



# Preston & South Ribble Flood Risk Management Scheme Areas 1 & 2

Non-Statutory Environmental Report

## Part 1: Main Report

December 2020

We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

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## *Quality Assurance*

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## *Approvals*

Name	Signature	Title [complete using 497-10 as guidance]	Date	Version
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## Part Two – Technical Assessments

- Landscape and Visual:
  - Landscape and Visual Impact Assessment (ENV0000009C-JAC-ZZ-ZZ-RP-L-0001);
- Ecology:
  - Preliminary Ecological Appraisal (Mott MacDonald 2019a, ENV0000009C-MMD-DZ-00-RP-EN-0303001);
  - Verification Survey (Jacobs 2020, ENV0000009C-JAC-ZZ-00-MO-BD-0001);
  - Otter surveys undertaken by Jacobs and the Environment Agency (Jacobs 2020, ENV0000009C-JAC-ZZ-00-BD-0002);
  - Great Crested Newt eDNA report (Jacobs 2020, ENV0000009C-JAC-ZZ-ZZ-RP-BD-0001);
  - Marine Conservation Zone Assessment (ENV0000009C-JAC-XX-00-RP-EN-0002);
  - Stage 1 Habitats Regulations Assessment (ENV0000009C-JAC-XX-00-RP-EN-0004);
  - Bat Activity Survey Report (ENV0000009C-JAC-ZZ-ZZ-RP-BD-0003, associated drawing ENV0000009C-JAC-ZZ-ZZ-DR-BD-0001); and
  - Biodiversity Net Gain assessment (ENV0000009C-JAC-ZZ-00-RP-BD-0002).
- Heritage:
  - Heritage Statement (ENV0000009C-JAC-XX00-RP-EN-0003).
- Geology, Soils, and Contaminated Land:
  - Geoenvironmental Assessment (ENV0000009C-JAC-ZZ-00-AS-EN-0001).
- Water Framework Directive:

- Water Framework Directive Compliance Assessment (ENV0000009C-JAC-XX-00-RP-EN-0001).
- Flood Risk:
  - Flood Risk Assessment (FRA) (ENV0000009C-JAC-ZZ-00-RP-EN-0002).
- Noise and Vibration:
  - Construction Noise Report (ENV0000009C-JAC-ZZ-ZZ-TN-EN-0001).
- Cumulative Impacts; and
- Other issues.

## List of Reference Design Drawings

Reference	Description
ENV0000009C-JAC-ZZ-41A-DR-C-0001	Area 1A General Arrangement (GA) Plan 1 of 3
ENV0000009C-JAC-ZZ-41A-DR-C-0002	Area 1A GA Plan 2 of 3
ENV0000009C-JAC-ZZ-41A-DR-C-0003	Area 1A GA Plan 3 of 3
ENV0000009C-JAC-ZZ-41B-DR-C-0001	Area 1B GA Plan 1 of 3
ENV0000009C-JAC-ZZ-41B-DR-C-0002	Area 1B GA Plan 2 of 3
ENV0000009C-JAC-ZZ-41B-DR-C-0003	Area 1B GA Plan 3 of 3
ENV0000009C-JAC-ZZ-41C-DR-C-0001	Area 1C GA
ENV0000009C-JAC-ZZ-41D-DR-C-0001	Area 1D GA
ENV0000009C-JAC-ZZ-42A-DR-C-0001	Area 2A GA Plan 1 of 2
ENV0000009C-JAC-ZZ-42A-DR-C-0002	Area 2A GA Plan 2 of 2
ENV0000009C-JAC-ZZ-42B-DR-C-0001	Area 2B GA Plan 1 of 3
ENV0000009C-JAC-ZZ-42B-DR-C-0002	Area 2B GA Plan 2 of 3
ENV0000009C-JAC-ZZ-42B-DR-C-0003	Area 2B GA Plan 3 of 3
ENV0000009C-JAC-ZZ-42C-DR-C-0001	Area 2C GA and Sections
ENV0000009C-JAC-ZZ-ZZ-DR-L-0002 to ENV0000009C-JAC-ZZ-ZZ-DR-L-0009	Landscape Masterplan Sheet 1 to Sheet 8
ENV0000009C-JAC-ZZ-42X-DR-L-0001	Ribble Sidings Indicative Landscape Proposals



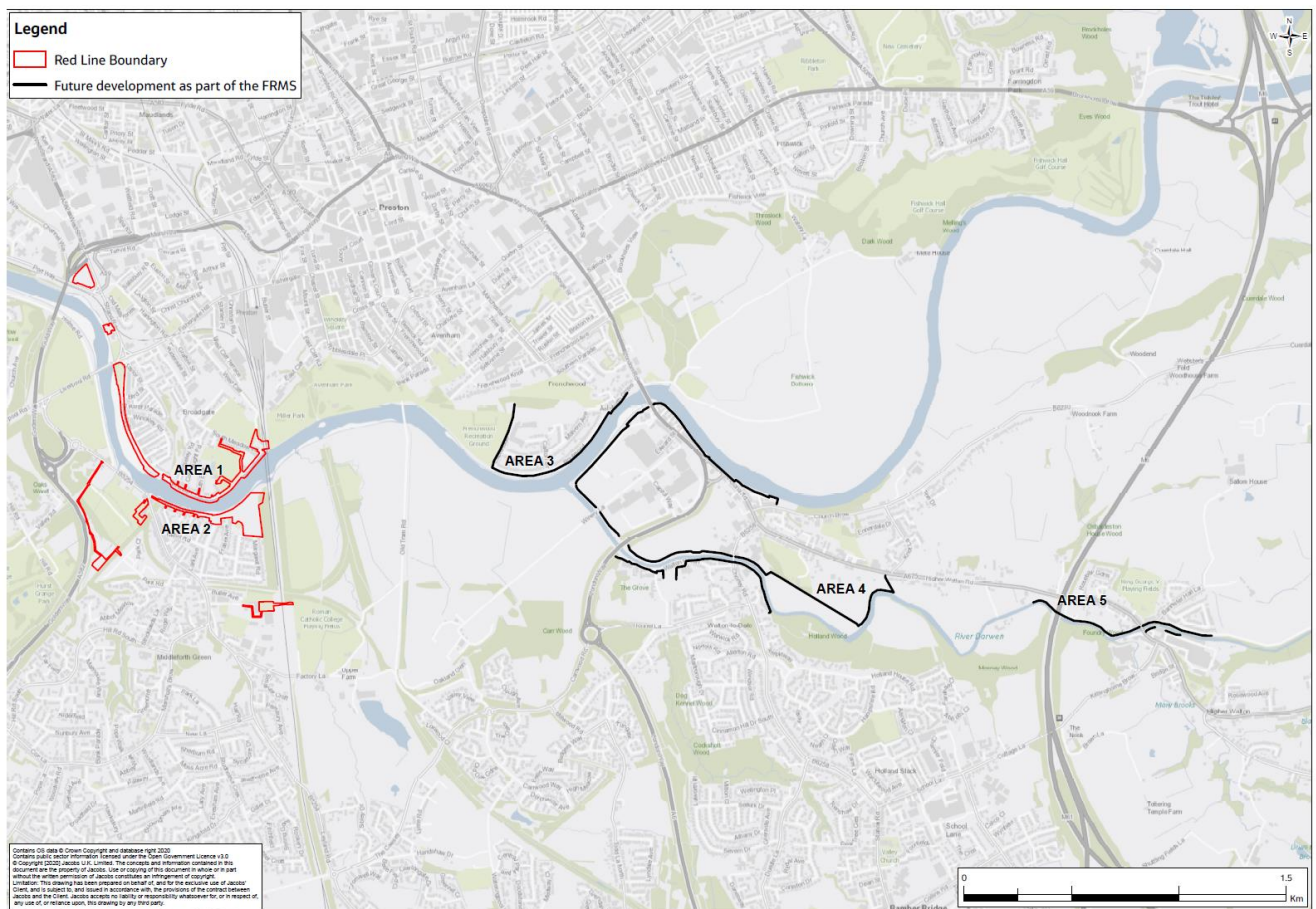


# Part One

# 1 Background

## 1.1 Introduction

The Environment Agency, in partnership with the European Regional Development Fund (ERDF), North West Regional Flood & Coastal Committee, Lancashire County Council, Preston City Council, and South Ribble Borough Council, are proposing a flood risk management scheme to better protect approximately 4,800 properties along the rivers Ribble and Darwen through Preston and South Ribble. In order to facilitate works, the Flood Risk Management Scheme (FRMS) is being designed and constructed in phases. The scheme has been divided into five areas as illustrated below in Figure 1.1.



**Figure 1.1 Five phases of Preston & South Ribble Scheme**

The full extent of the Preston and South Ribble FRMS (of which this planning submission covers Areas 1&2 as shown in figure 1.1) runs to the south of Preston city centre, along a 4.5 kilometre (km) stretch of the River Ribble, extending from Broadgate to Walton-le-Dale. It also includes a 4 km stretch of the River Darwen from the confluence with the River Ribble to Higher Walton. Due to its large scale, the Preston & South Ribble FRMS has been divided into five Phases of works. These Phases are referred to as Areas and consist of the following:

- Area 1 – Riversway and Broadgate – runs along the right bank of the River Ribble between the West Coast Main Line (WCML) Viaduct at the upstream extent and the Liverpool Road Bridge at the downstream extent.
- Area 2 – Lower Penwortham – situated along the left bank of the River Ribble, between the WCML Viaduct and the Cadent gas pipe bridge. The proposed Scheme also includes works inland from the river around the Penwortham Methodist Church, and across the Golden Way footpath. There are also works to an existing culvert beneath the WCML railway approximately 500 metres (m) south of the river.
- Area 3 – Frenchwood and Walton-le-Dale along the Ribble – extends along the right bank of the River Ribble between Walton Bridge and the Esplanade, and along the left bank of the Ribble between Church Brow and the confluence of the River Darwen.
- Area 4 – Walton-le-Dale along the Darwen – extends along the right bank of the River Darwen from Knot Lane in Walton-le-Dale to the confluence with the River Ribble, and along the left bank from Drakes Hollow (off Chorley Road) to the A6 London Way.
- Area 5 – Higher Walton – extends along the right bank of the River Darwen between Bannister Hall Crescent and the M6, and along the left bank from Higher Walton Mill to Cann Bridge.

This Non-Statutory Environmental Report (ER) has been prepared to support the planning application for Areas 1&2 of the FRMS (hereafter referred to as the proposed Scheme). The proposed Scheme includes properties at risk of fluvial and tidal flooding from the River Ribble in the local authority areas of Preston City Council (PCC) and South Ribble Borough Council (SRBC) (these are referred to as Phase 1 and Phase 2 respectively on Figure 1.1).

The purpose of this ER is to provide a single point of information related to the environmental risks, mitigation measures and environmental opportunities of the proposed scheme. It presents a summary of baseline environmental information and an assessment of the potential environmental impacts, opportunities and known constraints associated with the proposed Scheme. It also details any mitigation works proposed, and how potential construction related impacts shall be managed.

This ER considers all potential receptors that could be affected by the construction and operation of the proposed Scheme with a focus on biodiversity, landscape and visual amenity, cultural heritage, and water (specifically the requirements of the Water Framework Directive (WFD)).

It was agreed that Lancashire County Council (LCC) are best placed to act as the planning authority due to the proposed Scheme spanning two Local Planning Authorities (LPA) and their strategic role as Lead Local Flood Authority (LLFA). LCC was contacted on the 5<sup>th</sup> February 2020 for a formal Screening Opinion under the Town and Country Planning (Environmental Impact Assessment (EIA)) Regulations SI 99/23. The council responded on the 11<sup>th</sup> March 2020 confirming that they consider the proposed Scheme does not constitute EIA development. Following further development of the proposed Scheme through detailed design, a formal Screening Opinion was also requested from the Marine Management Organisation (MMO) on 30<sup>th</sup> October 2020. At the time of writing, this request is still within its determination period.

Despite the determination of a non-EIA development, this non-statutory ER has been prepared to ensure that any environmental issues are clearly documented and managed appropriately.



## 1.2 Site location and description

Preston is a city located in Lancashire, on the north bank of the River Ribble, which flows east to west towards the Ribble Estuary (Figure 1.2). It is the administrative centre of the county and has a population of approximately 313,000. The River Darwen is a main tributary of the River Ribble with the confluence in Walton-le-Dale. There are extensive flood defences along both watercourses which are the focus of the proposed flood risk management scheme. The existing defences are shown on Figure 1.3.

The proposed Scheme (Areas 1&2) is situated along both banks of the River Ribble, primarily along the alignment of the existing defences with some minor extensions or alterations.

