. **Environmental**
4. **Economic**

Framework applicable to -
1. Existing natural capital or green/blue infrastructure typologies
2. Strategic needs/benefits/ opportunity assessment at various spatial scales
3. Intervention-derived benefits
4. Delivery 'optioneering'

Benefits/value calculated -
1. Intervention suitability to address need/deficiency (Y/N)
2. Semi-quantitative indication of likely benefits provided

EXPERIENCE

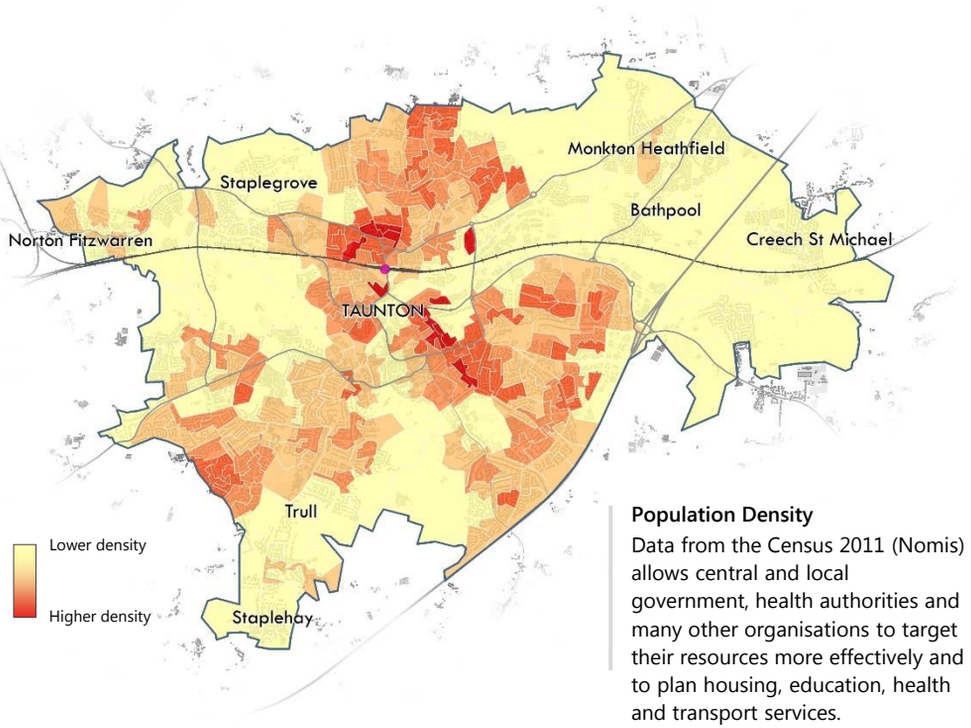


Bridge Street / North Street, Taunton by The Academy of Urbanism via Flickr (CC BY-NC-ND 2.0)

TAUNTON OVERVIEW

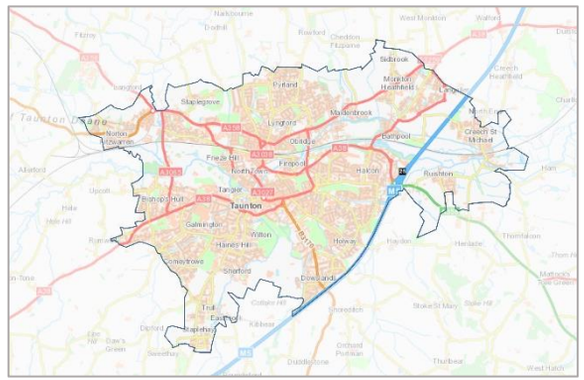
Taunton is the county town of Somerset, home to almost 65,000 people. It's name stems from the river Tone running through its centre.

In 2011, the population of the Taunton unitary authority was 64,621, making it the most populous town in Somerset. It is part of the larger Borough of Taunton Deane, which also encompasses Wellington and surrounding villages.



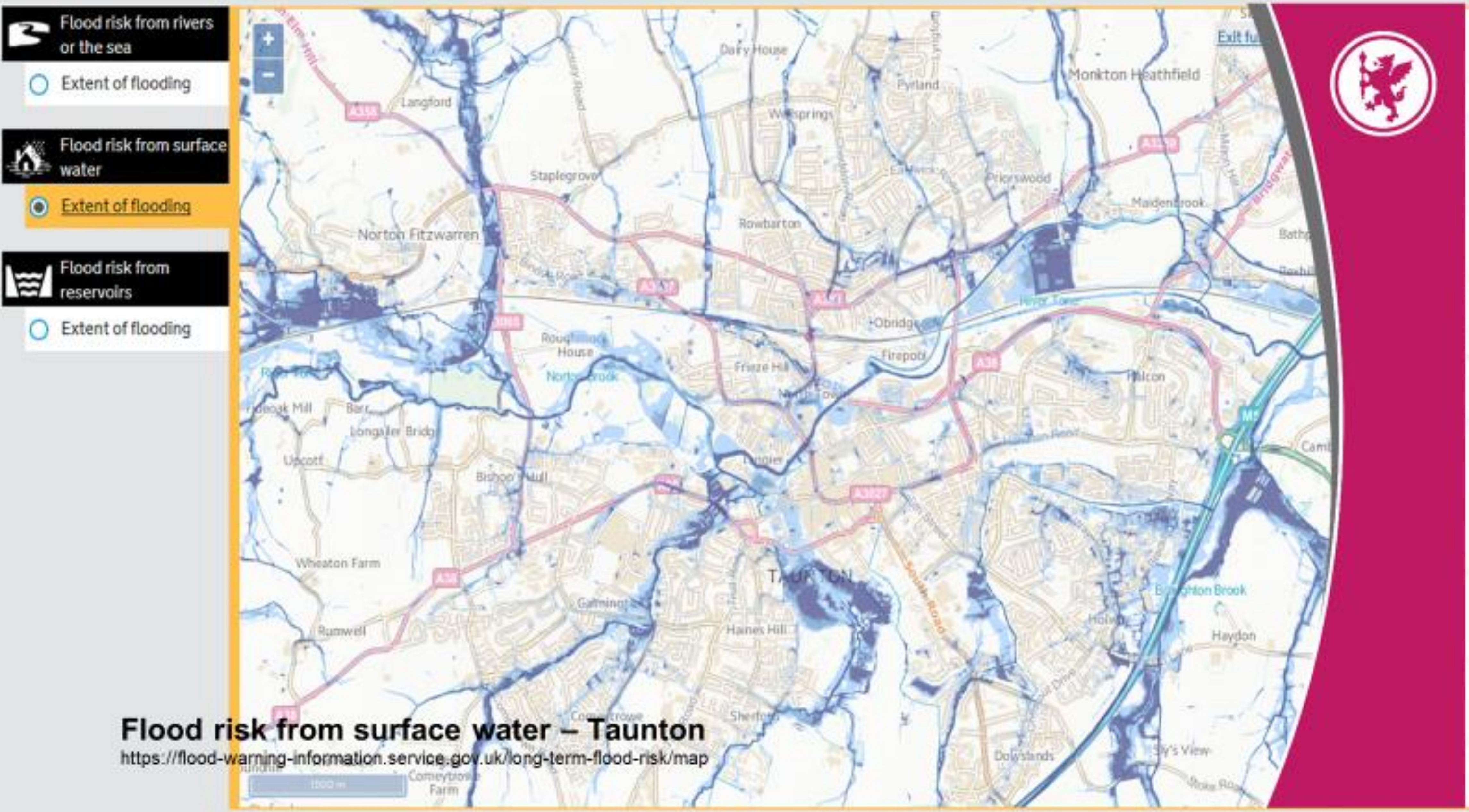
Population Density

Data from the Census 2011 (Nomis) allows central and local government, health authorities and many other organisations to target their resources more effectively and to plan housing, education, health and transport services.



Study Area

The study area for this work traces around the centre of Taunton plus the surrounding parishes that make up the suburbs of Taunton. The borders have mainly been based on Lower Super Output Areas, however some areas have been merged or split to generated useful units of analysis. Where areas had to be split, the border often follows the boundaries of Census Output Areas.



Flood risk from surface water – Taunton

https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

CURRENT ASSETS

A comprehensive audit of the environmental infrastructure allows an understanding of the natural capital in the landscape and the ecosystem services these assets currently provide.

This review allows assets providing important benefits to be identified and provides evidence in support of efforts to protect and enhance them and ensures this happens in a strategic and correctly targeted way.

Parks & gardens

Publicly accessible parks, gardens and open green spaces are an important part of Britain's heritage that provide spaces for people to undertake recreation and cultural activities.

Image by Mark Ferbert CC BY-NC-ND 2.0

Wetlands & ponds

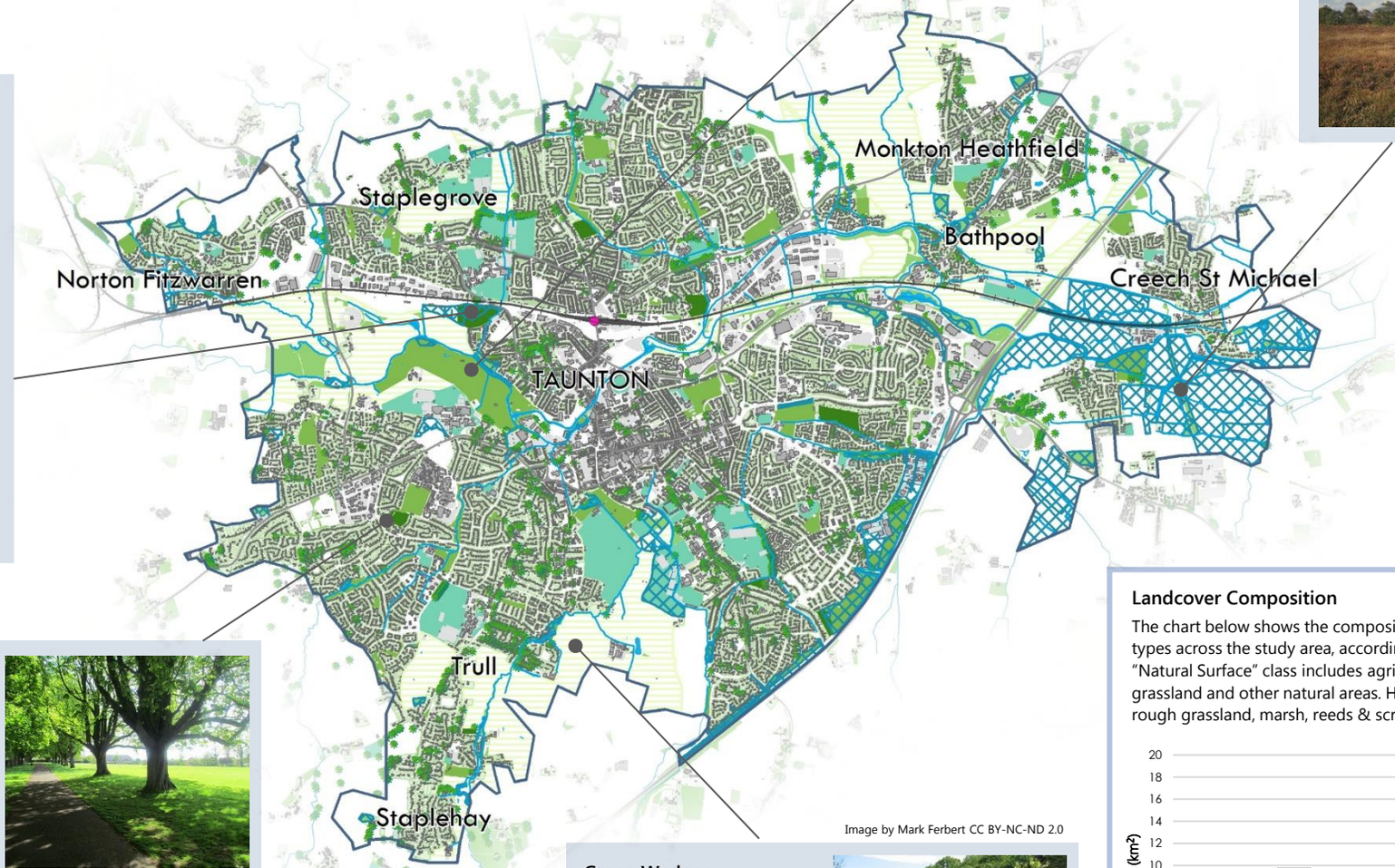
Wetlands are transitional habitats, between terrestrial and aquatic ecosystems, where the water table is at or near the surface. Taunton features Lowland Wet Grasslands, a rare habitat type.

