



the **Leeds Flood Alleviation**
Scheme Design Guide & Vision

Draft 4

Introduction:	
Flooding: The Threat	5
The Purpose of this Document	6
The River Corridor	7
The Environment Agency Proposals	7
Leeds Waterfront Strategy	8
The Waterfront Strategy Objectives	8
The Design Vision Objectives	9
How to Use this Document	10
The Study Zones: Description and overall map Zones 1-7	11
Zone 1: Newlay to Kirkstall Abbey, Bridge Road	12
Zone 2: Bridge Road to Viaduct Road	18
Zone 3: Viaduct Road to Wellington Bridge (A58)	26
Zone 4: City Centre: Wellington Bridge to Crown Point Bridge	32
Zone 5: Crown Point Bridge to Atkinson Hill Swing Bridge	44
Zone 6: Atkinson Hill Swing Bridge to M1 Motorway Bridge	50
Zone 7: M1 Motorway Bridge to Fleet Weir, Woodlesford	56
Design Guide	62
Biodiversity	73

Leeds is the regional capital of Yorkshire and Humber and one of the UK's fastest growing cities. Significant flooding in the city centre would be catastrophic. It would affect lives, property, business and travel. Potential changes to our climate and weather patterns look likely to cause more severe storms and heavier rainfall and based on the Environment Agency's predictions this could radically increase peak flood levels throughout the River Aire corridor affecting the city centre in particular.

Leeds is a major economic centre and the financial capital of the North. With a population of around 750,000 it is the second largest Metropolitan District in England and covers an area of approximately 217 square miles. In terms of wealth creation Leeds is a major driving force within the regional economy. Total Gross Domestic Product (GDP) stands at over £12.8 billion per annum, and is projected to grow by around 34% the next ten years. Over the last ten years over £2.5 billion has been invested in large property development schemes, a further £1.5bn is currently under construction with £3.4bn in the pipeline.

The role of Leeds as the regional capital of Yorkshire and Humber makes continued investment and development pivotal, not only to Leeds but to the North of England. Leeds City Council has set out its 'Vision for Leeds' to 2020 which encompasses aspirations for the city centre as a place that is 'welcoming, walkable, liveable and well connected'. It also describes Leeds as a place that is 'sustainable, business friendly, and has a high quality environment and cultural offer'.



Flooding: the Threat

Leeds city centre has been flooded by the river throughout recorded history as well as in recent years. Serious flood damage was narrowly avoided during the October 2000 flood event, when water levels rose to such an extent that a major arterial road into the city had to be closed as a precautionary measure. In June 2007 the Leeds District experienced three severe rainfall events each of which led to flooding in different parts of the city. This was the wettest June since records began, with an average of over 153mm falling throughout June in northern England and around 100mm falling in the 24 hour period covering 25th June. Although the River Aire flooded a number of properties in and around the city, the city centre narrowly avoided major flooding and damage was relatively limited.

The worst flooding occurred in areas of South Yorkshire and affected Sheffield, Doncaster, Rotherham and Hull. Lives were lost and businesses, homes, services and infrastructure were severely damaged. If the rainfall had tracked further north rather than settling over South and East Yorkshire it could have

affected Leeds to the same extent or possibly worse. As a major economic centre and regional capital the effects of this would transcend Leeds' boundaries and would further impact on regional economics.

Over the last few years Leeds City Council has taken a number of positive steps towards improving flood risk management, emergency response, and flood defence work. The Environment Agency is currently working in partnership with Leeds City Council, and other agencies, in developing a strategic approach to drainage and flood risk management for Leeds. Part of this work concentrates on identifying areas at risk and proposals for flood defence along the River Aire corridor. The project is known as the Leeds Flood Alleviation Scheme and is a collaboration between Leeds City Council, the Environment Agency, Yorkshire Forward, and Yorkshire Water.

The Partnership is currently co-funding on two lines of work – The Leeds FAS Design Vision and the Leeds Economic Flood Risk Impact Study.

The Purpose of this Document

The Environment Agency is proposing to raise defences in various locations along the River Aire corridor in the form of walls, embankments, and other devices. The proposals are sited along the waterfront, and around important features and infrastructure such as the Leeds - Liverpool Canal, the Aire and Calder Navigation, and the extensive railway network running parallel with the river.

Full details of the defence engineering works are not known at present but it is inevitable that they will have an impact on the character of the waterfront and will affect how the river corridor develops and is used. Where defences are proposed there is a variety of engineering options available and to ensure the proper integration of the defences into any area it is crucial to consider them at an early stage of scheme planning.

The purpose of **the Leeds FAS Design Vision** work is to ensure existing elements, future aspirations and wider design visions for the city are properly integrated into the physical appearance and functional design of the Leeds Flood Alleviation Scheme defences. The work will analyse the river corridor as a whole, looking at the existing landscape and land uses, proposed development / growth areas, and future ambitions for the city centre waterfront. It is intended that the vision will embrace the aspirations identified under local planning policies and frameworks and from these identify opportunities for environmental enhancements that could be delivered as part of the defence scheme. The Vision will also make recommendations on the design of flood defences which are relevant to that particular area and which maintains local character and identity. It will further set out relevant strategies which should influence and shape all aspects of flood defence planning, and which can produce attainable benefits throughout.

It is important for Leeds to have a clear vision as to how the flood defences will work within the existing landscape - be it city centre, city rim, semi-rural or rural. It is intended that this document will be a comprehensive guide for the overall design and positioning of the flood defences and is primarily for use by the Environment Agency. However, the objectives and recommendations of the Vision can also be used to inform and engage future developers and decision-makers in the public sectors, and in commerce, to ensure consistent standards of design are followed on development schemes throughout the river corridor.

The River Corridor

The study area covers approximately 19km of river corridor, and includes significant areas of land extending either side of the waterfront. The Flood Alleviation Scheme follows the river corridor from Newlay Bridge in the west and runs east, downstream to Fleet Weir, Woodlesford. It includes the built-up area of Leeds City Centre.

Also included in this vision document are areas of flood plain west and east of the main study area so that the whole stretch of river within the Leeds City Council boundary is covered.

The river corridor contains the Leeds - Liverpool Canal and the Aire and Calder Navigation, running parallel to the river and merging within the city centre. The canal and river share a common landscape, with both water bodies providing transport, recreation, wildlife and amenity to Leeds. The canal and river have particular flood risks associated with each. Within the river corridor is an extensive rail network running through the flood plain and therefore forming a key component of the study area.

The Environment Agency Proposals

Currently Leeds has no formal defences. There are discontinuous informal defences but these are of variable condition and many are likely to fail in severe flood conditions. The informal defences do not create a continuous barrier and gaps and low spots offer routes for flood water to enter the city centre and other vulnerable areas along the river corridor. The height of flood defences is also variable and it is likely that defences will be regularly breached in the future.

The Environment Agency proposes to raise the standards of flood protection by a combination of measures including improvements, flood warnings, providing information on flood proofing, and by significantly raising the standard of flood defences.

The Leeds Flood Alleviation Scheme (FAS) is part of a wider initiative to manage flood risk in the Upper Aire catchment. A high level Catchment Flood Management Plan (CFMP) for the Aire and a more detailed Flood Risk Management Strategy (FRMS) for the Upper Aire are underway. The FRMS has investigated in detail the extent of flood risk to Leeds and has recommended that the Leeds FAS should be developed.

The Environment Agency has modelled the river corridor for a 1 in 200 year extreme flood event (0.5% annual probability) and have assessed that there are approximately 3,300 properties in Leeds at risk of being affected by flooding, with over 2,000 being residential. Flooding of the city centre would extensively affect offices, shops, bars, and restaurants and impact on daily commuters, residents, recreation and tourism.

'Raising defences' includes both the existing formal and informal defences to the river. Existing structures are to be upgraded and new defences constructed to a defined level of flood risk. New defence structures are strategically planned throughout the river corridor thereby creating an extensive infrastructure of barriers. The barriers will take the form of embankments, concrete faced and piled walls, and raised ground levels. Control structures are also proposed to minimise water flows through goits and surface water drainage improvements and pumping stations will also be considered at strategic locations.

Leeds Waterfront Strategy

The Leeds Waterfront Strategy is the key document to guide the regeneration of the Leeds waterfront. It covers an area of 6.5km of the river and canal corridor running through central Leeds and therefore covers a key section of the FAS Design Vision Study. The Waterfront Strategy was produced by Leeds City Council in conjunction with a number of partner organisations including the Environment Agency. It is now adopted as Supplementary Planning Guidance (SPG) and as such is used as a basis for negotiating design, planning conditions and legal agreements relating to appropriate development along the waterfront.

Leeds Waterfront Strategy Aims & Objectives

The overall objectives of the Waterfront Strategy are common to the FAS Design Vision. These being:

- Develop a strategic vision that identifies the key components for generating an attractive, vibrant, safe and sustainable waterway corridor.
- Provide a framework to inform, guide and assess new development, and improvement or management proposals to ensure that these are appropriate and meet the needs and aspirations of local communities.
- Develop a co-ordinated approach to development and marketing of the waterway that allows public, private and voluntary interests to work in a co-ordinated way to achieve the strategic vision.
- Identify opportunities to improve pedestrian access to and along the waterway corridor.
- Identify opportunities for environmental improvements to the waterway corridor, including the waterway, waterfront walkways and riparian properties.
- Provide proposals for the creation of vital, sustainable and viable development and activity on and along the waterway.
- Provide guidance on issues of waterside design, including a vocabulary of street furniture and materials, to create a distinctive and co-ordinated identity for the waterfront area.
- Review the issues of flood defence that affect the riverside corridor.
- Promote the use of the waterspace for suitable leisure activities and navigation through a waterspace strategy.
- Safeguard the long-term future of areas of significant landscape, heritage, ecological and nature conservation value.

