



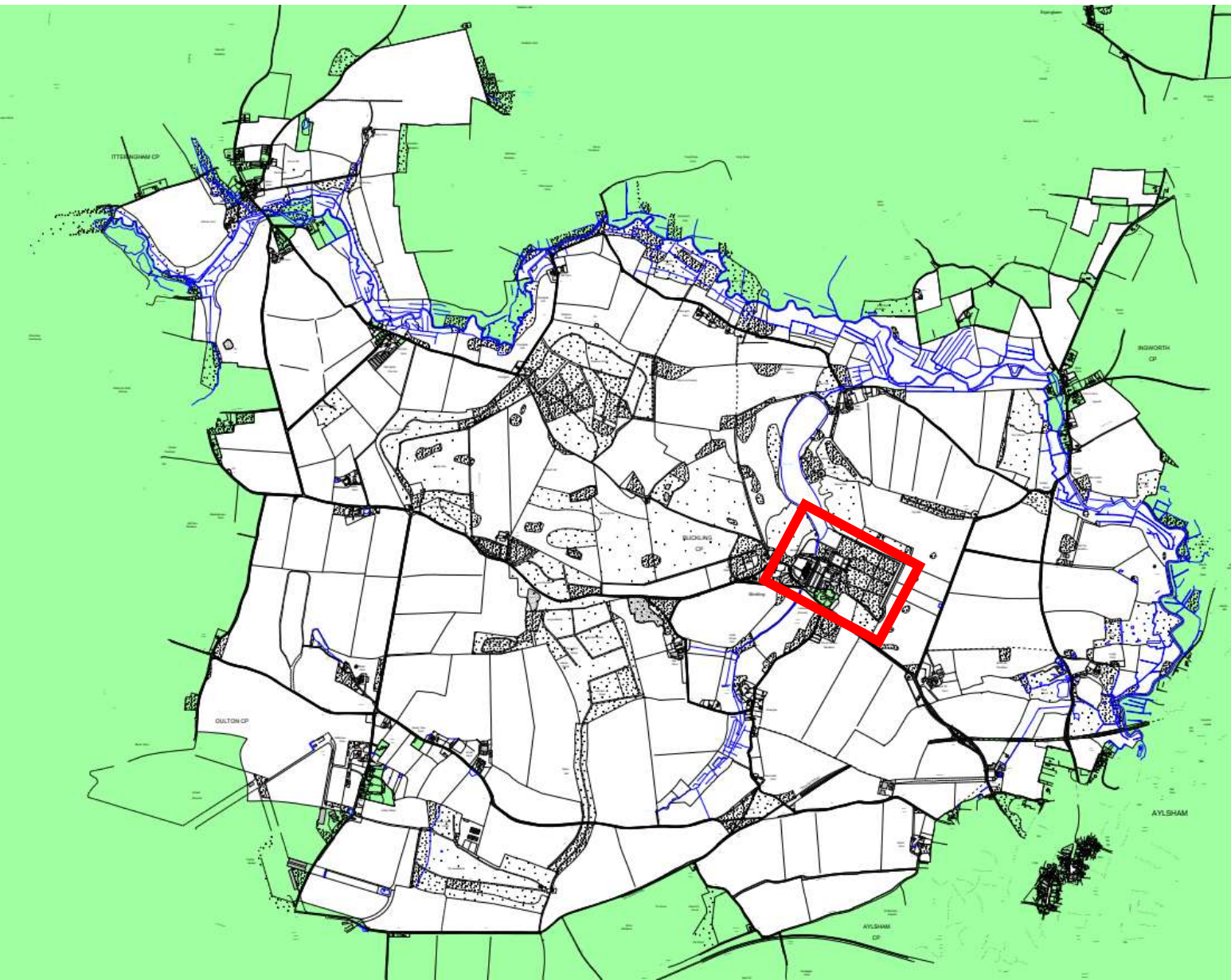
National
Trust

Full Circle Climate Adaptation at Blickling Estate

Heather Jermy, General Manager

Understanding the Context

Blickling: A Norfolk Country Estate



4,600 acre estate

9 holiday cottages

91 residential tenancies

19 commercial tenancies

19,100 collection items

Grade II* Registered Park and Garden

39 listed buildings and structures

Blickling Conservation Area











c. 200,000 visits into pay barrier

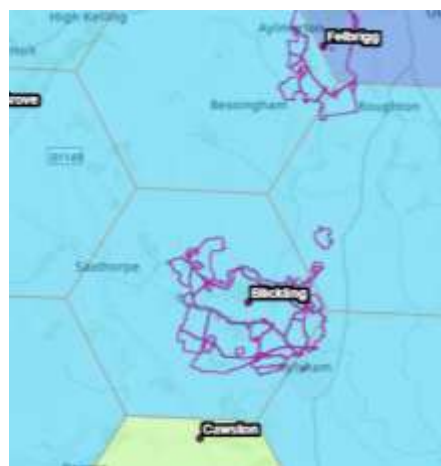
c. 180,000 additional visits to wider estate