Image by Natural England CC BY-NC-ND 2.0

Allotments

An allotment is an area of land, leased from a private or local authority landlord, for growing fruit and vegetables, ornamental plants, or the keeping of hens, rabbits or bees.

Image by Ruth Hartnup (CC BY 2.0)



Trees

Trees in cities are sometimes protected by Tree Protection Orders, which make it an offence to cut down or damage this important asset.

Image by Mark Ferbert CC BY-NC-ND 2.0

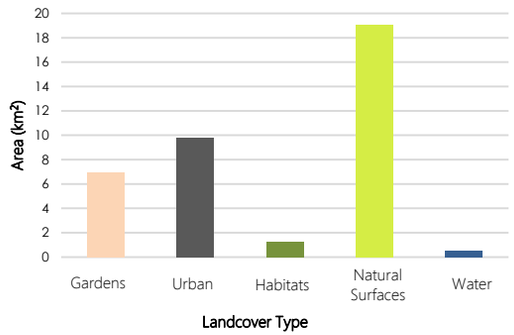
Green Wedges

These areas of land offer a space for recreation and conservation, providing a 'green lung' to urban areas. They have been included in the planning policy for Taunton Deane since 1991.

Image by Mark Ferbert CC BY-NC-ND 2.0

Landcover Composition

The chart below shows the composition of different land types across the study area, according to OS MasterMap. The "Natural Surface" class includes agricultural land, amenity grassland and other natural areas. Habitats include woodland, rough grassland, marsh, reeds & scrub.



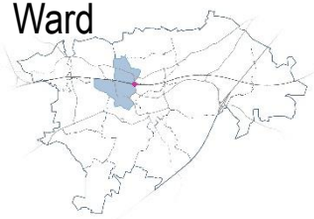
CURRENT NATURAL CAPITAL

Detailed view

Due to the high resolution datasets provided by Taunton Deane Borough Council, we are able to examine fine-scale features such as gardens, outdoor sports areas, play areas and water bodies.

Gardens
As they are widespread and well-used, domestic gardens are key component of urban green infrastructure.

Fairwater Ward



Priority habitats

Outdoor sports grounds

Rivers & waterbodies
Rivers, canals, pond and lakes are a key component of the natural capital (blue infrastructure) in an urban landscape.

River Tone, Taunton by Sarah via Flickr, BBCY2.0

Access to Nature
The "healthiest" areas in England (those with higher levels of activity and lower levels of obesity) have 20% more green spaces than the least healthy areas.

Air Quality
Air quality is often better within parks, for PM_{10} and other pollutants.

Flood Risk (Surface Water)
Due to high infiltration rates, grassed areas are able to nearly completely eliminate runoff, therefore having a positive impact on surface water flooding.

Aesthetic Quality
The aesthetic value of parks can be very high and is for example shown through their impact on property values as well as stress and mental fatigue.

Cultural Activity
Many parks provide venues for annual festivals, meeting spaces for community groups. Parks, as accessible local green spaces, can give rise to cultural activities like bird watching, painting or photography.

Climate Regulation
Parks, especially with high tree cover, can act as carbon sinks. In Taunton, 97.3% of the carbon pool stored in urban vegetation is stored in trees.

Air temperatures are often lower in parks. In London, air temperatures can be 2-8˚ lower in greenspaces.

Habitat Network
Parks have often been found to be the most biodiverse type of urban greenspace. Larger, more diverse and less isolated parks harbour more native biodiversity.

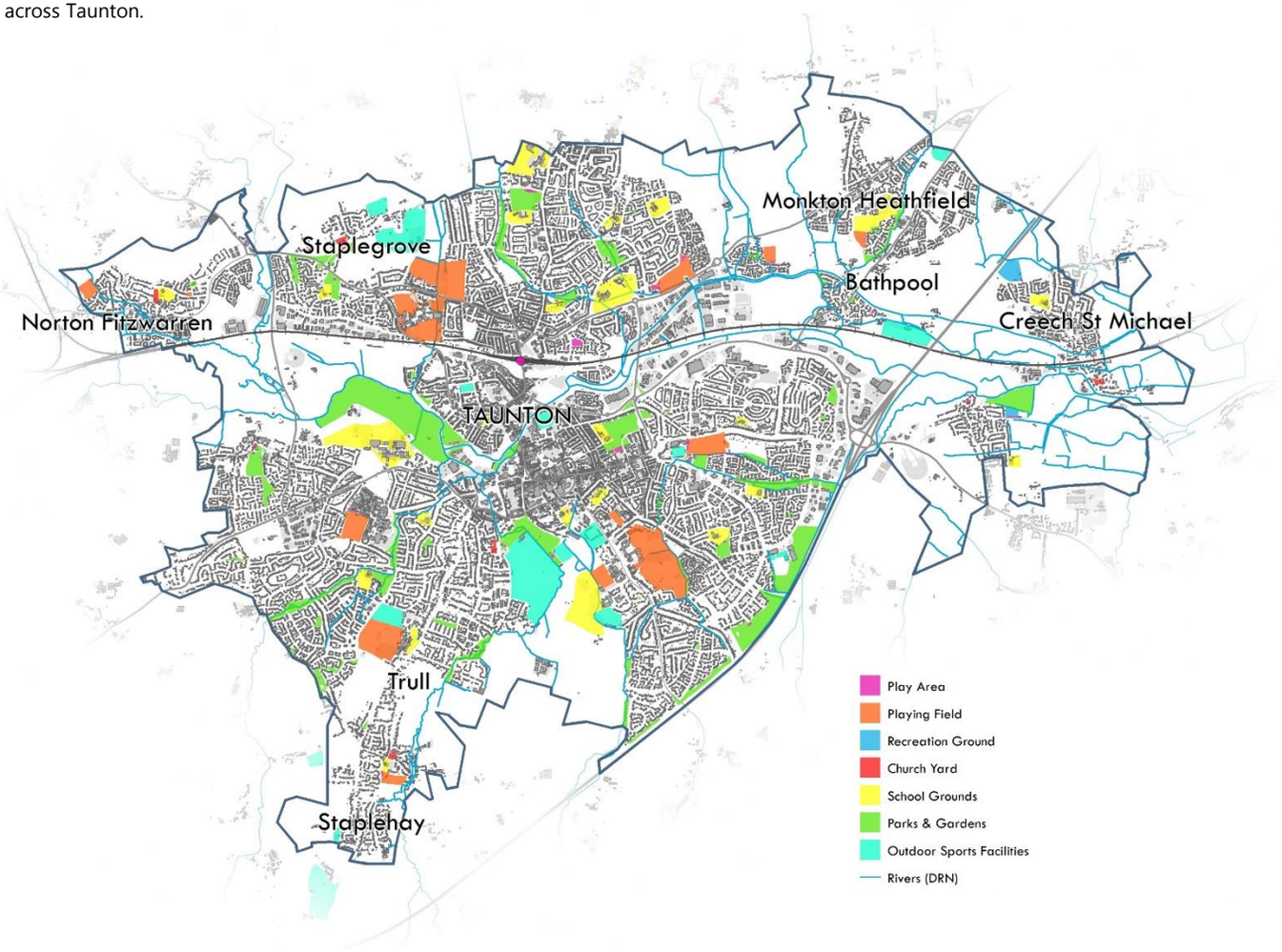
PARKS & AMENITY GREENSPACES

Public parks and gardens are vital natural assets in an urban environment. While high land prices and pressures from other objectives may make the creation of a new park in an area unlikely, this makes it all the more important for us to understand the benefits provided by existing parks, determine who receives these benefits and manage them in a way that maximises the benefits they provide.

Parks have recorded increasing visitor numbers, showing that there is a demand for their use. Over 10% of people visit or pass through their local parks daily, and over 50% at least once per month. Parks, depending on their size and design, can bring together a number of different elements of green infrastructure and SuDS features. By bringing these different features together a park can provide an effect that is larger than the sum of its parts.

PARKS & OPEN SPACES IN TAUNTON

Detailed information provided by Taunton Deane Borough Council allows us to map the provision of parks, play areas and playing fields across Taunton.



ALLOTMENTS & ORCHARDS

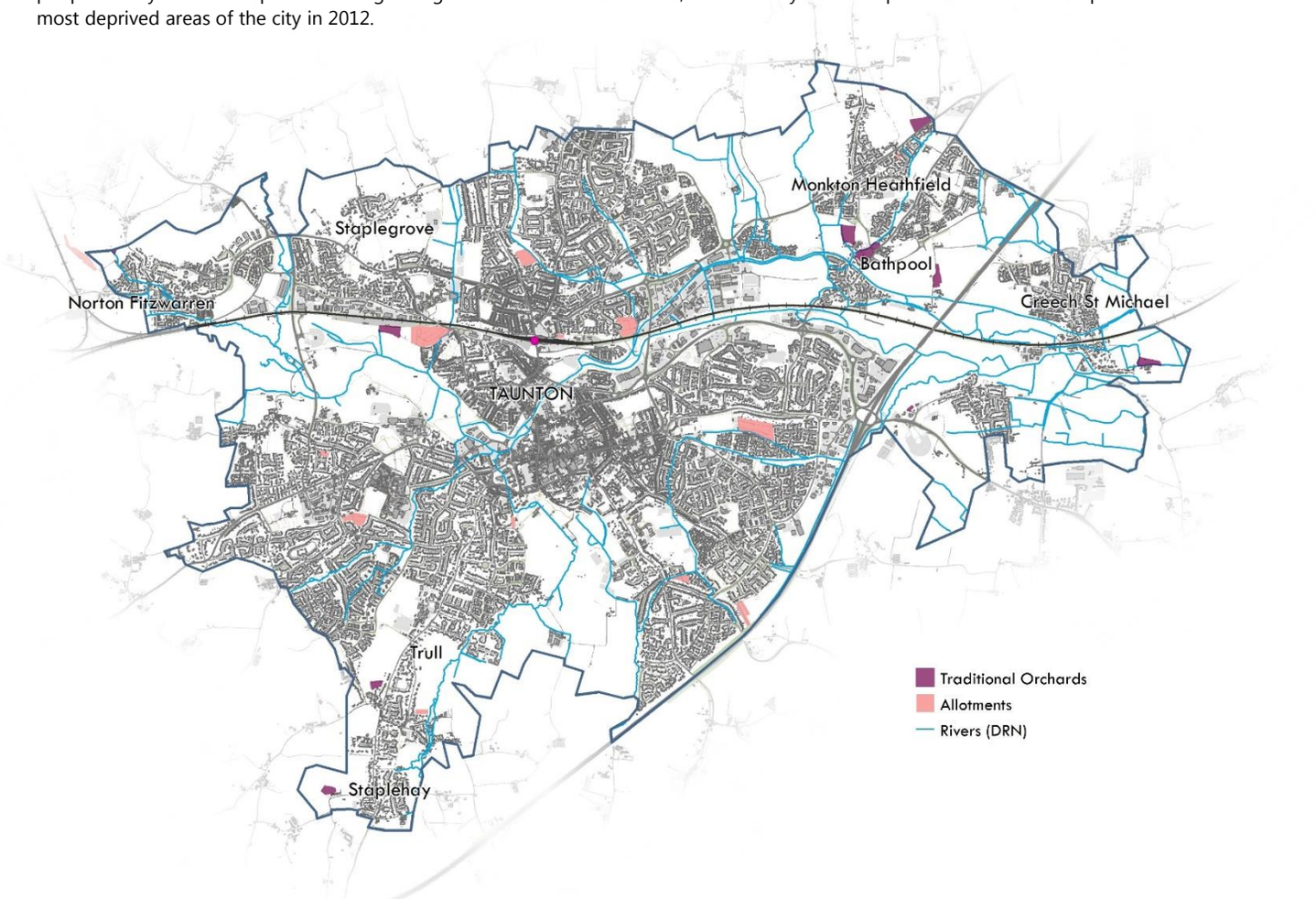
Allotments, orchards, community gardens and city farms are unique and special green spaces because of the social and cultural aspect of food production and land ownership in urban spaces.