The Design Vision Objectives

The Waterfront Strategy objectives will be used to guide the FAS Design Vision Study in its assessment of the wider river corridor. More specifically the Design Vision will aim to shape the layout and design of the flood defences and the scope of this work will therefore:

- Identify existing key sites directly affected by the flood defence scheme.
- Pinpoint planned development sites, future growth areas, city-wide design visions within the river corridor.
- Identify key opportunities for environmental improvements that the flood defence scheme can help deliver.
- Identify main mitigation measures required to minimise the impact of the proposed defences in sensitive locations.
- Establish specific design principles and parameters to reflect local issues and enhance local character and identity.
- Recommend design alternatives which still achieve the objectives of flood defences.
- Promote improvements to connectivity particularly to pedestrian and cycle routes and linkages to wider route networks. Develop the potential of the corridor as a 'green' commuter route.
- Safeguard and improve the ecological value and nature conservation of the river and flood plain.
- Contribute to the achievement of the flood alleviation scheme as a sustainable development.
- Provide a steer and directory to further regulatory information affecting the River Aire Corridor.

How to Use this Document

The Study Zones

The study area stretches from Newlay Bridge to the west of the city through to Woodlesford in the east. The study has been divided into 7 broad zones bounded by bridges. The zones are characterised by the predominating land use but may also contain a key site, for instance an important historic landmark such as Kirkstall Abbey, or a key commercial site such as the Kirkstall Leisure Complex.

The character and constraints within each zone are analysed and the impact of the flood defence proposals are assessed against these. The FAS development should relate to its local context and we have aimed therefore to bring both local planning policies and wider strategies into the analysis so that it is properly integrated into the whole. At specific locations, options for varying the alignment and design of the flood walls or embankments are explored and recommendations made to reduce any adverse effects on the landscape or built environment.

There are opportunities throughout the study area for improvements to the river frontage such as new landscape features, increased access and pedestrian / cycle linkages, and biodiversity enhancement. Each site is described on its own merits, but such opportunities to address corridor wide issues are identified throughout.

Each zone contains 3 maps of information:

- i) A map of the Environment Agency Draft proposals, showing the areas requiring flood defence and information relating to the proposed height of the flood defence.
- ii) A Context map showing the predominating land uses together with key sites, constraints, access, and planning policies relevant to the area. This map provides a synopsis of the whole environment and also shows what is or may be changing.
- iii) The Vision map: This brings together the information from both of the above to identify areas of potential conflict with recommended actions, design guidance, mitigation measures, and enhancement opportunities.

Zones 1-7

Zone 1: Newlay Bridge to Kirkstall Bridge (Bridge Road)	page 12 - 17
Zone 2: Kirkstall Bridge to Viaduct Road	page 18 - 25
Zone 3: Viaduct Road to Wellington Bridge (A58)	page 26 - 31
Zone 4: City Centre - Wellington Bridge to Crown Point Bridge	page 32 - 43
Zone 5: Crown Point Bridge to Atkinson Hill Swing Bridge	page 44 - 49
Zone 6: Atkinson Hill Swing Bridge to M1 Motorway Bridge	page 50 - 55
Zone 7: M1 Motorway Bridge to Fleet Weir, South of Woodlesford	page 56 - 61

The Design Guide

page 62 - 72

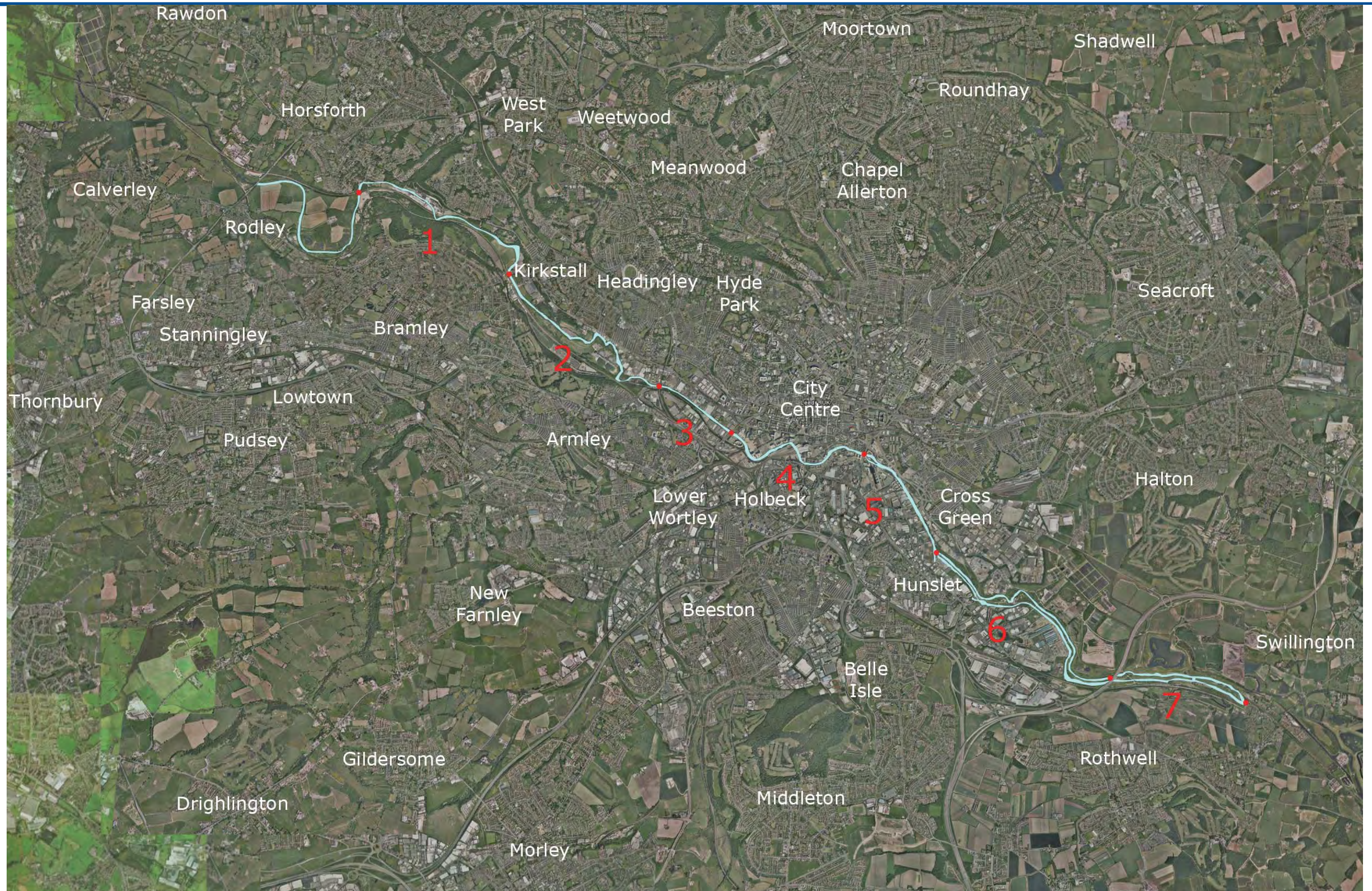
The design guide shows a series of generic design solutions for the placement and appearance flood walls and embankments throughout the river corridor. The design principles shown for each solution may be applicable to a number of situations and are intended as 'good practice' examples.