Key environmental constraints in proximity to the site include multiple Public Rights of Way (PRoW), two historic bridges Penwortham Old Bridge, and West Coast Main Line (WCML) Viaduct, and the historic park Avenham and Miller Park. There are also several protected ecological sites, including the River Ribble Marine Conservation Zone (MCZ); the Ribble and Alt Estuary Special Protection Area (SPA), and Ribble and Alt Estuary Ramsar, these are situated approximately 6.5km downstream from the scheme. A summary of the environmental constraints can be found in the Environmental Constraints Plan (ENV0000009C-JAC-XX-XX-DR-0001) in figure 1.2.

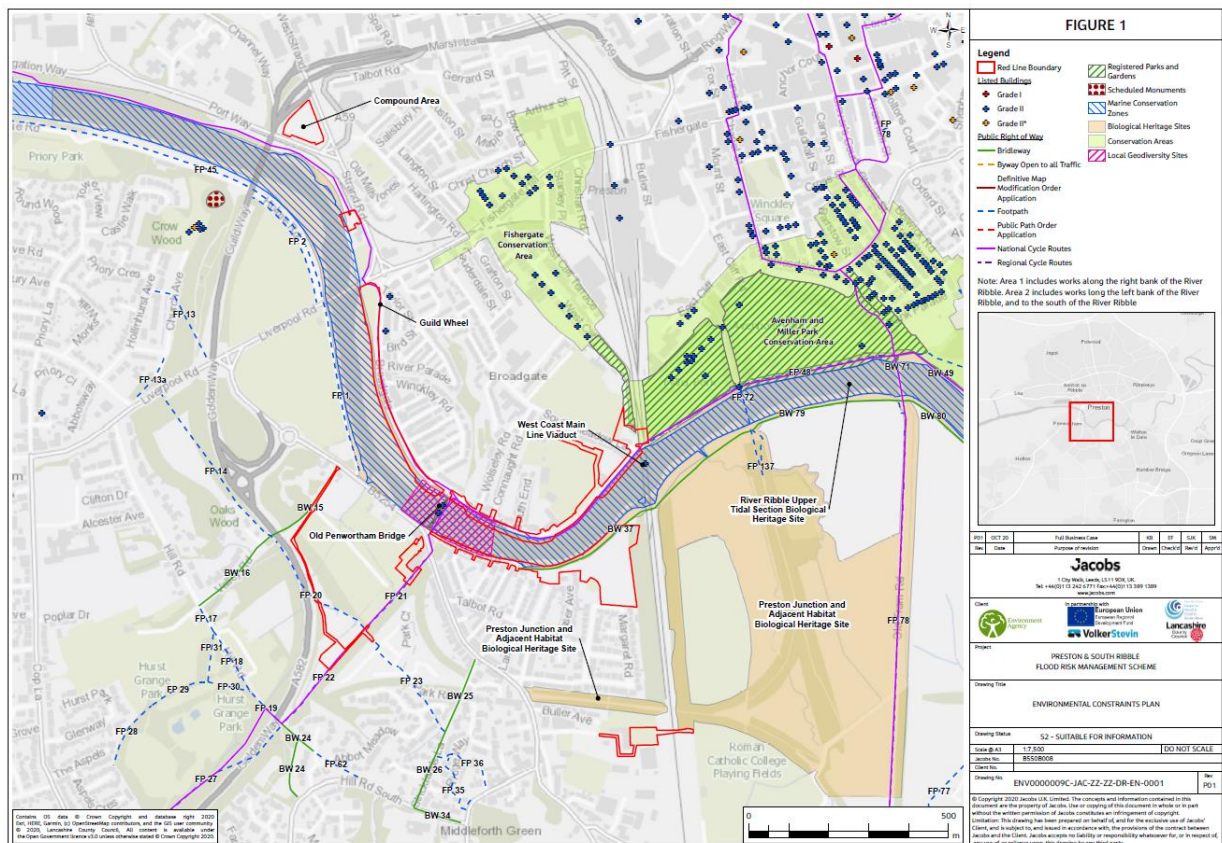


Figure 1.2 Environmental Constraints in Areas 1 and 2

## 1.3 The problem

The largest recent flood event was Storm Eva (26<sup>th</sup> December 2015) which was estimated to have been a 2.9 % Annual Exceedance Probability (AEP) (1 in 35 year return period) event on the Ribble and a 1.33% (1 in 75 year return period) event on the Darwen. The peak flow on the Ribble at Samlesbury was 1,110 cubic metres per

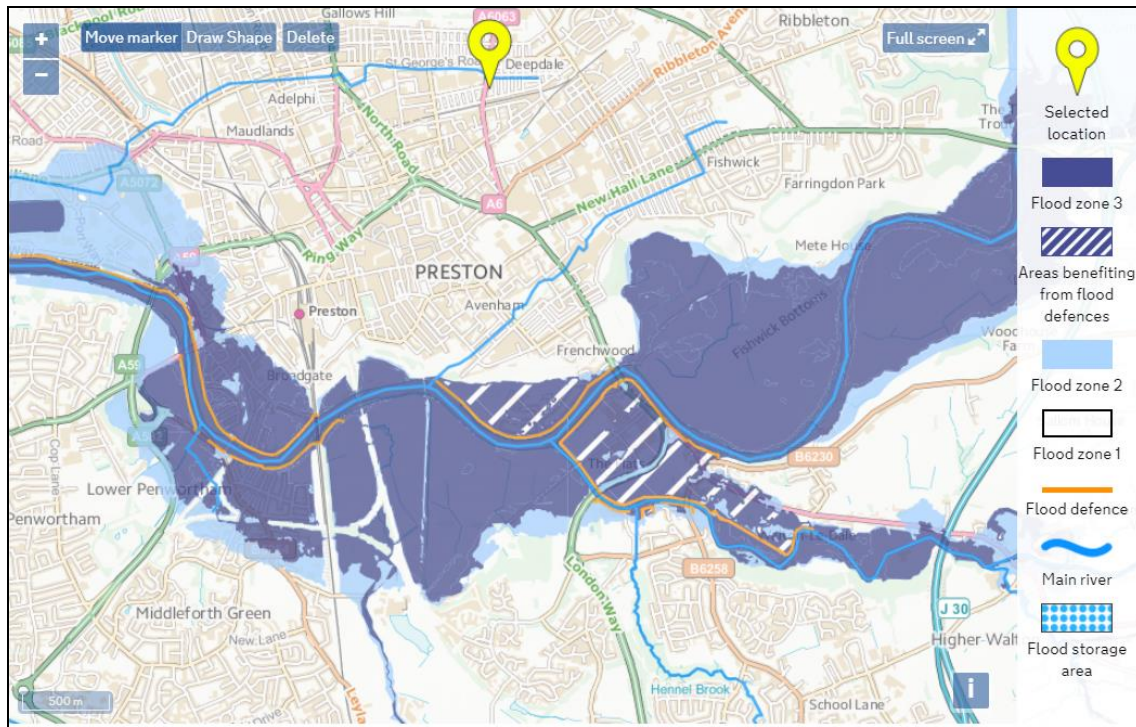
second ( $\text{m}^3/\text{s}$ ) (highest on record) and  $218 \text{ m}^3/\text{s}$  on the Darwen at Blue Bridge (joint highest on record with the June 2012 event). The second highest flow on record for the Ribble was in October 1980, with a flow of  $1,040 \text{ m}^3/\text{s}$ . Had Storm Eva been centred 10-15 km northwards then rainfall intensity across the catchment would have been 5-10% higher and it is highly likely that some defences would have overtopped resulting in the flooding of thousands of properties.

There are considerable lengths of existing flood defences along both watercourses, but they do not provide a high standard of protection (SoP) and this will worsen with climate change. Heavy rainfall from Storm Eva combined with already heavily saturated catchments which resulted in widespread flooding in the north of England. Within Preston, the existing defences were sufficient to contain flows within the Ribble, but the most significantly affected areas were in Walton-le-Dale and Higher Walton along the Darwen. Overall, the event was considered a near miss, with peak water levels observed to be at or just below existing defence levels.

The Environment Agency's climate change guidance for the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2018) indicates that climate change is likely to have an impact on river flows and rainfall intensity, which are both likely to contribute to the increased frequency of events such as Storm Eva which will exceed the capacity of the existing flood defences within Preston and South Ribble.

The proposed Scheme is designed to provide a present-day Standard of Protection (SoP) of 0.5% Annual Exceedance Probability (AEP). This SoP is predicted to reduce over time due to the impact of climate change to a 1.33% AEP SoP by the end of the 2080's epoch. The SoP was arrived at in accordance with FCERM (Flood and Coastal Erosion Risk Management) appraisal guidance.

As noted previously there are existing flood defences within Preston and South Ribble which are comprised primarily of flood walls with some sections of earth embankments. Despite this, Areas 1&2, and some of Areas 3, 4, & 5 are still shown as being within Flood Risk Zones 2 and 3 (Figure 1.3). It should be noted there are no formal defences in Higher Walton (Area 5.)



**Figure 1.3** Environment Agency Flood Risk Map of Preston showing existing defences in the vicinity of the River Ribble and the River Darwen throughout the 5 Areas

## 1.4 Structure of the report

### Part One

Part one of the ER (this document) sets out the proposed Scheme and assessment methodology and includes a summary of the detailed environmental assessments covered in Part Two alongside a review of cumulative effects, and a conclusion.

### Part Two

The second part comprises the detailed environmental assessments / reports carried out. These include:

- Landscape and Visual;
- Ecology;
- Heritage;
- Geology, Soils, and Contaminated Land;
- Water Framework Directive;
- Flood Risk;
- Noise and Vibration;

## 1.5 Review and comments

A copy of the ER is available upon request via the email address below.

Any comments should be directed to the Preston & South Ribble email address:

[PSR@environment-agency.gov.uk](mailto:PSR@environment-agency.gov.uk)



## 2 Project development

### 2.1 Scheme development

In 2015, Storm Eva resulted in significant rainfall across the River Ribble catchment and a flood event estimated to have been 2.9% AEP on the River Ribble, and a 1.33% AEP event on the River Darwen. Since this event, the Environment Agency has undertaken a detailed study to identify the best way to invest funding for improved flood protection in Preston and South Ribble. Funding for the Preston and South Ribble FRMS has come from various partners, including the European Regional Development Fund.

### 2.2 Option selection process

A long list of options was developed in accordance with the Flood and Coastal Erosion Risk Management Appraisal Guidance (FCERM-AG). The Long List of Options presented a comprehensive review of the various measures for managing flood risk throughout Preston and South Ribble. Table 2.1 provides a summary of the identified intervention measures and the reason for progressing (short-listing) or rejection of each option. The merits of each were assessed against key criteria. The long list of options was subject to discussions with key partners at the Making Space for Water Group.

**Table 2.1 Long list of options considered at Outline Business Case**

Generic Option	Description	Reason for short list or rejection
1.	Do nothing: includes blockages at key structures and failure of defences	Shortlisted as baseline for all other options to be compared against
2.	Do minimum: includes some blockages at key structures and breaches of defences further into the appraisal period	The 'existing situation'. Shortlisted as the baseline against which all new investment options to be compared against.
3.	Linear defences: solid permanent defences along the channel banks	Shortlisted as the main current response. Visual intrusion will potentially constrain visibility over the river.
4.	Linear defences: active management / transparent defences in targeted areas	Shortlisted as potential supplementary measures. Active management measures can be constructed in a short space of time, prior to a flood event (e.g. demountable defences). Operational staff availability is key. Transparent measures (glass panels) allow the retention of views, however they do require an

		increased maintenance regime.
5.	Flood storage	Rejected – not viable based on lack of suitable candidate areas, high costs of construction, high operation and maintenance demands, the significant risks introduced and the major negative environmental impact.
6.	River conveyance improvements	Rejected – structures along the River Ribble cause little to no flow constriction in the 1% (1 in 100 year) AEP present day event. Two bridges constrain the river flows along the Darwen in extreme storm events, however removal will pass forward flows downstream and therefore potentially increase flood risk to Walton-Le-Dale.
7.	Natural Flood Management (NFM)	Rejected – option is not considered as a viable standalone solution along the main rivers due to the significant widths and flows.  This option is being considered for some of tributaries along the Darwen as part of Areas 4&5.
8.	Urban redevelopment / renaturalisation of the river	Rejected – the majority of riverside areas are highly urban, the study area is primarily residential and such a measure would come at significant cost.
9.	Property level protection / Property flood resilience such as airbrick covers, flood doors, etc	Shortlisted to reduce flood risk to outlying or isolated properties, however not effective for large areas due to high depth of flooding.

