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Bath Quays Waterside : Flood Defence Project

Introduction

Introduction

Bath & North East Somerset Council and the Environment Agency are working together to provide a very important infrastructure project. It will provide flood defences for parts of the city centre that will also begin to build a positive relationship between Bath's city centre and the River Avon.

The Bath Quays Waterside Project will put in place essential flood mitigation and defence works to the north and south banks of the river between Churchill Bridge and Midland Bridge that address the negative impacts of climate change. In summary, these interventions will:
• Reduce existing and future flood risk to the Lower Bristol Road and 60 properties on the South side of the river through the provision of new flood defences;
• Provide the flood mitigation to enable the redevelopment of the Bath Quays and Manvers Street sites forming the first step towards the realistion of the Bath City Riverside Enterprise Area and the Council's 'Innovation Quays' project.

While the Project was started as a flood mitigation and defence project, it is also a major opportunity to overcome the city's history of turning its back on the river. The project seeks to significantly enhance the riverside, creating better access and a more beautiful and enjoyable environment for local people and visitors to the city.

The Council and Environment Agency are funding these essential works with a combination of Flood Defence Grant and Revolving Infrastructure funding made available by West of England Local Enterprise Partnership.

Transforming the Riverside

These works form the first step towards the realisation of the Bath City Riverside Enterprise Area. This project is part of the preliminary engineering works to enable redevelopment of Avon Street carpark and the former Newark Works to jointly form part of a new and exciting business destination - Innovation Quays.

The Bath City Riverside Enterprise Area and the subsequent Innovation Quays project offer the potential to radically transform this area through the creation of a major new waterside place. The projects include upper and lower level river promenades, a defined cycle route, natural landscaping and ecology, a large riverside public space offering opportunities for outdoor performances and events, and greater opportunities to hold activities on the river. The new environment will provide an attractive and playful waterfront for Bath that can be used and enjoyed by thousands of people all year round.

Through facilitating the development of Innovation Quays, Bath Quays Waterside will contribute to the delivery of the Bath City Riverside Enterprise Area and the creation of around 3,600 new homes, 650,000 square feet of new workspace and up to 9,000 new jobs for local people.

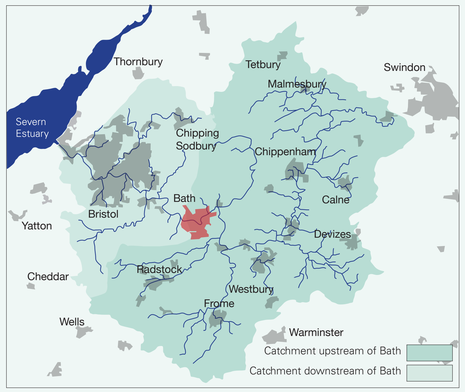
The River

The River Avon in Bath is an integral part of the city's character. It forms a "green ribbon" which threads through the city, linking the surrounding hills with the city centre. At Pulteney Weir and Parade Gardens it provides a focus for relaxed riverside strolling. In the past, the river here was a setting for regattas and other entertainments.

Downstream, Bath's industrial development has left a legacy of distinctive waterside warehouses. The riverside environment is an underused asset in the city centre, with the potential to make a major contribution to the City's future.

(below) Bath waterside in the past. Images courtesy of Bath in Time

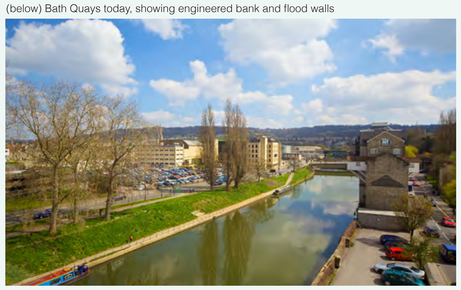
The River Avon in Bath



The River Avon flows through Bath in a steep-sided valley on its way to Bristol and the Severn Estuary. Upstream of Bath the river drains an extensive catchment area. Flooding was a frequent occurence in Bath until the 1970's when extensive flood prevention works were completed.

(above) Plan showing River Avon and Bath city centre

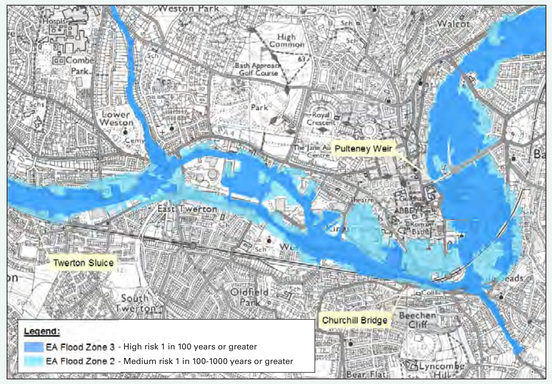
(below) Bath Quays today, showing engineered bank and flood walls



Flooding in Bath

The existing defences along Green Park Road and Lower Bristol Road were completed in the 1970s. The defences have a 1 in 50 chance of being overtopped every year in a flood event. This is a relatively high risk of flooding compared to other cities in the UK. The proposed redevelopment of the Lower Bristol Road area requires the risk of flooding to be reduced even further. In terms of planning policy, the flood defences need to be raised so that the annual chance of them being over-topped is less than 1 in 100, including the increased risk from forecast climate change.