The specific ecosystem services provided depend on how the allotments/orchards are used and therefore guidance for allotment owners and users should consider management of surface water and multiple ecosystem services. They have the potential to contribute benefits locally by infiltrating runoff, providing amenity benefits and providing the opportunity to incorporate other interventions, like ponds, water storage and swales, within them, maximising multiple benefits.

As they are not accessible to the general public, certain benefits, such as access to nature and education, can only be provided on a limited scale. However, this is likely to particularly benefit older people, which can be an important part of their role in an urban area.

ALLOTMENTS IN TAUNTON

There are 45 allotment sites across Taunton. 32 are managed by local allotment societies, the rest by the City Council. Rents range from £6.50 to £22 per plot and year. As a response to the growing demand for allotment sites, Taunton City Council opened an additional 30 plots in some of the most deprived areas of the city in 2012.



Access to Nature
While allotments are not freely accessible, they provide significant health benefits to a wide number of people, especially in an older age group.

Air Quality
Air quality is not a significant benefit provided by allotments, however they can have an impact on a regional scale. Orchards are likely to have a more significant impact as trees filter pollutants.

Flood Risk (Surface Water)
Open surfaces allow infiltration and can increase groundwater recharge, therefore improving low flow conditions.

Aesthetic Quality
The aesthetic quality has been found to be the second most important aspect in choosing an allotment site, it can therefore be inferred that they generate significant aesthetic benefits.

Cultural Activity
Growing food is an excellent – and in urban environments, rare - cultural and educational activity.

Low Flows
Infiltration can enable groundwater recharge and so have a positive impact on low flows.

Habitat Network
Allotments and orchards can provide great habitats for pollinators and other insects as well as mammals, birds, amphibians and more.

Climate Regulation
Allotments and orchards provide mitigation of the Urban Heat Island effect by lowering air temperatures and allowing influx of fresh air, and store carbon in vegetation and soils. This benefit is likely to be greater from orchards.

Access to Nature
When accessible, gardens can provide increased physical fitness, connection to nature, relaxation and recovery from trauma, and similar benefits related to stress avoidance and cognitive function.

Flood Risk (Rivers & Sea)
Increasing permeability of an area by 30% could lead to as much as a doubling in the magnitude of 100 year return period floods.

Aesthetic Quality
Gardens provide aesthetic benefits for neighbourhoods. One study showed that 50% of gardeners appreciate the 'more beautiful environment' created in urban areas.

Cultural Activity
Gardens allow playful, creative and place-shaping activities as well as growing food. Gardening increases sense of self-esteem, identity and ownership.

Water Quality
Bioretention and capture and destruction of pollutants in the soil can help to improve water quality. Fertilization and pesticide use however will have a negative impact.

Habitat Network
Even small domestic gardens can be important habitats for all kinds of wildlife. Collectively, gardens have been shown to hold over 1000 plant species across the UK.

Property Value
It is widely accepted that gardens add value to a property. A survey by HomeSearch found that a garden added 20% in value.

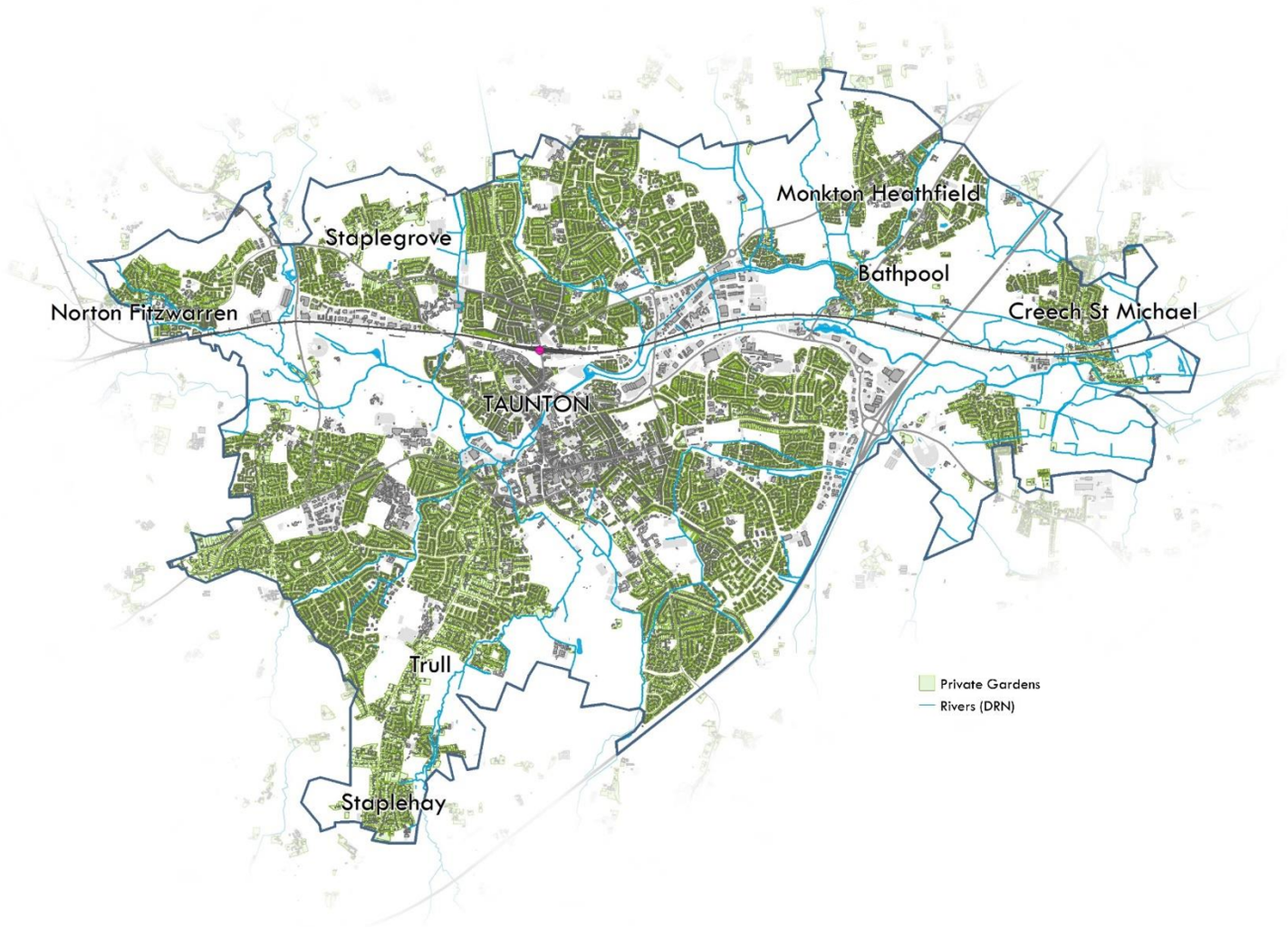
PRIVATE GARDENS

In 2002, an estimated 27 million people in the UK owned gardens. Domestic gardens contribute about a quarter of the total urban area in typical cities in the UK, and contribute up to 86% of the total number of trees in a city. In addition, the accumulated number of structures such as ponds, nesting sites or compost heaps is significant at the city-scale.

Private gardens are mainly used for relaxation and recreation, with over a third of garden owners surveyed in 2011 naming these as main activities in the garden, with gardening, eating, drying laundry and socialising being other common activities.

PRIVATE GARDENS IN TAUNTON

The vegetated, permeable area provided by gardens is being significantly reduced each year due to development pressures, individual choices regarding the design of the garden and their conversion/maintenance to provide space for private vehicles. Nonetheless, the map below shows there is significant provision of domestic gardens across Taunton.



URBAN RIVERS

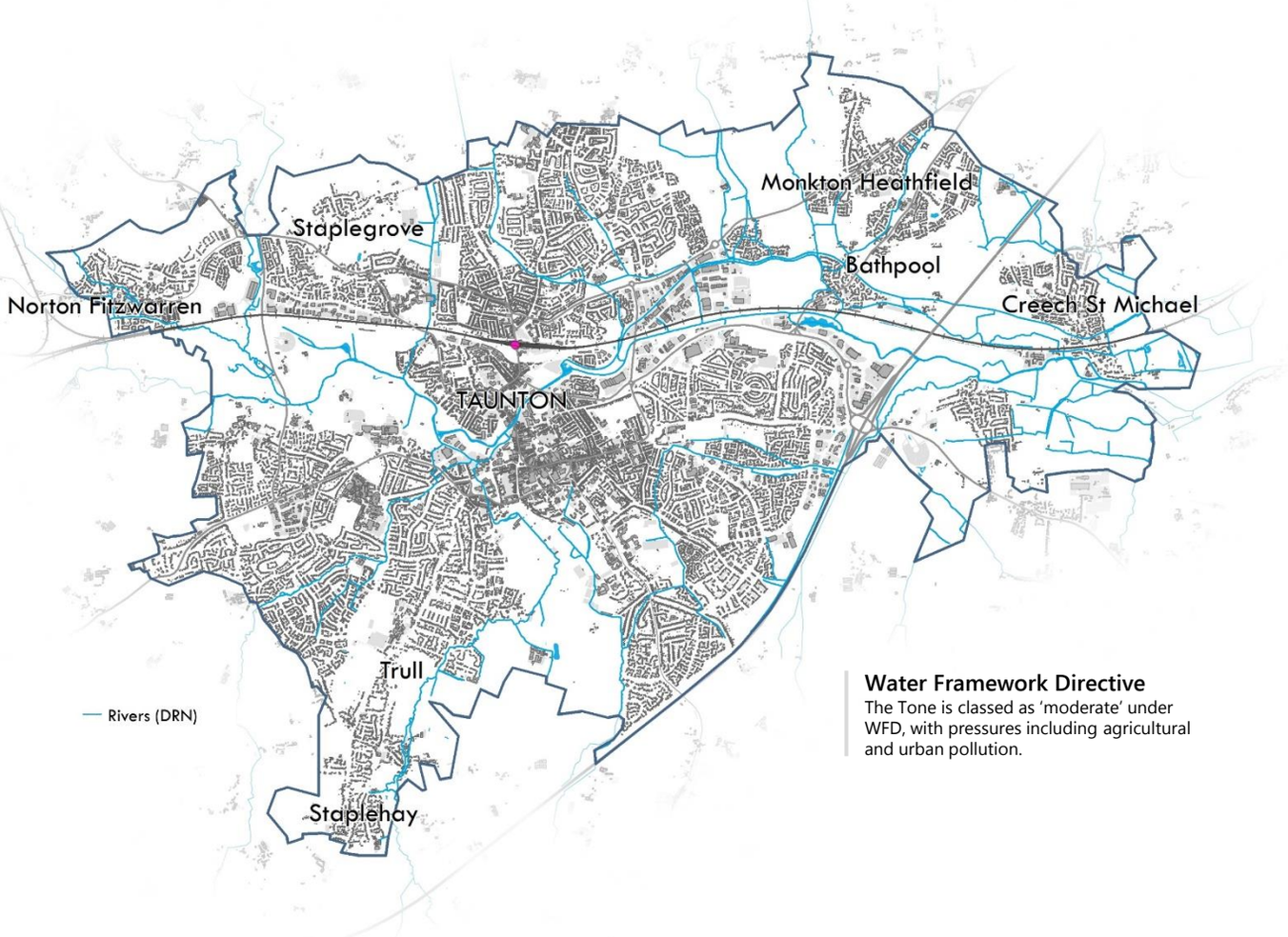
Rivers have often provided the resources and benefits necessary for the development of cities. Yet, in urban areas, rivers have often been seen as a threat to infrastructure and human health rather than as a resource, leading to their increasing degradation.

The benefits that arise from protecting rivers and restoration projects include access and habitat improvements. Opportunities for river restoration may be more easily found in parks & open spaces than in built up urban environments.

Rivers receive water as runoff from their surroundings, even more so due to the increasing impermeability of the urban environment. Sewers – meant to carry surface water flow, but often also carrying pollutants from misconnections – also discharge into watercourses. Other pressures in the urban environment include culverting and straightening, pesticides from roadsides or amenity areas, fertiliser and sediment from construction sites.