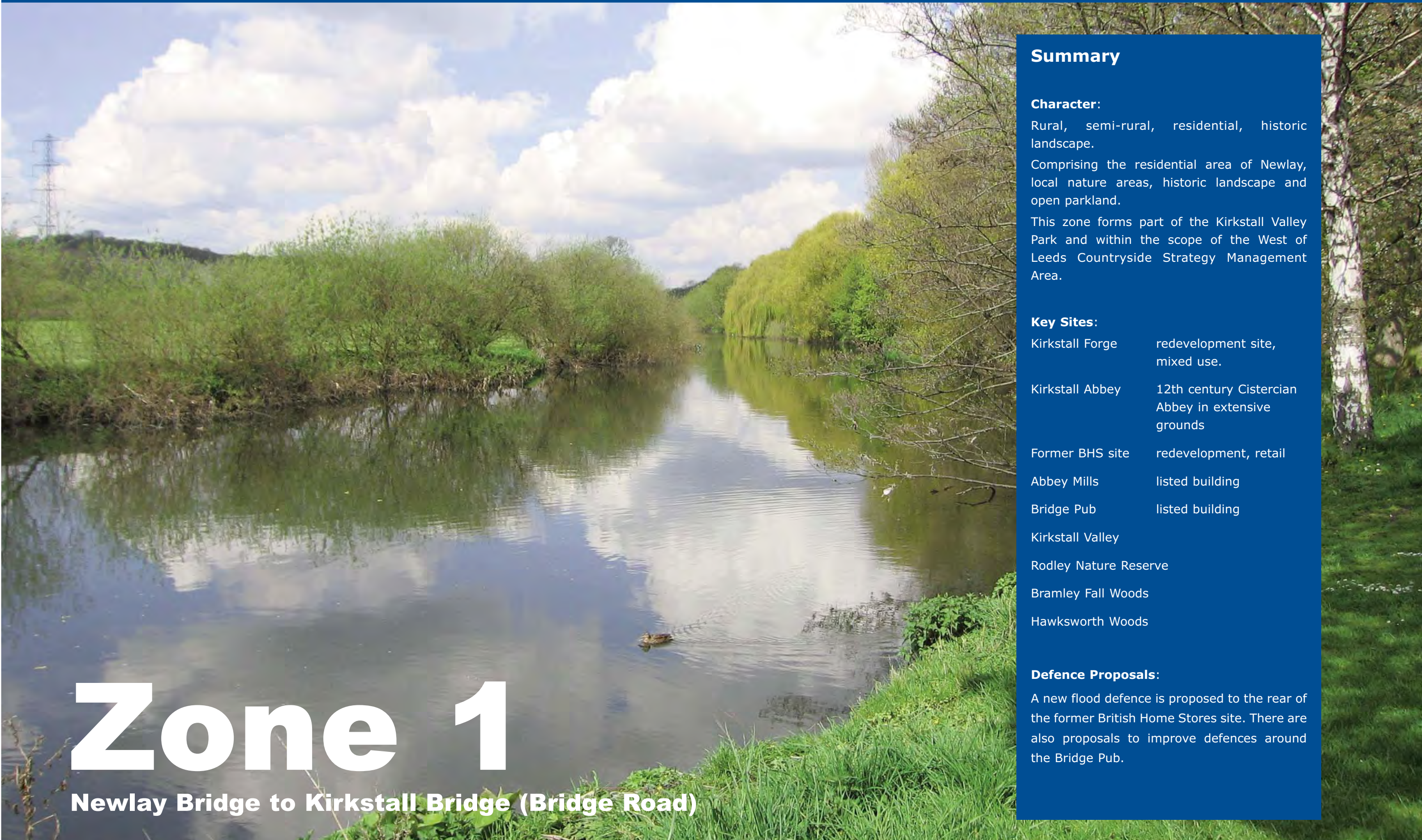
Biodiversity

page 73 - 76

This section is devoted to biodiversity and habitat enhancement and generic design solutions are again presented as 'good practice' models. The section also sets out principles and detailed objectives for the protection of the environmental quality of the river corridor.

The Study Area - River Corridor and Zones





Zone 1

Newlay Bridge to Kirkstall Bridge (Bridge Road)

Summary

Character:

Rural, semi-rural, residential, historic landscape.

Comprising the residential area of Newlay, local nature areas, historic landscape and open parkland.

This zone forms part of the Kirkstall Valley Park and within the scope of the West of Leeds Countryside Strategy Management Area.

Key Sites:

Kirkstall Forge redevelopment site, mixed use.

Kirkstall Abbey 12th century Cistercian Abbey in extensive grounds

Former BHS site redevelopment, retail

Abbey Mills listed building

Bridge Pub listed building

Kirkstall Valley

Rodley Nature Reserve

Bramley Fall Woods

Hawksworth Woods

Defence Proposals:

A new flood defence is proposed to the rear of the former British Home Stores site. There are also proposals to improve defences around the Bridge Pub.

Context

West of Leeds Countryside Strategy Management Area:

(Ref. The Leeds Countryside Strategy)

The West of Leeds Countryside Strategy Management falls into two main areas: The first is a belt of urban fringe countryside to the west which divides Leeds and Bradford. The second is the Kirkstall Valley and Hawksworth Wood which form encapsulated areas of countryside and important green corridors.

Situated between Leeds and Bradford these areas perform a critical Green Belt function and important recreational resource for the communities of Farsley, Pudsey, Farnley, and Wortley.

Kirkstall Valley is an urban green corridor of strategic significance within the district. Extending from the Inner City at Armley to Bramley Fall and through to the river valley beyond Calverley Bridge, the valley contains a series of landscape features and individual attractions. Through this setting pass the River Aire, the Leeds - Liverpool Canal and the Leeds - Carlisle railway.

Areas of industrial activity and recent redevelopment schemes contrast with open areas of the valley floor which contain a mixture of playing fields, nursery gardens, parkland, woodlands and derelict land. Key attractions include Armley Park, Gotts Park, Kirkstall Abbey and Museum, Hawksworth Woods and Bramley Fall, (also Armley Mills Museum in adjacent Zone 2).

The canal towpath and an extensive network of footpaths provide opportunities for informal recreation. The waterways, woodlands and areas of green space provide opportunities for nature conservation. Given these characteristics, the Kirkstall Valley and the Aire Valley as a whole are clearly key resources which need to be conserved and enhanced in the context of the Countryside Strategy.

Further information can be found in the Leeds Countryside Strategy, West of Leeds document.

Kirkstall Valley Park Plan and West Leeds Country Park

Within West Leeds several key initiatives have influenced and continue to influence the character of the countryside. The Kirkstall Valley Park Plan and the Kirkstall Valley Planning Framework and Ranger service have set a context for countryside management within the Valley. The Kirkstall Valley Park Plan and Kirkstall Valley Planning Framework have now been subsumed within the Leeds UDP.

The West Leeds Country Park initiative was started in 2005 to protect, improve and publicise the benefits of greenspace within West Leeds. The most recent priority is the development of the Green Gateways Trail – a network of footpaths connecting public rights of way and permissive ways.

Kirkstall Valley Park Plan and West Leeds Country Park are further expanded upon in Zone 2.

Key Sites

Rodley Nature Reserve

Rodley Nature Reserve is situated on functional floodplain in a 'U' shaped bend of the river. The nature reserve was created on former sewage sludge fields and includes an extensive wetland system of open water, reed, marsh and wet grassland. A large (2 hectare) lagoon receives water from the river via two wind pumps, and the marsh and reed beds receive water via a sluice gate on the lagoon. The area is a recognised 'flyway' for wildfowl and waders. Rodley Nature Reserve is managed by a voluntary body - Rodley Nature Reserve Trust.

Bramley Falls Park and Bramley Woods

Bramley Falls Woodland Estate forms part of Kirkstall Valley Park and includes nearly 12 hectares of ancient semi-natural woodland and a Leeds Nature Area. The park is a popular recreational spot for local communities Bramley, Newlay and Kirkstall to the south of the river and there is a good network of paths through and around the site connecting to Newlay Locks on the canal. There are currently no direct connections over the river although the new development site at Kirkstall Forge includes new crossing points. The Bramley Falls estate is managed by Leeds City Council Parks and Countryside.

Hawksworth Woods

Hawksworth Woods is a key component of the Kirkstall Valley Park. It is managed alongside Cragg Wood, and Outwood as a Leeds Nature Area and is an ancient semi-natural broadleaf woodland. Numerous public rights of way run through the woods linking to Kirkstall Road and Kirkstall Forge development to the South.

Kirkstall Forge

This is a redevelopment site with planning permission for mixed use. Under the new development plans there is full access to the river front with footpath and cycle provision, new bridges and a new railway station. The scheme has planning permission, but at this point in time (June 2008) there is no certainty of construction.

The developers have included flood defence as part of the overall development. It is not known at present whether this is to the same standard to which the Leeds FAS is designed. Consistency in design standards should be checked.

BHS Site: currently under redevelopment

The area to the rear of the current (BHS) building is within the character influence of Kirkstall Abbey historic grounds. There are stone built properties immediately to the west of the site along the waterfront, and a well vegetated water margin, including protected trees and protected species habitats.

Opportunity / Constraint

Design of the defence should be in sympathy with the prevalent historic character and where flood walls are constructed these should be faced in natural stone.

There is an opportunity here to form better connections between the Leeds Liverpool Canal, Kirkstall Bridge Pub and Kirkstall Abbey Grounds. At present there is waterfront access available either side of the BHS site – along the Kirkstall Abbey grounds to the West and along the rugby training grounds to the East. Clearly there is a missing link as pedestrians must walk away from the river via Bridge Road or the mill race adjacent to Abbey Mills. There is an opportunity here to improve upon existing paths which run alongside the mill race and further develop these for cycle use. Improvements to signage would also strengthen this connection.

A detailed assessment should be made of the positions of trees and protected habitats which have been identified within this area and are certain to be affected by construction work. Any loss of vegetation will impact on protected species and lead to loss of habitat. Compensatory measures should be agreed with the Planning Authority Nature Conservation Officer / Species Protection Officer.

Kirkstall Abbey

Kirkstall Abbey marks the start of the Leeds Industrial Heritage Trail. Improving pedestrian links between the Abbey grounds to Kirkstall Bridge will enhance the experience of the Heritage Trail.

Kirkstall Abbey is a significant heritage asset to Leeds being one of the best preserved Cistercian Abbeys in Britain. The Abbey and historic grounds are managed by Leeds City Council Parks and Countryside and have recently undergone a £3.5 million restoration project funded by the Heritage Lottery Fund and English Heritage. This has included the opening of a brand new visitor centre.

Abbey Mills

Abbey Mills is located at the southern end of Kirkstall Abbey Grounds. It dates back to medieval times, and is a Grade II listed building.

Abbey Mills and St Ann's Mills (further east along the river corridor) were acquired by the Council between 1965 – 1970 as public open space for a Kirkstall riverside park, but have continued in industrial use until the present day. The park proposal did not progress and both mills became part of the Council's light industrial portfolio.

Redevelopment proposals for both sites are currently in progress and are subject to consultations with residents and stakeholders. The City Council is proposing to sell Abbey Mills for refurbishment but would ensure that the buildings would be preserved to listed building status. The Council propose to retain St Ann's Mill for redevelopment as industrial units and, as part of both schemes, improvements will be made to the immediate area and riverside walk.