Events including Winter Lights, Easter Trail, concerts and agricultural show

Open 363 days a year

Understanding the climate threats

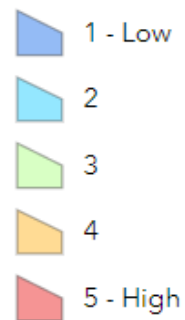
Heat and Wind



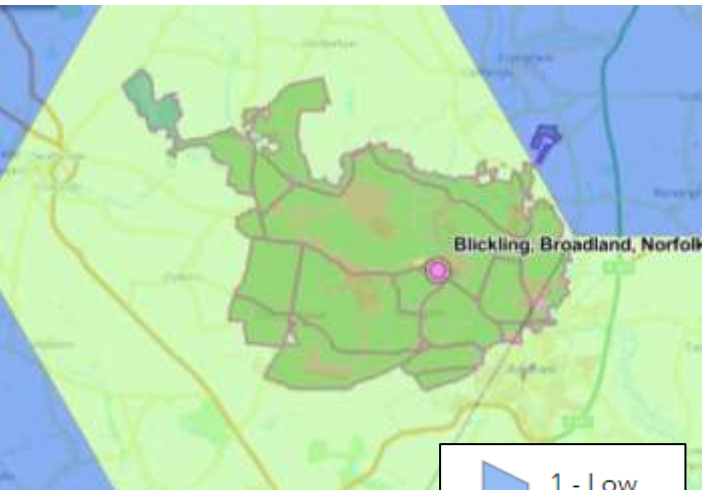
Baseline 2020



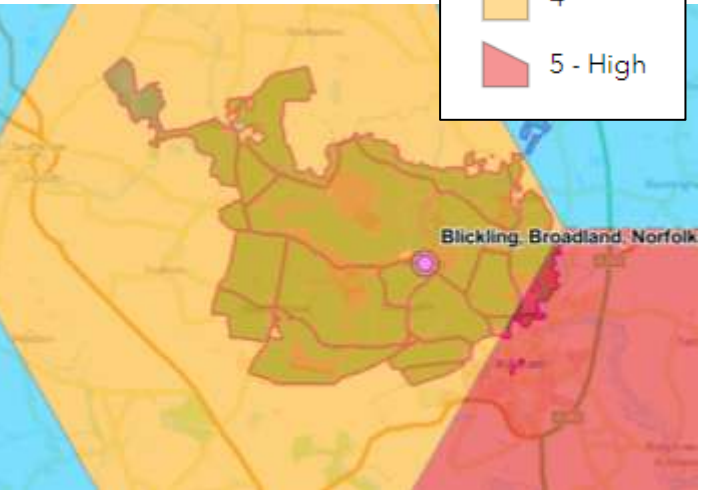
Predictions 2060



Shrink / Swell



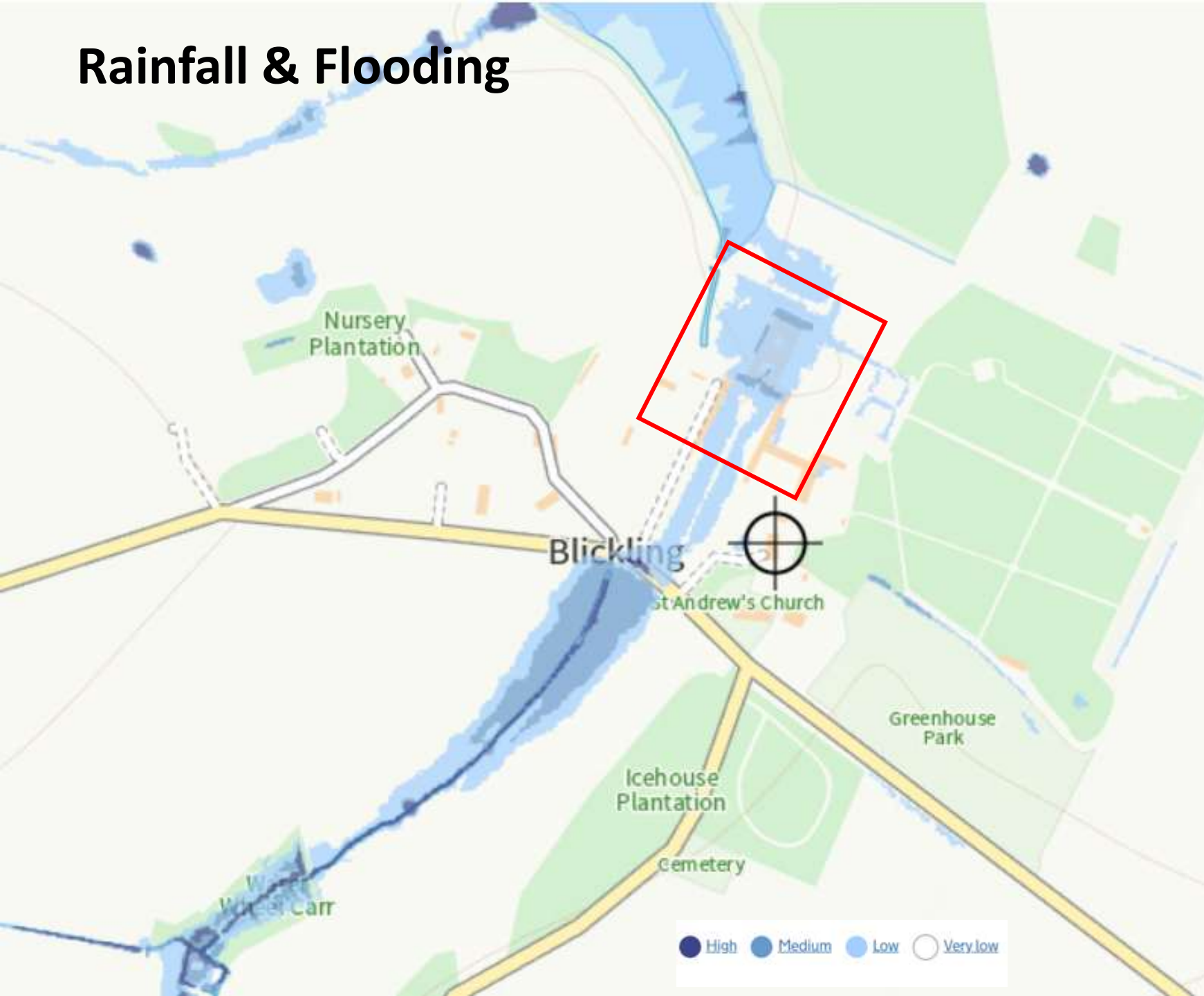
Baseline 2020



Predictions 2060



Rainfall & Flooding



- By 2045, 10% less rainfall.
- Drought will increase, floods will get bigger, and bigger dumps of rain fall between very dry periods.
- Future peak extreme flood could be 60 to 80% higher for the area.
- Water ingress into hall with building and collections at risk.
- Flooding in gardens results in lower visitor numbers.

Rainfall & Flooding



Rainfall & Flooding



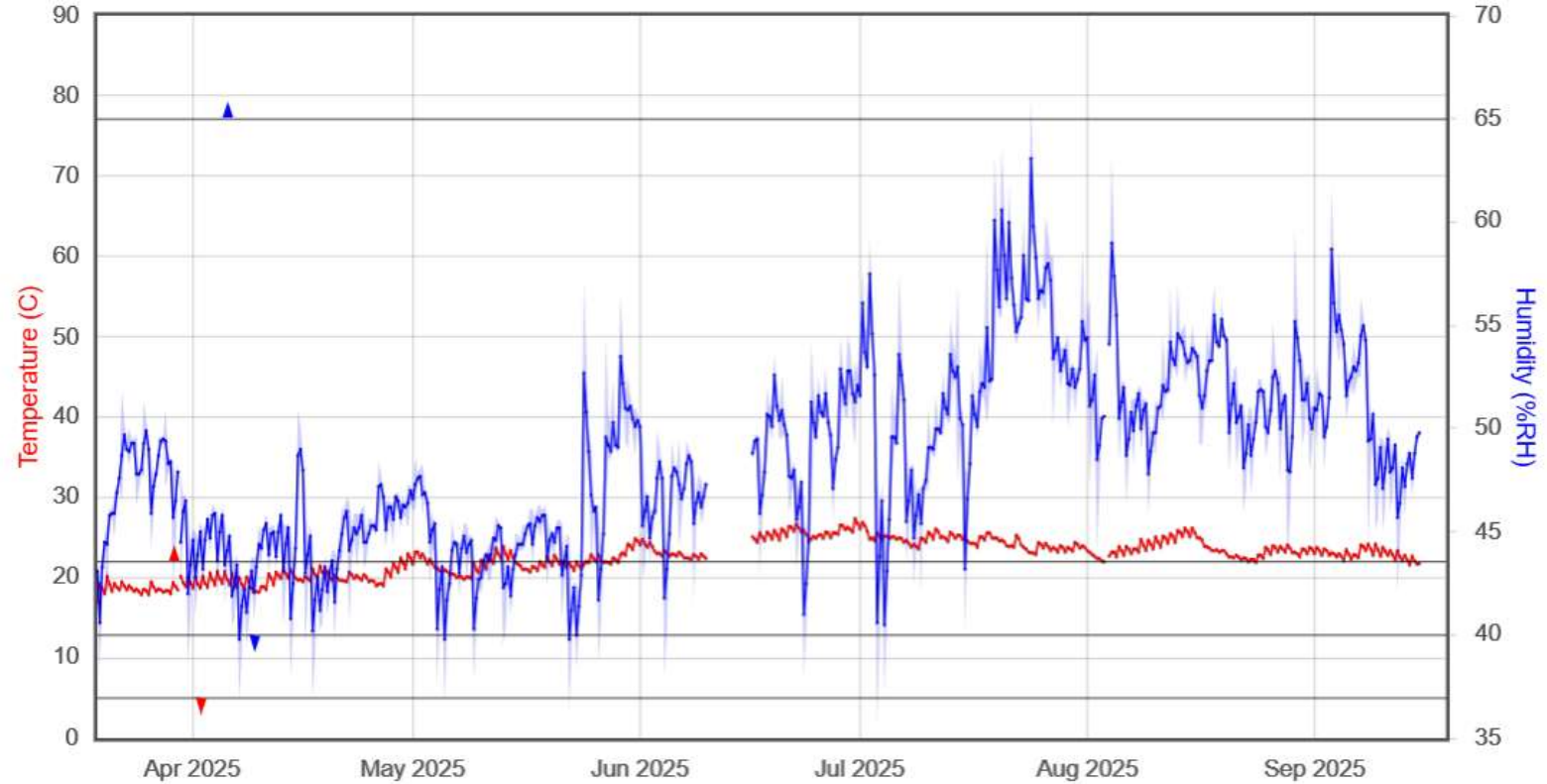
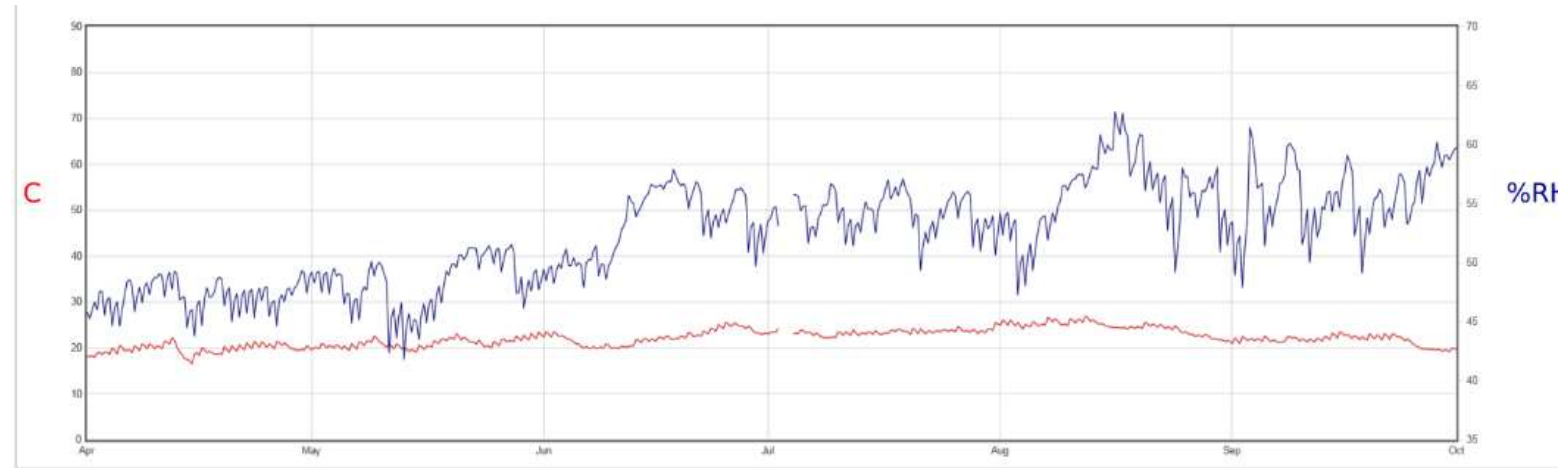
Understanding Threats: Rainfall & Flooding



Property	
Blickling	635
Baddesley Clinton	286
Wimpole	190
Sudbury Hall	111
Shugborough	99
Packwood	97
Stourhead	97
Charlecote Park	84
Gunby Hall	78
Rufford	78
Croome	73



Understanding Threats: Humidity



■ BLI Brown Drawing Room, Temperature (C)
■ BLI Brown Drawing Room, Humidity (%RH)