URBAN RIVERS IN TAUNTON

The River Tone is the main river running through Taunton. It is a tributary of the Parrett and is about 20 miles long. The Tone rises in the Brendon Hills and fills Clatworthy Reservoir with drinking water before continuing through a rural landscape. Where the river reaches Taunton, it is classified as "heavily modified" under the Water Framework Directive, with many of the smaller rivers flowing into it culverted.



Water Framework Directive
The Tone is classed as 'moderate' under WFD, with pressures including agricultural and urban pollution.

Access to Nature
River restoration can improve the quality of parks. This has been shown for by the restoration of the River Quaggy in Sutcliffe Park, where about 30% of the visitors only started visiting after the restoration project had improved the area.

Air Quality
Air quality is likely to be improved due to denser vegetation and the transport of fresh air along the river corridors – however this could also mean the distribution of pollutants from busy roads.

Flood Risk (Rivers & Sea)
Restoring rivers, with actions such as re-meandering, establishing vegetation and creating wetlands, slows the flow and increases water storage capacity.

Aesthetic Quality
River landscapes are one of the most attractive landscapes, and this provides many benefits by drawing people to the area. Rivers also have a positive effect on mental health and property values.

Cultural Activity
Water is connected to many activities that are not only recreational and benefit human health but also have cultural traditions connected to them.

Water Quality
Freshwater systems can dilute and store pollution - to a certain level. River restoration and protection through GI can impact positively on a river's health.

Habitat Network
Rivers are amongst the UK's most diverse ecosystem, and provide connectivity through a landscape.

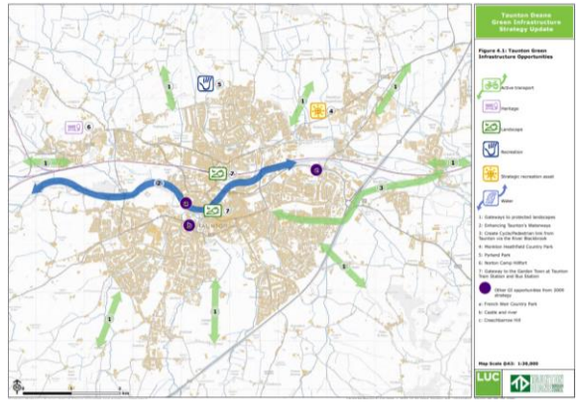
Property Value
View of water or a garden adjacent to water can have a significant positive impact on property values, with studies showing increases in value of 10-30%

PRIORITY AREAS & DRIVERS

Before assessing the baseline of benefits received by local communities, it is important to consider any existing priority areas and drivers for improving natural infrastructure, including legislative drivers and restrictions, socioeconomic patterns, funding incentives or local plans.

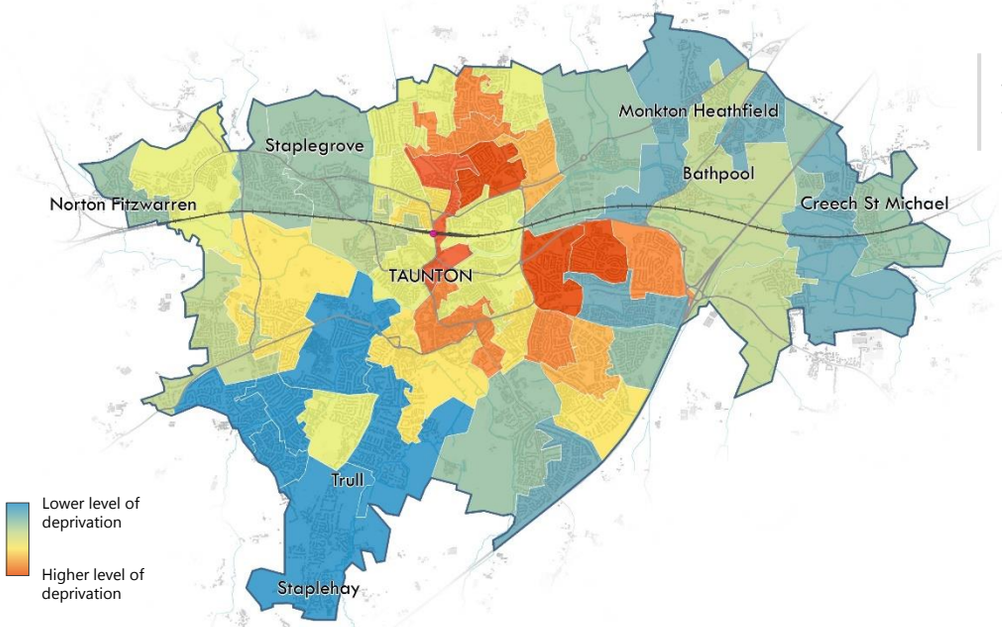
There are numerous priorities and drivers that affect the management of natural resources in an urban area. The maps on this page highlight two of these for Taunton; social deprivation and health. The Taunton Deane Green Infrastructure Opportunities document is also highlighted as an existing strategy being implemented across Taunton.

It is well-documented that areas of social deprivation are often linked to poorer health, reduced air quality, increased crime rates and lower access to natural spaces. Many types of natural interventions provide benefits that address some of these issues. It is important to assess which parts of the city are suffering from socioeconomic problems and to investigate whether natural infrastructure could contribute to resolving them. These factors should be kept in mind throughout the strategic targeting process.



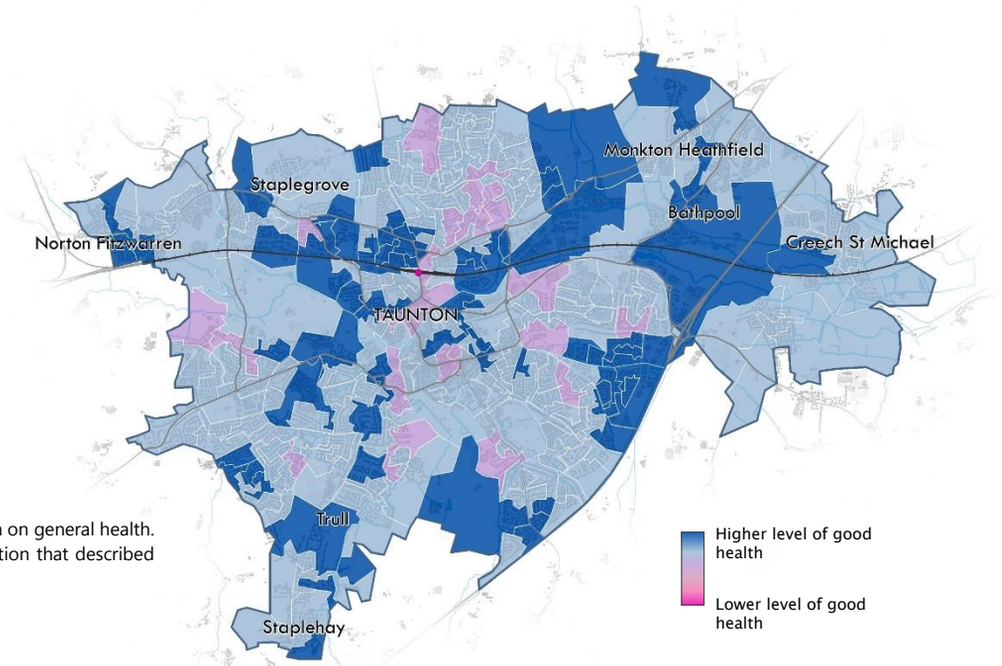
Existing Green Infrastructure Strategy

In 2017, Taunton Deane Borough Council published their updated GI strategy, identifying existing initiatives and future opportunities.



Social deprivation

The Index of Multiple Deprivation (2015) shows relative deprivation for neighbourhoods in England. It uses 7 indicators of deprivation, including income, employment, health, crime and the environment.

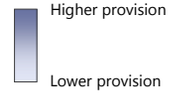


General health

The 2011 Census collected self-assessment data on general health. This map shows the distribution of the population that described their health as 'good' or 'very good'.

BENEFIT METRICS

The level of provision of each benefit in the Wheel can be mapped individually, to give a clear view of how areas are performing against each benefit. The 12 metrics have been assessed in detail for each of the areas and neighbourhoods of Taunton.



ACCESS TO NATURAL SPACE

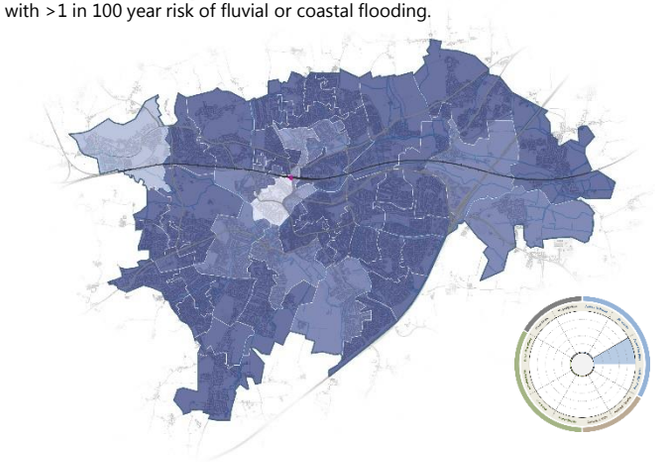
This indicator was assessed by calculating the percentage of people in each area that live within a 600m (~10 mins) walk of an accessible natural space.

AIR QUALITY (PM_{10})

This indicator was assessed by calculating the average concentration of PM10 (using modelled mean background concentration levels for 2016) in each area.

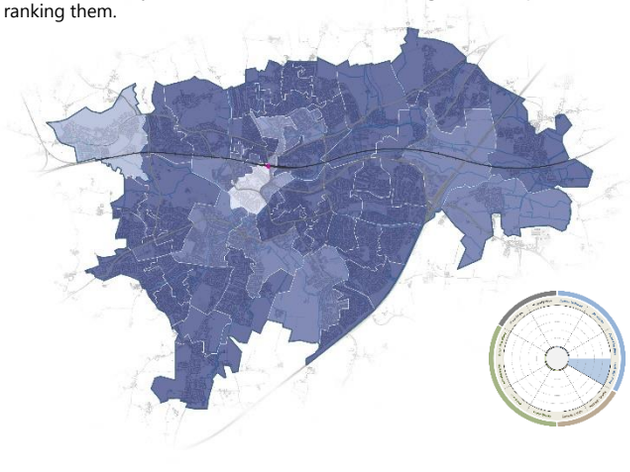
FLOOD RISK (RIVERS & SEA)

The indicator for the social impacts of flood risk from rivers and sea was assessed by calculating the number of residential properties located in areas with >1 in 100 year risk of fluvial or coastal flooding.



FLOOD RISK (SURFACE WATER)

The indicator for the social impacts of flood risk surface water flooding was assessed by calculating the number of residential properties located in areas with >1 in 100 year risk of surface water flooding in each spatial unit and ranking them.



AESTHETIC VALUE

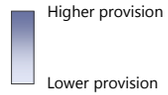
This indicator was assessed by analysing the number of Flickr-posted photos tagged per spatial unit, which had been tagged with keywords relating to ecosystems and nature.

CULTURAL ACTIVITIES

This indicator was assessed by determining the number of cultural activity groups or facilities related to nature per 1000 people in each area.

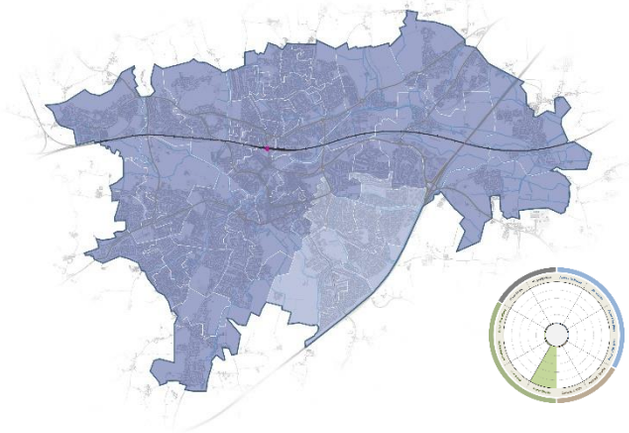
BENEFIT METRICS *...continued*

The level of provision of each benefit in the Wheel can be mapped individually, to give a clear view of how areas are performing against each benefit. The 12 metrics have been assessed in detail for each of the areas and neighbourhoods of Taunton.



