European Union
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Jacobs

Preston and South Ribble FRMS

Marine Conservation Zone: Screening Assessment

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November 2020

Environment Agency

In partnership with:

Lancashire County Council

North West Regional Flood & Coastal Committee

Environment Agency

European Union
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Contents

Marine Conservation Zone (MCZ) Screening Assessment

Environment Agency record of assessment (Screening)

Screening assessment: Part 1 -

- Ribble Estuary MCZ

Version: ***23/11/2020***

1. Permission, plan or project (PPP) details

Type of PPP: Capital Schemes

Environment Agency reference: Preston &South Ribble Flood Risk Management Scheme

National grid reference: SD5375228546

Site/project name or reference: Preston and South Ribble Flood Risk Management Scheme (P&SR FRMS)

2. Description of proposal

The Preston and South Ribble FRMS offers an improved standard of protection to approximately 4700 properties along the Rivers Ribble and Darwen. The scheme consists mainly of replacing and/or raising the existing concrete walls and earth embankments, and is split into five areas (Figure 1):

Area 1: Riversway and Broadgate;

Area 2: Lower Penwortham;

Area 3: Frenchwood & Walton-le-Dale (Ribble frontage);

Area 4: Walton-le-Dale (Darwen frontage); and

Area 5: Higher Walton.

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 1.2km long, extending from the West Coast Main Line (WCML), downstream to Liverpool Road Bridge. Proposed defences comprise:

- Replacement of the existing concrete wall, with a new concrete wall, between Liverpool Road bridge and Penwortham Old Bridge;
- Replacement of the existing concrete wall, with a new concrete wall with glass panels on top, along Riverside between Penwortham Old Bridge and Miller Gardens Apartments;
- A new flood gate located in front of Miller Gardens Apartments;
- A new concrete wall along the boundary of the BAC/EE Preston Social and Sports Association cricket pitch between Miller Gardens Apartments and Ribble Cottage;
- A new flood gate located close to Ribble Cottage;
- Replacement of the existing concrete wall, with a new concrete wall with glass panels on top, running on the river side of the road between Ribble Cottage and the railway viaduct;
- A concrete wall 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.
- 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.

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 0.8km long, extending from the West Coast Main Line (WCML), downstream to Penwortham Old Bridge, and turning inland to tie into the abandoned railway embankment. Proposed defences comprise:

- A new concrete wall along the boundary of the Penwortham Methodist Church between the church and the allotments. In order to maintain

security of the allotments, fencing will be installed along the top of the new wall.

- A new ramp to raise existing road levels at the entrance to Penwortham Methodist Church and a up and over ramp along the Golden Way Footpath between the Penwortham Methodist Church and the disused railway embankment.
- Replacement of the existing concrete wall, with a new concrete wall with glass panels on top, along Riverside Road extending upstream from the Cadent Gas pipe bridge;
- A new concrete wall along the river front linking Riverside Road to Ribble Sidings. A blockwork retaining wall and inclined embankment will be constructed to stabilise the existing bank;
- An earth embankment along the river front of Ribble Sidings, replacing the existing embankment;
- In addition, there are two further isolated sections of defence:
- A short earth embankment in the gap in the abandoned railway embankment, at the access point to Penwortham Residential Park; and
- The partial filling in (to flood defence level) of a culvert under the WCML, some 500 metres inland from the River Ribble.

Area 3: Frenchwood & Walton-le-Dale (Ribble frontage)

Located on the left (south) and right (north) banks of the River Ribble, to the east of the city centre, upstream of the confluence with the River Darwen. This area comprises three sections of defence:

- 1.1km of earth embankment and concrete wall running along the Esplanade, and replacing or raising existing wall and embankment along the Boulevard in Frenchwood, on the north bank;
- Raising 0.5km of existing earth embankment and concrete wall between the confluence of the Ribble and Darwen and London Road Bridge on the south bank; and
- Replacement of the existing concrete wall (0.8km), with some sections of glass panels on top, between London Road Bridge and Kings Croft.