(top right) Flood event in Bath city centre in 1960's
(right) Flood event at Bath North Quay, Winter 2014

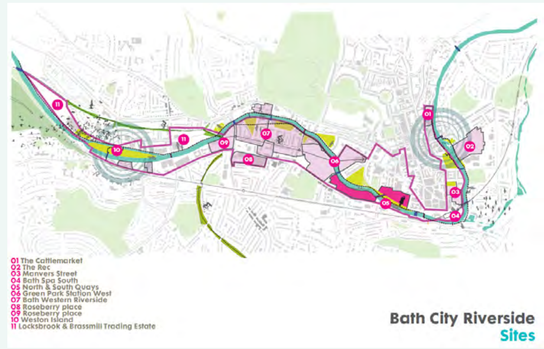


(above) Flood Zones in Bath city centre (Environment Agency)

The raising of the existing flood defences has the potential to increase the risk of flooding in areas upstream of the scheme area. In order to avoid this, the size of the river channel needs to be increased. There is no space to do this along Lower Bristol Road so it is proposed to widen the river channel by lowering ground levels by Green Park Road between The Ambury and Avon Street.

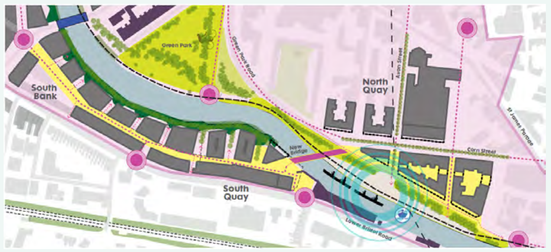
The existing flood defences in Bath were designed to pass flood water through the City as quickly as possible. This was achieved by providing a large 'self-cleansing' river channel. This means that any silt that settled within the channel was washed away by any large flow of water down the river. Recent surveys of the river show that the 1960s design has been successful in avoiding the build-up of silt in the river. This means that dredging of the river is not required as part of this scheme.

Bath City Riverside Enterprise Area



(above) plan view of Bath City Riverside Enterprise Area

Designated as a key zone for economic growth by the West of England Local Enterprise Partnership, the Bath City Riverside Enterprise Area has the ability to deliver 65% of the District's jobs growth and play a key role in providing much needed accommodation for the area's flourishing high-value business sectors. Supported by infrastructure, Bath in the future will be a city where businesses, academia and creativity combine to create value and enhance the quality of life.



(above) plan of Bath Quays Waterside in context of Bath City Riverside Enterprise Area

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Bath Quays Waterside : Flood Defence Project

Bath City Riverside Enterprise Area Masterplan

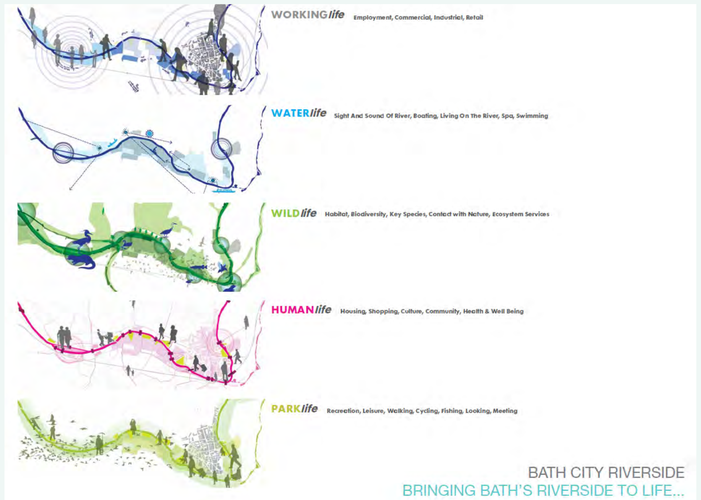
Introduction

Towards the end of 2013 the Council appointed Feilden Clegg Bradley Studios (FCBS) to lead the preparation of a Masterplan for the Bath City Riverside Enterprise Area. The Masterplan covers the entire Enterprise Area (a total area of 98 hectares), and will advise on how to deliver key sites and development opportunities within. The Masterplan also informs the preparation of the Placemaking Plan which was launched last year and will provide planning policy for future developments.

Following their appointment, the team have been observing the Enterprise Area, meeting with stakeholders and compiling an understanding of the evidence which will inform the Masterplan.