### 2.2.1 Short-listing

The following short-listed options were identified for detailed analysis, with the first two providing baselines by which the 'do something' options could be compared:

- Option 3: Linear defences – Sustain current standard of protection (maintain existing defence heights);
- Option 4: Linear defences – Improve the SoP (1.33% AEP based on 2050's climate change levels);
- Option 5: Linear defences – improve SoP (1.33% AEP based on 2080's climate change levels); and
- Option 9: Property level protection.

These options were subjected to hydraulic modelling and subsequent technical analysis. This process determined that the preferred option is Option 5 which delivers the highest level of protection and includes glass panels in order to retain visual connectivity with the river. Option 9 is not required in the proposed Scheme but is being considered elsewhere in the Preston and South Ribble FRMS.

## 2.3 Consultation

Statutory and non-statutory consultees and stakeholders have been involved throughout the development of the proposed Scheme. Effective stakeholder and public engagement is considered to be central to inform option selection and design of the proposed Scheme. The consultation has:

- Ensured that the knowledge, experience and views of the local residents and other stakeholders were taken into account at all stages of the project;
- Informed the development of the proposed Scheme by identifying and, where appropriate, addressing concerns of consultees; and
- Contributed to the success of the project and improved decision-making by ensuring that the final proposed Scheme design was agreed by the local stakeholder community.

The external consultees involved to date include:

- Natural England (NE);
- Historic England (HE);
- Network Rail;
- Lancashire County Council (LCC);
- Sport England;
- Preston City Council (PCC);
- South Ribble Borough Council (SRBC);
- The Marine Management Organisation (MMO); and
- Affected landowners.

*Conclusions drawn from stakeholder engagement to date:*

- The scheme should aim to retain visual connection between properties and the river;
- The scheme should provide long-term protection to the residents of Frenchwood and Walton-Le-Dale to reduce the risk of flooding and to avoid repeatedly disrupting these communities;
- The predicted reduction in SoP due to climate change is unacceptable; and
- Options which result in higher defences than the leading option would be deemed unacceptable by the public and the Environment Agency, which ruled out raising defences beyond the 1.33% AEP SoP to the end of the 2080's climate change epoch.

*Future Consultation*

Throughout the construction phase of the proposed Scheme and the continued detailed design of Areas 3, 4, and 5, engagement with local residents, statutory stakeholders and interested parties will continue.

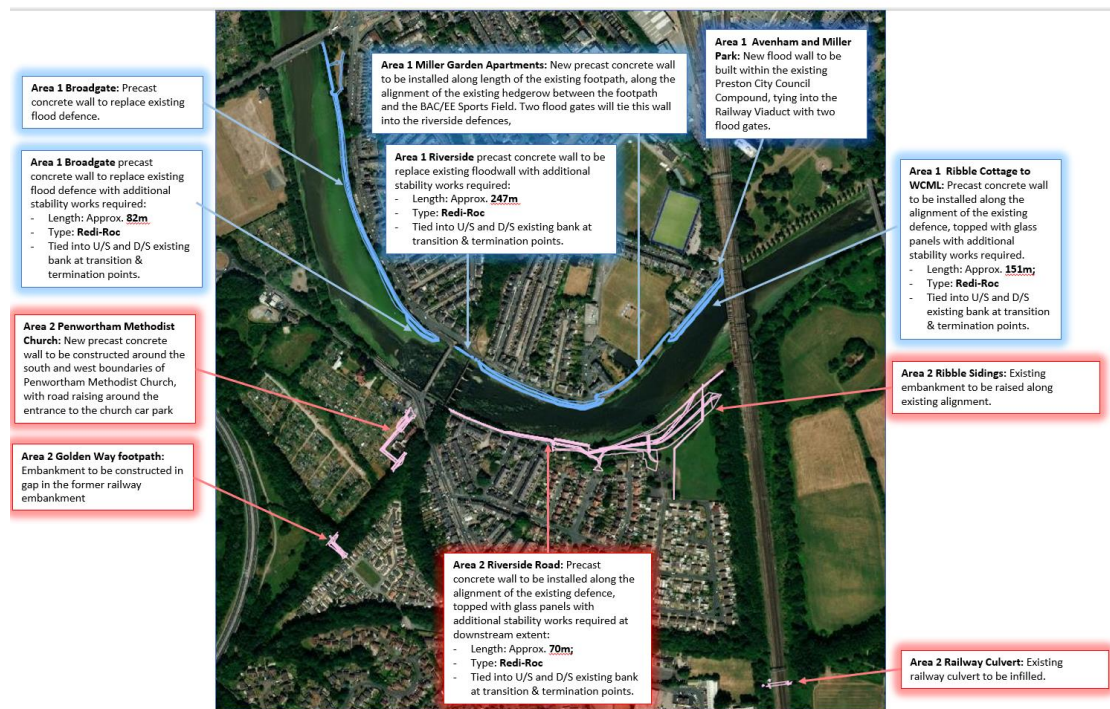
During the construction of areas 1 & 2, engagement with local residents, stakeholders and interested organisations will continue to ensure that they are kept up to date on progress. Regular updates relating to the construction works will also be communicated to the local community. Close liaison with Local Councils, the County Council and

statutory stakeholders will also be maintained to fulfil the necessary planning and other legislative requirements. We will also liaise with landowners and our own internal teams on the proposed method statements for the works and details of the proposed Scheme, such as the timing of works and access along public rights of ways. The intention is to have a specific location on site where the public can attend a staffed drop-in centre.

# 3 The proposed Scheme

## 3.1 Scheme description

An overview of the main components of the proposed Scheme, excluding Sea Cadets can be seen on figure 3.1. Sea Cadets is considered minor works to improve access to the river for emergency services which are shown on ENV0000009C-JAC-ZZ-41D-DR-C-0001.



**Figure 3.1** Overview of the proposed Scheme, excluding minor works around the Sea Cadets

## 3.2 Area 1: Riversway and Broadgate

Located on the right (north) bank of the River Ribble, to the south of the city centre. This area is approximately 1.2 km long, extending from the West Coast Main Line (WCML), downstream to Liverpool Road Bridge. Proposed defences comprise:

- Replacement of the existing concrete wall (0.75 m to 1.23 m high), with a new concrete wall (1.19 m to 1.34 m high), between Liverpool Road bridge and Penwortham Old Bridge. A visualisation of the proposed layout is shown in figure 3.2;
- Replacement of the existing concrete flood wall (0.78 m to 1.08 m high), with a new pre-cast concrete flood wall (0.77 m to 1.4 m high) with glass panels on top (0.8 m high), along Riverside between Penwortham Old Bridge and Miller Gardens Apartments;
- A new flood gate (1.35 m high) located in front of Miller Gardens Apartments;
- A new concrete wall (1.14 m to 1.26 m high) along the boundary of the BAC/EE Preston Social and Sports Association between Miller Gardens Apartments and Ribble Cottage. A visualisation is provided in figure 3.3;

- A new flood gate (1.45 m high) located close to Ribble Cottage;
- Replacement of the existing concrete wall (1.09 m high), with a new concrete wall (1.34 m to 1.6 m high) with glass panels (0.8 m high) on top, running on the river side of the road between Ribble Cottage and the railway viaduct;
- A concrete wall (1.3 m to 2.6 m high) will be constructed along the boundary of the existing Preston City Council compound, with two flood gates tying into the abutments of the WCML viaduct. The northern flood gate will be 1.4 m in height, and the southern flood gate will be 1.8 m high; and
- In addition, 3 lengths of the existing river bank from just downstream of Old Penwortham Bridge to the WCML will be stabilised with a blockwork revetment. These lengths are estimated as 82 m, 247 m, and 151 m respectively.



**Figure 3.2** Visualisation of the proposed Scheme along Broadgate looking downstream towards Liverpool Road Bridge





**Figure 3.2** Visualisation of the proposed Scheme looking downstream along the boundary of the BAC/EE cricket ground

### 3.3 Area 2: Lower Penwortham

Located on the left (south) bank of the River Ribble, to the south of the city centre. This area is approximately 0.8 km long, extending from the WCML, downstream to Penwortham Old Bridge, and turning inland to tie into the abandoned railway embankment. Proposed defences comprise:

- A new concrete wall (1.0 m to 2.2 m high) along the boundary of Penwortham Methodist Church and the allotments. In order to maintain security of the allotments, fencing will be installed along the top of the new wall to ensure that a minimum height of 1.8 m is provided;
- A new ramp to raise existing road levels by approximately 1.0 m at the entrance to Penwortham Methodist Church and a ramp along the Golden Way path between the church and the disused railway embankment.
- A new ramp across the gap in the disused railway embankment which provides access into Penwortham Residential Park;
- A new concrete wall (1.4 m high) with glass panels (0.8 m high) on top, along Riverside Road extending upstream from the Cadent Gas pipe bridge. Visualisation provided in figure 3.4;
- A new concrete wall (1.5 m high) along the river front linking Riverside Road to Ribble Sidings. A blockwork retaining wall (70 m long) will be constructed to stabilise the existing riverbank;
- Removal of the existing flood embankment (1.7 m high) at Ribble Sidings and construction of a new 3.5 m high embankment with a 3 m crest width and 1 in 3 side slopes. The existing riverside footpath (NCR 55 and PRoW 7-9-BW34) route will be maintained with an access ramp over the proposed flood embankment; and
- Filling in of a culvert under the WCML, approximately 500 m inland from the Ribble Viaduct.

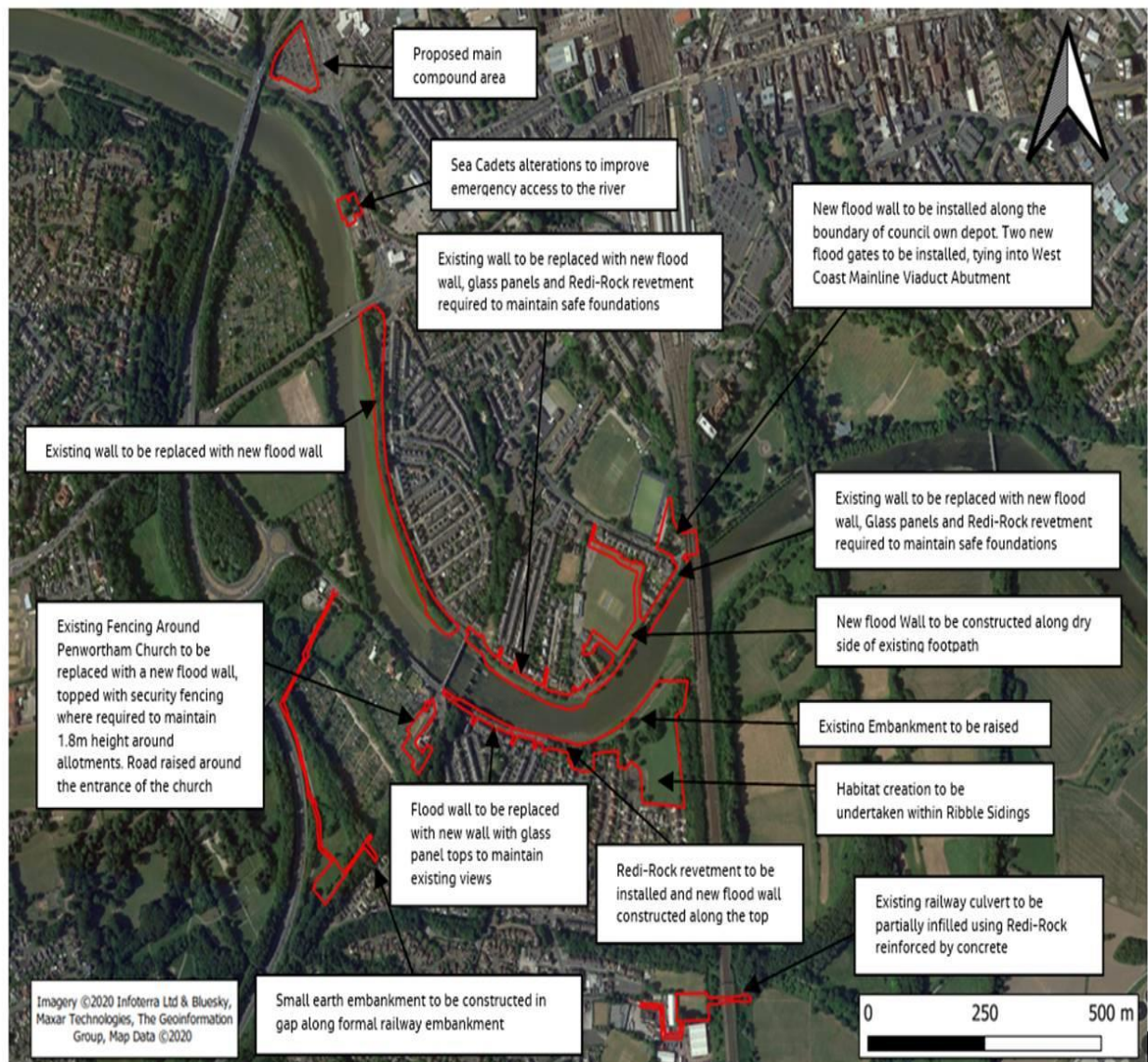


**Figure 3.3** Visualisation of the replacement flood defence, taken from Riverside Road looking upstream towards the West Coast Mainline Viaduct

### 3.4 Construction overview

At this stage there is an outline programme of how the proposed Scheme will be constructed. This information is indicative and subject to change through further development of the design. The red line boundary for planning purposes is shown in figure 3.4.