Area 4: Walton-le-Dale (Darwen frontage)

Located on the right (east) and left (west) banks of the River Darwen, through Walton-le-Dale to the south of the city centre:

- On the right bank proposed defences comprise predominantly earth embankments, extending some 1.9km upstream from the confluence with the Ribble. Flood walls locally, only in close proximity of buildings;
- On the left bank, proposed defences comprise a combination of concrete wall, earth embankment and road ramps extending approximately 0.8km upstream of the confluence.

Area 5: Higher Walton

Located on the right (east) and left (west) banks of the River Darwen, at Higher Walton, extending upstream from the M6 motorway:

- On the right bank proposed defences comprise a combination of concrete walls and earth embankments, extending some 1.0km upstream from the motorway;
- On the left bank, proposed defences comprise predominantly concrete or sheet pile walls, extending approximately 0.5km upstream of the Cann Bridge.

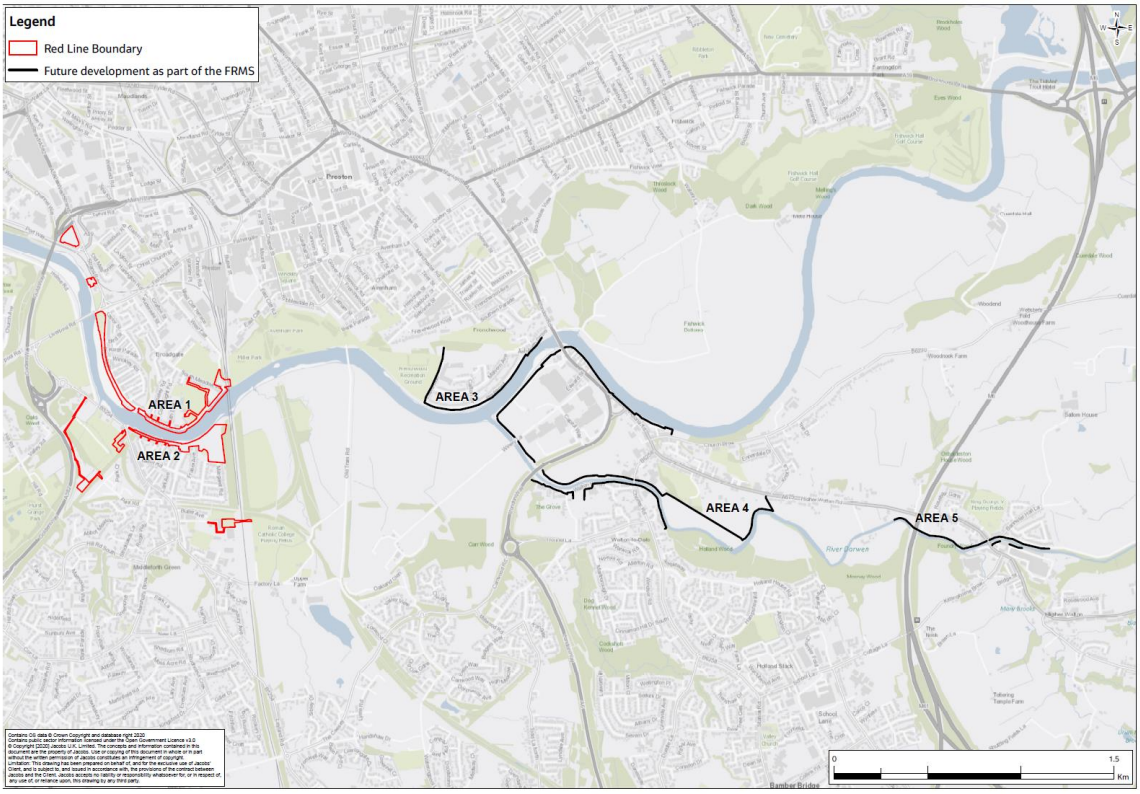

Figure 1: Location of Areas.

Figure 2: Areas of encroachment into the Ribble estuary for Area 1 (North bank, blue line) and Area 2 (South bank, pink line).