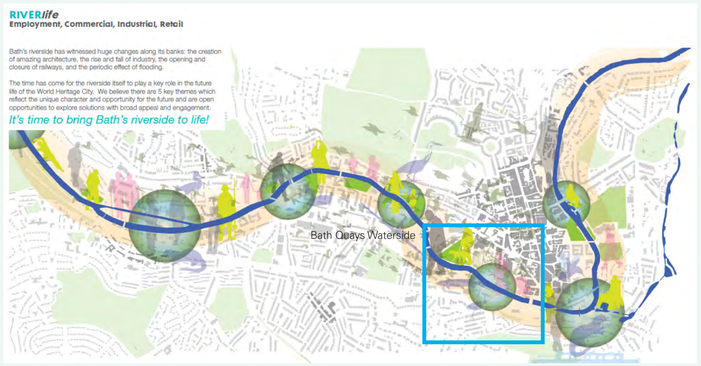
Masterplan : The Five Principles

Some early thinking about the principles and values that will guide the project have emerged - to add a new chapter to the life of the city and truly bring the river corridor and its varied attributes to life!



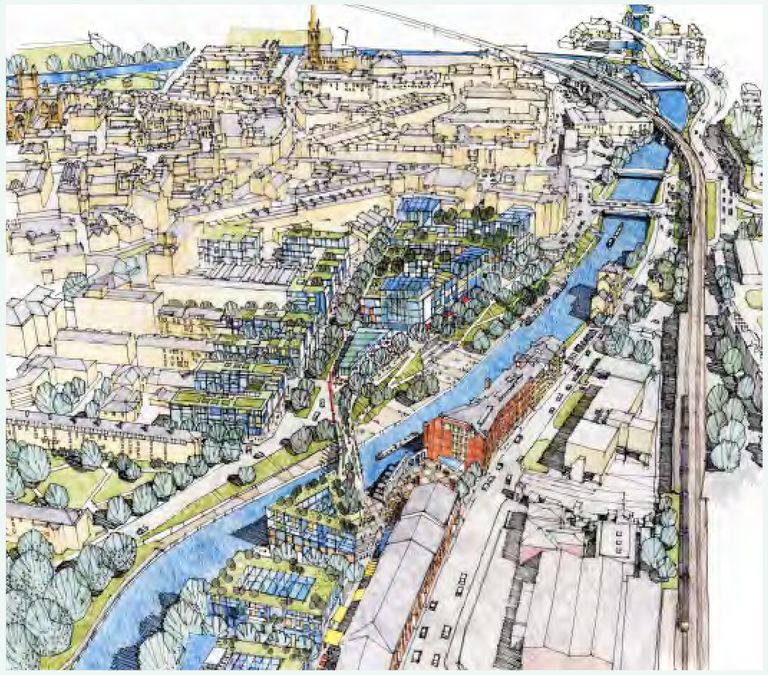
Integration

Bath Quays Waterside is an important hub within the Masterplan and significant to the future of the city



Bath Quays Waterside

Bath Quays lies at the heart of the Bath City Riverside Enterprise area. It comprises the North Quay where Broad Quay and Green Park Road are today and the South Quay.



This area, known as Innovation Quay, presents unique and exciting opportunities for the future of the city centre. With the prospect of the re-modelling of the riverside to create robust flood relief works the site offers outstanding potential for the creation of a new 'innovation quarter' for Bath where exciting new workspaces and commercial uses can come together on the riverside.

Proposals for North Quay focus on mending the relationship between the city centre and the riverside: establishing new street typologies, with Corn Street and Avon Street, pulling the greenery of the river corridor into the city centre and new pedestrian connections to St James Parade and Somerset Street responding to the scale and form of the historic quayside streets.

Proposals for South Quay focus upon the creative reuse of the historic industrial buildings of Newark Works and the formation of new 'landmark' buildings on the bend of the river benefitting from views from Churchill and Midland Bridge. A new bridge, connecting North & South Quay, will improve links for pedestrians furthering the opportunity for a fun riverside environment.

Waterside and city regeneration

Bath Quays Waterside envisions a new city quarter where living, working and relaxing takes place in green streets and surroundings. Streets will be planted with trees and feature sustainable urban drainage; the street patterns will connect the city to the new riverside.

(left) Green river frontage

(left) Sustainable Urban Drainage

Phasing

Delivering vital flood defence and flood mitigation works will start to create a much stronger physical relationship between the river and the city centre. The works will be constructed in a phased manner to enable future redevelopment to follow on. The initial works (Flood Defence and Flood Mitigation) will form the necessary river edge conditions and bank profiles, creating opportunities to embrace future uses in the spaces created, linked to the development of Bath Quays.

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Bath Quays Waterside : Flood Defence Project

Inspiration / Aspiration

Riversides in other cities

Many cities around the world are implementing flood defence projects, in response to projected climate change, changing rainfall patterns and increased run-off causing downstream flooding. Some cities have turned the challenge of flood defence into an opportunity to reshape their riverbanks and the relationship between their city and the river.

Oslo has created waterfront walkways connecting pocket parks and boat moorings within the city

Chester has enhanced the Groves alongside the River Dee to create an attractive, tree sheltered place with bandstands and seats

Lyon has transformed the banks of the Saone river in the city centre to create a linear park, with play space and tranquil natural areas

Frankfurt has re-landscaped its riverfront to create a tree-lined green space which extends to the city outskirts

Pittsburgh has integrated flood protection engineering into a new waterfront alongside the river Allegheny, to create new moorings, a linear walkway, and plenty of greenery

What type of riverside is right for Bath Quays?