**Figure 3.4** Red line boundary of Areas 1&2

### 3.4.1 Indicative construction programme

The construction programme is anticipated to commence in August 2021 with preconstruction mobilisation and the application for site specific consents and licences. Construction is anticipated to commence in September 2021 and will take approximately 18 months to complete, including planned reinstatement works.

The initial works will involve the Contractor setting up facilities, including site compounds and construction access routes. For the purposes of the construction programme, the proposed Scheme has been divided into sub-areas, starting at the downstream extent and moving upstream. A breakdown of the anticipated construction programme can be seen in Table 3.1.

**Table 3.1** High level indicative Construction Programme

Area of Works	Anticipated Start and End
<b>Area 1 – Downstream to Upstream</b>	
Sea Cadets	September 2021 to April 2022
Liverpool Road Bridge to Penwortham Old Bridge	September 2021 to August 2022
Penwortham Old Bridge to Cadent Gas Pipe Bridge	February 2022 to May 2022
Cadent Gas Pipe Bridge to Miller Gardens Apartments	June 2022 to January 2023
Miller Garden Apartments to Mini Centre	February 2022 to May 2022
Mini Centre to WCML Viaduct	October 2022 to February 2023
WCML Western Arch	June 2022 to July 2022
<b>Area 2 – Downstream to Upstream</b>	
Penwortham Methodist Church	March 2022 to May 2022
Ground raising along footpath into Penwortham Residential Park	April 2022
Cadent Gas Pipe Bridge (infilling arch)	March 2022
Cadent Gas Pipe Bridge to end of Riverside Road	June 2022 to March 2023
Riverside Road revetment	August 2022 to March 2023
Ribble Sidings Embankment	July 2022 to August 2022
WCML Culvert Infill	March 2022

### 3.4.2 Construction compounds

Three compounds are proposed for the Scheme. The main compound will be situated within the Portway Park and Ride car park to the northern extent of the proposed Scheme, accessible via Port Way. This compound will be used as a base for the Contractors offices, lay-down area, plant and storage. The Park and Ride will be closed to the public during construction. There will be two satellite compounds; one within Broadgate Gardens at the northern end of Broadgate, and the other within the car park of Preston Sports Club, off South Meadow Lane. The satellite compounds will have welfare facilities and plant storage with most materials being delivered direct to the working areas.

In addition, lay down areas for the works include the area north west of Golden Way, adjacent to the footpath, amenity grassland in Ribble Sidings, and within the St Mary Magdalene Primary School adjacent to the WCML underpass.

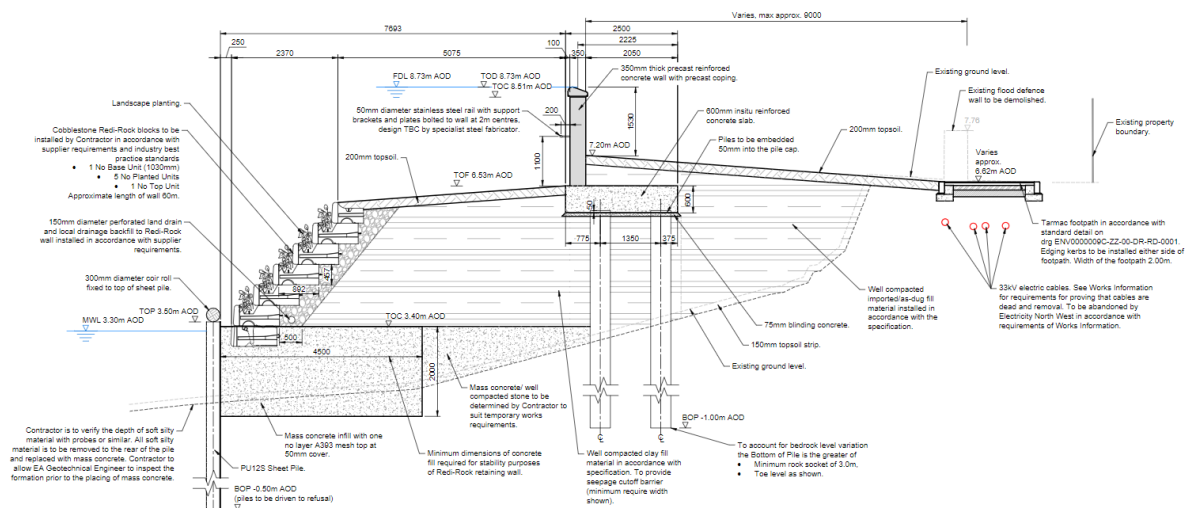
### 3.4.3 Construction activities, plant and equipment

The construction of the proposed Scheme can be divided into 4 distinct aspects: construction of flood walls along existing alignment, including installation of new flood

gates; stabilisation of revetments using Redi-Rock units; raising of existing embankment; and infilling of railway culvert. The plant and equipment required for the works are discussed below:

#### Revetment works – figures 3.5 and 3.6

- Stabilisation works will be undertaken where necessary by installing sheet piles into the riverbed to act as a coffer dam using a 52 tonne (t) vibratory piling rig;
- Excavation will be undertaken behind the sheet pile to create space for the foundation of the Redi-Rock using a 22 t tracked excavator;
- A concrete causeway will be constructed to the rear (landward side) of the sheet pile using a 4 t vibratory roller to form the foundation on which the Redi-Rock blocks will be installed in layers using a 6 t lorry with a lifting boom to create a sloping terrace profile, with a backfill of cohesive material to form a seepage barrier;
- The new flood defence wall will be set back from the top of the Redi-Rock revetment as shown below.



**Figure 3.5** Example of Redi-Rock cross section and flood wall taken from ENV000009C-JAC-DZ-42B-DR-0002





**Figure 3.6** Photos of Redi-Rock structures in-situ

*Flood walls along existing alignment – figure 3.7*

- A temporary flood defence will be erected prior to demolition of the existing wall and foundation. Where necessary some sections of footpath will require demolition as well;
- Installation of piling mat and auger boring of 450mm along the wall foundation. Piles will be installed into bedrock, with the piling rig operating in a linear manner along the alignment;
- Construction and installation of reinforcement for the wall foundation;
- Temporary working platforms may be required in the river where it is necessary to allow access to the river side of the defence during construction and where there is no existing riverbank. The platforms would allow the precast wall units to be supported until concrete foundation is poured;
- Pre-cast concrete wall units will be lifted into position by crane and the concrete foundation will be poured in sections up to 15 m long;
- Where glass panels are required, glass panel support posts will be fixed to the top of the pre-cast concrete wall using a drill and fix mechanism and the 3 m long glass panels will be installed between the support posts;
- Pre-cast concrete copings (for sections where no glass panels are proposed) will be installed onto the top of the pre-cast concrete wall with a dowel connection between units lifted into place using a crane;
- Where tie-ins to existing structures are required, a reinforced concrete wall with dowel bars will be used to form a watertight seal;
- Riverside footpaths and highways will be reinstated following completion using an excavator and compacted by a roller. Tarmac surfacing will be installed in accordance with Lancashire County Council Highway standards.



#### *New flood wall around Penwortham Methodist Church*

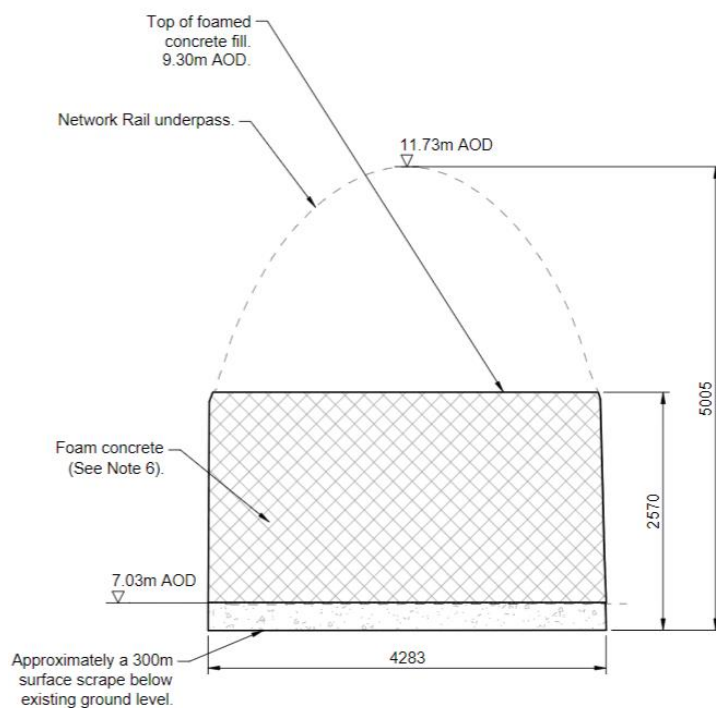
- Demolition and site clearance undertaken by an excavator including the removal of topsoil, surfacing, brickwork stub wall and security fencing around the perimeter of the church. Topsoil and subsoil removed from the allotments will be stored and reused on completion of the works. Material from each individual allotment to be stored separately to ensure reinstatement to its original location;
- Installation of reinforcement for the wall foundation;
- Pre-cast concrete wall units will be lifted into position by crane and the concrete foundation will be poured in sections up to 15 m long;
- Pre-cast concrete copings will be installed onto the top of the pre-cast concrete wall by crane with a dowel connection between units where required. Railings will be fixed to the top of the wall where required to give a minimum height of 1800 mm security perimeter along the allotments; and
- Soft landscaping of allotments and Penwortham Methodist Church. Topsoil will be reinstated with supplementary import of suitable growing material where required. Any sheds and / or allotment furniture will be reinstated to its previous condition. Allotment soil to be reinstated to the same state as it was removed.

#### *Ground Raising (Penwortham Church and the Golden Way footpath)*

- Clay will be imported to site and installed and compacted to 250 mm layers using a mini-dumper, mini-excavator, and roller to create 2 ramps around the church, one at the entrance off Leyland Road, and the other along the footpath adjacent to the old railway embankment;
- Appropriate surfacing will be installed following the ground raising with timber post and rail fencing along ramps.

#### *Railway culvert infill*

- A trench drain and a concrete slab will be constructed at the eastern end of the culvert;
- Redi-Rock retaining walls will be constructed at the East and West ends of the underpass up to 2.3 m in height with concrete infill between them.



**Figure 3.9** Railway culvert infill, taken from ENV0000009C-JAC-DZ-42C-DR-C-0001

### *Flood gates*

These will comprise of:

- Pre-fabricated sections, which will then be assembled on site
- Sub-frames cast into prepared bases
- Individual Gates brought to site and hung on the sub-frame

## 3.5 Construction access and traffic management

It is anticipated that the majority of deliveries and collections from site will be from the main compound within the Portway Park and Ride Car Park.

Routes to be agreed with the Local Highways Authority prior to commencement of works. Traffic generated (including the movement of material on the road network and on site) will be managed in accordance with a Traffic Management Plan agreed with Local Highways Authority.

It is anticipated that there will be a requirement to temporarily close some roads in the local area to facilitate the construction works:

- Rolling single lane closure of Broadgate between September 2021 to June 2022;
- Riverside between Penwortham Old Bridge to Miller Gardens Apartments between June 2022 and December 2022;
- Riverside between the Continental Pub to the Mini Centre between September 2022 to February 2023; and
- Riverside Road between May 2022 and March 2023.

Pedestrian access to residential properties will be maintained for the duration of the road closures. Where necessary alternative access to businesses will be implemented.

There will be restricted access to the car park of Penwortham Methodist Church and nearby access to the allotments between March 2022 and June 2022.