The approximate lengths of encroachment into the River Ribble on the north bank are in sections of 82m, 247m and 151m (west to east as show in blue in Figure 2). On the south bank there is one section of 70m. The average encroachment is around 3.5-4.5 m reaching a maximum of approximately 6.5 m into the river channel.

Across both Areas 1 and 2 the total area of mudflat lost is just over 1,500m^2 or 0.001km^2. This is not considered significant in the context of the total area of mudflat available in the River Ribble intertidal area (approximately <500ha).

3. Ribble Estuary MCZ

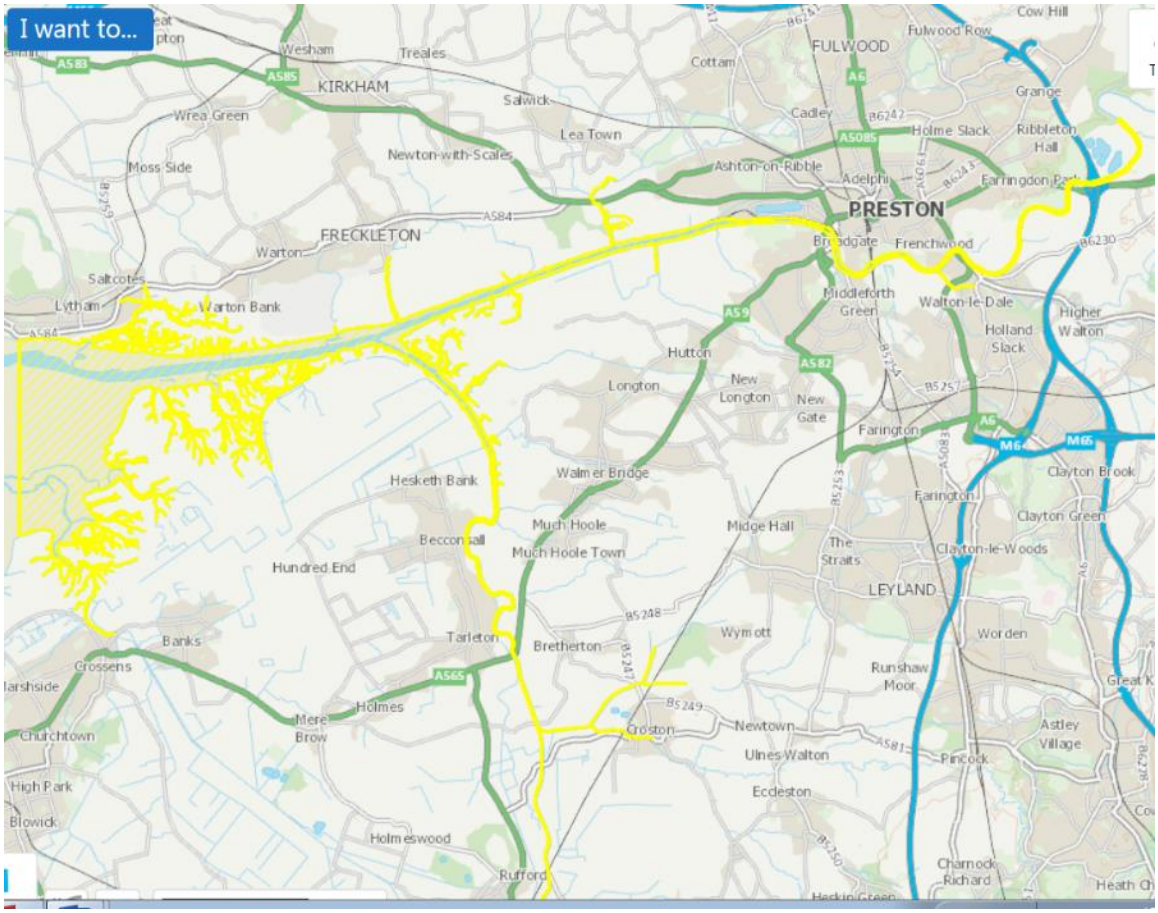

Figure 3: /// Marine Conservation Zone (MCZ)

This MCZ screening assessment concerns only Area 1 and 2 (Riversway and Broadgate and Lower Penwortham) as there are proposed works that would affect the area below MHWS. Although Areas 3 and 4 are within the tidal extent, no instream or permanent works are proposed below MHWS.