Climate Adaptation: A Holistic Approach

A holistic approach

Prioritisation

Climate

- Impact
- Likelihood

Condition

- Current condition
- Potential to Decline

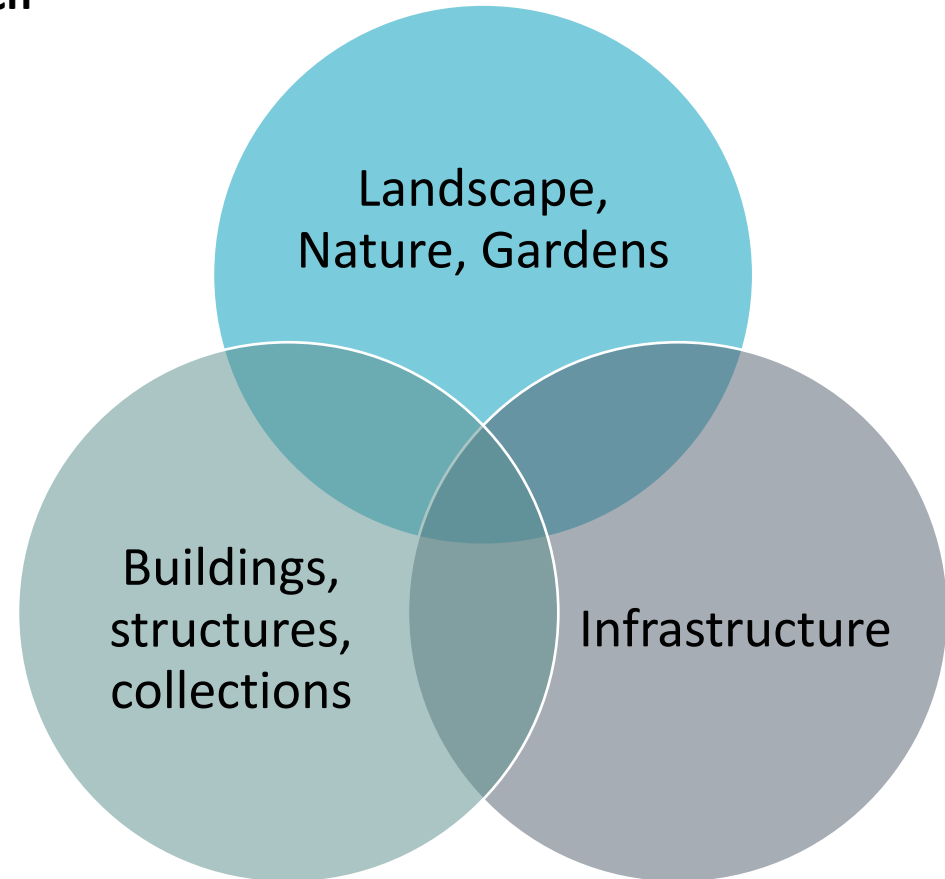
Significance

- Historic & cultural
- Public Benefit

Risk

- Health & Safety
- Reputational

Approach



A staged approach



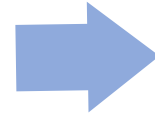
Understanding

- Historic Research
- Surveys & Monitoring
- Risk Assessments
- Recording Observations



Planning

- Feasibility Studies
- Climate risk assessment
- Funding Applications
- Stakeholder Engagement



Implementing & Evaluating

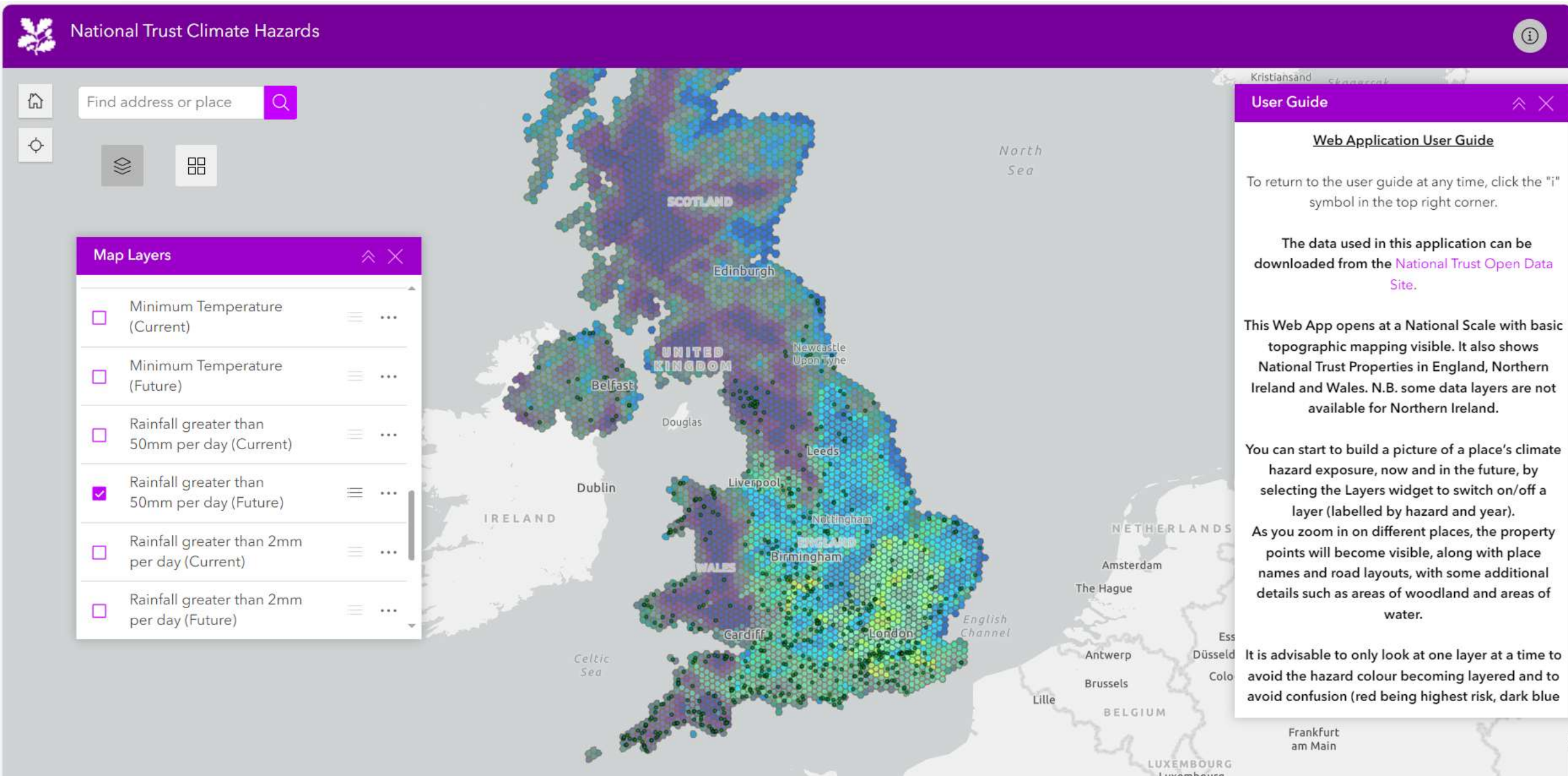
- Working with partners
- Sustainable design tool
- Ongoing monitoring
- Sharing successes