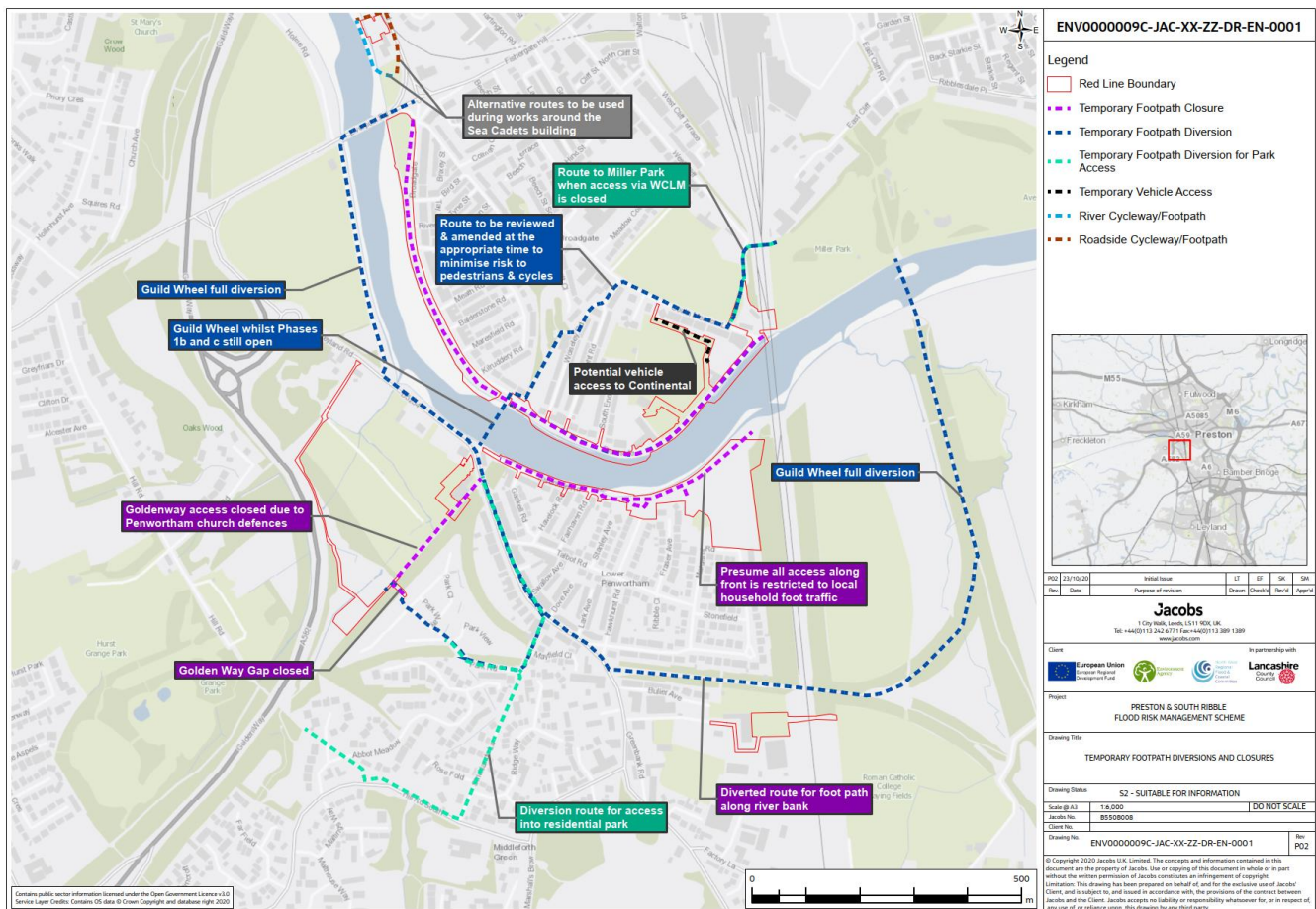
### **3.5.1 Footpath and cycle route diversions and access**

During construction works, there will be multiple temporary footpath and cycle route diversions required, including:

- National Cycle Route (NCR) 55;
- NCR 62;
- The Preston Guild Wheel that follows the existing footpath along Area 1;
- The Ribble Way long distance path that follows the existing footpath along Area 1;
- 7-9-FP20, that meets the Golden Way footpath at the entrance to Penwortham Residential Park;
- 7-9-FP21 which forms a part of the Golden Way footpath;
- 7-9-FP22 which forms a part of the Golden Way footpath;
- 7-9-BW34 that runs along the River Ribble between the existing embankment and the river channel in Area 2;

Locations of these footpaths can be found on the Environmental Constraints Map (ENV0000009C-JAC-ZZ-ZZ-DR-EN-0001). Proposed diversion routes can be seen in figure 3.11 (ENV0000009C-JAC-XX-ZZ-DR-EN-0001). These will be temporarily closed and diverted as construction commences at the various extents of the proposed Scheme.





**Figure 3.10** Proposed PRow diversion routes

There will be a requirement for a temporary closure of the riverside entrance to Miller Park between May 2022 and June 2022. Appropriate consents will be obtained, and proposed diversion routes agreed prior to construction commencing.

### 3.5.2 Trees within Working Areas

A tree survey of the working area has been undertaken to record the trees that may be affected by the proposed Scheme (Jacobs, 2020) (Arboricultural Impact Assessment, ENV0000009C-JAC-XX-00-RP-EN-0004). This includes the methodology of the survey and provides plans showing tree locations, canopy sizes, indicative Root Protection Areas (RPA) and classification with an accompanying tree schedule. An Arboricultural Method Statement including Tree Protection Plans has been developed and is included in Part Two of the ER. Trees to be protected or removed will be agreed with the relevant local authority prior to construction.

#### Area 1

Sea Cadets – 3 young trees to be removed adjacent to roadside footpath

Broadgate Gardens – 10 mature trees along the landward side of the flood wall to be removed;

Broadgate, between Liverpool Rd Bridge and Penwortham Old Bridge – 540 m of self-seeded trees to be removed from riverward side of flood wall;

Riverside, between Penwortham Old Bridge and gas pipe bridge – 28 m of self-seeded trees to be removed from riverward side of flood wall;

Riverside, between gas pipe bridge and Miller Gardens apartments – approx. 10 trees to be removed from riverward side of flood wall;

Riverside, along boundary of the cricket ground – 150 m of hedgerow to be removed; and

Riverside, between Ribble Cottage and WCML Viaduct – approx. 10 trees to be removed from riverward side of flood wall.

## **Area 2**

Ribble Sidings – approx. 170 trees including 34 mature to be removed along existing flood embankment. Some trees have been identified as having low potential for bat roosts therefore recommended that ‘soft felling’ measures are undertaken, whereby, the trees are felled in a sectional manner with brash from the canopy being removed first. Brash should be laid on the ground around the trunk to form a cushion when lowering further branches and trunk sections with suitable roosting features. Suitable roosting features should be lowered and positioned face up and then inspected by a suitably qualified licensed bat ecologist. Should roosting bats be found or suspected at any time then works must stop immediately;

Ribble Sidings – trees along the riverfront to be retained – one of these trees offered medium potential for bat roosts but further survey undertaken which determined no bat roosts;

Ribble Sidings, Hawkhurst Rd frontage – approx. 40 trees including 20 mature to be removed;

Riverside Road – approx. 13 trees to be removed from riverward side of flood wall.;

Penwortham Methodist Church – tree and vegetation within the grounds including one mature tree which is protected by Tree Preservation Order (TPO);

Tie-in to old railway embankment – the footpath raising is likely to require some tree removal/works along the tow of the embankment. All these trees are protected by a woodland TPO;

Penwortham Residential Park some branch removal for access is required – the trees along the old railway embankment fall under the same TPO; and

WCML underpass – some minor clearance of scrub required.

All lost ornamental and screening vegetation will be replanted and trees will be replaced on a 5 to 1 ratio.

Tree loss has been minimised through the detailed design phase of the proposed Scheme. This includes alteration of the proposals to avoid substantial tree loss along the bottom of the old railway embankment adjacent to the Golden Way footpath; revising the design around the entrance to Miller Park to avoid mature tree loss within the Registered Park and Garden, and working with the Contractor to retain street trees along Broadgate.

It will not be possible to replace all the trees in the same location due to constraints associated with the new defence and underground services. Trees will be replanted in local areas such as Ribble Sidings, and additional sites for replanting have been

identified at Fishwick Bottoms and land adjacent to the Golden Way footpath. The Landscape Masterplans (ENV0000009C-JAC-ZZ-ZZ-DR-L-0002 to ENV0000009C-JAC-ZZ-ZZ-DR-L-0009) show proposed tree replanting locations.

### **3.5.3 Invasive plant species**

The invasive plant species Himalayan Balsam, giant hogweed, and Japanese Knotweed are present along Areas 1 & 2, specific locations can be in the Preliminary Ecological Appraisal (Jacobs 2020, ENV0000009-JAC-ZZ-00-MO-BD-0001). A Biosecurity Mitigation Plan will be implemented through the construction phase to manage these species and prevent their spread during construction. A Construction Environment Management Plan (CEMP) will be developed which will incorporate actions to manage biosecurity of the site.

### **3.5.4 Management of environmental impacts during construction**

All site activities with the potential to cause disturbance to the existing environment will be managed in accordance with an Environmental Action Plan (EAP). The EAP will be used to manage the environmental impacts and improvements that are set out in this report. The objectives, actions and targets set out in the EAP will be assigned to relevant parties with monitoring throughout the mobilisation, construction, and post-construction stages to ensure that the required mitigation measures are fully implemented. The EAP does not detail objectives and actions that are considered to be construction best practice which are automatically applied to Environment Agency schemes. A CEMP will be produced and implemented to address the standard working practices.

## **3.6 Post-construction details**

### **3.6.1 Reinstatement**

Prior to the commencement of works all areas to be used, including access routes, compound and storage areas will be subject to condition surveys. On completion of the works, areas will be resurveyed and remedial works undertaken where necessary. Reinstatement details will be discussed and agreed with landowners before starting construction.

All reinstatement works, landscape mitigation and enhancement measures, including grass seeding, native tree planting and shrub planting, will be carried out upon completion of the main engineering works. The Principle Contractor will be responsible for all landscape reinstatement works. Reinstatement works will predominantly comprise the remedial works to alleviate compaction, topsoiling, cultivation and grass seeding. These works will have a 12 month defects period to ensure the successful establishment of the grass sward on the embankment and reinstated areas affected by the works. This includes provision of temporary protective fencing should it be required.

During reinstatement, the embankment will be seeded with a native wildflower mix. Disturbed ground not identified for habitat creation will be reinstated to pre-construction condition.

Mitigation planting measures would be subject to establishment of a maintenance and management agreement for a period of up to 5 years following implementation (subject

to landowner agreement where located on private land) and would then be handed back the landowner for future management.

The long term management of the habitat creation areas required for Biodiversity Net Gain will be taken on by the relevant Local Authority.

### 3.7 Operation and maintenance

The majority of the new defences will be passive structures requiring no manual operation. The exception being the 4 floodgates that will be manually closed when there is a flood warning, and manually reopened again once it has been deemed safe to do so. Maintenance will involve regular inspections with tests undertaken to ensure continued operation.

### 3.8 Decommissioning

There are currently no plans for decommissioning of these assets, however they may change due to future modifications. The proposed Scheme includes a large foundation to accommodate the need to raise the walls in the future to allow for changes to flood risk that may result from climate change.

# 4 Environmental impact assessment methodology

## 4.1 Scoping

A scoping exercise of relevant environmental topics has been undertaken based upon a general understanding of schemes of this nature and the site-specific constraints. This was described within the Preliminary Environmental Information Report (PEIR) for the proposed Scheme. The PEIR provided a summary of the baseline environmental information and identified key environmental issues to be scoped into the assessment, as well as scoping out receptors that were not considered to be affected. The following section provides a summary of the scoping process.

### **Topics scoped in for further environmental assessment:**

- Landscape and Visual Amenity: Potential for impacts from the raised defences, and associated structures. Assessment required to inform the design and appropriate mitigation measures.
- Biodiversity: Potential direct impacts to the River Ribble Marine Conservation Zone (MCZ), direct and indirect impacts to fish, and species such as otter within the River Ribble. Ecological assessment required to inform the design and identify mitigation measures. Biodiversity Net Gain (BNG) requirements to be confirmed.
- Archaeology and Built Heritage: Potential impacts to the setting of Penwortham Old Bridge (Scheduled Monument and Listed Building) and Avenham and Miller Park (Registered Park and Garden), and potential for direct impacts related to the tie in of new defences at the West Coast Main Line (WCML) Viaduct Listed Building. A Heritage Statement is recommended to inform design and construction.
- Geology, Soils, and Contaminated Land: Potential risks to receptors from land contamination. Assessment of risk from land contamination required to allow the identification of any necessary mitigation measures.
- Noise and Vibration: Potential for construction noise and vibration (in particular from piling) to affect sensitive receptors including residential properties and recreational users.
- Water Environment: Potential for impacts to the water quality of the River Ribble due to encroachment required for the construction of the new flood wall and to stabilise the existing revetments. Water Framework Directive assessment to be undertaken to investigate potential impacts and to inform design and required mitigation.
- Flood Risk: Works are situated within a floodplain. Potential for risk of flooding to the proposed Scheme during construction, and potential risk of changes to flood risk to areas outside of the proposed Scheme during operation. Flood Risk Assessment to be undertaken.
- Cumulative Effects: Scoped in.