MCZ name	Complete list of protected features
Ribble Estuary MCZ (1475915) The Ribble Estuary MCZ (designated in May 2019) is an inshore site which covers approximately 15 km^2. It is located in the southern part of Morecambe Bay, Lancashire, in the Irish Sea. The MCZ is located in stretches from the mouth of the River Ribble estuary at Lytham in the west to Samlesbury in the east. The MCZ encompasses the tidal River Ribble and the tidal sections of tributaries i.e. the River Douglas, River Darwen and Savick Brook.	**Smelt (*Osmerus eperlanus*)** Smelt were once widespread in estuaries in the UK but have declined considerably over the past 200 years. They are known to congregate in large shoals in lower estuaries and migrate into freshwater where they spawn in spring. Estuaries such as the Ribble therefore provide critical habitats required to complete smelt lifecycles, including for feeding and post-larval development. Smelt is an indicator of ecosystem health, being very sensitive to a broad range of environmental degradations. Populations of this species have suffered declines and extinctions mainly owing to water pollution, overfishing, habitat loss (particularly where spawning grounds have been destroyed by silting, river works or other factors) and disruption to their access to spawning grounds by weirs or other barriers.

MCZs requiring screening and features

Smelt live in the saline water of estuaries and around the mouths of rivers. The majority of its life is spent in the estuarine zone, with just short incursions in the littoral zone (Rochard and Elie, 1994). It feeds on shrimps and small crustaceans; larger individuals feed on small fish. During February and March, smelt travel upriver to spawn in fresh water before then returning to the sea. Reproduction takes place between February and April, depending on the water-temperature. This species produces 8,000-50,000 yellow eggs with a diameter of 0.6-0.9 mm which adhere to the bottom. Eggs hatch in 3-5 weeks and the larvae descend to the estuarine zone.

Historically there have been smelt caught as part of a fishery in the Ribble, although the smelt population in the Ribble has subsequently been described as small (Maitland, 2003). In a review of the status of smelt in the UK, it was indicated that smelt had been caught at six sites in the Ribble, indicating local recruitment (Colclough and Coates, 2013). Surveys have shown that adult smelt are present in low numbers but are most abundant in the Ribble Estuary between June and October, with October being the peak month. Although records are sparse, the area where they have been caught in greatest abundance is 7.5

miles upstream from the estuary mouth, i.e. downstream of the scheme to the west of Preston. This species has been recorded in low numbers during June off Lytham St Annes at the mouth of the Ribble Estuary during Environment Agency monitoring. This stock is considered to be part of the Morecambe Bay population, which is the most significant aggregation of this species in the area (Jones and Spees, 2017). EA TraC surveys conducted close to the Scheme at the Ribble Rail Bridge between 2014 and 2018 (May/June or September or both) did not record any smelt using the fyke netting techniques, although several other species were recorded ranging from benthic (e.g. flounder) to pelagic (e.g. herring).

Although smelt have been caught in the River Ribble, attempts to record spawning activity by Jones and Spees in 2017 were not successful (although larval surveys were not part of the study). Suitable spawning habitat in the main River Ribble consisting of greater than 50% cobbles, pebbles and gravels with little or no silt has been identified upstream (east) of Preston (Figure 4). Potentially suitable habitat has also been identified on tributaries such as the River Darwen near Walton le Dale.

Based on the records of smelt from the areas downstream of the scheme, it is likely that that this species occurs in the estuarine waters adjacent to the scheme and would be able to migrate through the Ribble estuary upstream towards freshwater spawning grounds around the upper tidal limit (e.g. from Fishwick Bottoms) where they would be able to spawn in spring.