Reactive Change

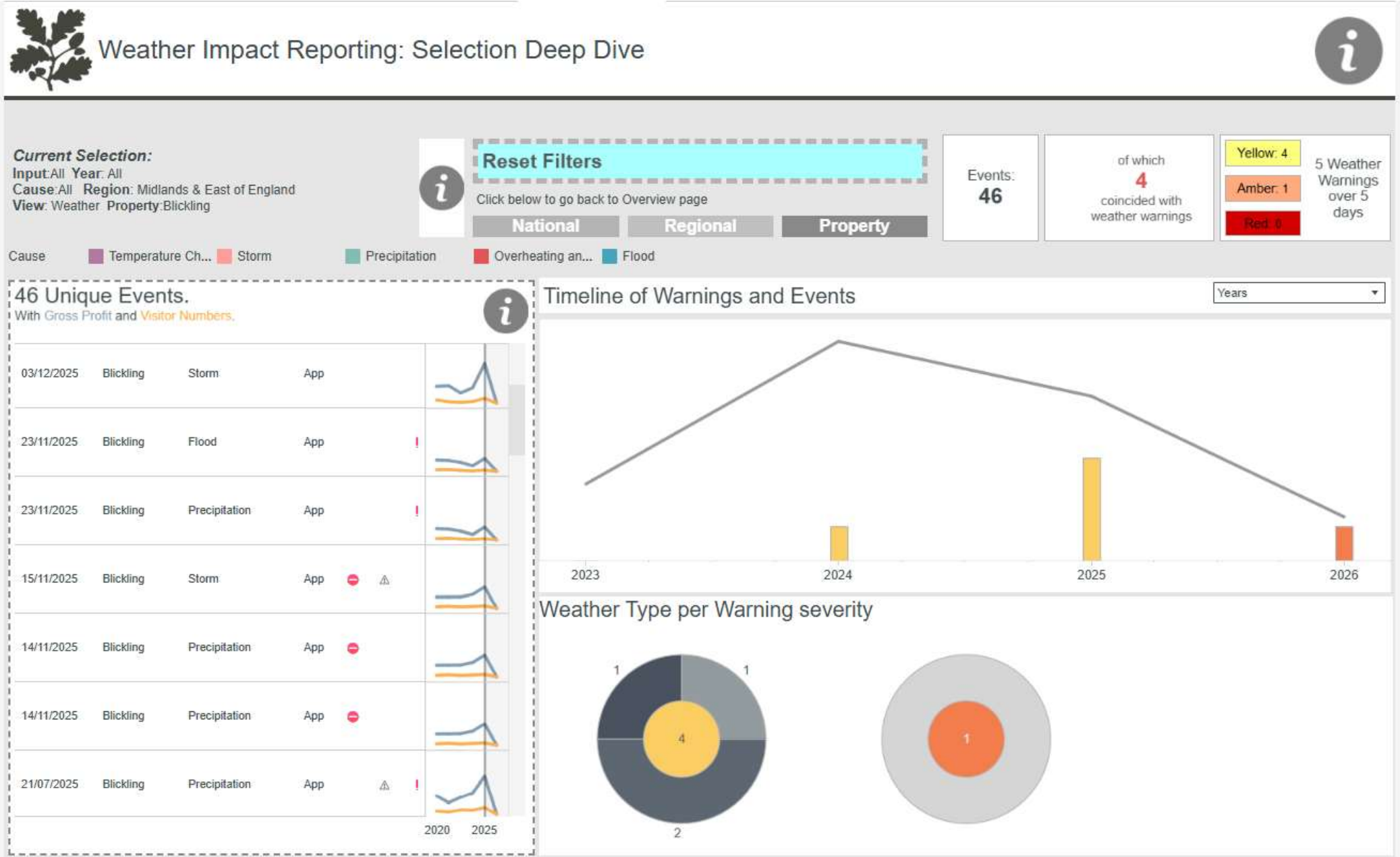
Temporary solutions

Opportunities too good to miss

Identifying Risk & Prioritising



Identifying Risk & Prioritising



Identifying Risk & Prioritising

Climate hazard	Cause and effect	Impact	Likelihood	Risk level	Details of hazard climate / weather drivers	Exposure considerations	Vulnerability / sensitivity	Adaptation options
Flooding	Drainage capacity to get water away from the building	4	3	12	Flooding caused by prolonged periods of rainfall over days/weeks or short, intense periods of rainfall over hours. Leading to fluvial and pluvial (surface) flooding, and groundwater flooding.	Specific factors to consider at Blickling: Proximity to lake, moat, presence / absence of hard-ground surfaces, local geology.	Specific factors to consider at Blickling: Structural integrity of the building fabric; State of maintenance/repair; Materials used; State of maintenance/repair of local drains/water management systems; Presence/absence of people on site	• Ensure soakaways and drainage are maintained and rainwater goods leading to these are clear and well maintained. • Attend culverts; ensure clear route for surge water flows around building; • Flood evacuation plans in place; • Change the layout of buildings to lower impact (e.g. moving sensitive services high off ground) • Maintenance strategy and plan implementation
Storm damage - wind	High-impact debris, rainwater goods loosened/dislodged	3	1	3	Changing patterns of extreme weather events including high winds and low pressure systems. Increased likelihood of storm events	Specific factors to consider at Blickling: Topography; Soil types; Exposure to prevailing weather systems; Tree species used and their tolerance of extreme weather events.	Specific factors to consider at Blickling: Type of plant/tree species and its resilience to high winds; Season (trees in full leaf more prone to damage); Proximity to trees; State of repair/maintenance of built fabric;	• Monitor and remove tree limbs and possibly crown reduce high-risk trees adjacent to, or overhanging roofs and buildings, clerk of works checks during conservation works, to improve fixings if insufficient. • Additional fastenings to ridges and slates; Higher codes of lead; Improved weathering details; Increased frequency of inspection, maintenance and repair cycles
Storm damage - high intensity rainfall	Debris build up, overtopping of rainwater goods and lead flashing, pooling causing water ingress, overflowing of outfalls and drainage	3	1	3				
Heat	Increased thermal stress causing damage to external fabric, cracking of hard materials e.g expansion of lead	2	4	8	Rapidly fluctuating temperatures over hours/days. Increasing temperatures across all seasons. More extreme variations in temperatures. Heatwaves.	Specific factors to consider at Blickling: Topography, Orientation, site aspect (certain aspects more exposed to solar radiation)	Specific factors to consider at Blickling: Structural integrity of the building fabric; Materials used; State of maintenance/repair	

↑
Risk Level

		IMPACT				
		very low 1	low 2	medium 3	high 4	very high 5
LIKELIHOOD	very high 5	5	10	15	20	25
	high 4	4	8	12	16	20
	medium 3	3	6	9	12	15
	low 2	2	4	6	8	10
	very low 1	1	2	3	4	5

Planning: Priority Projects

01 LANDSCAPE AND DRY MOAT SURFACE WATER DRAINAGE

Objectives

- Efficient and clear surface water drainage system
- Separation of the Parterre system from the Dry moat
- Controls of water levels of lake and use this as a storage vessel.

To Address

- Flooding of the dry moat
- Blockages and restrictions of surface water systems
- Attenuation of rain water during high frequency events

Delivery Mode

- Surveys
- Feasibility Study
- Capital Projects

02 CONSERVATION OF CLOCKTOWER

Objectives

- Address the defective condition of the fabric
- Replace poor rainwater detailing and manage rainwater disposal
- Safe access to facilitate future maintenance to avoid dilapidation

To Address

- Defective fabric
- Poor rainwater detailing
- Lack of access to maintain the fabric

Delivery Mode

- Surveys
- Feasibility Study
- Capital Projects

03 BUILDING AND ROOFSCAPE SURFACE WATER DRAINAGE

Objectives

- Ensure roofscape drainage is sufficiently channelled to the surface water system
- Increase the size and quantity of rain water goods to suit surges
- Remove internal rain water goods

To Address

- Internal water ingress
- Outdated rain water strategy for the building due to climate change manage and attenuate greater volumes of rainwater
- Prevent rainwater damaging internal fabric

Delivery Mode

- Surveys
- Feasibility Study
- Capital Projects

04 REROOFING REPAIRS

Objectives

- Ensure watertight roofs
- Repair defective structures
- Safe access to roof scapes

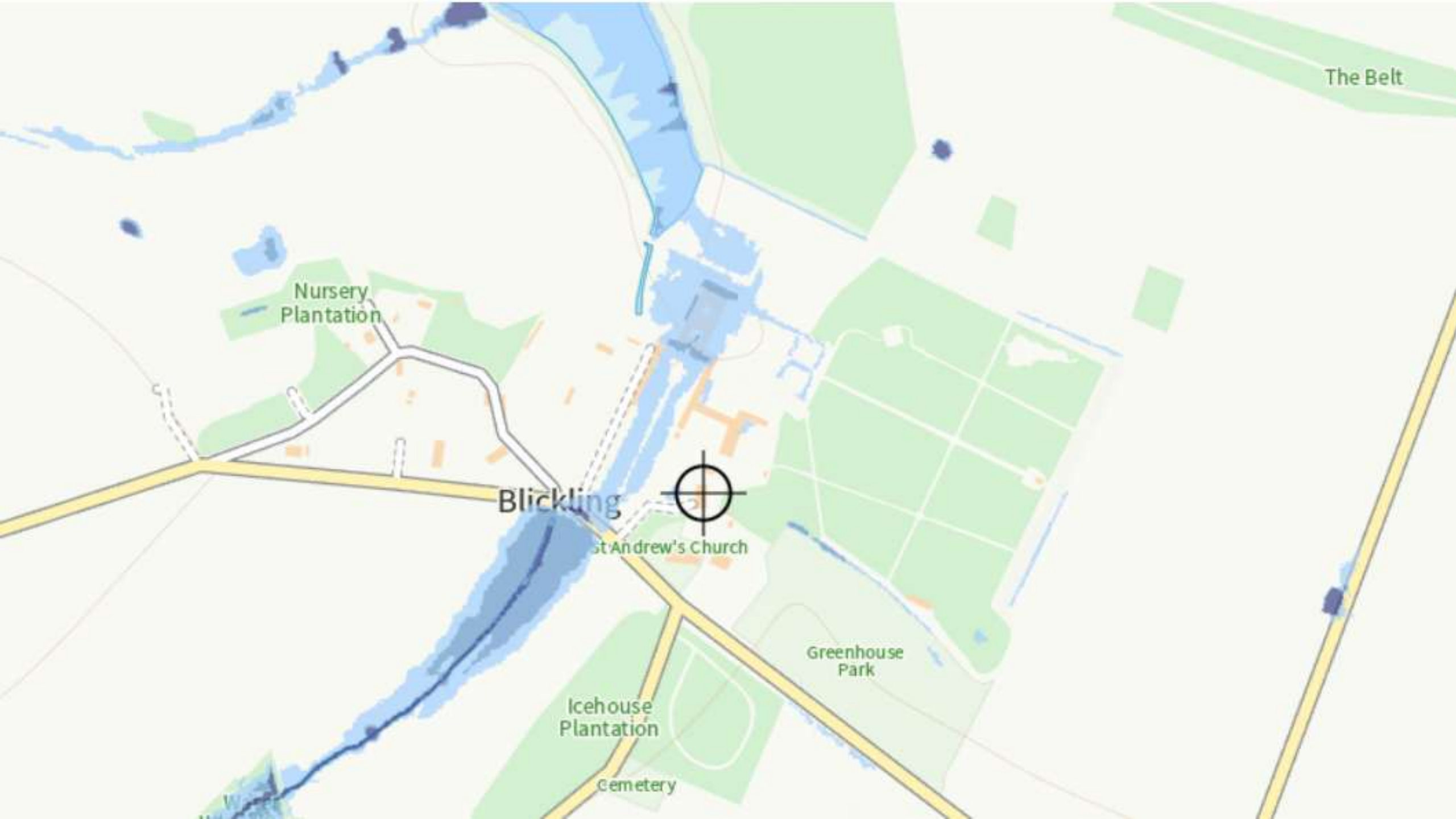
To Address

- Lack of roof membranes and susceptible detailing
- Risk of structural failures
- Future build-up of maintenance backlog