### Topics scoped out of further assessment:

- Air quality and climate change: There will be minimal emissions of air pollutants during construction, with no potential for significant pollution from combustion (e.g. vehicles). Potential impacts from dust can be managed through construction management measures. There will be no emissions during operation.
- Waste: Any waste arisings during construction will be managed through implementation of a Contractor's Site Waste Management Plan.
- Land use and local community: there will be temporary closures and diversions of public rights of way and cycle routes, including the Guild Wheel. Any potential impacts would be short-term and temporary, and outweighed by the benefits of the proposed Scheme once operational.

## 4.2 Assessment methodology

Throughout the project, the approach to the assessment has followed the underlying principles set out below:

- Identify and evaluate baseline conditions at the site and its environs;
- Consider potential causes and impacts and the magnitude of each potential impact;
- Assess the significance of potential impacts, taking into account the sensitivity of resources and the magnitude of impacts;
- Identify mitigation measures; and
- Assess the level of significance of residual impacts, taking into account any identified mitigation measures.

Significance can be beneficial or adverse and this is noted within the assessment for each topic.

Information about environmental baseline conditions and potential impacts has been obtained through collation and review of baseline information, supplemented by consultation and targeted field surveys. The assessments have been undertaken by appropriate environmental specialists working alongside design engineers and has taken account of the comments received from consultees.

The methodologies used to assess and evaluate the environmental impact of the remaining topics is described within the individual assessment reports in Part 2 of this ER.

### 4.2.1 Mitigation

Mitigation measures have been identified to prevent or reduce impacts to an acceptable level and where possible offset any effects on the environment. Impacts were assessed both with and without mitigation to determine the effectiveness of the mitigation measures. Impacts remaining with the inclusion of mitigation are known as the residual impacts. Mitigation measures for the proposed Scheme are detailed within the individual assessment reports (ER Part 2) and also summarised in the Environmental Action Plan (EAP).

#### **4.2.2 Assumptions and limitations**

A number of assumptions have been made during this assessment:

- Information provided by third parties, including databases and publicly available information is correct at the time of publication;
- Baseline environmental conditions are assumed to remain relevant throughout the proposed Scheme's delivery (although in reality, due to the dynamic nature of the environment, conditions may change during construction and operation); and
- Construction details, including proposed working methods, have not been fully developed and will need to be clarified through consultation and engagement with landowners, relevant authorities, and the contractor.

# 5 Summary of detailed assessments

This section summarises the findings of the environmental appraisals, which are included in full in Part 2 of this ER.

## 5.1 Landscape and Visual Impact Assessment

A Landscape and Visual Impact Assessment (LVIA) (ENV0000009C-JAC-ZZ-ZZ-RP-L-0001) has been completed in accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition (Landscape Institute / IEMA 2013) and considers potential effects on the landscape character and visual receptors that may arise as a result of the proposed Scheme.

The LVIA concludes likely landscape impacts in construction phase of the proposed Scheme, arising from:

- Presence of construction equipment, materials, and staff throughout the proposed Scheme;
- Removal of mature trees throughout Areas 1 and 2 as well as an established hedgerow within Area 1;
- Removal of ornamental tree and shrub planting within the grounds of Penwortham Methodist Church;
- Temporary closures / diversions to both formal and informal public rights of way, as well as roads;
- Temporary loss of amenity grassland areas along the lengths of the new flood wall; and
- Temporary loss of allotments within the proposed working area along the boundary of Penwortham Methodist Church.

The construction works themselves will be clearly apparent in locations close to the works along Broadgate, Riverside, Riverside Road and Ribble Sidings and will have significant effects upon visual and landscape receptors. However, these impacts will be temporary and limited to the construction period of works.

Permanent landscape changes are likely to arise as a result of:

- Replacement of an existing flood embankment, replacement pre-cast concrete flood walls, and replacement pre-cast concrete flood walls with glass panels;
- Existing riverbank stabilised with Redi-Rock blockwork revetment;
- Clearance of trees, scrub, ornamental shrubs, hedgerows, and amenity grass;
- Planting of trees, shrubs and other plants as mitigation for lost vegetation or for visual and landscape purposes. The removal of trees and other vegetation during construction will be mitigated by new planting but it will take many years for this to establish, and then to grow to similar maturity, particularly with regard to trees. In certain locations there may be a medium to longer term visual impact as a result. However, in some areas it is not possible to replace lost



vegetation due to location of underground services and/or proximity to the flood walls; and

- Introduction of species rich grassland and wetland areas within Ribble Sidings.

Mitigation by design has been undertaken throughout the design process to address site constraints and stakeholder requirements. Some examples of this include the incorporation of glass panels along the top of the new flood walls to maintain views of the river, redesign of the flood wall around the entrance to Miller Park to avoid works within the main park. Compound areas have been sited within areas of existing hardstanding wherever possible, with the exception of Broadgate Gardens which will require reinstatement following construction.

The improved flood defences will be clearly visible in close views for residents along Riverside, Riverside Road, and Miller Gardens apartments. Glass panels on top of the concrete flood wall will retain views of the River Ribble corridor. The 3.5 m high flood embankment at Ribble Sidings will be clearly visible in rear, upper floor views for residents at the end of Fraser Avenue. The height of the flood embankment with a ramped pedestrian and cycle route access over the crest will impact on the privacy of adjacent residents. Tree and shrub planting adjacent to property boundaries and at the base of the embankment will reduce the effects once established.

Where appropriate, enhancements will be secured including, but not limited to:

- Enhancements within Broadgate Gardens to include new footpath route to seating areas, pollinator friendly planting, and incorporation of the existing viewing platform into the flood wall design;
- Ecological and landscape enhancements at Ribble Sidings;
- Enhancements within open space at the end of Hawkhurst Road to include new footpath routes, tree and shrub planting;
- Interpretation boards relating to heritage assets such as Penwortham Old Bridge;
- Tree planters and seating along Riverside and near Penwortham Old Bridge to enhance the streetscene; and
- Signage and route demarcations of Preston Guild Wheel.

The Environmental Masterplans (ENV0000009C-JAC-ZZ-ZZ-DR-L-0002 to 0009) demonstrate the sensitive approach that has been undertaken including the replacement of trees at a ratio of five to one.

In the long term (15 years post-construction), mitigation planting, habitat creation, and reinstatement will have established, therefore the impact of the proposed Scheme is expected to be minor negative.

There is negligible effect anticipated on the Local Landscape Character Areas during operation.

## 5.2 Ecological Impact Assessment

Ecological surveys for the proposed Scheme comprise:

- Preliminary Ecological Appraisal (Mott MacDonald 2019a, ENV0000009C-MMD-DZ-00-RP-EN-0303001);

- Verification Survey (Jacobs 2020, ENV0000009-JAC-ZZ-00-MO-BD-0001);
- Otter surveys undertaken by Jacobs and the Environment Agency (Jacobs 2020, ENV0000009C-JAC-ZZ-00-BD-0002);
- Great Crested Newt eDNA report (Jacobs 2020, ENV0000009C-JAC-ZZ-ZZ-RP-BD-0001);
- Marine Conservation Zone Assessment (ENV0000009C-JAC-XX-00-RP-EN-0002);
- Stage 1 Habitats Regulations Assessment (ENV0000009C-JAC-XX-00-RP-EN-0004);
- Bat Activity Survey Report (ENV0000009C-JAC-ZZ-ZZ-RP-BD-0003, associated drawing ENV0000009C-JAC-ZZ-ZZ-DR-BD-0001); and
- Biodiversity Net Gain assessment (ENV0000009C-JAC-ZZ-00-RP-BD-0002).

The proposed Scheme encompasses habitats associated with the urban location along the River Ribble, i.e. amenity grassland, planted trees, treelines (planted and self-seeded), roads, bridges, and pedestrianised areas. The Ribble and Alt Estuary Special Protection Area (SPA), and Ribble and Alt Estuary Ramsar are situated approximately 6.5km downstream from the scheme. The Ribble Estuary Marine Conservation Zone (MCZ) is designated for smelt (*Osmerus eperlanus*). An MCZ assessment has been undertaken which concluded that there was no risk to the site's conservation objectives. Stage 1 HRA assessment concluded that there was no significant effect to the qualifying features of the Ribble and Alt Estuary Ramsar or the Ribble and Alt Estuary SPA due to significant distance from the proposed Scheme. Additionally, no plan, permission, or project was identified that could give rise to 'in-combination' effects. Conclusions of these assessments have been discussed in detail with Natural England and the Environment Agency's Fisheries, Biodiversity and Geomorphology team.

Stands of Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glanduiflora*), and giant hogweed (*Heracleum mantegazzianum*) have been identified throughout the area. A Biosecurity Management plan will be implemented during construction.

Bat activity and bat roost potential surveys have confirmed low level bat activity in Areas 1 and 2. The majority of bat species were common and soprano pipistrelle, very low numbers of other species were recorded. Bats require freshwater habitats to rehydrate. The brackish water conditions at site could be a possible factor in terms of the low levels of bat activity. The urban nature of the site and the noise and light pollution could also be another factor influencing the levels of bat activity and the species recorded. No impacts on bat roosts are anticipated. In order to minimise disturbance during construction, it is recommended that night-time works are avoided, and any lighting is directed away from the watercourse.

Otter are known to be present within the area of the proposed Scheme. Otter surveys confirmed presence of commuting otter, however no active couches or holts, or resting features were identified on either the right or left banks within the proposed Scheme. A precautionary pre-construction survey for otter will be undertaken six weeks prior to start of works, to ensure availability of up-to-date information and confirm the baseline results. A CEMP will incorporate pre-construction surveys and site recommendations of the ecological assessments.

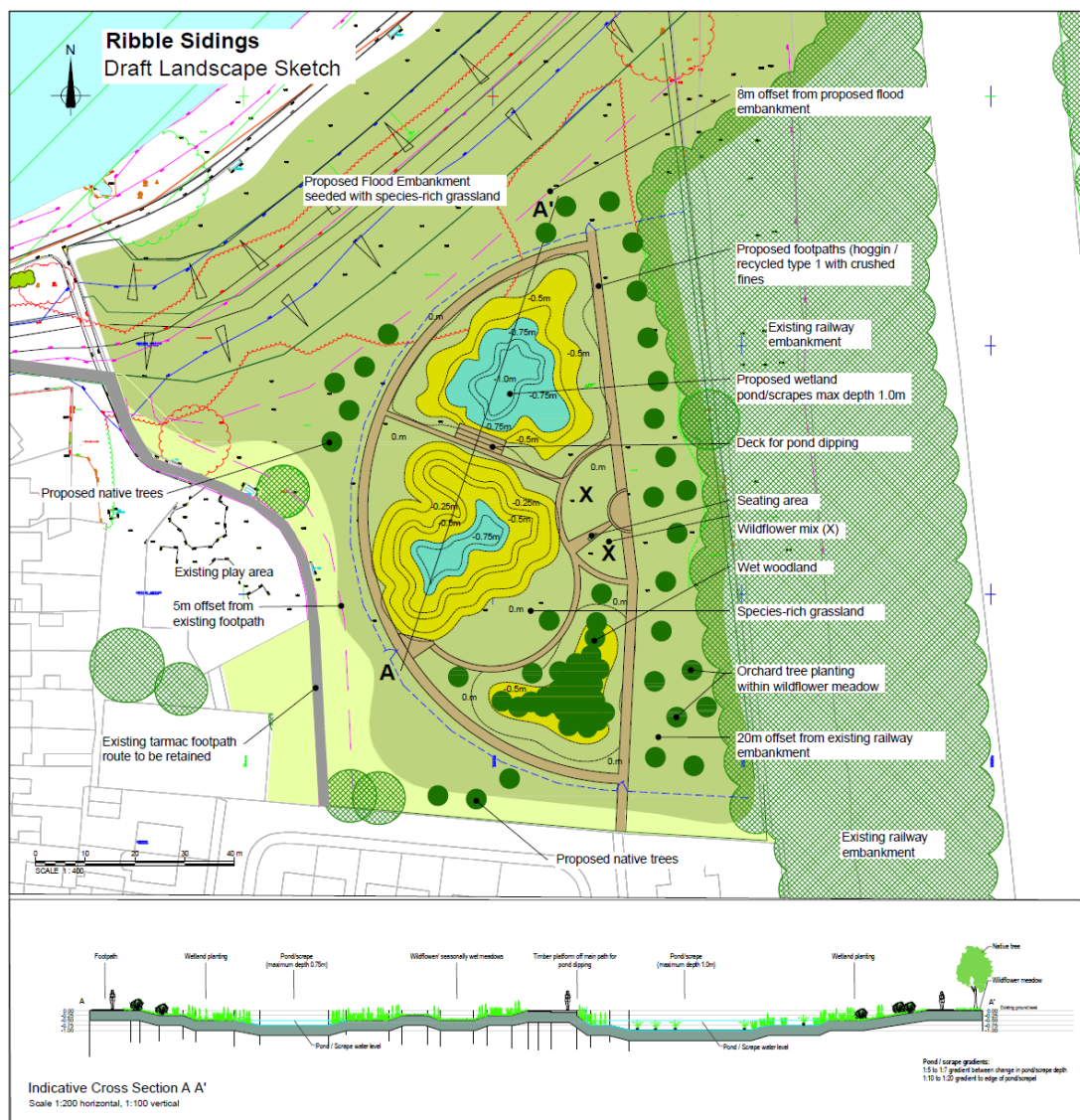
Trees and scrub vegetation have the potential to support breeding birds between March and August inclusive. It is the intention that all vegetation clearance for the scheme will be undertaken outside of this period. Where this is not possible a pre-

works check will be undertaken by an experienced ecologist within 24 hours of the proposed start.