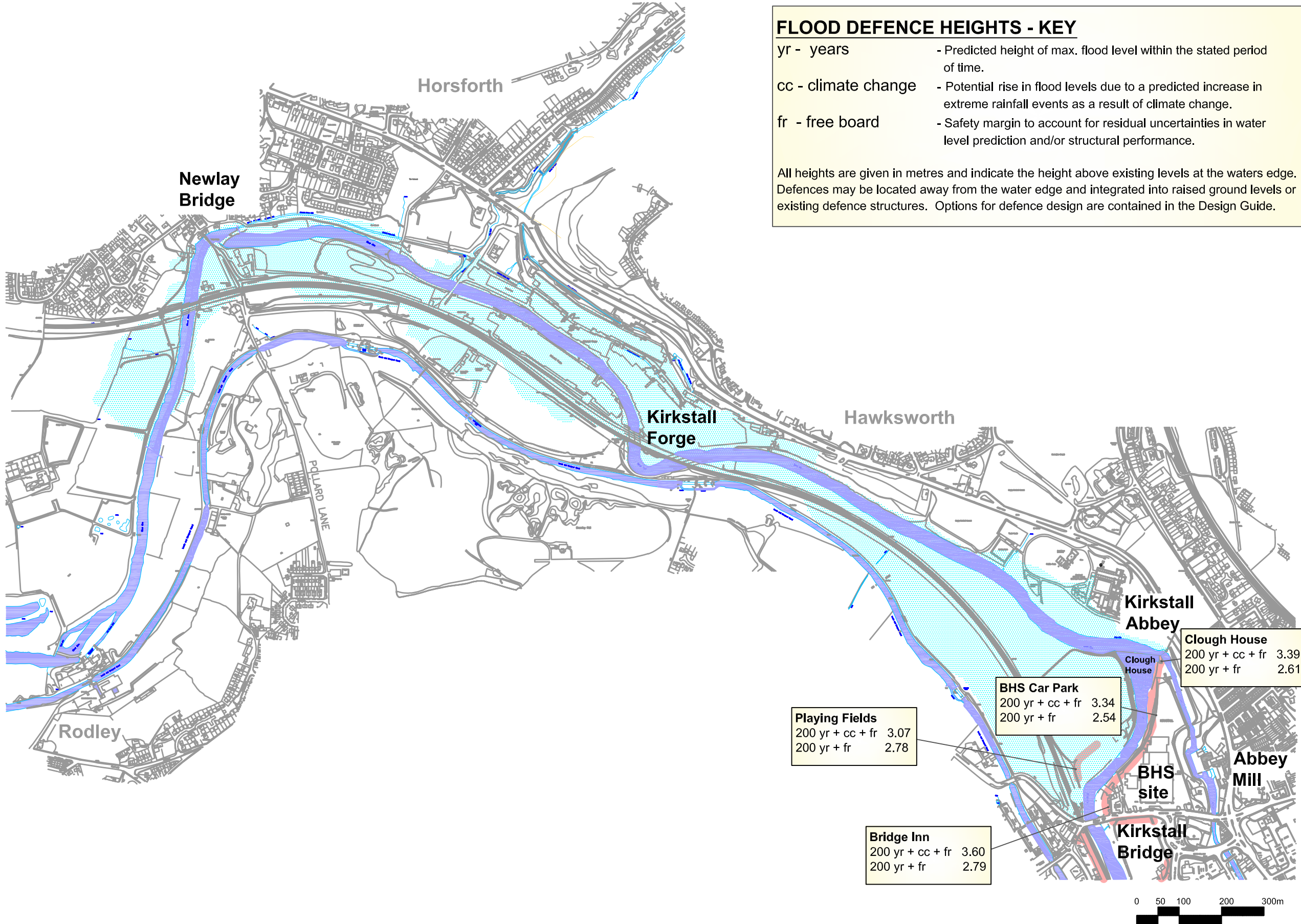
Old Bridge Inn

The Old Bridge Inn is a Grade II listed building and is situated on the banks of the Aire adjacent to Kirkstall Bridge.

Opportunity / Constraint

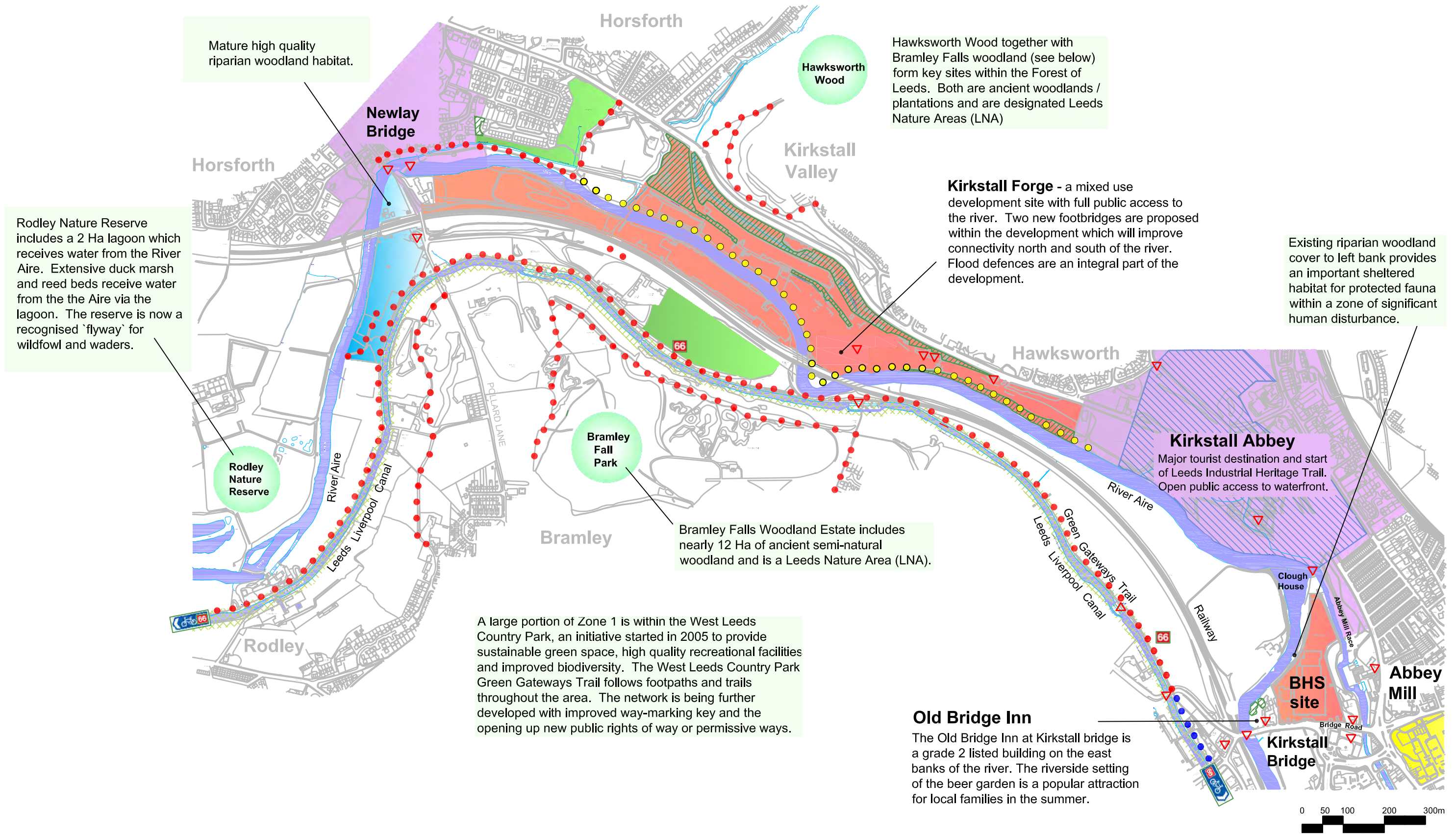
The pub and beer garden are immensely popular with families because of the pleasant riverside setting. This outdoor amenity should be maintained and where flood defences are required should not destroy the strong connection between pub and river. There are existing walls set between the pub and beer garden which could possibly be further improved as flood defence.