The Flood Defence Project will create an new area of landscape at North Quay. What is currently a narrow road verge and steep embankment will become a wide towpath and a shallower bank with places to sit. It could become a new river front destination for Bath providing a place for people to relax close to the waterside.

The project team has consulted with landowners and affected parties adjoining the scheme along with a number of statutory and representative stakeholders including:

- Natural England
- Bath Preservation Trust
- English Heritage
- B&NES Initiative
- Sustrans

We asked Stakeholders their opinions on what this river front space should be like.....

Should North Quay be a hard paved quayside, or green and planted?

Should it be a paved quay side like it was historically .....

or should it be a green riverside which brings nature to the heart of the city?

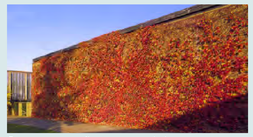
Stakeholders said.....

Precedent Images

Terraces and Green Walls

Bands of planting interlinked with pathways

Terrace with distinctive bands of paving



Green screen reflects seasonal change

Riverside Promenade

Walking and cycling routes combined

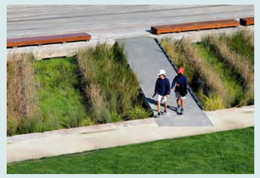
Tree lined promenade

Embankment and Ramps

Planted embankment

Ramp and steps to negotiate level change

Waterside Planting



Connecting with nature

Biodiverse planting

Quayside Promenade

Opportunities for seating and staying

Promenade for strolling

Shady and sunny seating areas

Green River Corridor

The emerging concept designs for the Bath Quays River front envision the river corridor as a green thread which brings nature to the heart of the city.

Tree planting will be enhanced using species with a long life span which are flood tolerant and will contribute to the biodiversity of the riverside environment.

The important role of the river as a wildlife corridor will be enhanced; lighting levels will be kept low to avoid impact on bats using the river as a foraging route; river edges will be profiled to provide river edge aquatic habitats and otter resting places.

People will be drawn to the river via a new promenade walk at the top of the bank providing an attractive sunny south facing frontage with views to the water. Bankside terraces and the widened towpath will provide places for seating and play features, boat moorings and cycle routes.

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Bath Quays Waterside : Flood Defence Project

Scheme Description

Key Project Sponsors

The Council and the Environment Agency are working together to deliver a very important infrastructure project to deliver flood defences for parts of the city centre that will also begin to build a positive relationship between Bath's city centre and the River Avon.

This project builds on, and brings together, work completed over a number of studies, including the Environment Agency's Bath Flood Defence Scheme in 2004, the Council's Flood Risk Management Strategy in 2010 and the evidence base that has been collated by the council to support its core strategy, most notably the 2013 Bath Flood Risk Management Technical Note produced by Black and Veatch.

Policy Context

B&NES Economic Strategy, Draft Core Strategy and National Planning Policy Framework:
- Protection of green belt
- Prioritise brownfield development
- Bath growth targets (net increase):
  - o 5,700 jobs
  - o 6,000 homes
- Key Bath development sites located on River Avon
- No adverse impact on flood risk to third parties
- Safe means of access/egress in flood conditions

Green Infrastructure Strategy
- Requirement to protect & enhance green infrastructure
- Identifies importance of River Avon & Kennet & Avon Canal corridors
- River ecology and habitats
- Flood solutions create clear opportunities to deliver ecological and amenity benefits

Public Realm & Movement Strategy & Pattern Book
- Connecting river to network of city centre streets and public spaces: enhanced access
- Importance of green corridor
- Opportunity for 'garden streets' with SUDS, trees & ecology near to riverside
- Public art and animation
- Legibility and wayfinding

Bath City Riverside Enterprise Area Masterplan and Placemaking Plan:
- Masterplan will advise on how to deliver key sites and development opportunities within.
- The Masterplan also informs the preparation of the Placemaking Plan and will provide planning policy for future developments.

World Heritage Site
- Take into account Statement of Outstanding Universal Value
- Important attributes, Trees and Bath's green links
- Impacts on built heritage

River Strategy and Transport Strategy
- Project to co-ordinate with emerging strategies