Habitat creation measures are proposed at Fishwick Bottoms and Ribble Sidings to help mitigate the impacts of the scheme and also fulfil Biodiversity Net Gain requirements (figure 5.1). The habitat creation at Fishwick Bottoms consists of a linear strip of tree planting following the right bank of the Ribble. In addition to this, agreement in principle has been obtained with South Ribble Borough Council for further tree planting within open land adjacent to the Golden Way footpath.

The proposed habitat improvements at Ribble Sidings consist of:

- Species-rich grassland along the new flood embankment;
- Wetland pond scrapes with a depth of no more than 1 m and deck for pond dipping;
- Wildflower meadow within which orchard trees will be planted; and
- Wet woodland.



**Figure 5.1** Extract of proposed habitat creation in Ribble Sidings (ENV0000009C-JAC-ZZ-42X-DR-L-0001)

Best environmental working practice will be employed for all works. In-channel works will be restricted to the 16<sup>th</sup> of June to the 31<sup>st</sup> of January to avoid impacts to migratory Smelt and course fish present in the River Ribble. Taking into context existing planned mitigation, pre-construction surveys and presence of an ECoW throughout the construction phase, no significant residual impacts are anticipated to result from the proposed Scheme.

## 5.3 Heritage Statement

There are a number of designated assets within proximity to the proposed Scheme. A Heritage Statement (ENV0000009C-JAC-XX00-RP-EN-0003) has been prepared to assess the potential impacts of the proposed Scheme on these assets and on previously unknown archaeological remains.

The Heritage Statement identified three features of heritage interest within the study area potentially affected by the proposed Scheme, the WMCL Viaduct (Listed Building), Penwortham Old Bridge (Scheduled Monument and Listed Building), and Avenham and Miller Park (Registered Park and Garden).

No significant impacts are predicted to any of these designated assets, however requirement for floodgate tie-ins to the WCML Viaduct will require Listed Building Consent, and tie-in of new flood wall to Penwortham Old Bridge which may require Scheduled Monument Consent. Listed Building Consent has been applied for in combination with this planning application, the requirement for additional Scheduled Monument Consent is being discussed with Historic England. Avenham and Miller Park does not require any additional consents, potential effects on the park will be considered as part of the planning application.

Historic England were consulted regarding the proposed works in Miller Park and as a result a revised design has been progressed which avoids the need for works within the park itself.

No designated historic building would be significantly affected either temporarily or permanently as a result of the proposed Scheme. There would benefit to the Conservation Area to the north west of the park as a result of increased flood protection.

## 5.4 Geology, Soils, and Contaminated Land

A programme of Ground Investigations (GI) have been carried out for the proposed Scheme, on which a Geoenvironmental Assessment (ENV0000009C-JAC-ZZ-00-AS-EN-0001) has been undertaken.

This identified an elevated concentration of contaminants within made ground throughout Areas 1 and 2. These contaminants were primarily polycyclic aromatic hydrocarbons (PAH), as well as barium and lead, and asbestos fibres, which were found diffuse throughout the made ground and not associated with any one point source.

A Conceptual Model identified potential localised risks associated with the reuse and retention of the made ground as a result of the contaminants mentioned above. No unacceptable risks to future site users or controlled waters have been identified, provided that the soils in Broadgate Gardens are left in situ, due to elevated PAH levels, and soils adjacent to Penwortham Methodist Church are retained beneath any

imported fill for the proposed raising of ground level, due to elevated PAH concentrations.

A Materials Management Plan (MMP) will be prepared to document reuse of materials within the proposed Scheme. The CEMP will also incorporate actions to manage any contaminated material encountered on site.

## 5.5 Water Framework Directive Assessment

A Water Framework Directive Assessment has been undertaken to assess the potential impacts of the proposed Scheme on WFD status (ENV0000009C-JAC-XX-00-RP-EN-0001). I

As the proposed Scheme is affecting the channel of the River Ribble there is potential for impacts to the Ribble Transitional / Coastal (TraC) waterbody. This assessment was undertaken by a geomorphologist with input from Environment Agency specialists. The investigation utilised mapping of mudflat habitats from aerial photography to help determine the likely impacts associated with the proposed revetment works. Computer modelling was undertaken to assess the predicted flow rates in various levels of flood both with and without the proposed Scheme to determine any potential changes. The assessment concluded that, taking into consideration the impacts of the proposed Scheme, it is unlikely to compromise progress towards achieving good ecological potential or cause a deterioration of the overall ecological potential of the waterbodies.

## 5.6 Flood Risk Assessment

A Flood Risk Assessment (FRA) (ENV0000009-JAC-ZZ-00-RP-EN-0002) has been undertaken for all five areas of the proposed Scheme.

The proposed Scheme is classified as “water-compatible” and therefore, is considered appropriate development within Flood Zone 3b in accordance with National Planning Policy. Although the proposed Scheme is within the predicted flood extents, the proposed Scheme is designed as a flood defence and so the flood risk to the Scheme itself is considered to be low.

There is a risk of short-term increase to risk of flooding upstream of the proposed Scheme extents during high magnitude events, however this increase would only be a risk until the construction of the full Preston and South Ribble FRMS. There are some remote properties beyond the current scheme that have been identified as being subjected to minor long-term, adverse impacts to flood risk in high magnitude flood events as a result of the Preston and South Ribble FRMS. Therefore, property level protection and resilience measures will be implemented in consultation with individual property owners

Any works that would reduce the effectiveness of the existing defences would require the installation of temporary defences. This would ensure that the standard of protection to properties that benefit from the existing defences would not reduce as a result of the construction works themselves. Full details of the temporary works would be provided within the Environmental Permit Application.



In conclusion, although the proposed Scheme would have some adverse impacts, these would be mitigated effectively through temporary flood defences implemented through the construction phase. The adverse impacts would be significantly outweighed by the benefits the proposed Scheme would bring to large areas of Preston and South Ribble. Therefore, the proposed Scheme is considered to be in accordance with local and national planning policy.

## 5.7 Noise and vibration

A Construction Noise Report (ENV0000009C-JAC-ZZ-ZZ-TN-EN-0001) for the construction of the proposed Scheme has been carried out.

The assessment has defined the existing baseline noise levels and estimated the noise and vibration levels from each of the proposed construction activities at the nearest noise sensitive receptors. The main focus of the assessment was residential receptors.

The findings show that there is potential for construction noise levels to exceed what is required to trigger the installation of Noise Insulation or Temporary Re-Housing measures. In order to mitigate this, restrictions on the timings of the noisiest works will be implemented. Construction works will not exceed:

- A period of ten or more days in any fifteen consecutive days; or,
- A total number of days exceeding forty in any six consecutive months.

In accordance with good site practice, the following measures should be implemented:

- Noise and vibration control at source: e.g. selection of quiet and low vibration equipment, location of equipment on site, control of working hours and the provision of acoustic enclosures; and,
- Screening: e.g. local screening of equipment or perimeter hoarding.

Further measures to reduce the noise and vibration impacts are outlined in Section 5 of the Construction Noise Report. These will be incorporated into the Contractor's CEMP.

Where there remains the potential that some of the proposed activities will still result in noise levels above the accepted trigger levels, proactive community relations are key to let residents know when works are taking place, that they might be noisier than they would expect, the duration of those works, and the benefit to them once the works are complete.

In the event of complaints being received, noise and/or vibration monitoring will be undertaken to ensure that the complaint is thoroughly investigated, and remedial actions are implemented as required. Noise monitoring will be undertaken whilst site operations are active during the stated working hours and will be recorded. All results from noise and vibration monitoring undertaken in response to complaints will be shared with the complainant and the Local Authority, if requested, and will remain on file for the duration of the project.



# 6 Cumulative impacts

## 6.1 Introduction

Cumulative impacts (combined) result from the combined impacts of multiple developments (inter-project) including impacts that could arise from incremental changes caused by past, present, or reasonably foreseeable activities, developments or plans together with the proposed Scheme. 'Reasonably foreseeable' is interpreted to include other proposals that already have consent or are awaiting determination in the planning process with design information in the public domain.

Combined effects could also arise as a result of individual impacts of the proposed Scheme (also called intra-project impacts) e.g. where different project elements in different locations have a cumulative impact on a particular receptor, or where different impacts such as noise, air pollution, and traffic disruption all disrupt the same receptor. The impacts resulting from a single project may not be significant on their own but when combined with impacts resulting from other schemes, these could become significant.

The assessment considered beneficial cumulative effects as well as potential adverse effects. This included a desk-based review of relevant planning applications within 2 km of the proposed Scheme, and flood risk management schemes within 5 km upstream and downstream of Areas 1 and 2.

## 6.2 Combined impacts (intra-project impacts)

The cumulative impacts identified in this section are those multiple actions or combined impacts from various elements of the proposed Scheme acting on a single environmental receptor or resource. The primary focus was upon significant residual effects, however, non-significant effects (minor or above) were also considered to allow for consideration of a number of minor impacts affecting one receptor to make a cumulative significant impact.

Minor adverse residual effects have been identified for some landscape and visual receptors, however no other residual impacts for other receptors were predicted and therefore there are unlikely to be cumulative impacts. A number of non-significant effects have been predicted that, when combined, could cause a significant effect. These include impacts during construction, including changes to views, noise, dust, access and general disturbance, particularly for users and residents in properties along the river frontages. These will be managed via good communication with land-owners / tenants (in the surrounding properties as well as those directly affected) and by minimising disturbance, including implementation of a CEMP. Effects will also be temporary. As a result, impacts are not considered to be significant.

## 6.3 Inter-project impacts

Assessment of inter-project cumulative effects has included a review of flood risk management schemes within 5 km of Preston and within 2 km of PCC's, SRBC's and LCC's planning application information, to understand the potential for cumulative effects with other developments in the area. The assessment of inter-project cumulative impacts has been based on information available at the time of writing

(November 2020). Below are the developments that were considered in the cumulative effects' assessment, alongside the proposed Scheme:

- **Preston FRMS Areas 3 and 4:** There are 5 areas of works that form the Preston and South Ribble FRMS. Areas 3 and 4 are situated upstream of Areas 1 and 2 in Frenchwood and Walton-le-Dale. At the time of writing these areas are subject to detailed design and the associated planning application is expected to be submitted in Autumn 2021. Given the distance from Areas 1&2 (over 1 km upstream), and timing of the respective works (following substantial completion of Areas 1&2), cumulative effects are not considered likely to occur.
- **Preston FRMS Area 5:** Area 5 is situated in Higher Walton which is upstream of Area 4 on the River Darwen. Given the distance, and timing of the respective works, cumulative effects are not considered likely to occur.

There are no other known proposed projects in the area likely to cause cumulative effects. It is therefore concluded there are no likely inter-project cumulative effects.