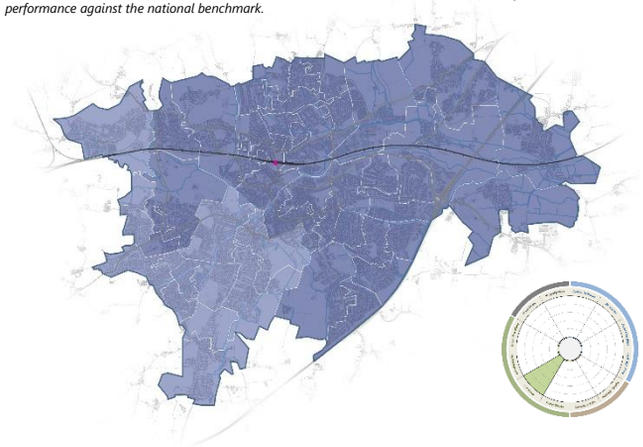
WATER QUALITY

The indicator for water quality was assessed using the number/average number of urban Reasons for Not Achieving Good Status (from Environment Agency data) in each area.



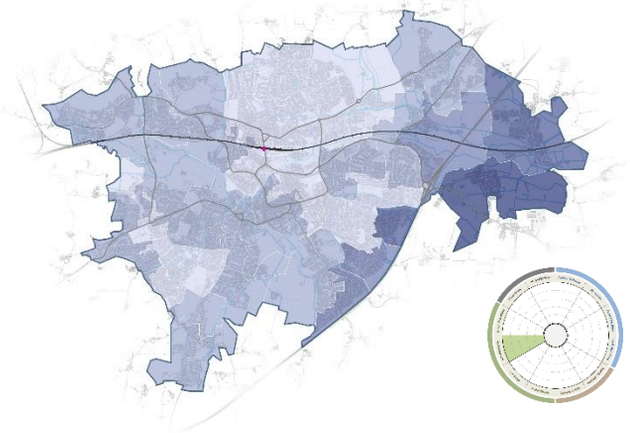
LOW FLOWS

This indicator was assessed using the water reliability predicted for each waterbody in the EA's Catchment Abstraction Management Strategy (CAMS).
N.b. This indicator was not a relative score within the urban area, but a reporting of the environmental performance against the national benchmark.



HABITATS FOR WILDLIFE

This indicator was assessed using the area of priority natural habitats in each local area.

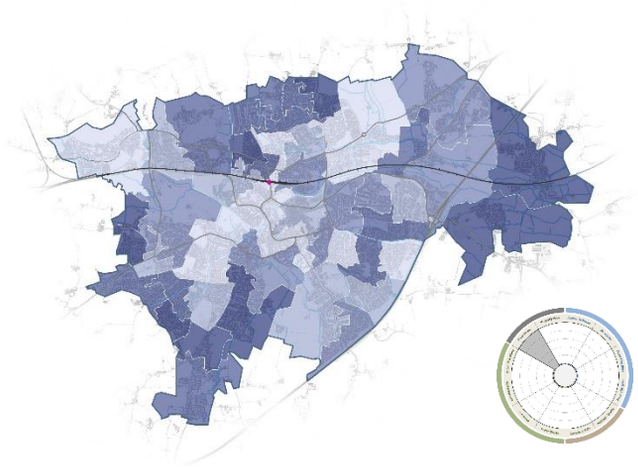


LOCAL CLIMATE REGULATION

This indicator was assessed by determining the average temperature (using Landsat 8 thermal imagery) in each area.

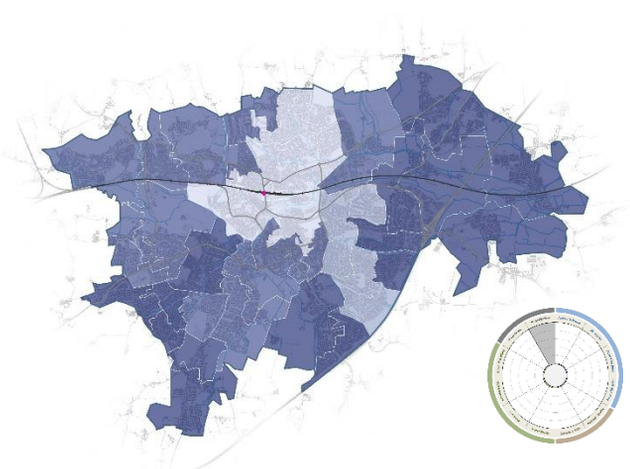
FLOOD DAMAGE COST

The indicator for the cost of flood damages was assessed using the Environment Agency's (EA) National Flood Risk assessment (NaFRA).



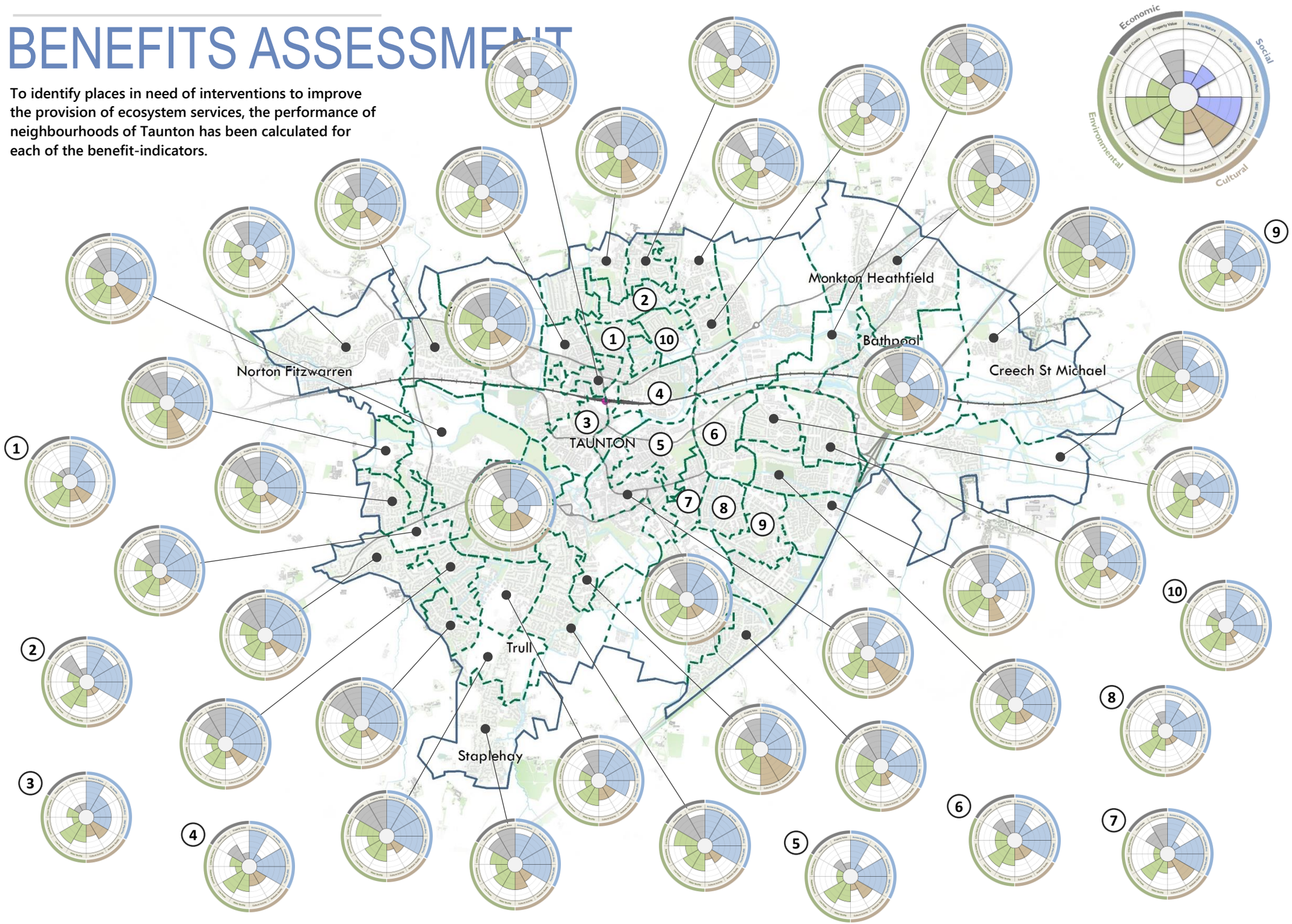
PROPERTY VALUE

This indicator was assessed by calculating the average price paid for a 2-bed house in December 2015 in each area.



BENEFITS ASSESSMENT

To identify places in need of interventions to improve the provision of ecosystem services, the performance of neighbourhoods of Taunton has been calculated for each of the benefit-indicators.



SPONGE 2020 FOCUS AREAS

Using all of the data and evidence examined so far, including issues such as deprivation, health, and the benefit-indicator metrics, several areas of Taunton have been chosen as target areas for the SPONGE 2020 project.

NATURAL ASSETS

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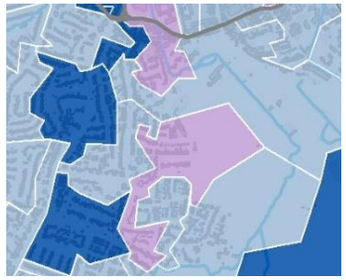

SOCIETY & ECONOMY

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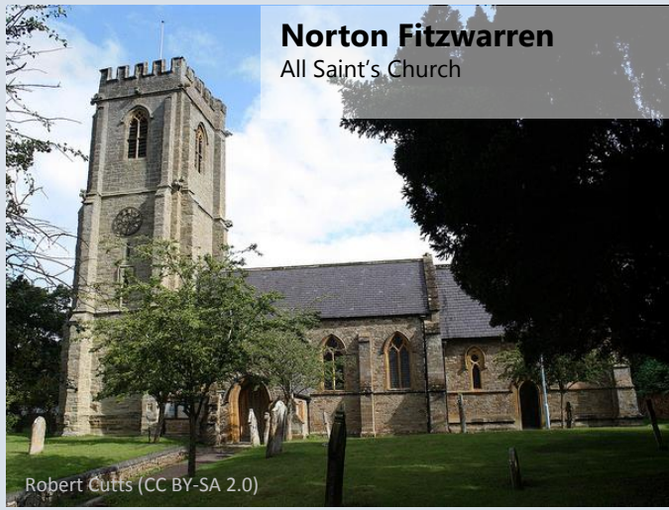
ECOSYSTEM SERVICES PROVSION