Flood Defence Project

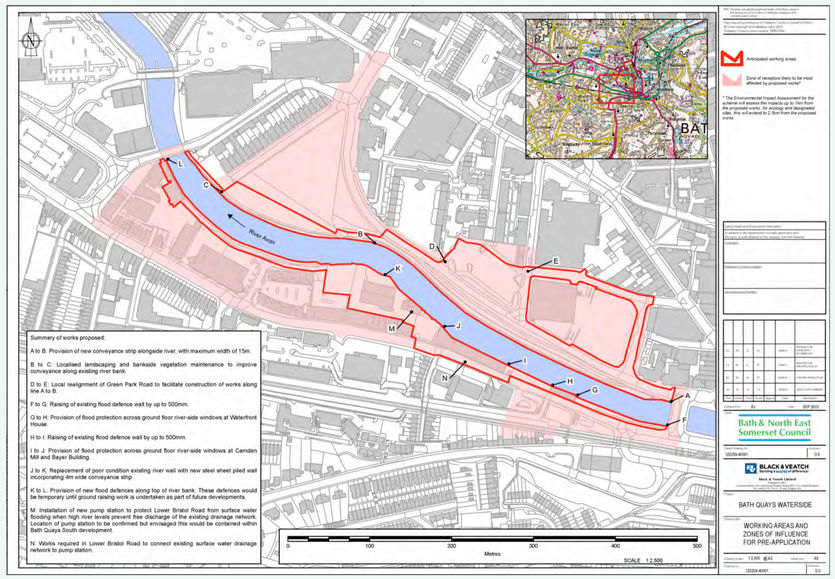
Lower Bristol Road is a key access route into and out of the city as well as providing the main access to a number of residential and industrial units in the south Bath area. Modelling confirms that existing flood defences protecting Lower Bristol Road would be overtopped during a 1 in 50 annual probability event.

Lower Bristol Road is at a high risk of flooding from the local surface water drainage network. The risk of flooding is increased when discharge into the Avon is prevented by higher river levels.

The Environment Agency previously investigated the feasibility of improving the standard of flood protection in this area. However the improvements did not have a sufficiently high benefit cost ratio to attract funding at the time (2004).

The Council is currently progressing its Masterplan for Bath. This includes proposals to develop key Enterprise Areas alongside the River Avon. Works will be required to reduce the risk of flooding to the sites and to provide safe access to / egress from them.

This project presents an opportunity to realise a long-held objective for the Environment Agency and B&NES to work in partnership to deliver flood risk management improvements along the River Avon. These improvements would benefit local residents and businesses on the south side, who would receive a greater level of flood protection, and the wider community, who will benefit from reduced flooding disruption and an enhanced river corridor, with development on both banks.



Ecology

The River Avon is a Site of Nature Conservation Interest and is home to a range of important habitats and species. During recent stakeholder engagement meetings it was clear how important the local environment and preservation of ecology was to people.

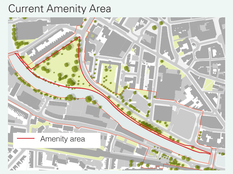
The project team is taking very seriously their responsibility to safeguard wildlife and trees that could be affected by the plans. Expert opinion has been sought from the Environment Agency, Natural England and the private sector. A wide range of ecological surveys within the area identified for the scheme have been carried out, including surveys for bats, otters, kingfishers, reptiles, trees and vegetation. Plans are in place to avoid adverse impacts on wildlife, appropriate mitigation and enhancement of the area.

Flood Defence Project : description

The Bath flood defence project will affect the Bath Quays Waterside area in the following ways:

- Enlarging the capacity of the river to convey flood water will lead to widening of the towpath and re-profiling of the bank alongside Green Park Road.
- This in turn requires that Green Park Road is diverted away from the riverside northwards to link up with Corn Street.
- Trees along the southern verge of Green Park Road and along the new road alignment will be removed and replaced with new planting.
- New flood walls will be built to protect the south bank and Lower Bristol Road from flooding. The flood walls will replace existing walls where present.
- Some existing trees, on the proposed line of the new wall will need to be removed. Tree loss will be mitigated with new replacement trees, where required.
- The loss of trees on the north side of the river will open up local views, but will not have any substantial effects on wider views across the city.
- The area of accessible amenity landscape alongside the river will increase due to the increase in width of the towpath.
- Improvements to pedestrian and cyclist access to the north bank will be possible as a result of the flood works.

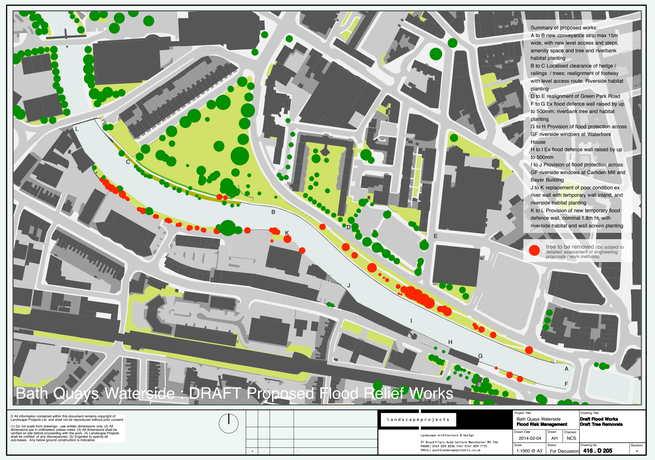
Current Amenity Area



Proposed Amenity Area

Current Movement

Proposed Movement



Proposed changes to flood walls

Trees

Tree surveys have also been carried out. One group of trees that will be affected are on the north bank of the River opposite Avon Street car park. These will require removal to allow the works to Green Park Road and are mainly Poplar trees from the 1970s, these trees were planted to screen Green Park Road from the opposite side of the river and are reaching the end of their natural life.