# 7 Other issues

## 7.1 Consents

### 7.1.1 Environmental permitting

A permit for 'Flood Risk Activities' will be required from the Environment Agency for the construction of the works. These are activities in, under and over a main river and other activities that could affect flooding from a main river or sea. The Contractor will apply for this prior to work on site.

### 7.1.2 Habitats Regulations Assessment

A Stage 1 HRA screening has been undertaken which concluded that, given the characteristics, scale, location and temporary nature of any impacts, there will be no likely significant effects during construction or operation of the proposed Scheme that could compromise the Conservation Objectives for the Ribble and Alt Estuaries SPA. The Stage 1 Screening for the proposed Scheme is presented in Part Two of this ER.

### 7.1.3 Water Framework Directive

A Water Framework Directive Assessment has been undertaken for the proposed Scheme and is presented in Part Two of the ER. The assessment considers the potential impacts of the proposed Scheme on hydro-morphological, physico-chemical quality and biological quality elements. The proposed Scheme is considered to be WFD compliant.

### 7.1.4 Public Rights of Way

Temporary diversions of designated PRoW will require notice to Lancashire County Council. The Contractor will be responsible for securing these permissions.

### 7.1.5 Highways

The works will require temporary traffic management measures on some of the local roads including Broadgate, Riverside and Riverside Road. The Contractor will apply for Temporary Traffic Regulation Orders (TTRO) from the Local Highways Authority. The Contractor will develop and adhere to a Construction Traffic Management Plan.

### 7.1.6 Listed Building Consent

Listed Building Consent will be required for tie-ins to WCML Viaduct. This has been applied for as part of this Planning Application.

### **7.1.7 Scheduled Monument Consent**

Scheduled Monument Consent may be required for tie-in and works around Penwortham Old Bridge. Discussions with Historic England are being undertaken to determine the need.

### **7.1.8 Tree Preservation Orders and Tree removal in a Conservation Area**

Trees of special significance are protected by TPOs, which can be applied individually, to a group of trees, or to a woodland. A TPO means that consent is required from the Local Authority to any works to the tree or trees. Trees situated within a Conservation Area are considered to be under the same protection. There will be affects to trees within TPOs in both Areas 1 & 2 ranging from minor pruning to full removal. This will be carried out in consultation with the relevant Local Authority.

## **7.2 Enhancements**

Opportunities to deliver environmental improvements in the study area have been considered during the development of the proposed Scheme. Discussions have been undertaken regarding several enhancement measures with Preston City Council and South Ribble Borough Council. The proposed enhancements are shown on the Environmental Masterplan drawings (ENV0000009C-JAC-ZZ-42X-DR-L-0001; ENV0000009C-JAC-ZZ-ZZ-00-DR-L-0002 to ENV0000009C-JAC-ZZ-ZZ-00-DR-L-0009). They include the following proposals:

- Habitat creation within Ribble Sidings, creating a shared space for people and wildlife;
- Interpretation boards;
- Improved layout of the public rights of way along Riverside to provide a safer environment for pedestrians and cyclists;
- Habitat creation at Fishwick Bottoms; and
- Tree planting within council land adjacent to Golden Way.

Additional opportunities to enhance the local environment will be sought through the construction phase. This could include improvements to footpaths and cycle ways and the local streetscene.

## 8 Summary

The non-statutory environmental assessment described within this report and in the accompanying documents, demonstrates that the proposed Scheme would have no significant effects on the environment. The proposed Scheme design has been developed to incorporate measures to minimise potential adverse impacts and, where possible to enhance the local landscape, in particular the habitat creation in Ribble Sidings and the incorporation of additional planting along the Redi-rock terracing.

Potential adverse impacts during construction of the proposed Scheme will be controlled through good site practice measures implemented through the Contractor's CEMP. In addition, an EAP has been prepared which summarises the key findings and actions from the Environmental Report to assist with the implementation of these measures.

# List of abbreviations

AEP	Annual Exceedance Probability
BNG	Biodiversity Net Gain
CEMP	Construction Environmental Management Plan
EAP	Environmental Action Plan
ECow	Ecological Clerk of Works
EIA	Environmental Impact Assessment
ER	Environmental Report
FCERM-AG	Flood and Coastal Erosion Risk Management - Appraisal Guide
FRA	Flood Risk Assessment
FRMS	Flood Risk Management Scheme
HE	Historic England
HRA	Habitats Regulations Assessment
IEMA	Institute for Environmental Managers and Assessors
km	Kilometre
LCC	Lancashire County Council
LLCA	Local Landscape Character Area
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
m	Metre
m <sup>3</sup> /s	Metres cubed per second
MCZ	Marine Conservation Zone
mm	Millimetres
MMO	Marine Management Organisation
MMP	Materials Management Plan
NE	Natural England
NPPF	National Planning Policy Framework
PCC	Preston City Council
PEIR	Preliminary Environmental Information Report
PRoW	Public Rights of Way
SOC	Strategic Outline Case



SoP	Standard of Protection
SPA	Special Protected Area
SRBC	South Ribble Borough Council
t	Tonne
TPO	Tree Preservation Order
TraC	Transitional and Coastal
TTRO	Temporary Traffic Regulation Order
WCML	West Coast Main Line
WFD	Water Framework Directive

# Glossary

Baseline	A description of the present state of the environment with the consideration of how the environment would change in the future in the absence of the plan/programme/project as a result of natural events and other human activities.
Baseline studies/survey	Collection of information about the environment which is likely to be affected by the project
Catchment	A surface water catchment is the total area that drains into a river. A groundwater catchment is the total area that supplies the groundwater part of the river flow.
Catchment Flood Management Plan (CFMP)	A high level plan carried out by the Environment Agency in order to manage the risk of flooding to people, property and the environment in an integrated way. These plans form the basis of future flood risk management proposals.
Character area	An area of land with distinctive landscape features resulting from an interaction of wildlife, landforms, geology, land use and human activity as defined by the Countryside Agency.
Conservation Area	An area designated under the Town and Country Planning Act, 1990 to protect its architectural or historic character.
Countryside and Rights of Way (CROW) Act 2000	<p>This Act applies to England and Wales and has five parts: -</p> <ul style="list-style-type: none"> <li>Access to the countryside</li> <li>Public rights of way and road traffic</li> <li>Nature conservation and wildlife protection</li> <li>Areas of outstanding natural beauty</li> <li>Miscellaneous and Supplementary</li> </ul> <p>This act increases the protection of SSSIs. Environment Agency plans/programmes/projects must gain consent for works in or near SSSIs using a CROW form.</p>
Cumulative Impacts	The combined impacts of several projects within an area, which individually are not significant, but together amount to a significant impact.
Department for Environment, Food and Rural Affairs (DEFRA)	The government department responsible for flood management policy in England
Historic England	Government statutory advisor on the historic environment, funded jointly by the government and by revenue from properties

	and members.
Environmental Action Plan (EAP)	A standalone report or section within another environmental impact assessment document which ensures that constraints, objectives and targets set in the main Environmental Report/Statement are actually carried out on the ground. Actions are separated into those to be carried out before, during and after construction.
Environmental Impact Assessment (EIA)	“EIA is an assessment process applied to both new development proposals and changes or extensions to existing developments that are likely to have significant effects on the environment. The EIA process ensures that potential effects on the environment are considered, including natural resources such as water, air and soil; conservation of species and habitats; and community issues such as visual effects and impacts on the population. EIA provides a mechanism by which the interaction of environmental effects resulting from development can be predicted, allowing them to be avoided or reduced through the development of mitigation measures. As such, it is a critical part of the decision-making process.” <a href="http://www.iema.net/eiareport">www.iema.net/eiareport</a>
Environmental Report (ER)	<p>(1) The document produced for projects that do not require statutory environmental impact assessment, but where environmental impact has been carried out. This includes projects that require planning permission from the local authority but the effects of the proposal will not be significant. An ER usually follows the same template as an Environmental Statement, but is less detailed.</p> <p>(2) The document produced to describe the strategic environmental assessment process carried out for strategies. This report can be standalone or contained as an appendix to a strategy.</p>
Environmental Statement (ES)	The document produced to describe the environmental impact assessment process where statutory environmental impact assessment is required.
Flood alleviation scheme (FAS)	Scheme designed to reduce the risk of flooding in a given area
Flood defence	A structure (or system of structures) that reduce flooding from rivers or the sea
Flood risk management strategy (FRMS)	A long term (50 years or more) plan for coastal or river management to reduce the risk of flooding and carry out. They are more detailed than CFMPs.
Flood risk mapping	A system of maps created by the Environment Agency to show areas that are at risk of a flood that has a 1 in 100 chance (or higher) of occurring in any given year
Geographical	A computer based system for capturing, storing, integrating,

Information Systems (GIS)	manipulating, analysing and displaying data spatially.
Habitats Directive	EC Directive (92/43/EEC) on the Conservation of natural habitats and of wild flora and fauna. Implemented (with the Birds Directive (79/409/EEC)) in the UK as the Conservation (Natural habitats and wild flora and fauna) Regulations (1994). This establishes a system of protection of certain flora, fauna and habitats considered to be of International or European conservation importance. Sites are designated as Special areas of conservation (SACs), special protection areas (SPAs) and/or Ramsar sites. Any developments in or close to these designated areas are subject to the Habitat Regulations for approval of English Nature. Together these sites are referred to as the Natura 2000 network.
Local Nature Reserve (LNR)	Nature reserves designated under the National Parks and Countryside Act (1949) for locally important wildlife or geological features. They are controlled by local authorities in liaison with English Nature.
Main river	A watercourse designated by DEFRA. The Environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities on main rivers. Responsibility for maintenance rests on the riparian owner.
Marine Management Organisation	An executive non-departmental public body established under the Marine and Coastal Access Act 2009 with responsibilities including marine licensing and working with Natural England and others to manage a network of marine protected areas (marine conservation zones and European marine sites).
Mitigation measures	Actions that are taken to minimise, prevent or compensate for adverse effects of the development.
Natural England	Natural England is an Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs. Their purpose is to protect and improve England's natural environment and encourage people to enjoy and get involved in their surroundings. Their aim is to create a better natural environment that covers all of our urban, country and coastal landscapes, along with all of the animals, plants and other organisms that live with us.
Nitrate vulnerable zone (NVZ)	Area where surface or ground waters are above the standards set by the Nitrates Directive (91/676), as implemented in England and Wales by SI2164/2002
Ramsar site	Wetland site of international importance listed under the Convention on Wetlands of International Importance under the Conservation of Waterfowl Habitat (Ramsar) Convention 1973.
Riparian	Area of land or habitat adjacent to rivers and streams
Scheduled monument	Nationally important historic sites, buildings or monuments identified by English Heritage and designated by the Secretary of

	State for Culture, Media and Sport. Any work affecting a scheduled monument must gain consent from English Heritage under the Ancient Monuments and Archaeological Areas Act (1979).
Scoping	The process of deciding the scope or level of detail of an EIA/ SEA. During this stage the key environmental issues (likely significant effects) of a project/strategy are identified so that the rest of the process can focus on these issues. Issues may result from the proposal itself or from sensitivities of the site.
Screening	(1) For environmental impact assessment, the process of deciding which developments require an environmental impact assessment to be carried out and whether this will be statutory.  (2) For strategic environmental assessment, the decision on which plans, strategies or programmes require strategic environmental assessment to be carried out and whether this will be statutory.
Screening opinion	Statutory opinion from the competent authority as to whether a proposed project requires statutory environmental impact assessment according to the Environmental Impact Assessment Regulations.
SEA Directive	European Directive 2001/42/EC “on the assessment of the effects of certain plans and programmes on the environment”
SEA Regulations	The regulations transposing the SEA Directive into UK law
Site of Special Scientific Interest (SSSI)	Nationally important sites designated for their flora, fauna, geological or physiographical features under the Wildlife and Countryside Act (1981) (as amended) and the Countryside Rights of Way (CROW) Act (2000).
Special Area for Conservation (SAC)	Sites of European importance for habitats and non bird species. Above mean low water mark they are also SSSIs.
Special Protection Area (SPA) and proposed Special Protection Area (pSPA)	An area designated for rare or vulnerable birds, or migratory birds and their habitats, classified under Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC). They are also SSSIs. Proposed sites receive the same protection as fully protected sites
Standard of protection (SoP)	The level of protection from flooding, for example an SoP of 1 in 100 means that the flood defences in an area provide protection from floods up to a size of flood with a probability of occurring of 1 in 100 in any year
Water Framework Directive (WFD)	EC Directive (2000/60/EC) on integrated river basin management. The WFD sets out environmental objectives for water status based on ecological and chemical parameters, common monitoring and assessment strategies, arrangements for river basin administration and planning and a programme of measures in order to meet the objectives.





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