Delivery Mode

- Surveys
- Feasibility Study
- Capital Projects

Case Study:
Water Management
Phase 1



The Belt

Nursery
Plantation

Blickling

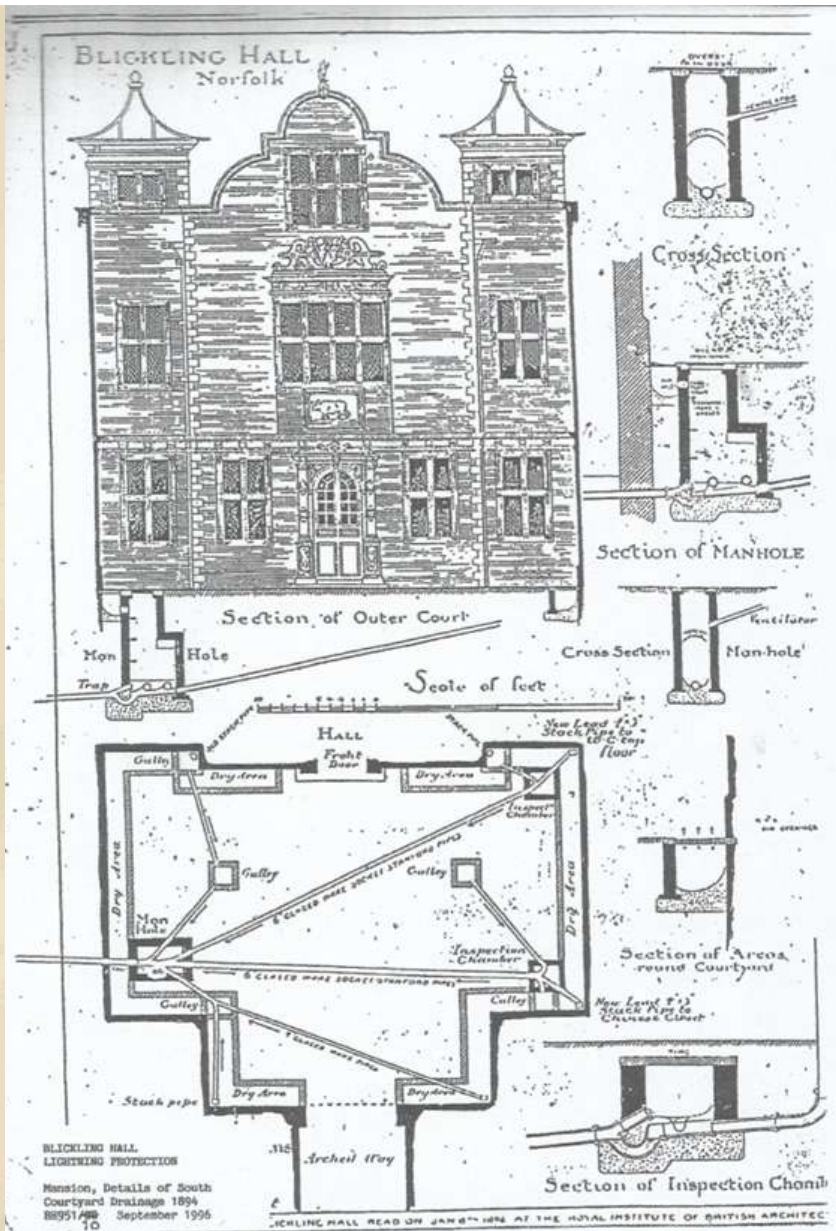
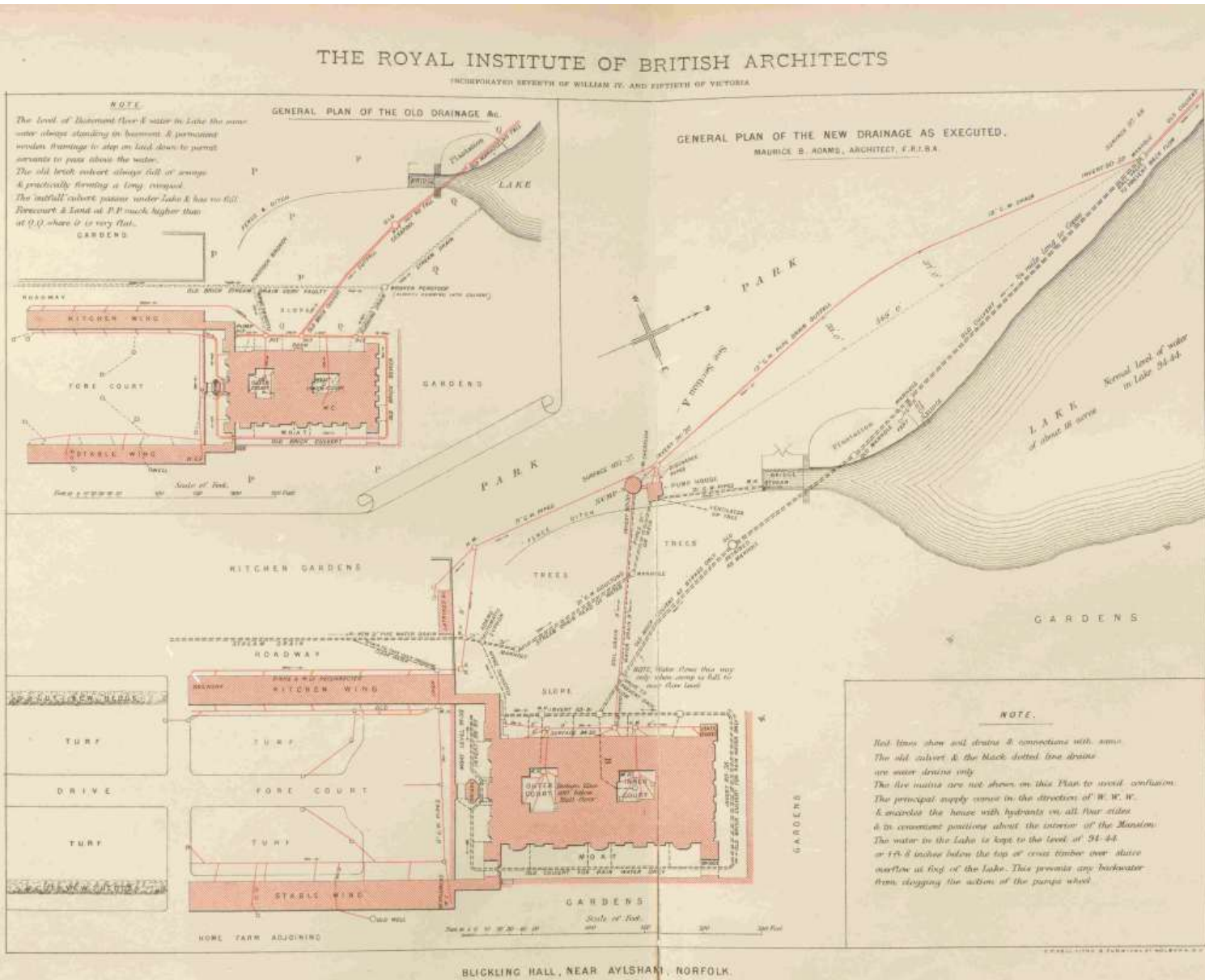
St Andrew's Church