The new scheme will reinstate mature trees and carry out landscaping. For example, we are investigating planting a mixture of species including more fruiting species that will help to attract birds. Options for creating quiet areas along the River - mainly on the south bank - for the benefit of creatures such as otters are also being considered.

(above) view of the Poplar trees which will be affected by the river bank re-profiling.

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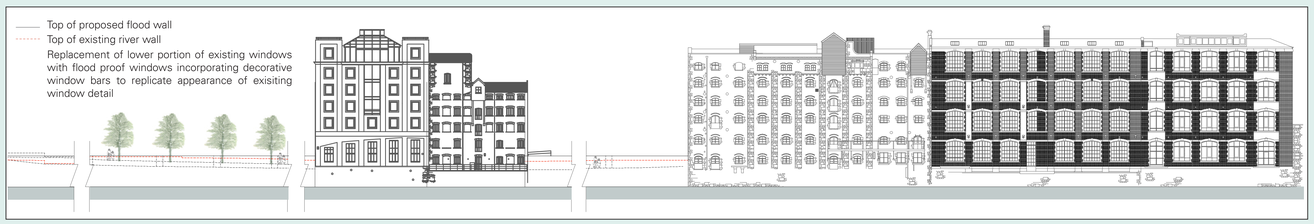
Scheme Description

Plan

Typical treatment to waterfront



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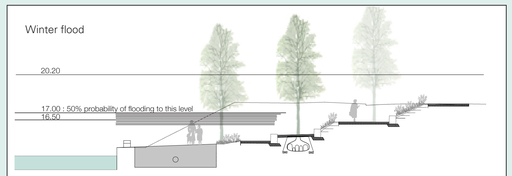
Through facilitating the development of Innovation Quays, Bath Quays Waterside will contribute to the delivery of the Bath City Riverside Enterprise Area and the creation of around 3,600 new homes, 650,000 square feet of new workspace and up to 9,000 new jobs for local people.

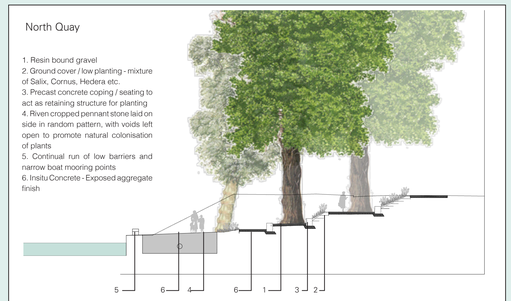
Sections



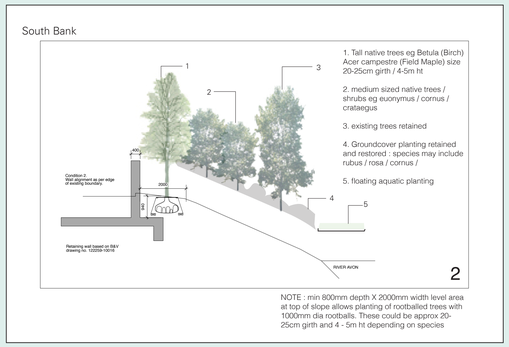
	Winter (Oct - April) number of days level is exceeded		
water level	average	median	Probability of this level being reached
17.0	1.0	0	50%
16.9	1.2	0.4	62%
16.8	1.6	0.8	67%
16.7	2.2	1.3	79%
16.6	2.9	2.3	86%
16.5	4.0	3.5	90%
16.4	5.5	4.8	93%
16.3	7.5	6.4	95%
16.2	9.9	9.1	96%

- Current towpath level is likely to be reached at least once every winter, with it being underwater for on average 10 days
- To significantly reduce the likelihood of the area being flooded at least once would require a substantial level increase
- Raising the levels by 300mm would halve the number of days an area would be expected to flood for

1A



Mature 1B



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NOTE : min 800mm depth X 2000mm width level area at top of slope allows planting of rootballed trees with 1000mm dia rootballs. These could be approx 20-25cm girth and 4 - 5m ht depending on species

Frequently Asked Questions

Question: What is the impact on existing trees, how many will be removed?

The flood defence project will require the removal of 23 trees along the riverside at North quay. 14 of these are poplar trees which were planted in the 1970's and are now reaching the end of their life.

Trees will be planted to replace those lost. The species chosen will be flood tolerant and found elsewhere along the river in Bath including White Willow and Tulip tree. They will be planted as large specimens generally between 7-9m height to ensure they will have an immediate impact. The new flood wall at south bank will be screened by replacement tree planting on the river bank. Species will include White Willow, Field Maple and Birch.

Question: What is the impact on wildlife?
A full series of surveys have been undertaken in respect of wildlife and ecology, including surveys of trees and bird species using the trees, as well as bat and reptile surveys. The scheme represents an opportunity to enhance the river corridor for ecology and will consider the creation of new habitats. A holistic approach is being undertaken to ensure the scheme ties into other approaches in respect of the river corridor. This will include addressing sensitive issues such as lighting.