FOCUS AREAS

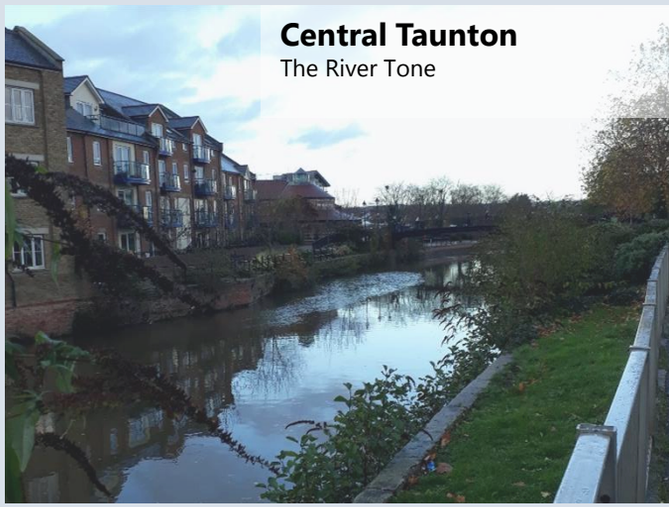
STRATEGIC TARGETING



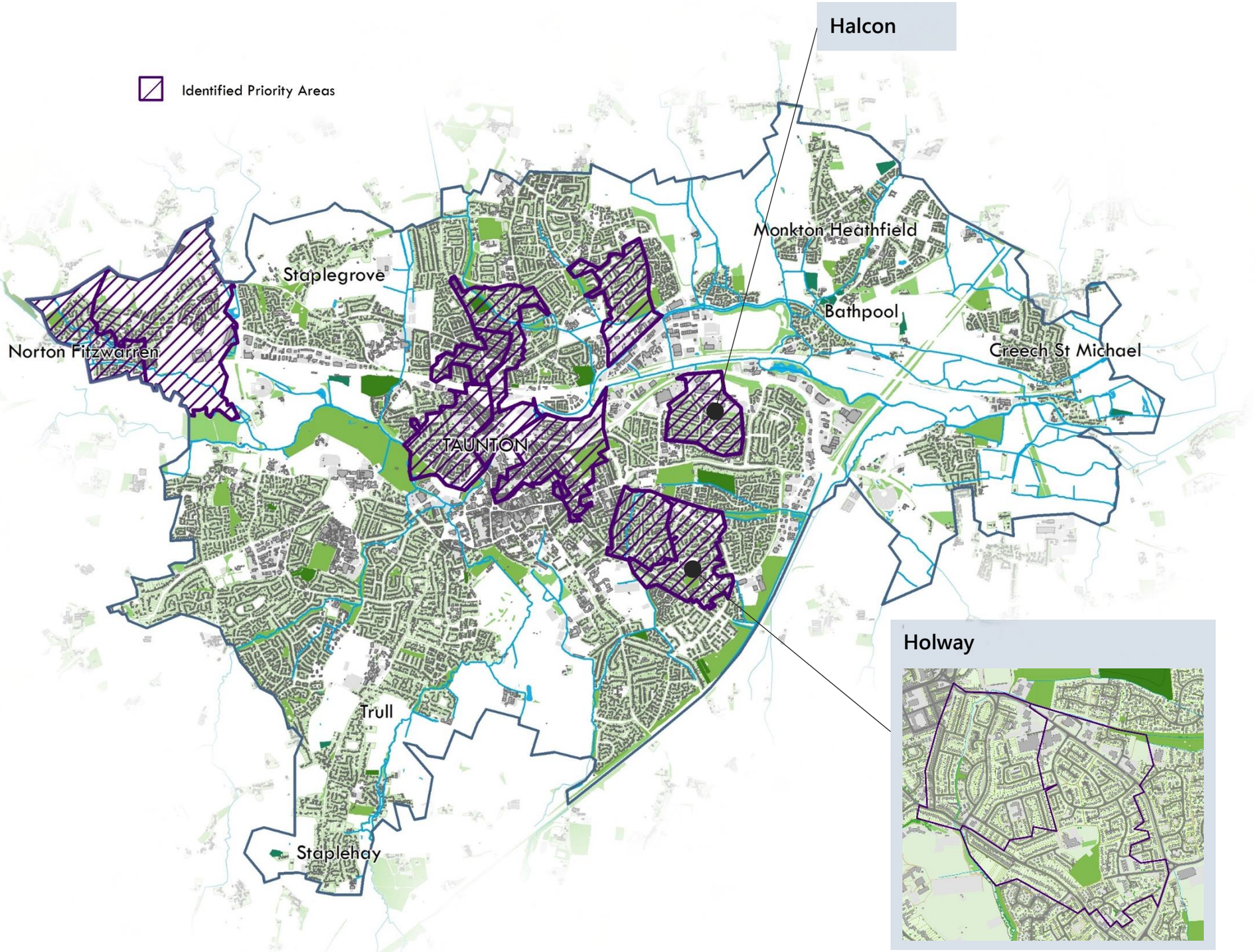
Norton Fitzwarren
All Saint's Church

Robert Cutts (CC BY-SA 2.0)

Priorswood
Priorswood library



Central Taunton
The River Tone


Halcon
Identified Priority Areas
Monkton Heathfield
Staplegrove
Bathpool
Norton Fitzwarren
Greech St Michael
TAUNTON
Trull
Staplehay
Holway

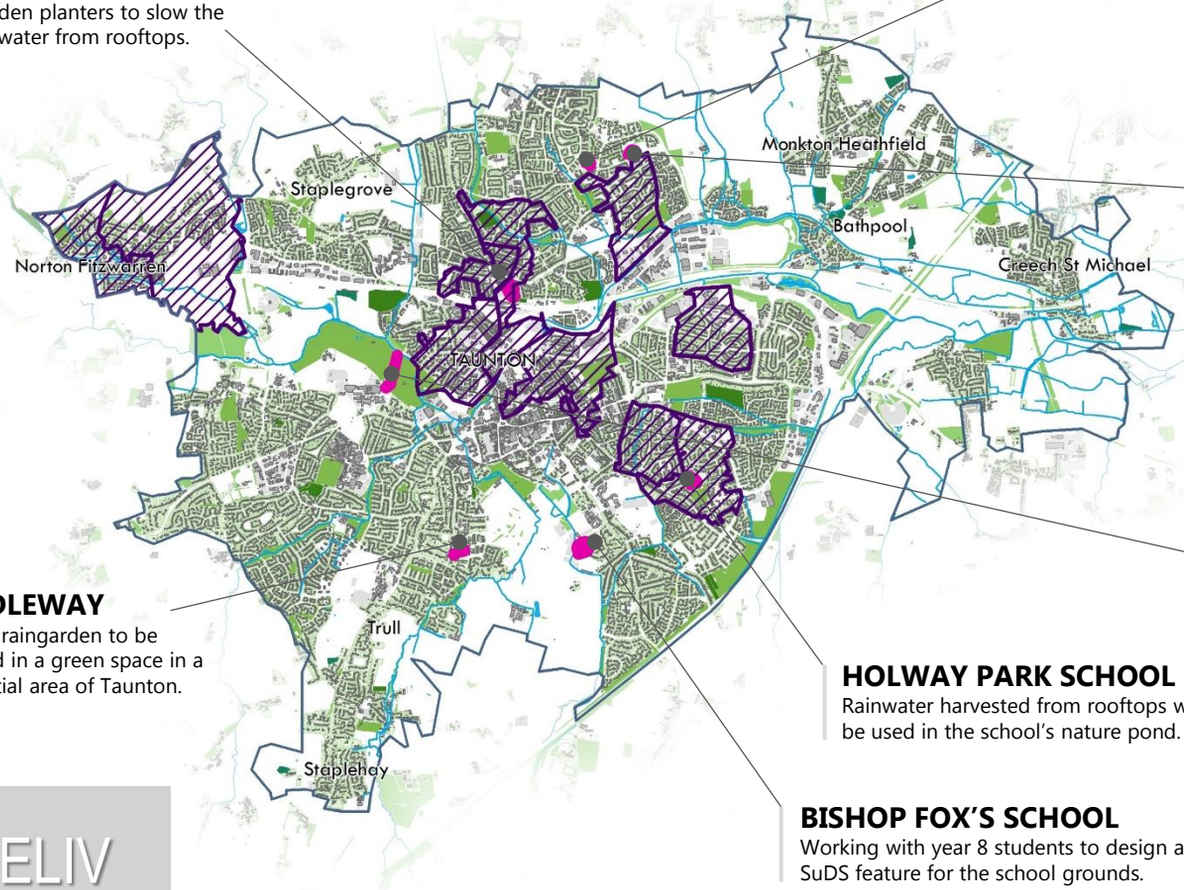
DELIVERY

The evidence document summarised the assessment of the data and evidence surrounding the natural capital and ecosystem services provision across Taunton. This has led to the selection of target areas for the SPONGE 2020 project, through which Westcountry Rivers Trust and Somerset County Council have been working with stakeholders to co-design and co-create sustainable drainage features which both reduce surface water flooding and bring multiple other benefits to local spaces.

The Somerset Pilot for SPONGE 2020 is now in its last year delivery phase, with funding also provided by Wessex Water, Somerset Rivers Authority, Postcode Local Trust, and the Royal Academy of Engineers, the team has been out working with local communities to engage, educate, design and install sustainable drainage features which will have a lasting impact on local spaces across Taunton.

The map below and the following case studies demonstrates some of the Somerset pilots for SPONGE

KILKENNY COURT
Raingarden planters to slow the flow of water from rooftops.



MIDDLEWAY
Sunken raingarden to be installed in a green space in a residential area of Taunton.

HOLWAY PARK SCHOOL
Rainwater harvested from rooftops will be used in the school's nature pond.

BISHOP FOX'S SCHOOL
Working with year 8 students to design a SuDS feature for the school grounds.

SELWORTHY SPECIAL SCHOOL
Raingarden installed in the school grounds to prevent surface water flooding from affecting emergency exits.

LYNGFORD PARK PRIMARY SCHOOL
A downpipe disconnection will take water from rooftops to a raingarden.

LONGRUN MEADOW
A series of retention ponds to slow the flow and improve water quality before it reaches the river.

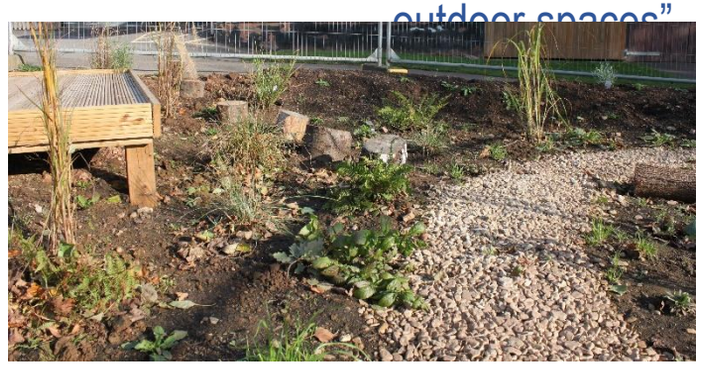
SELWORTHY SENSORY RAINGARDEN

A sensory raingarden was co-created with parents, staff and learners at Selworthy Special School in Taunton.

Selworthy is a school for children and young people with learning disabilities aged 4 – 19. The school uses outdoor spaces to allow their pupils to learn in the environment that suits them best. However, flooding due to a blocked surface drain sometimes left the grounds too muddy to be used. The raingarden was designed to capture the water creating this issue, removing the need for traditional drainage. As well as reducing flooding by storing 10m^3 of water, the garden incorporates sensory and interactive elements to enhance the space for children and staff.

Children, parents and staff were involved in designing as well as planting the raingarden. In addition, workshops and interactive lessons were used to educate and engage those taking part in issues around flooding and climate change.

"We are incredibly excited to work with Kathi and Shona on this exciting raingarden project. The project will ... reduce on site flooding and ensuring that our learners can continue to access outdoor spaces"



Westcountry Rivers Trust

Somerset County Council

Interreg 2 Seas Mers Zeeën SPONGE 2020 European Regional Development Fund

People's Postcode Lottery

Selworthy School

6 workshops with kids, staff & parents

2 planting sessions

Water captured from **511m^2**

80% of adults involved more aware of the effects of climate change in Taunton

95% think the raingarden is a valuable addition to the school


12 Months on

DEMONSTRATION RAINGARDENS

The Demonstration Raingardens project, funded by Wessex Water and Somerset Rivers Authority, delivered four raised raingarden planters on two council-owned housing sites in Taunton, Somerset.

They provide approximately 6m^3 storage/attenuation for roof runoff that would otherwise have fed into a combined sewer system, reducing runoff from an area of 220m^2.

Several consultations were held with experts, practitioners and local people and a raised planter design was chosen to fit with space constraints, maintenance levels and residents' needs. The height allows easy access for all residents, and the planters include native, exotic, edible and decorative plants, using dementia-friendly planting criteria to ensure enjoyment by all residents and provide habitats for insects.