Greenhouse
Park

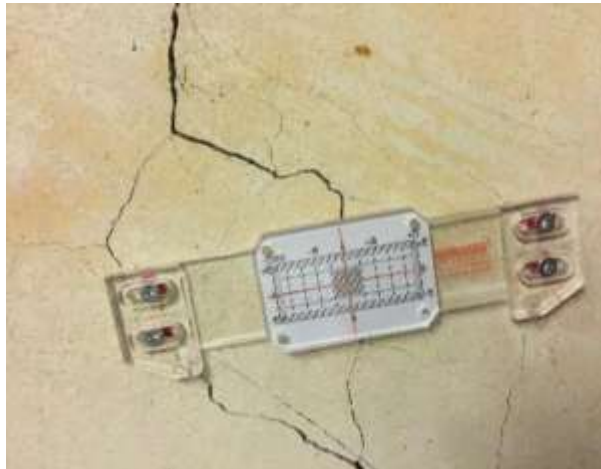
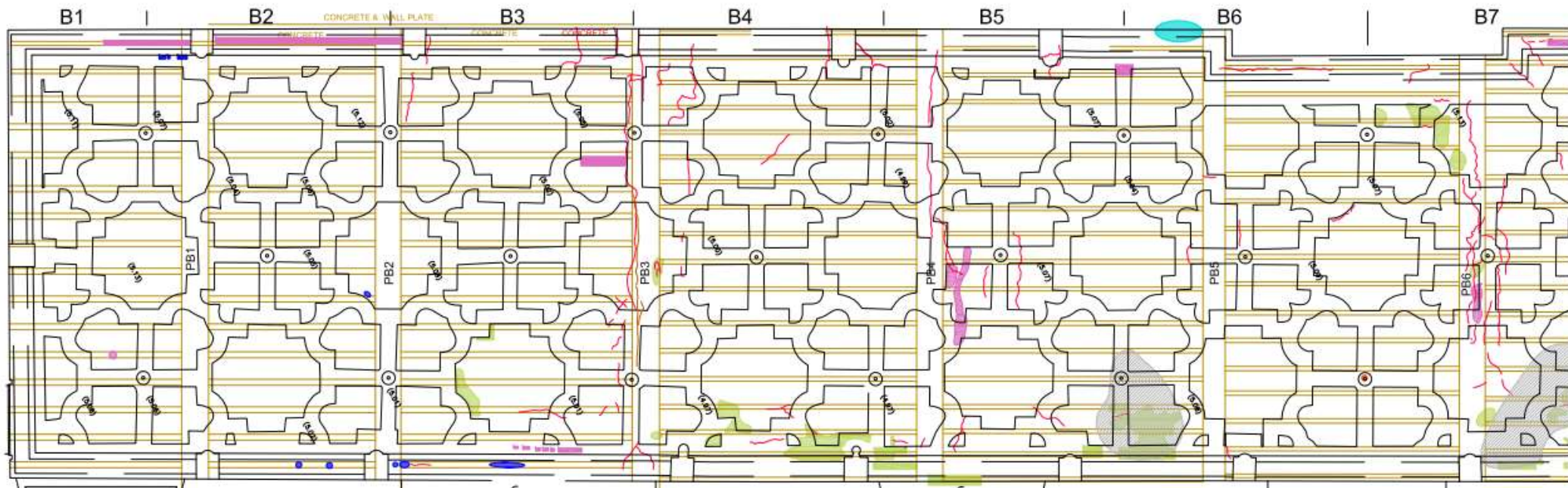
Icehouse
Plantation

Cemetery

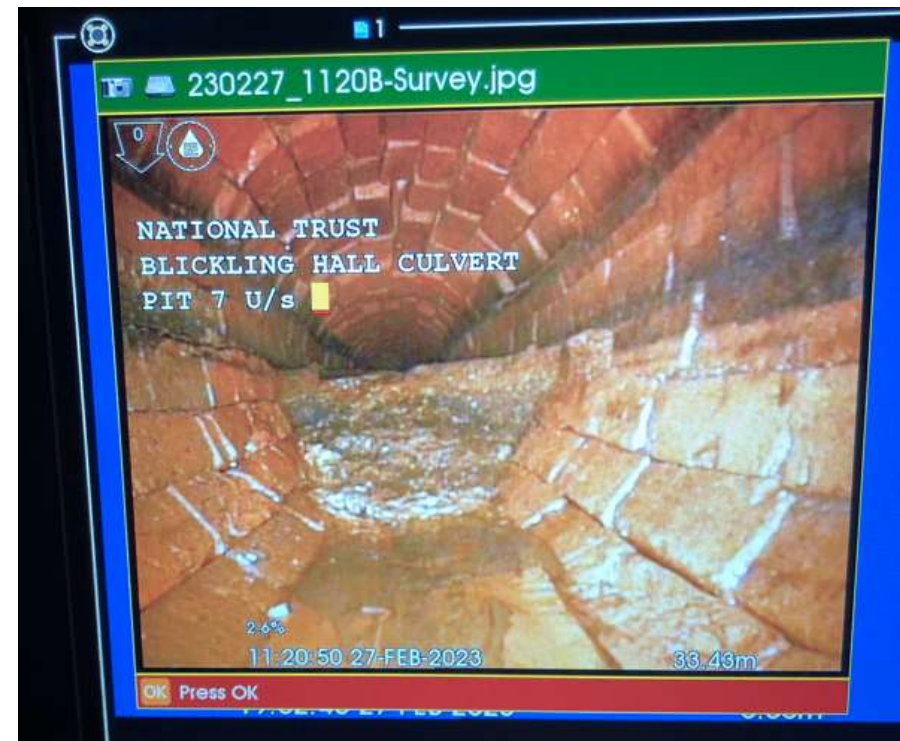
Research & Assessment



Research & Assessment



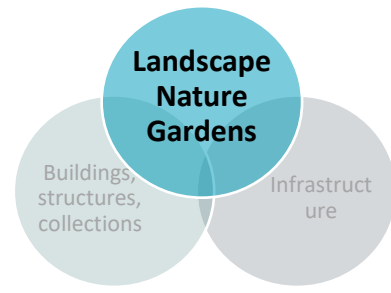
Research & Assessment



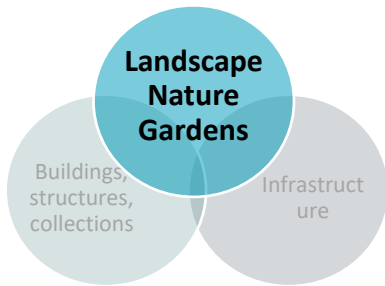
Research & Assessment



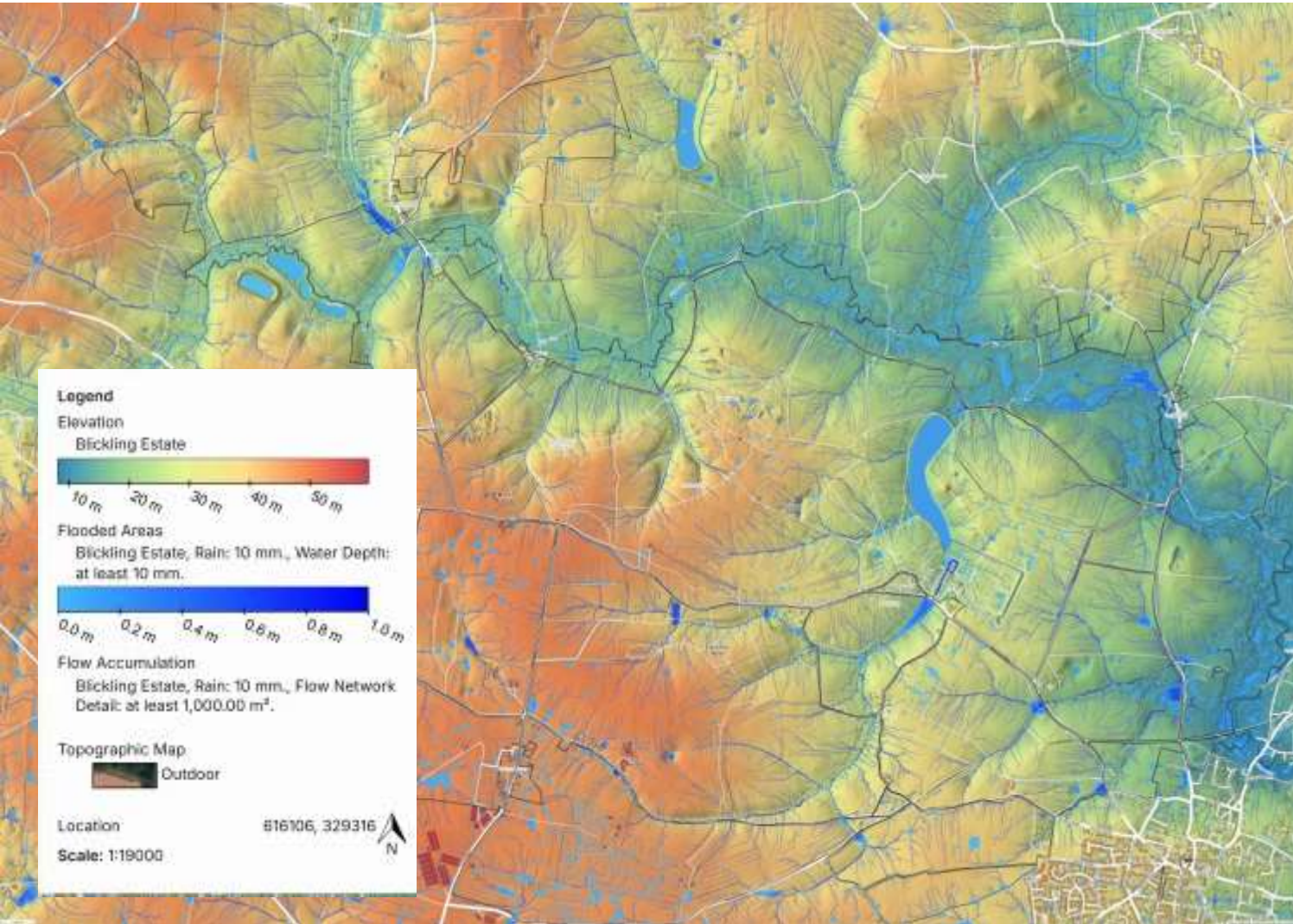
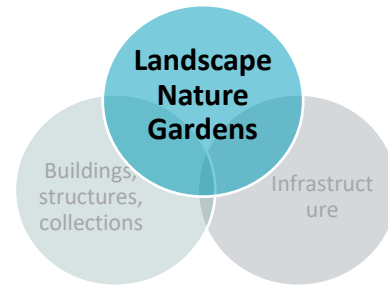
Finding Solutions: Nature - based



Finding Solutions: Nature - based



Finding Solutions: Nature - based



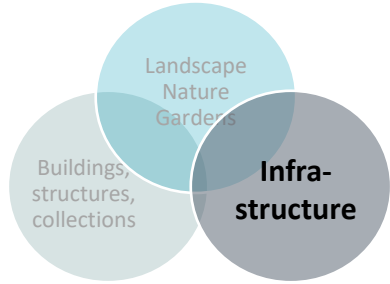
Current summer wetness in yellow and potential summer wetness in red (if restoration options carried through).