Environment Agency Draft Proposals - Zone 1



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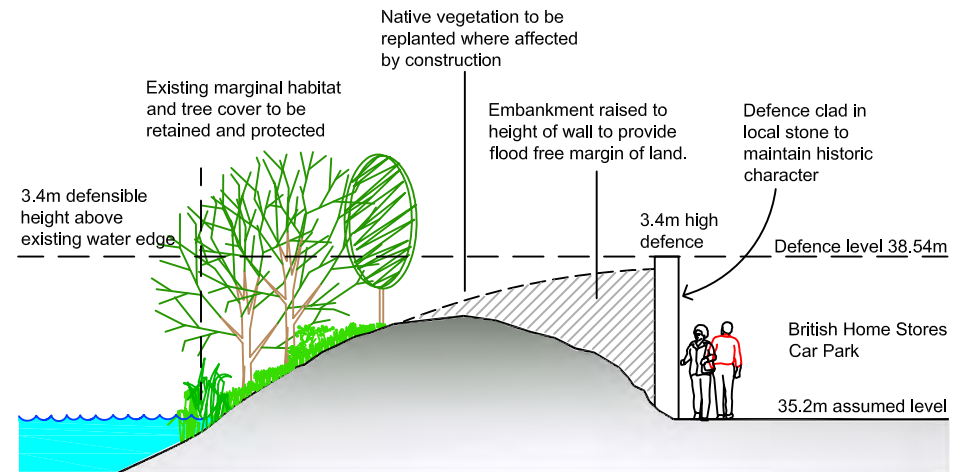
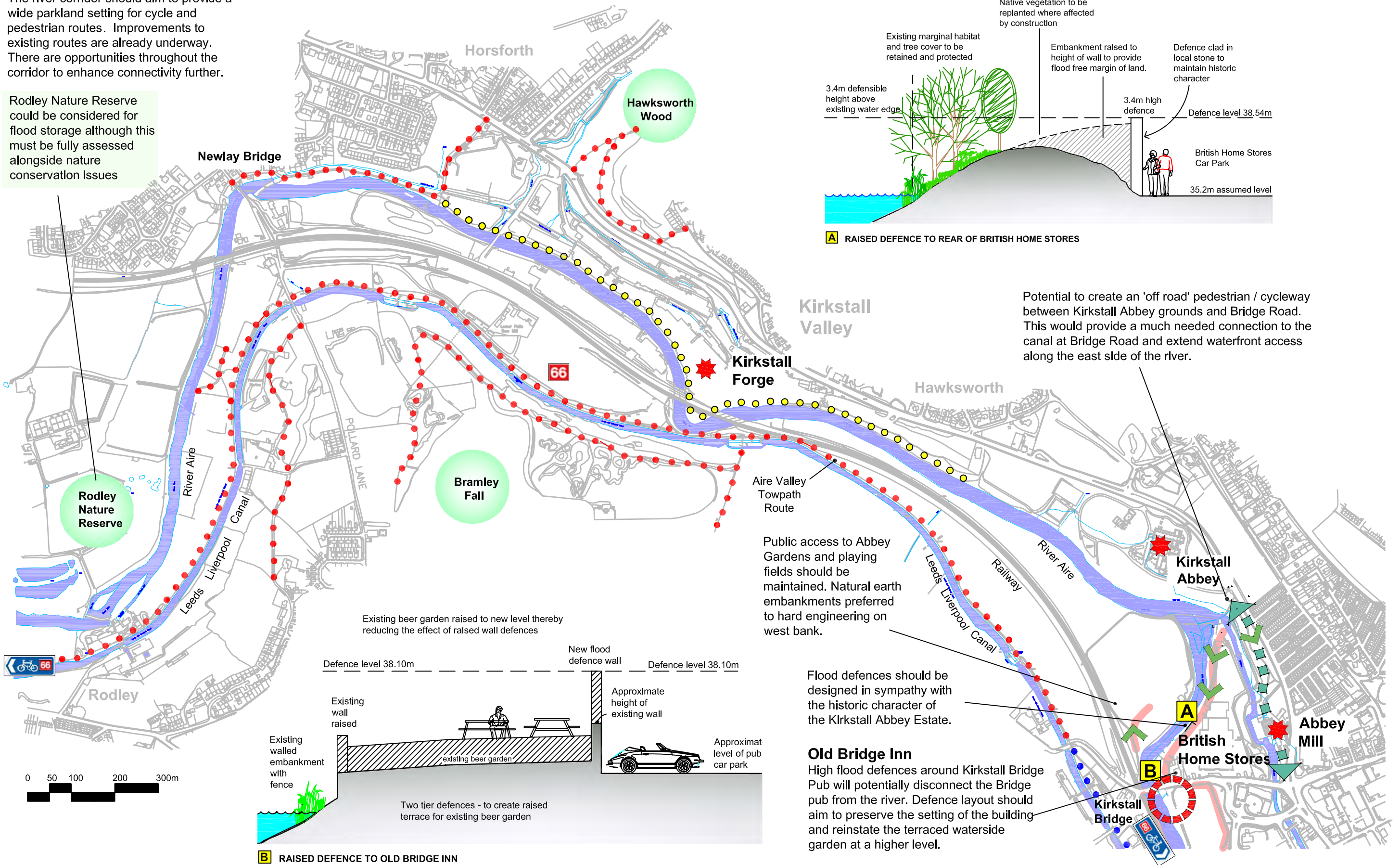
Zone 1 is predominantly urban fringe countryside comprising both arable and pastoral farmland. Situated between Leeds and Bradford this area performs a critical Green Belt function in preventing the coalescence of the two cities. The area provides an important recreational resource for the communities of Farsley, Pudsey, Farnley and Wortley. Ref: West Leeds Countryside Strategy Management Areas



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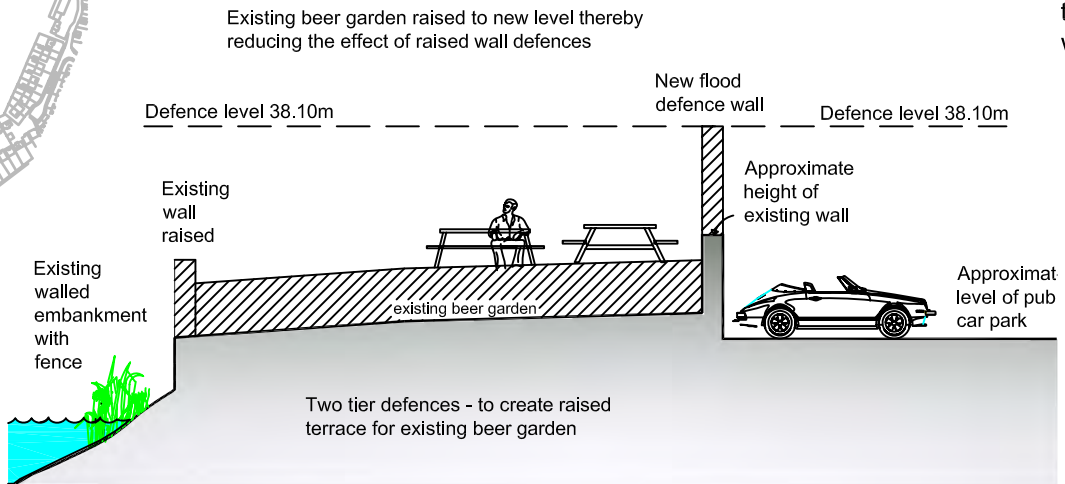
The river corridor should aim to provide a wide parkland setting for cycle and pedestrian routes. Improvements to existing routes are already underway. There are opportunities throughout the corridor to enhance connectivity further.

Rodley Nature Reserve could be considered for flood storage although this must be fully assessed alongside nature conservation issues



A RAISED DEFENCE TO REAR OF BRITISH HOME STORES

Potential to create an 'off road' pedestrian / cycleway between Kirkstall Abbey grounds and Bridge Road. This would provide a much needed connection to the canal at Bridge Road and extend waterfront access along the east side of the river.



B RAISED DEFENCE TO OLD BRIDGE INN

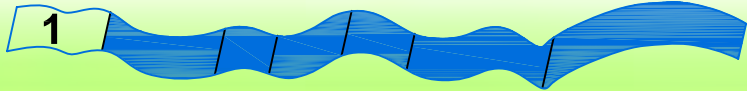
Public access to Abbey Gardens and playing fields should be maintained. Natural earth embankments preferred to hard engineering on west bank.

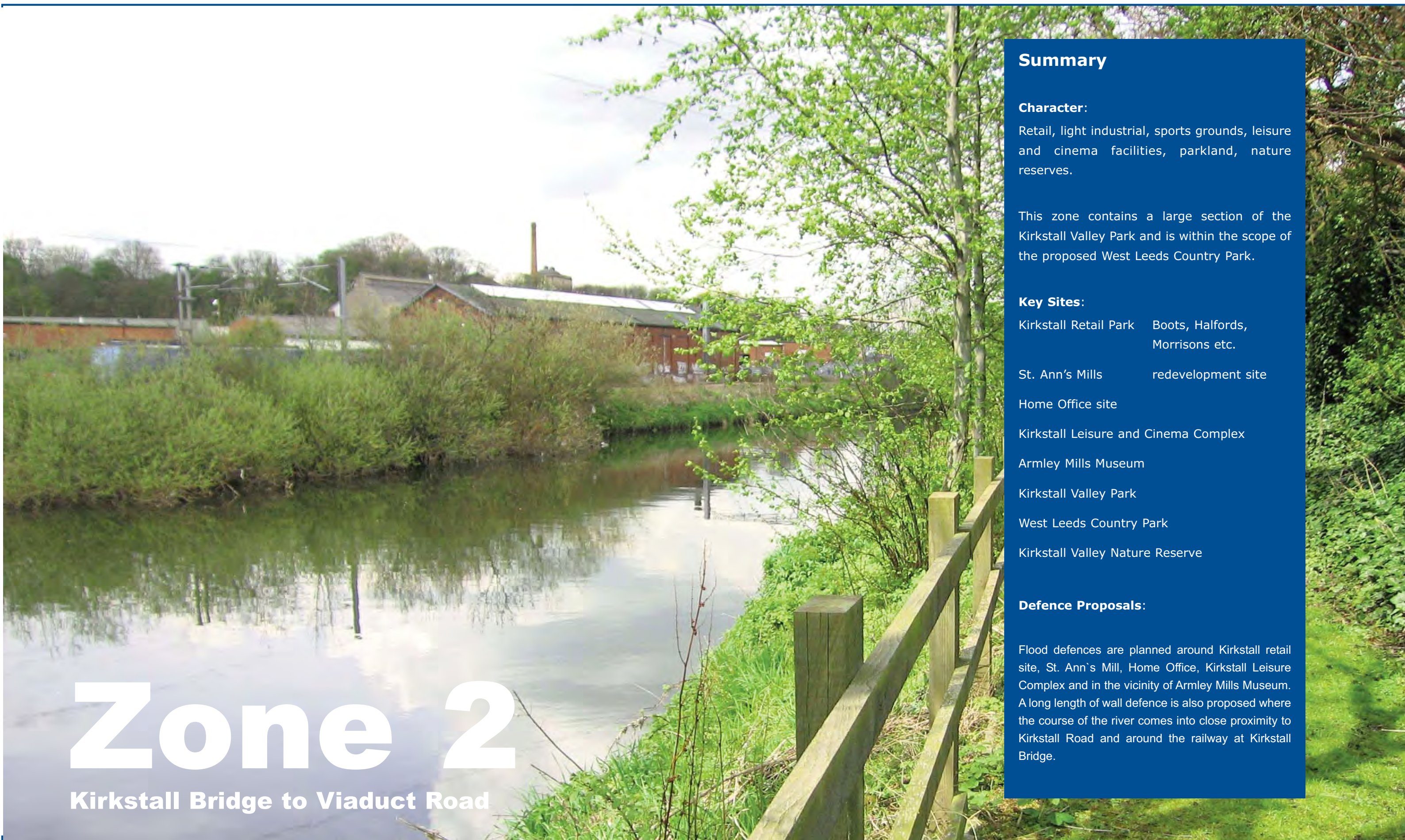
Flood defences should be designed in sympathy with the historic character of the Kirkstall Abbey Estate.