4 raingarden planters

2 sites

6 meetings with stakeholders

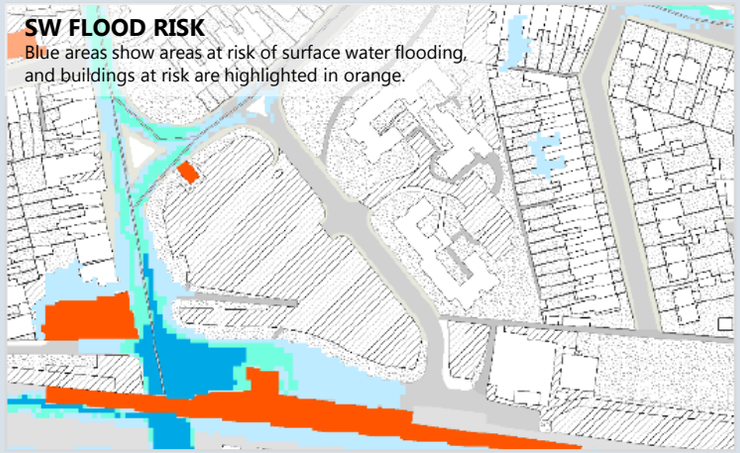
38 plant species

runoff slowed from **220m^2**

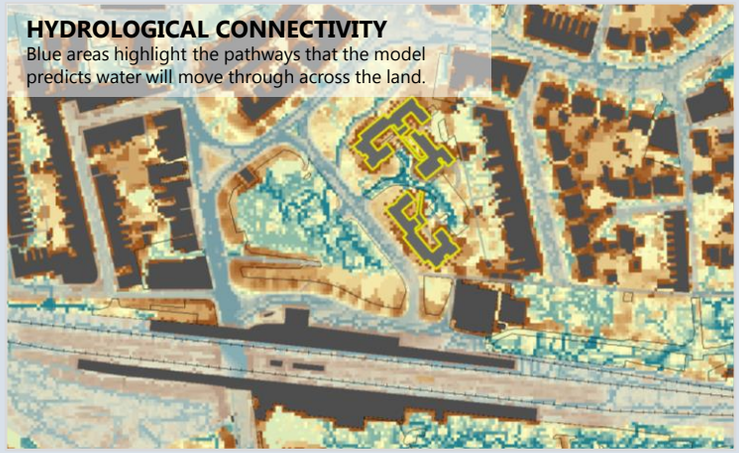
DELIVERY

USING DATA & EVIDENCE

Mapping data showing surface water flood risk and modelled hydrological connectivity were used to identify sites and understand the types of intervention which would be most suitable and where they would be most effectively placed.



SW FLOOD RISK
Blue areas show areas at risk of surface water flooding, and buildings at risk are highlighted in orange.



HYDROLOGICAL CONNECTIVITY
Blue areas highlight the pathways that the model predicts water will move through across the land.

Westcountry Rivers Trust · Somerset County Council · Interreg 2 Seas Mers Zeeën SPONGE 2020 European Regional Development Fund · For You. For Life. Wessex Water YTL GROUP · Somerset Rivers Authority

CONSULTATION

SITE SELECTION

CONSTRUCTION

PLANTING

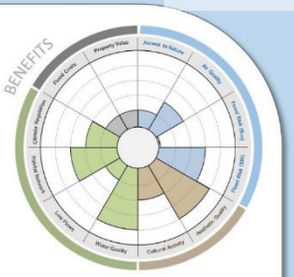
Plant selection: Grape hyacinth, Allium, American onion, Dutch garlic, Yarrow, Aster, Elephant's ears, Milky Bellflower, Catnip, Rosemary, Crimson flag, Lemon balm, Day lily, Moor grass, Sneezeweed, Spurge, Montbretia, Macedonian scabious, Meadow rue, Blue fescue, Japanese blood grass, Black mondo, Balkon clary, False goatsbeard, Lupin, European globe flower, Purple Moor Grass, Glaucous Sedge, Stinking Hellebore, Bugle, Ragged Robin, Meadowsweet, Water Avens, Hemp agrimony, Yellow Flag Iris, Dotted Loosestrife, Fairy Bellflower, Wood-rush

DESIGN

Somerset Demonstration Raingarden Project

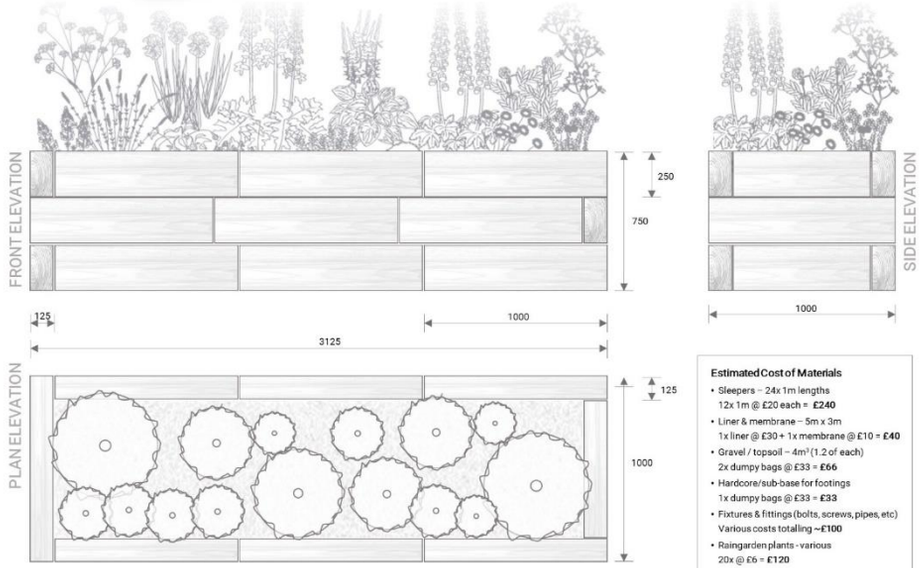
Raised Planter – Rainwater harvesting/detention basin

A rain garden is a shallow depression or raised planter, with absorbent, yet free draining soil and planted with vegetation that can withstand occasional temporary flooding. Rain gardens are designed to mimic the natural water retention of undeveloped land and to reduce the volume of rainwater running off into drains from impervious areas and treat low level pollution.



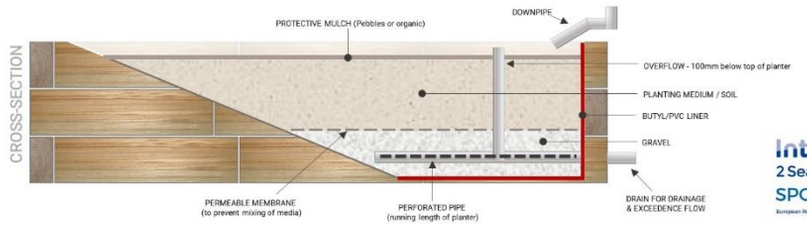
Estimated Water Storage/Attenuation

- Total volume of raingarden = 2.25 m^3
- Bulk density of gravel/soil = 50%
- Water storage/attenuation capacity of raingarden = 2 m^3
- Roof water volume per annum – Avg. rainfall p.a. (0.7 m) x 100 m^2 = 70 m^3



Estimated Cost of Materials

- Sleepers – 24x 1m lengths
  12x 1m @ £20 each = **£240**
- Liner & membrane – 5m x 3m
  1x liner @ £30 + 1x membrane @ £10 = **£40**
- Gravel / topsoil – 4m^3 (1.2 of each)
  2x dumpy bags @ £33 = **£66**
- Hardcore/sub-base for footings
  1x dumpy bags @ £33 = **£33**
- Fixtures & fittings (bolts, screws, pipes, etc)
  Various costs totalling ~**£100**
- Raingarden plants - various
  20x @ £6 = **£120**
- **TOTAL = £599** (variable by planter length)



Interreg 2 Seas Mers Zeeën SPONGE 2020

This project is being delivered in partnership by Westcountry Rivers Trust and Somerset County Council, with support from Somerset Rivers Authority and Wessex Water. It is also part of the Interreg 2-Seas-funded Sponge 2020 Somerset Pilot Project running from 2016-2020.

2 Years on

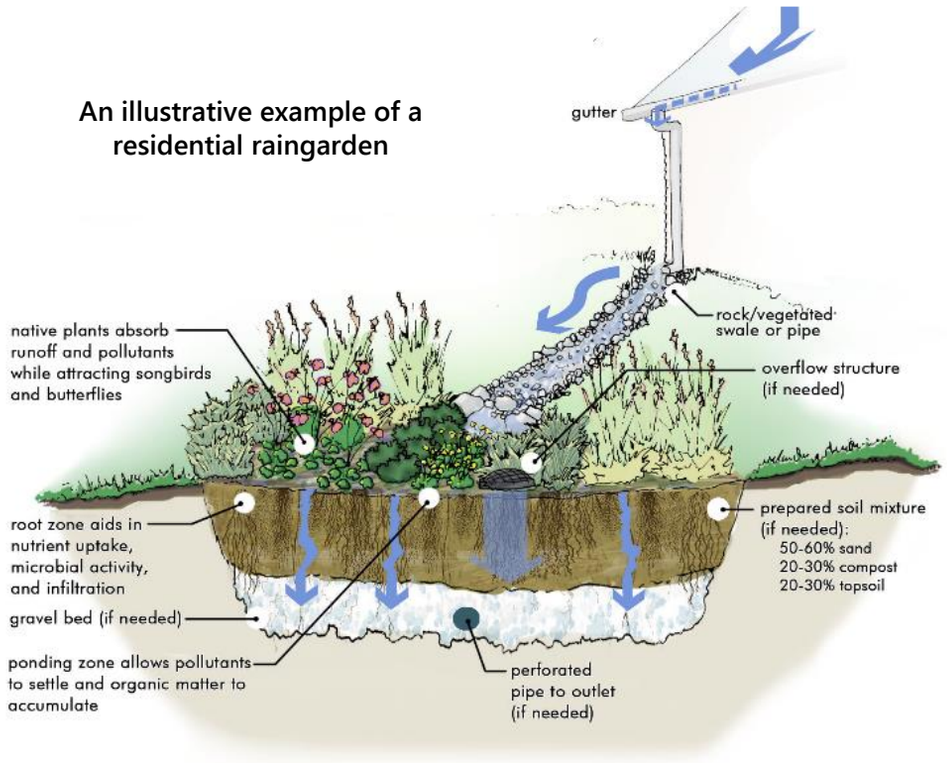
MIDDLEWAY

Following on from the Demonstration Raingardens project, we returned to Middleway in Taunton to build a sunken raingarden to take the rainwater from the roof of one of the buildings and allow it to soak into the ground.

The 19m^2 raingarden receives water from a roof area of approximately 70m^2. taken from the downpipe along a paved channel where it will then open up into a raingarden where the water can pool during heavy rain and then soak into the ground over time. This will prevent the rainwater from going directly to the sewer, reducing pressure on the water management system.

Westcountry Rivers Trust have held several meetings with Middleway residents, initially through the Demonstration Raingardens project, and now through a project funded by the People's Postcode Lottery. These events have helped with site selection and raingarden design. Following construction the community helped plant a variety of species, with more water-loving plants in the centre where pools of rainwater will form, and grasses and wildflowers to attract wildlife and create an attractive garden. A bench and stepping stones allow residents to interact with and enjoy the raingarden.

An illustrative example of a residential raingarden



16 plant species

runoff removed from 70m^2

Planting schedule:

- *Ajuga reptans*
- *Astilbe 'Fanal'*
- *Calamagrotis brachytricha*
- *Campanula glomerata*
- *Carex pendula*
- *Deschampsia caespitosa* 'Bronze veil'
- *Dryopteris felix-mas*
- *Helleborus foetidus*
- *Hemerocallis* 'Bertie Ferris'
- *Iris pseudacorus*
- *Lobelia cardinalis*
- *Pennisetum setaceum*
- *Salvia ocinailis* 'East Friesland'
- *Verbena Bonariensis*
- *Carex morrowii* 'Variegata'
- *Carex comans* 'Bronze form'

RAINGARDEN DESIGN SKETCH

DELIV
ERY


138B 140B
138A 140A
Interreg
2 Seas Mers Zeeën
SPONGE 2020
Innovative approaches


5 Months on

WESTCOUNTRY WOMEN WORKING WITH WATER (5W)

We also worked with a group of engineers to inspire school children in Taunton to understand a little more about water management in their town. We then used everything the students learnt to get their help designing SuDS to be built in both the schools.

5W aims:

1) To get young people, especially girls, interested in engineering and understanding a little more about the wide range of areas engineers work in, and the important issues and problems engineering can help to solve. In particular, we will talk about water management in our towns and cities.
2) To give engineers the opportunity to talk about their exciting work to new groups of people, and allow them to try out a whole range of engagement techniques.
3) To build raingarden features at the schools, designing them with the help of the school pupils and their teachers and parents.