Question: What value will I get from a new riverside walkway?
The Bath Quays Waterside project will provide an amenity space for people of all ages. There is a focus on playfulness and promenading within the scheme proposals and it is envisaged that people of all ages and walks of life will be able to engage with the waterside as a new place within the city. A few initial thoughts have focused on forming a performance space for outdoor events, the holding of raft races on the river, cafes, public art and ecology to create a waterfront that can be used and enjoyed all year round by local people.

Question: When Green Park Road is realigned where will the coaches park, especially during Christmas market?
The proposed realignment of Green Park Road will necessitate a reduction in size of the Coach Park, but it will remain in use as a drop-off and pick-up location for coaches. An alternative site for any longer term coach parking is being brought forward by the Council in connection with this project.

Question: Won't this re-alignment create more traffic congestion?
The traffic using Green Park Road will be able to use the new road arrangement in the future. This relocation of Green Park Road should not give rise to an increase in traffic flows on the Green Park Road or at the Southgate junction.

Question: Will the works affect access and use of the river during construction?
There is potential for minor disturbance to river users during construction, however, careful consideration will be given to project programming to ensure these works are undertaken outside periods of high river use.

Question: Will I be able to access my place of business during the works?
A full traffic and pedestrian scheme will be implemented during the works to enable full access to all adjoining properties within the development area. A full Traffic Management Plan will be developed as the scheme design develops.

Question: When will the works be taking place?
The project programme is being refined and developed through the design and consultation process. At present it is thought that works could start in 2015.

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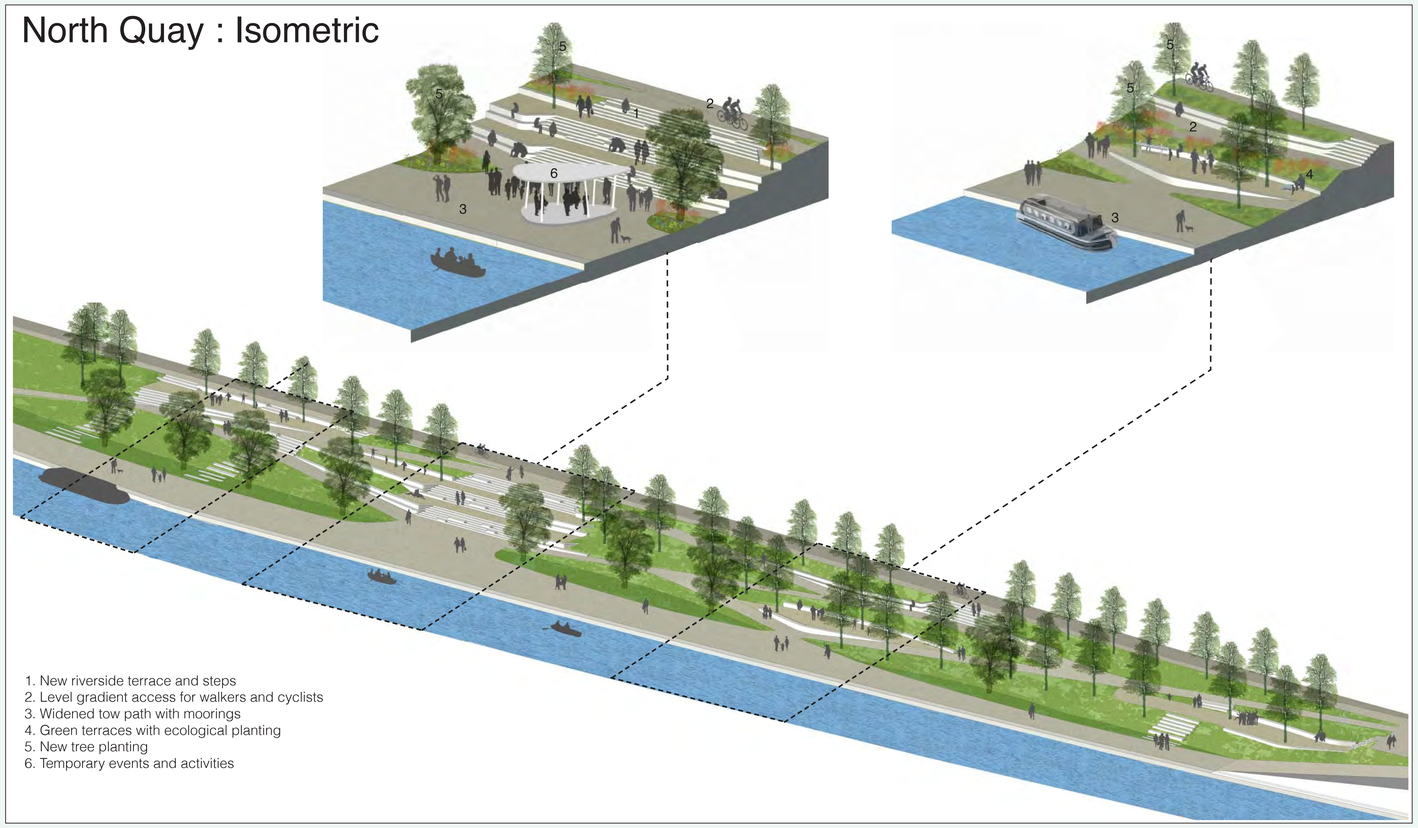
Bath Quays Waterside : Flood Defence Project