Old Bridge Inn
High flood defences around Kirkstall Bridge Pub will potentially disconnect the Bridge pub from the river. Defence layout should aim to preserve the setting of the building and reinstate the terraced waterside garden at a higher level.



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Zone 2

Kirkstall Bridge to Viaduct Road

Summary

Character:

Retail, light industrial, sports grounds, leisure and cinema facilities, parkland, nature reserves.

This zone contains a large section of the Kirkstall Valley Park and is within the scope of the proposed West Leeds Country Park.

Key Sites:

- Kirkstall Retail Park Boots, Halfords, Morrisons etc.
- St. Ann's Mills redevelopment site
- Home Office site
- Kirkstall Leisure and Cinema Complex
- Armley Mills Museum
- Kirkstall Valley Park
- West Leeds Country Park
- Kirkstall Valley Nature Reserve

Defence Proposals:

Flood defences are planned around Kirkstall retail site, St. Ann's Mill, Home Office, Kirkstall Leisure Complex and in the vicinity of Armley Mills Museum. A long length of wall defence is also proposed where the course of the river comes into close proximity to Kirkstall Road and around the railway at Kirkstall Bridge.

Context

Kirkstall Valley Park

An area of green corridor and parkland of strategic significance within Leeds City Council's Countryside Strategy. The Kirkstall Valley Park plan and Kirkstall Valley Planning Framework make extensive recommendations for improvements to connectivity and recreational development for this section of the Aire Valley corridor. The park plan in particular is a joint initiative between Leeds City Council and local community groups and should be used to inform the FAS on future development aspirations.

The Kirkstall Valley Park plan and Kirkstall Valley Planning Framework have now been superseded by the Unitary Development Plan, however the policies and proposals developed under the former documents are now contained in the UDP.

West Leeds Country Park

This initiative was started in 2005 to protect, improve and publicise the benefits of greenspace within West Leeds. The key aims of the initiative are to ensure the availability of sustainable green areas, diversify wildlife habitats and provide quality recreation areas. The plan supports a key aim of the Vision for Leeds to provide attractive greenspaces in close proximity to where people live and work. An integral part of the initiative is the Green Gateways Trail, a 32km circular trail which runs from the city centre, through the Aire Valley and into the countryside around Calverley. From here the trail follows the green corridor between Leeds and Bradford and wends its way through countryside before finally entering the urban areas of Armley and Wortley. Parks and ginnels are then used to effect the full circle back to the Leeds-Liverpool Canal and the City Centre.

The West Leeds Country Park and Green Gateways is currently being further developed with plans for way-marking key routes and opening up new public rights of way or permissive ways. The plans and future aspirations of the West Leeds Country Park should therefore be examined in detail against the Flood Alleviation proposals to identify areas where combined working can deliver environmental improvements.

Kirkstall Valley Nature Reserve

The nature reserve is currently managed by the Wildlife Trust and is a key component of the Kirkstall Valley Park.

Kirkstall Nature Reserve is made up of land formerly used by the old Kirkstall Power Station (now demolished) and is largely the old fly ash lagoons and a nearby island in the River Aire. The lagoons had been tipped with low grade building waste, and a thin layer of soil scattered on top, but the land has slowly regenerated, to become an attractive area of sparse meadowland with wild flowers. The tree covered island is inaccessible on foot and has plants and animals typical of a well-leached riverside location. The nature reserve has been developed jointly between the Council, Yorkshire Wildlife Trust, Eye on the Aire and the Kirkstall Valley Campaign.

The nature reserve is still being developed and there is scope to provide better connections between the north and south banks of the Aire and improved access to the nature reserve. However, there are protected species identified in this area and any flood development work, including improvements to footpaths / cycle links, must avoid interference with habitats.

See also St. Ann's Mill below and recreational development of the waterways.

Key Sites

Kirkstall Retail Site

This site already has flood defence embankments running alongside the retail buildings. The embankments are well vegetated with tree / shrub screen planting and form a green edge to the retail site. Rugby pitches are located to the west of the retail site and extend up to the waterfront. There is full pedestrian access along the bank of the river and a pleasant walkway towards St. Ann's Mill.

Unfortunately the walkway stops short of the mill and peters out into derelict land. There is an opportunity here to extend the footpath through to St. Ann's Mill and beyond to Goit Side.

The existing embankments are to be raised to improve flood protection to the retail buildings, with the rugby pitches forming an open storage area for flood water adjacent to the river. This layout preserves the existing waterfront access but engineering works to the embankments will remove the green edge / screen planting, and visually expose the retail site.

This removal of vegetation will destroy the green character of the area and should therefore be reinstated preferably by dense plantings on the new embankments or alongside the rugby pitches.

St. Ann's Mills

St. Ann's Mills are a former mill building with additional units and land used for industrial purposes. There are current planning proposals to refurbish the whole site to a high quality workspace for small businesses. The site has development links with Abbey Mills (*see Zone 1*) but both sites are to be treated separately. The general planning brief states that improvements are to be made to the immediate area and riverside walk.

The FAS proposes new defences for the mill buildings to the south and east in the form of embankments and walls. Although the St. Ann's buildings are not listed they are nevertheless considered to be important historically, and flood defences should be designed in sympathy with the existing stone building materials and character. There is scope to radically improve the quality of the landscaping around the site and riverside as it is currently despoiled from past building activity. The site also offers key opportunities to improve connectivity and environmental objectives outlined in the Kirkstall Valley Park, as indicated below.

Waterfront Access: Pedestrians are already encouraged to enter the St. Ann's Mill site by existing signs located on Kirkstall Road. A network of paths extends around the north side of the buildings and improvements could be made to extend pedestrian movement beyond the St. Ann's site along the north bank of the waterfront toward the rugby pitches to the west.

River / Canal Recreational Development: There have been a number of past proposals for the development of the waterways around St. Ann's Mills for canoeing, and the refurbishment of St. Ann's Mills as a possible canoe storage and changing facility. However; the most recent planning proposals concentrate on the development of the buildings for business use. The idea of a canoe course is still current and is being further developed by British Waterways as an extensive circular course along the valley toward the City Centre using both the river and canal.

Home Office site

The buildings require extensive new flood protection.

The area to east of the site is currently inaccessible and there is scope to improve pedestrian and cycle routes along the waterfront. There is an opportunity to make key pedestrian / cycle connections to the bridge at Redcote Lane, an important crossing point which effectively connects the Kirkstall community to the canal, nature reserve and parkland beyond. The design of the flood defence should, where possible, be set back from the river bank and include pedestrian and cycle access alongside.

Kirkstall Leisure and Cinema Complex

Although relatively new this site has been identified for remodelling and improvement and it is likely that the use will remain as leisure / retail. The site together, with Armley Museum on the opposite bank of the river, make up an important regeneration area and it is important that flood defences do not have a negative impact on either development.

Negotiations are underway to improve links between the sites and there is a good opportunity here to open up the waterfront as an amenity area and to form positive connections between both leisure facilities. The existing retail buildings back onto the river, and although there is a walkway along the waterfront it is unappealing and underused - mainly due to its hidden aspect and lack of natural surveillance. Indeed many visitors to the leisure complex are unaware that the river exists or that there is a bridge connection over to the south bank.

Flood defences are proposed along the north bank between the river and the retail park. Earth embankments, rather than walls would be more visually acceptable and there is potential to integrate existing paths onto the defences. Raising the paths could in turn improve views across the water and enhance user experience. It is recommended that paths are designed to accommodate cyclists.

Improved signage in the area will encourage positive use of the waterfront particularly if the footpaths are opened up to cyclists and the routes actually lead to other recreational destinations. (They currently lead to dead ends). The public realm area adjacent to the existing pedestrian bridge should be kept open, improved, and emphasised as a gateway to the south bank. Enhancements to the area - such as seats integrated with flood defences, would convey this area as an amenity area, somewhere to go, to relax and to explore beyond.

Armley Mills Museum

Armley Mills, once the worlds largest woollen mill is now an award winning museum. The buildings are listed Grade II and II* and the site is designated a Conservation Area with considerable architectural and historic value. The site has a unique setting, between river and canal and links into the canal towpath (the Sustrans Route 66 cycle link) and is close to the city centre. The future of the mill and museum is currently being reviewed with the intention of realising the full development potential of the site and which may include additional uses. A Planning Brief is being prepared in consultation with the Museum Service and local community.

East of Armley Mills and Kirkstall Leisure Complex

There is no access along the river in the area between Kirkstall Leisure Complex and Kirkstall industrial estate (see Zone 3). This constitutes a significantly long stretch of inaccessible waterfront.