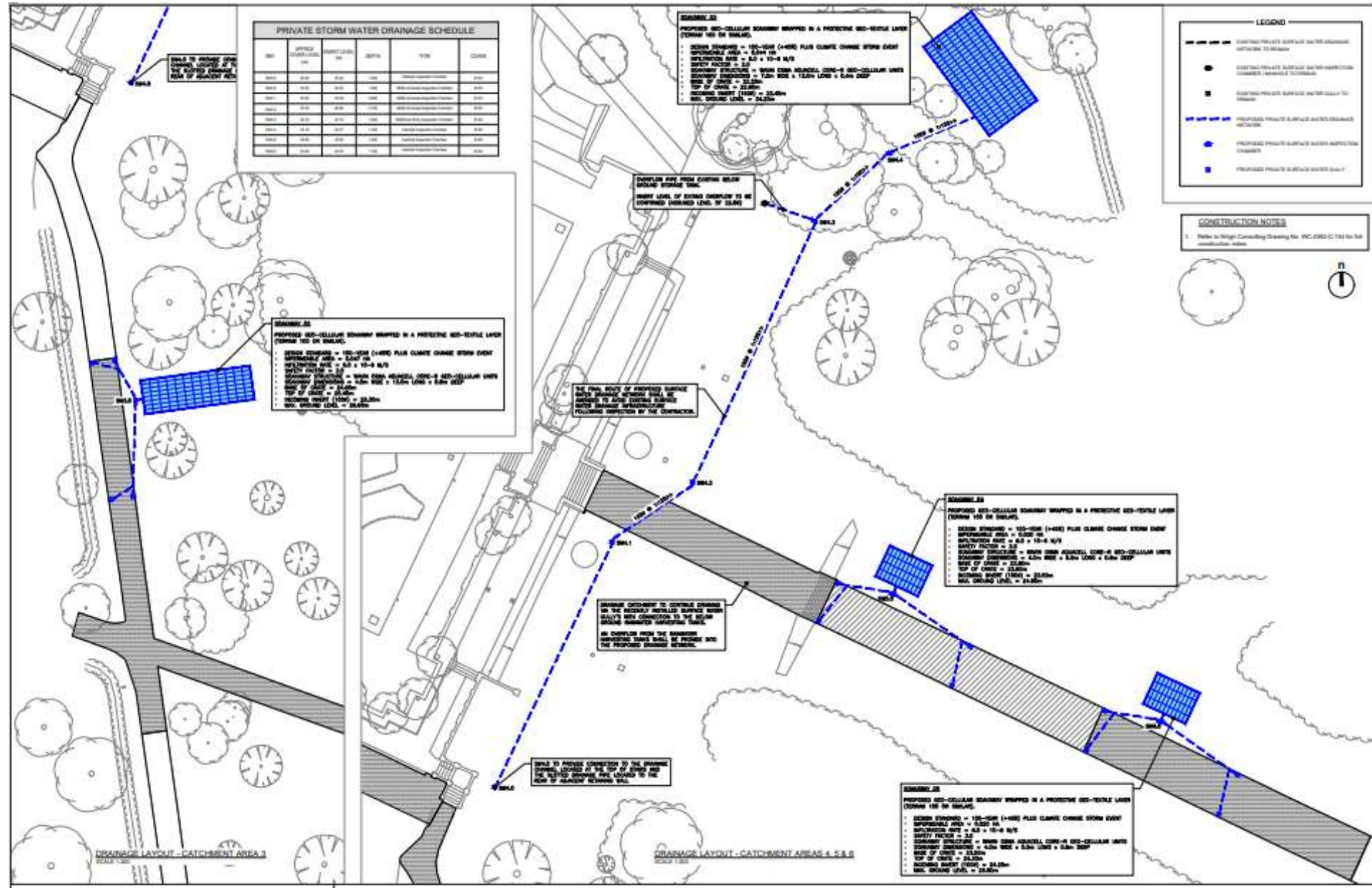
Current winter wetness. Potential for much greater floodplain storage through embankment removal and channel restoration.



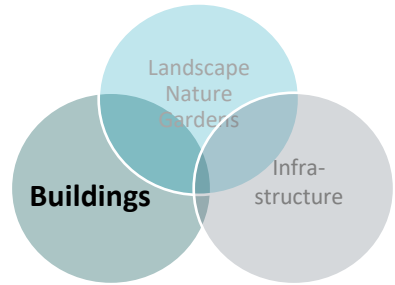
Finding Solutions: Infrastructure



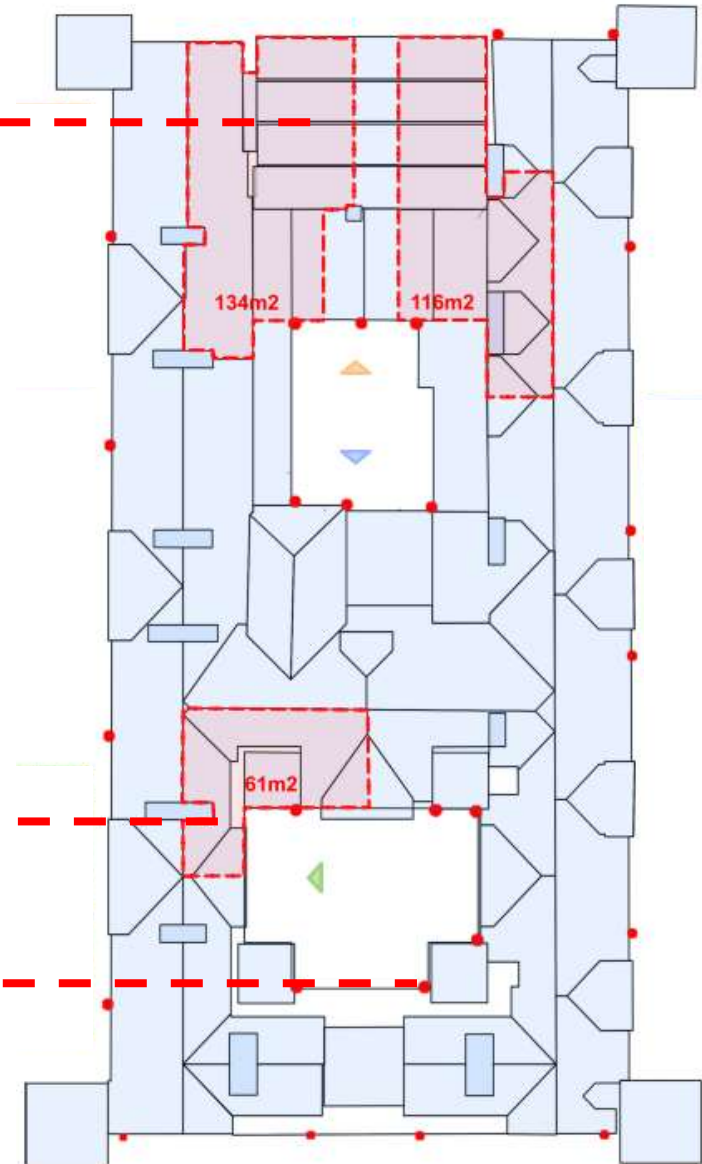
A Venn diagram with three overlapping circles. The top circle is light blue and contains the text "Landscape Nature Gardens". The bottom-left circle is light grey and contains the text "Buildings, structures, collections". The bottom-right circle is dark grey and contains the text "Infrastructure". The circles overlap in various combinations, but no text is present in the intersection areas.