Scheme Description

North Quay : Isometric



1. New riverside terrace and steps
2. Level gradient access for walkers and cyclists
3. Widened tow path with moorings
4. Green terraces with ecological planting
5. New tree planting
6. Temporary events and activities

View 1

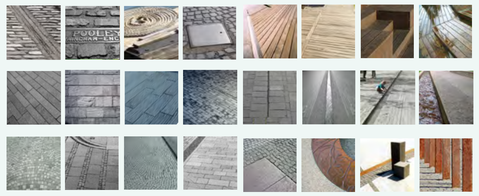
View 2

Activity

The new river side landscape at North Quay will provide a place for people to enjoy the tranquil waterfront. Due to the risk of flooding it is unlikely to be suitable for large scale public events but will be ideal for temporary and informal activities such as impromptu performances using the steps as an "amphitheatre". On the bankside terraces it will be possible for enthusiastic community groups to develop wildflower gardens growing spaces and other shared spaces. Suggestions for further ideas and activities are welcomed.

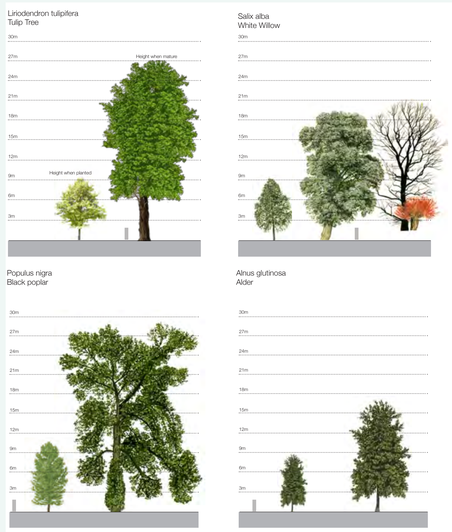
Materials

Materials for the new riverfront will be drawn from the palette of hard materials outlined in the Draft Bath Pattern Book and will include natural stone, cast iron and timber.



Trees

Trees for the new riverfront will be selected from the range of trees already found along the Avon waterfront in Bath outlined in the Draft Bath Pattern Book.



Frequently Asked Questions

Question: Why are changes to the existing flood defences necessary? Is Bath in danger of flooding?
Bath's flood defences along the River Avon were substantially improved in the 1970's, in response to severe flooding experienced in the City, notably in the 1960 and 1968 flood events. Since completion of the flood alleviation scheme in 1974, the City has not been significantly flooded, although the original defences have been stretched by recent events, notably in December 2000. The current flood risk management proposals represent a proactive response to the potential impact of climate change on flood risk in parts of the City, and plans to deliver economic growth in Bath through the development of the Bath City Riverside Enterprise Area. Flood risk from the River Avon is potentially a major constraint for Bath City centre, and managing flood risk is one of the priorities and local objectives. The Environment Agency's (Bristol Avon) Catchment Flood Management Plan states that they will also take action, with others, to actively reduce flood risk in Bath, where it is possible to do so. The proposed works to re-profile sections of the river channel can achieve this objective. Whilst providing a greater level of flood protection to existing residential/non-commercial properties along Lower Bristol Road, the works will also facilitate the safe redevelopment and regeneration of key riverside sites, at reduced flood risk.

Question: Aren't there plans to carry out flood works/storage in Batheaston? Why has the Council's strategy changed?
As part of the Council's Core Strategy evidence base, a series of studies have been carried out over a number of years in conjunction with the Environment Agency, which have better quantified existing flood risks, and assessed a range of possible flood risk mitigation options. The previous upstream storage options were discounted on feasibility and economic grounds. Both the Council and Environment Agency believe that the current proposals are the most technically effective and robust option. The works provide a deliverable means of unlocking key development sites and delivering flood risk benefits i.e the current proposal will provide a significant flood risk reduction to existing properties already at flood risk along the Lower Bristol Road.

Question: Will the proposed solution increase flood risk downstream e.g. Keynsham and beyond?
No. The proposed channel re-profiling works are localised and don't affect the total flood water volumes through the City. Any local improvements to flow conveyance would be insignificant by the time the flood peak reaches Keynsham, for example. The modelling work undertaken by our consultants Black and Veatch have shown that there is no increase in flood risk downstream of the City Centre.

Question: How is this being funded and paid for?
The Council and Environment Agency are funding these essential works with a combination of Flood Defence Grant and Revolving Infrastructure funding made available by the West of England Local Enterprise Partnership.

What's Next?

A project team was formed in the summer of 2013 to design and implement the Bath Quays Waterside Project. This is under direction of a steering group comprising senior council and Environment Agency officals. To date the project team has consulted with landowners and affected parties adjoining the scheme along with a selection of statutory and representative stakeholders. Wider public consultation will take place during April/ May 2014 with a planning application currently targeted for submission in June 2014. Subject to approval it is hoped that works could begin in 2015.

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Environment Agency

Bath & North East Somerset Council