DELIVERY

Schools Engagement

Co-design

HOLWAY PARK PRIMARY SCHOOL

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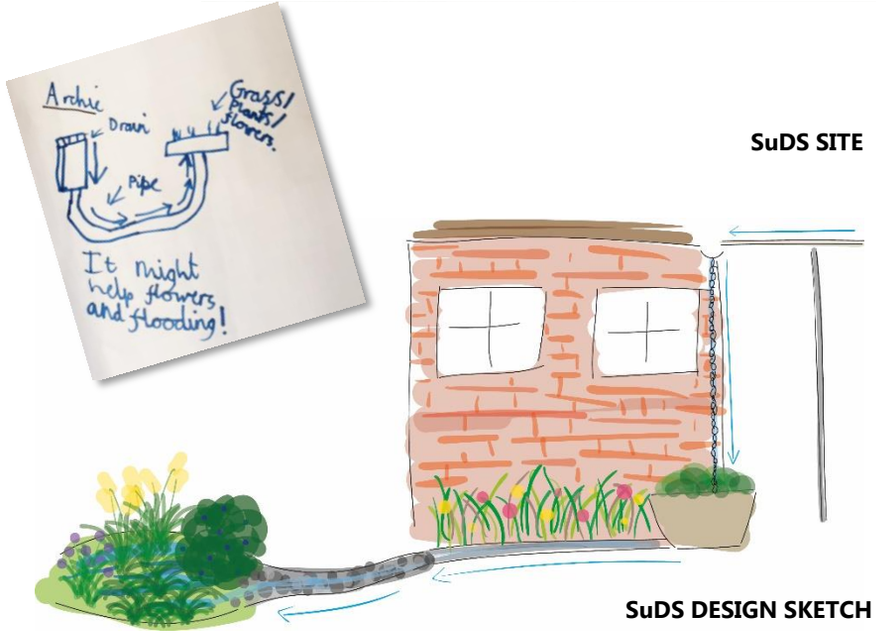
LYNGFORD PARK PRIMARY SCHOOL



Westcountry Rivers Trust

SOMERSET County Council

Interreg 2 Seas Mers Zeeën SPONGE 2020 European Regional Development Fund

ROYAL ACADEMY OF ENGINEERING Ingenious

1 lessons led by engineers

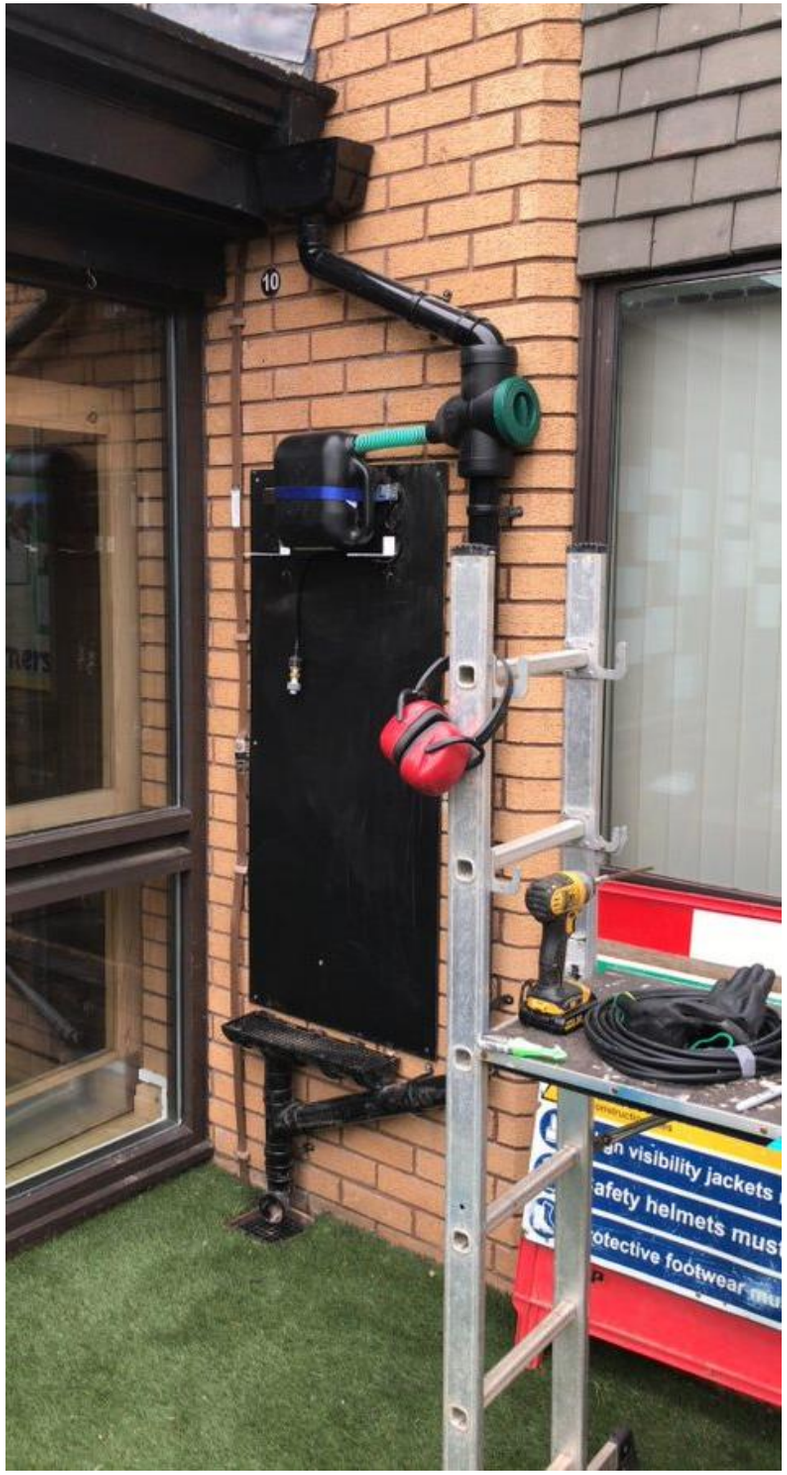
150 children involved

2 SuDS features built

0

Lyngford Park Primary


HOLLY
2



Holway Park Primary


PULL


10

Follow Up

SuDS in Somerset

Review of drainage in the planning process

- **Unique review of SuDS** built through the planning process from design to construction.
- Checked current status of constructed schemes to **assess their performance** and level of maintenance.
- **Findings are being used** to improve SuDS provision in the county through; enhanced **developer guidance**, increased **inspections**, and **showcase sites**.

DESIGN

More information provided with applications over time

74%

of applications included a drainage strategy

FEATURES

Not delivering multiple benefits (environment, amenity)

86%

of designs used ponds or underground storage

CONSTRUCTION

Sites under construction showed poor practice

Siltation, erosion, and pollution damaging SuDS features

MAINTENANCE

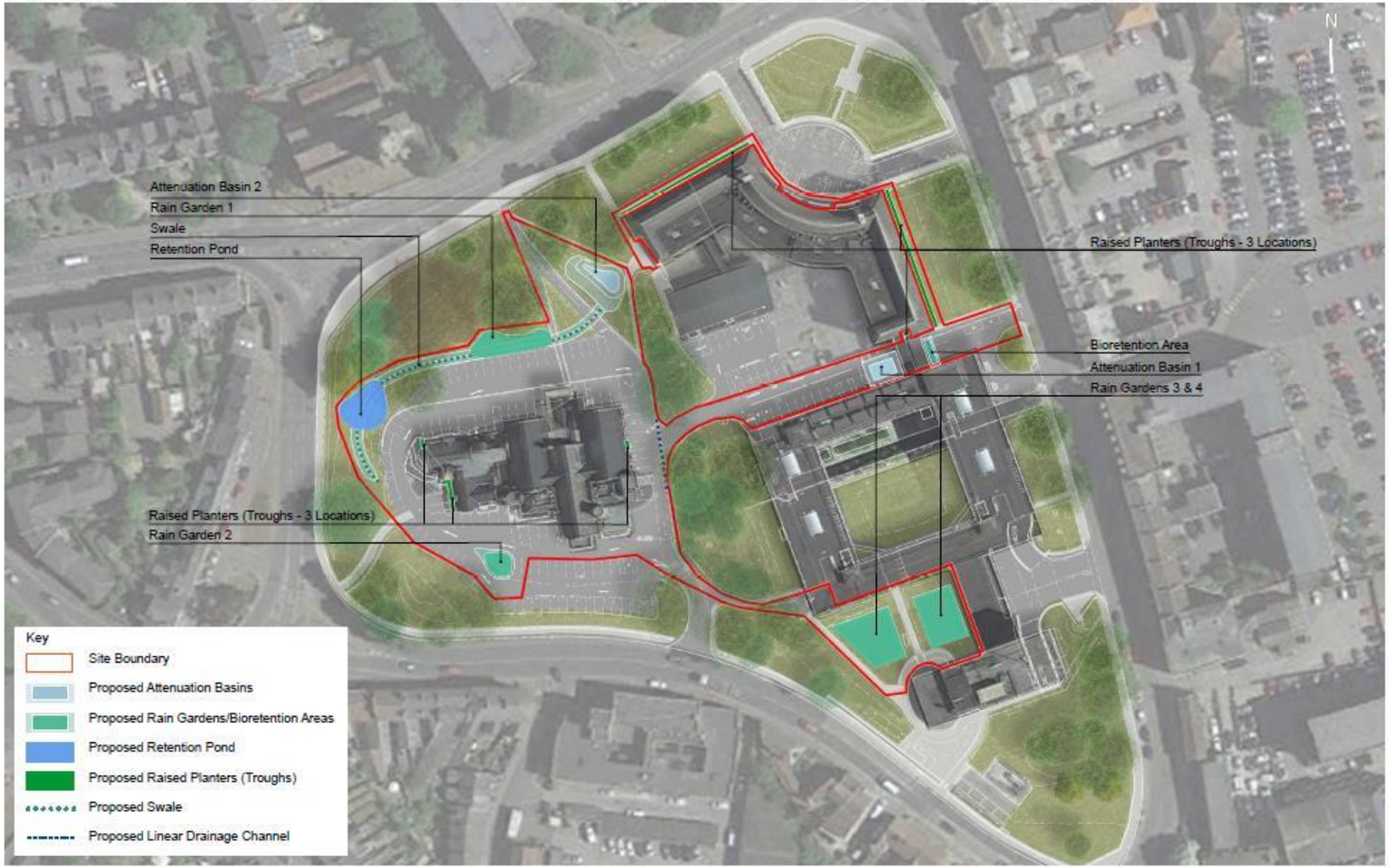
For older developments 6% were in Poor or Very Poor condition

60%

were maintained to a Very Good or Good standard.

Somerset Rivers Authority

PROPOSED SOMERSET COUNTY COUNCIL SuDS RETROFIT LAYOUT PLAN



PROJECT NO.	70058563	PLAN STATUS:	FOR INFORMATION
SCALE	1:1000@A3	DRAWN:	JL
DATE:	September 2019	CHECKED:	MH

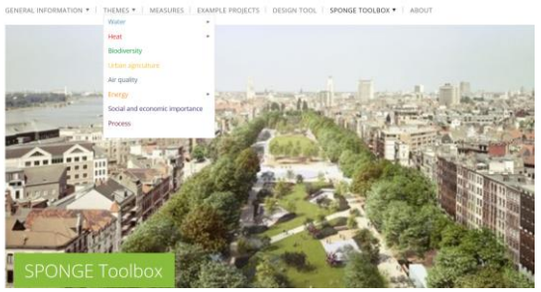
Interreg 2 Seas Mers Zeeën SPONGE 2020

Somerset County Council

Westcountry Rivers Trust

wsp

https://www.urbangreenbluegrids.com/sponge/



http://somerset-sponge.org/

SPONGE2020 and other SuDS Projects in 2020

- Working with Wellsprings school on a process to take them off grid
- Promoting the SPONGE2020 toolbox
- Working with Cornwall County Council on a two year ‘Greening Schools’
- Scoping 2021 onward with SCC

https://wrt.org.uk/project/preventing-plastic-pollution-ppp/