Pedestrians at this point are forced to walk up to the canal towpath through Armley Mills museum grounds, or walk out to Kirkstall Road to the north and back to the river front via Canal Road. Both alternatives deviate some distance from the river and the route through the museum grounds is currently barred, presumably to control public access to the museum itself.

The canal towpath provides the only viable east / west cycle and pedestrian route at this point and there is potential to make a positive link between the river and canal by utilising an existing bridging point to the east of the museum. Route-ways along the northern river bank should be further developed so that the Leisure Complex is accessed via a direct link along the northern bank.

There is also the potential to extend pedestrian / cycle access along the length of northern bank as an integral feature of the flood defences. This would make a significant improvement to connections between the Kirkstall and Armley communities (see Zone 3).



Zone 2 comprises of an area of green corridor and parkland of strategic significance within Leeds City Council's Countryside Strategy. The Kirkstall Valley Park Plan and Kirkstall Valley Planning Framework make extensive recommendations for improvements to connectivity and recreational development for this section of the Aire Valley.

Tree cover on existing flood defence mounds provide good screening to Morrisons car park and provides a green buffer between the river and retail park.

Attractive waterfront pathway following the river but finishes at a dead end before St Ann's Mill

St. Ann's Mill
Partly owned by Leeds City Council with a current planning brief including improvements to the immediate area. Although not listed, the buildings are of historic significance.

Kirkstall Valley Nature Reserve
Listed as a Leeds Nature Area (LNA) and forms an essential link in the Aire Valley Wildlife Corridor. Also highlighted by the Leeds Nature Conservation Strategy.

A reed bed system has been established to purify river water and help maintain water levels in wildlife ponds via a water driven pump.

Redcote Lane provides only access across the river to Kirkstall Valley and the canal.

Kirkstall wildflower garden and surrounding land currently being remodelled under the Kirkstall Road Quality Bus Initiative.

Existing footpath signs encourage access to St. Ann's Mill from Kirkstall Road

Goitside - a pleasant circular woodland walk

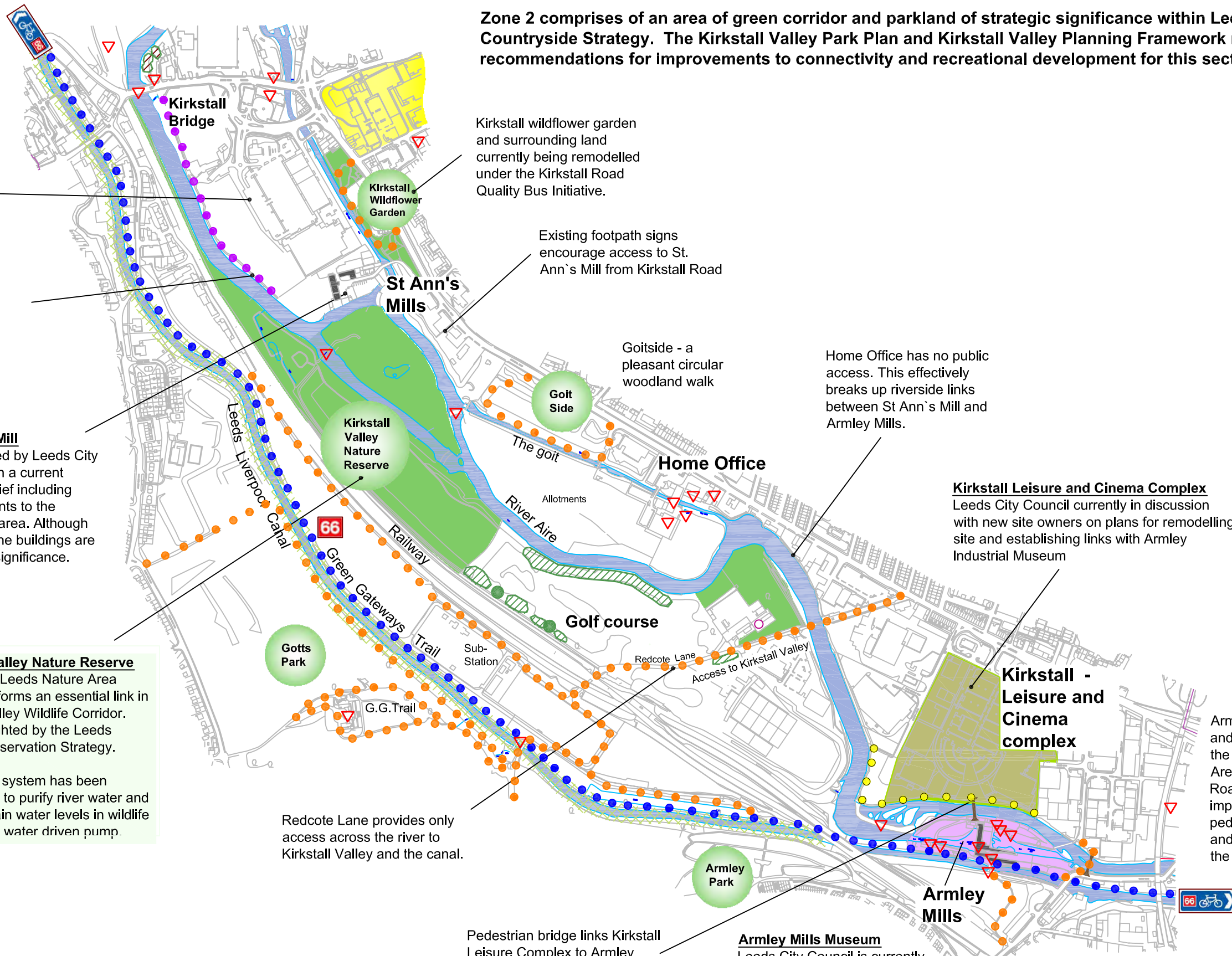
Home Office has no public access. This effectively breaks up riverside links between St Ann's Mill and Armley Mills.

Kirkstall Leisure and Cinema Complex
Leeds City Council currently in discussion with new site owners on plans for remodelling site and establishing links with Armley Industrial Museum

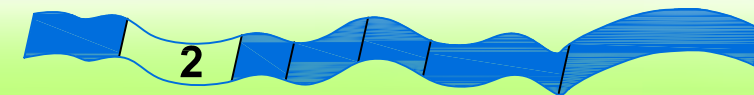
Armley Park, Armley Mills and Canal Road are within the West Leeds Gateway Area Action Plan. Canal Road is identified for improvements to the pedestrian environment, and to promote access to the canal

Pedestrian bridge links Kirkstall Leisure Complex to Armley Mills museum. Public space on the north bank, within the leisure complex, is underused.

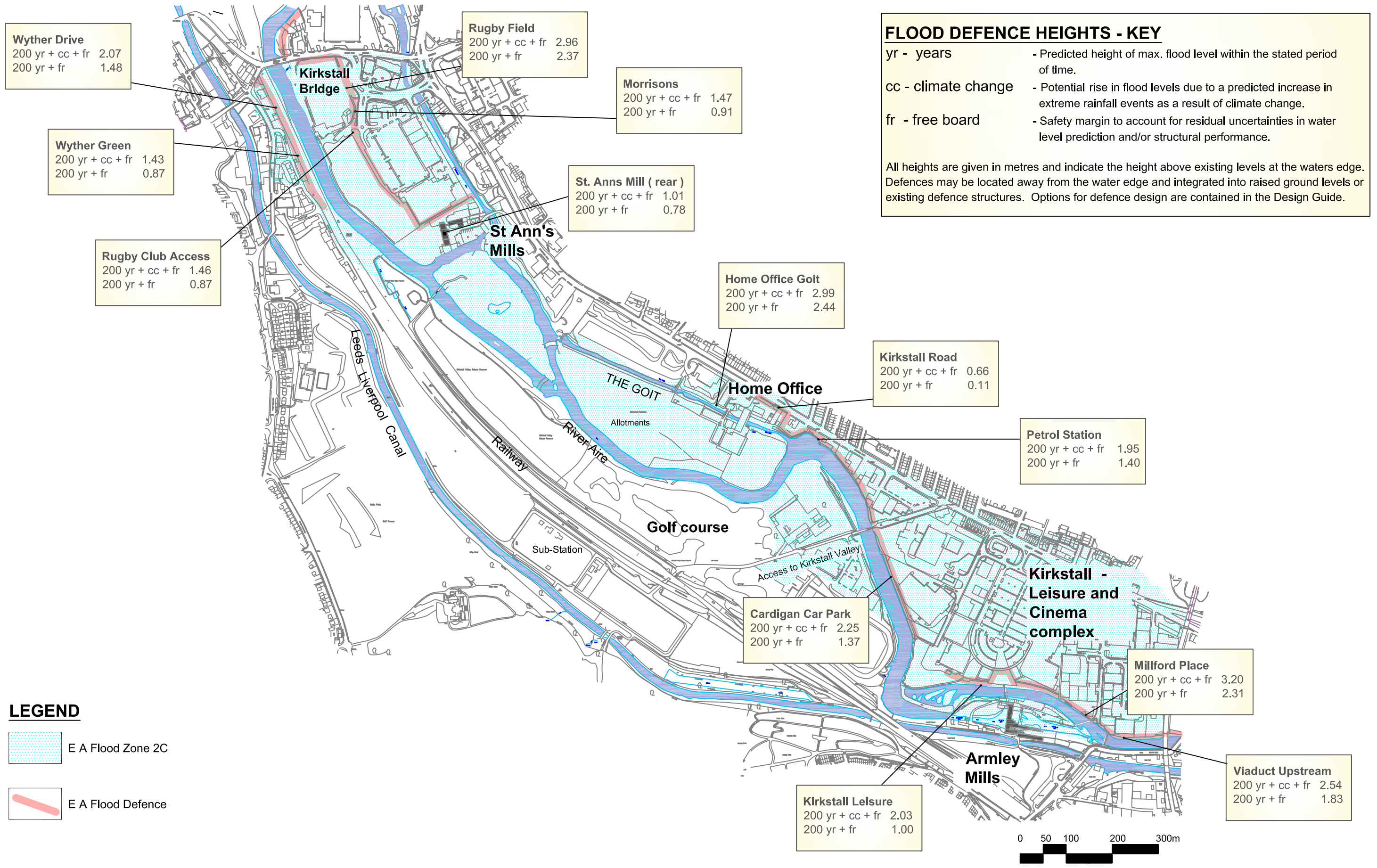
Armley Mills Museum
Leeds City Council is currently reviewing the development potential of the museum and surroundings.