Finding Solutions: Buildings

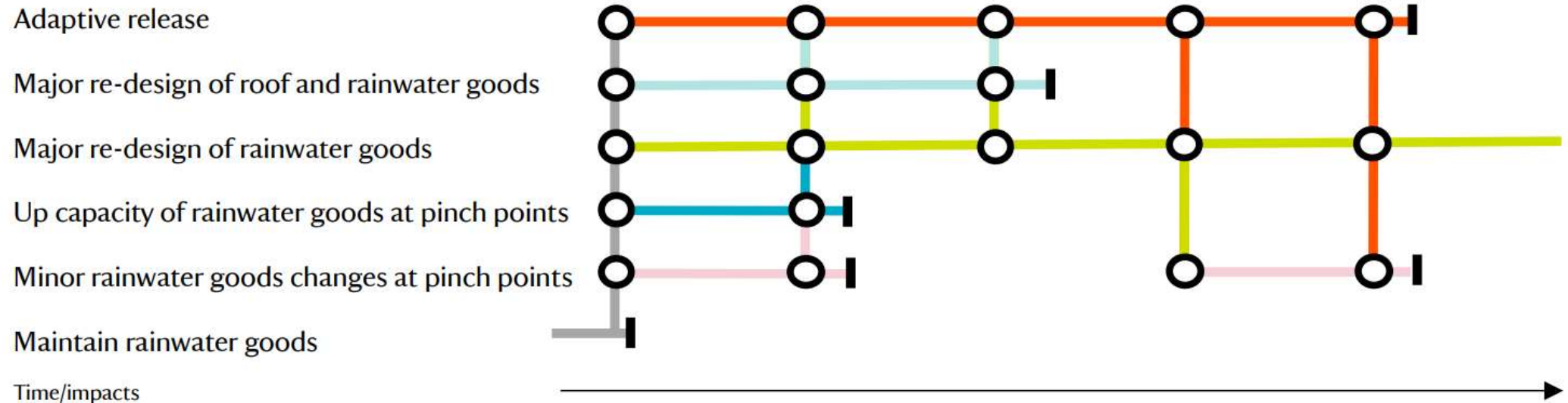


Rainwater Goods



Finding Solutions: Buildings

Rainwater Goods – Climate Adaptation Pathway



○ = a point where you can change approach

■ = a tipping point where you are **forced** to change approach because the current course of action ceases to be effective

<https://www.intro.org/new-national-trust-climate-change-adaptation-guidance/>

Finding Solutions: Engaging visitors



Visitor comments used the words *enjoyed*, *loved* and *liked* more than another other descriptive words.

The words *learnt* and *know* came through too, which shows that visitors were engaging with the interpretation and activities.

Finding Solutions: Engaging visitors



Restoring the lake wall

We're doing some conservation work to the north end of the lake wall, uncovering a part of Blickling normally hidden underwater. A sluice gate in the wall usually allows us to control the level of water in the lake but this is broken and needs to be replaced. Water is also leaking from the lake through cracks in the wall into nearby land. We'll be installing a temporary dam to hold back the water and enable essential repairs to the wall and sluice gate. Conservation work will start at the beginning of September and continue until December 2023.



Where can I walk?

The north end of the lake will be closed on the 'lake walk' and 'Brady's walk' routes, but you can follow the east and west sides of the lake 'out and back' instead.

Where can I fish?

The fishing platforms on the east side of the lake and Fisherman's car park will remain open.

This project has been part funded by a gift in a will from a former volunteer at Blickling. To find out more about supporting our work with a gift in your will please visit: nationaltrust.org.uk/giftsinwills

Conservation

Conversations



Blickling Estate NT

December 27, 2023 · 🌐

We're happy to announce that the popular Lake Walk is now fully open, following the completion of work to restore the dam wall and sluice gate.

The restoration project included meticulous re-pointing and replacement of failed bricks along the dam wall to ensure the longevity and strength of the wall. Alongside this work, Blickling's dedicated volunteer engineers used their valuable skills to refurbish the the sluice-gate mechanism, which helps control the water levels of the lake and prevents unexpected flooding to the surrounding land.

Blickling Estate's General Manager, Heather Jermy, explained: "We are grateful for the dedicated work and expertise the volunteer engineers have contributed to this vital restoration project, which has been part-funded by a gift in a will from a former volunteer at Blickling."

Read more about the project here: <https://bit.ly/LakeWallRestoration>

#conservationinaction #lakewalk #legacy



The Power of People together: INTO Withstanding Change

The Withstanding Change Project

As part of the **International National Trusts Organisation's 'Withstanding Change' project**, National Trust places twinned with project partners in East Africa and the Middle East to learn together about adapting heritage sites to the impacts of climate change.



The Withstanding Change Project



Semei Kakungulu, Mbale, Uganda.



Addis Ababa Rose Garden.



Old Customs House in Stone Town



Bayt al-Jaghbeer, Assalt



Stourhead



Mottisfont & Hinton Ampner



Llyn Peninsula & Penrhyn Castle



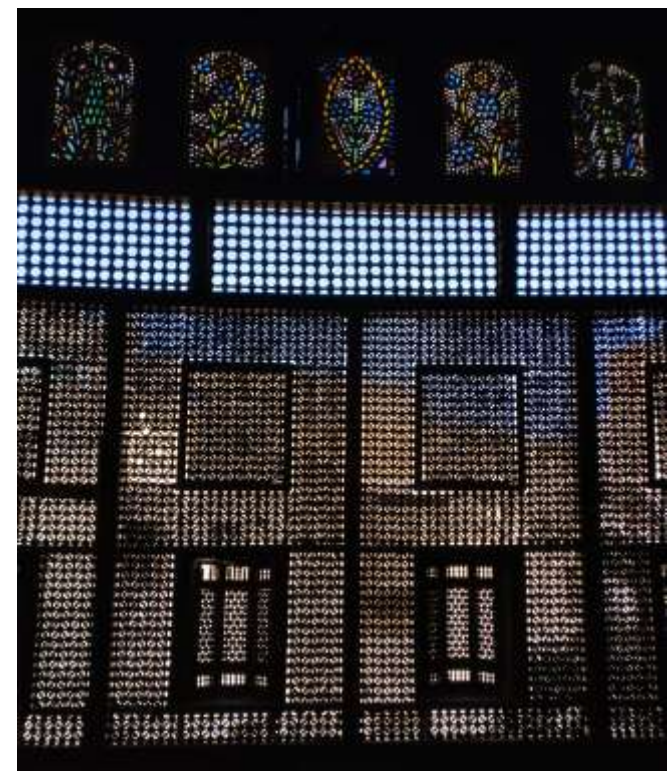
Coleshill & Buscot Estates

Bayt al- Razzaz, Historic Cairo

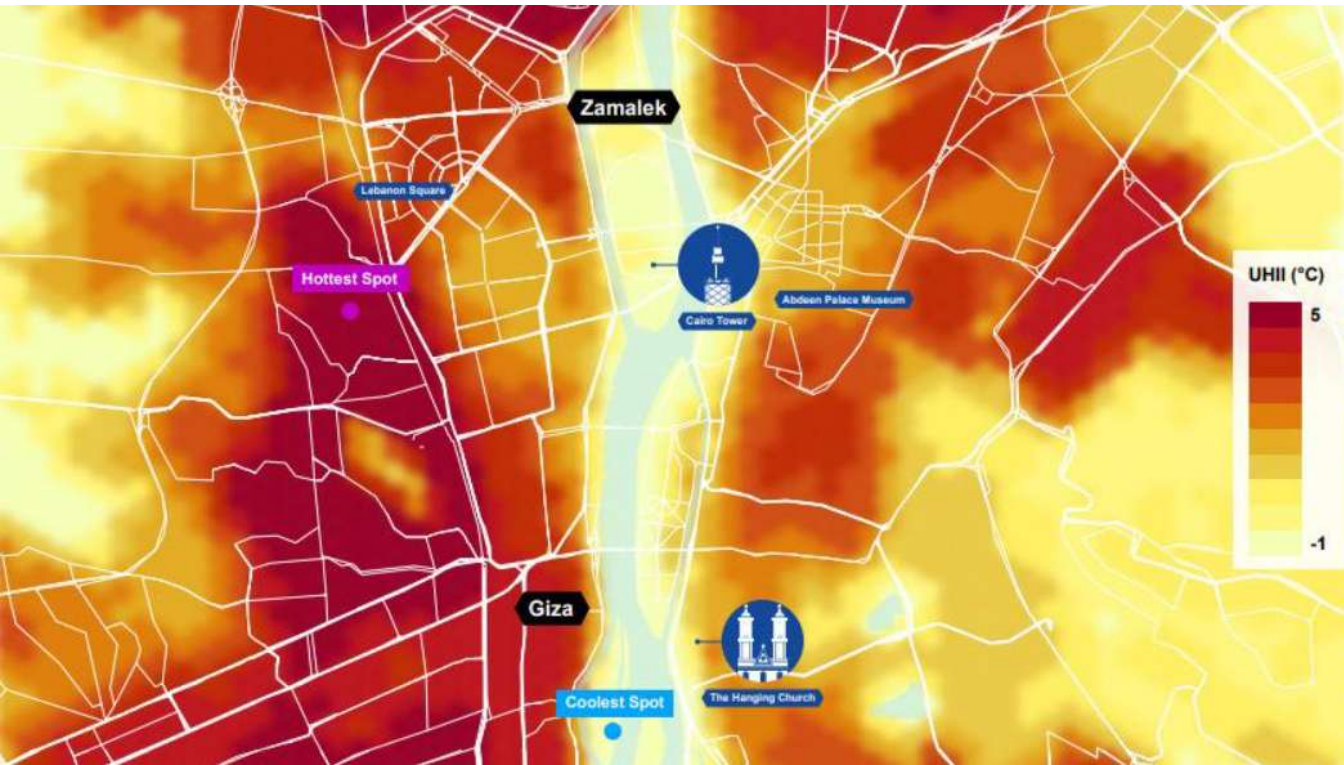


Bayt al- Razzaz, Historic Cairo





Shared Climate Impact







BEYOND BORDERS

The effects of climate change transcend national borders. That's why the National Trust has embarked on an exciting knowledge and skill-sharing twinning programme with five international heritage organisations in the Middle East and East Africa

By Sally Palmer



Be first to hear more from Heather, Omniya and others in a new National Trust podcast that's specially linked with this article. It's due for wider release in November, but we've made it available early for members. Scan the QR code or visit link.chnl.com/NTP143-mag





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