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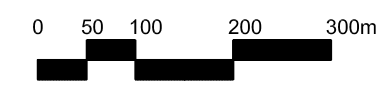


Environment Agency Draft Proposals - Zone 2



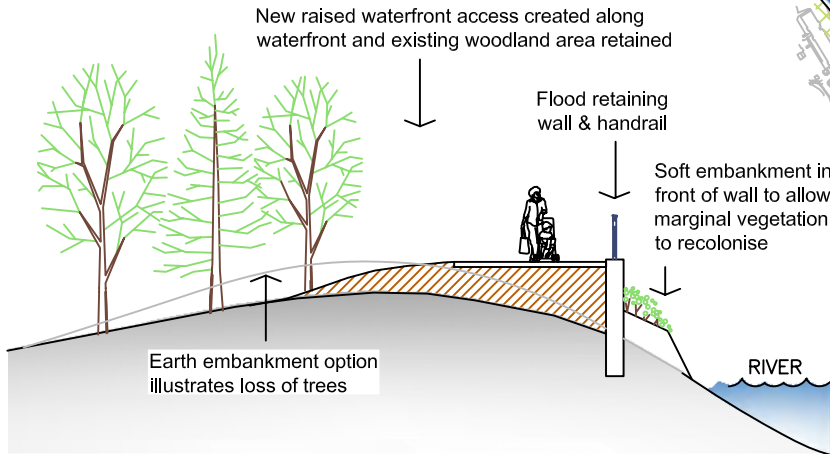
LEGEND

- E A Flood Zone 2C
- E A Flood Defence



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The eradication of Japanese Knotweed and other invasive species should be replaced with dense native planting



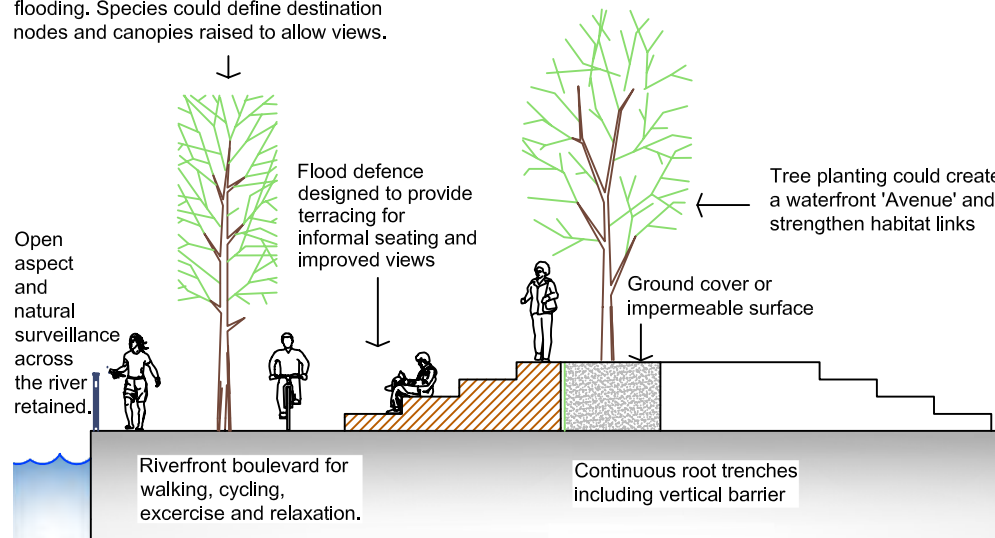
A FLOOD WALL AND WATERFRONT ACCESS
Typical Cross Section

Opportunities throughout this zone to improve habitat and biodiversity.

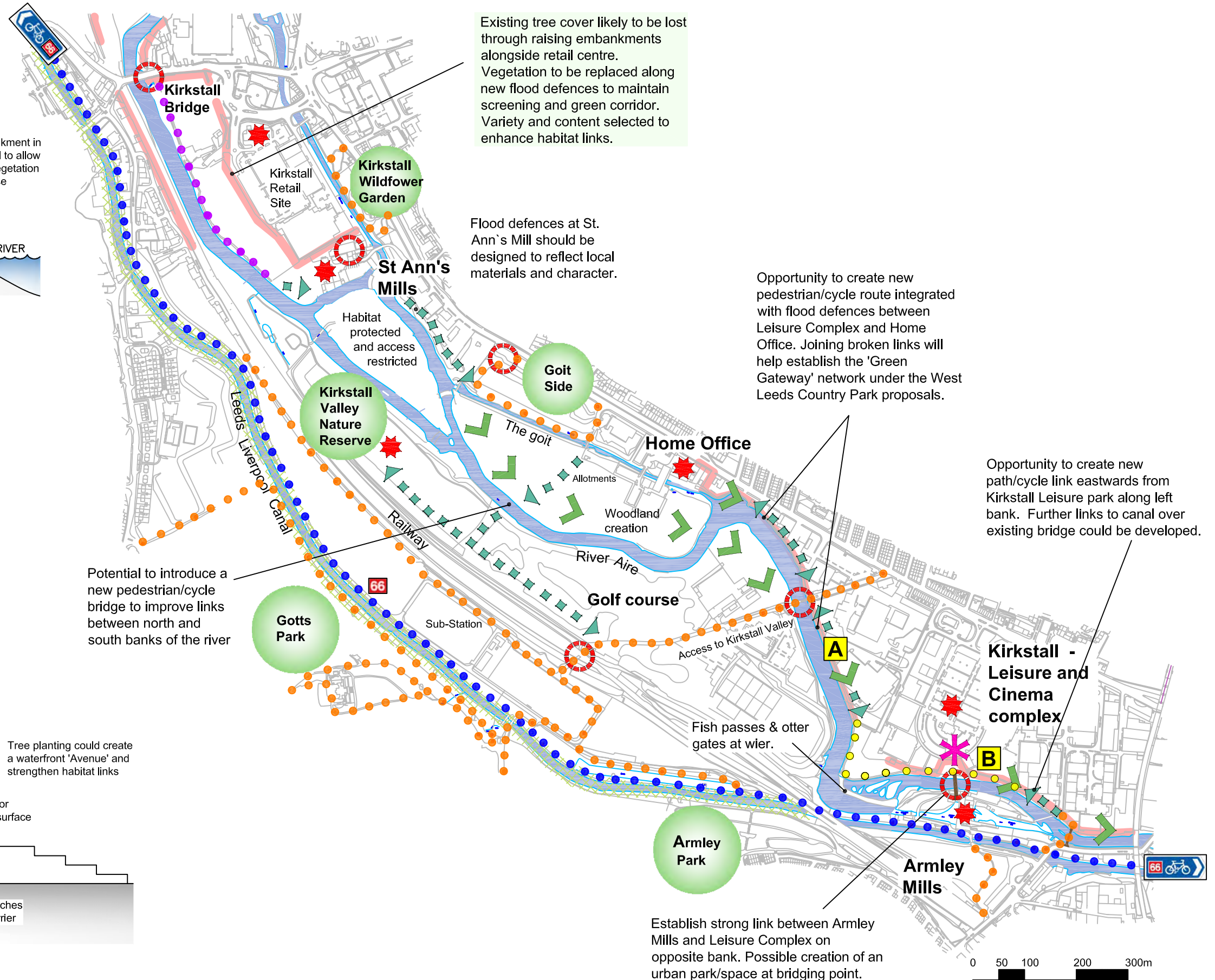
Unprotected green areas may be susceptible to an increase in flooding frequency and higher flood levels. Localised effects of raising defences should be assessed and habitats extended into flood free zones.

Opportunities to use bio-remediation techniques to reduce polluted run off from known contaminated land.

Species selected to withstand occasional flooding. Species could define destination nodes and canopies raised to allow views.



B WATERFRONT URBAN PARK/PUBLIC SPACE
Typical Cross Section



Existing tree cover likely to be lost through raising embankments alongside retail centre. Vegetation to be replaced along new flood defences to maintain screening and green corridor. Variety and content selected to enhance habitat links.

Flood defences at St. Ann's Mill should be designed to reflect local materials and character.

Opportunity to create new pedestrian/cycle route integrated with flood defences between Leisure Complex and Home Office. Joining broken links will help establish the 'Green Gateway' network under the West Leeds Country Park proposals.

Opportunity to create new path/cycle link eastwards from Kirkstall Leisure park along left bank. Further links to canal over existing bridge could be developed.

Potential to introduce a new pedestrian/cycle bridge to improve links between north and south banks of the river

Establish strong link between Armley Mills and Leisure Complex on opposite bank. Possible creation of an urban park/space at bridging point.

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