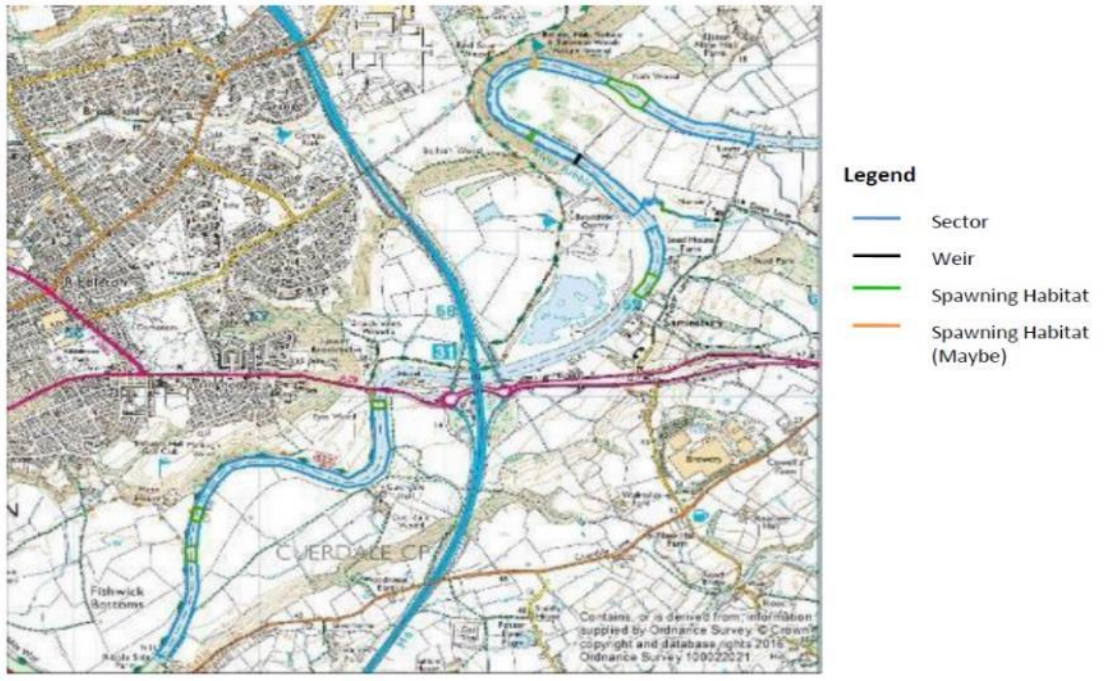

Figure 4. Spawning and potential spawning habitat in the main Ribble (taken from Jones and Spees, 2017

3. Conservation objectives

The assessment will consider the risk of significantly hindering the site's conservation objectives.

Ribble Estuary MCZ (1475915)
Recover to favourable condition. The conservation objectives are that the spawning habitat and population of smelt either remain in favourable condition or be brought into such condition. Favourable condition with respect to a spawning habitat within the MCZ, means that the habitat is of sufficient quality and quantity to enable smelt using the habitat to survive, aggregate, nest, lay or fertilise eggs during breeding, and favourable condition with respect to the smelt population, means that the composition of that population in terms of number, age and sex ratio is such as to ensure that the population is maintained in numbers which enable it to thrive. It should be noted that any temporary reduction of numbers of smelt is to be disregarded if the population is sufficiently healthy and resilient to enable its recovery. Any alteration brought about entirely by natural processes is also to be disregarded.

4. Risks (pressures) relevant to the type of PPP being assessed

Change in flow or velocity regime (Operation – flood defence structures altering hydrodynamics)

Changed water chemistry (Construction – Accidental pollution events e.g. oils, concrete)

Changes in physical regime (Operation – flood defence structures in river channel)

Disturbance (Construction – noise and lighting)

Habitat loss (Operation – encroachment into the river channel)

Habitat/community simplification (Operation – replacement habitat)

Physical damage (Construction – noise effects from piling)

Turbidity (Construction – runoff and sediment disturbance from bank removal works, installation of structures)

5. MCZ screening assessment table

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
Ribble Estuary MCZ (1475915)			
Smelt	Change in flow or velocity regime	Changes in the channel profile and reduction in the overall width of the River Ribble, particularly in the area where there is encroachment along both the north and south banks may cause areas of increased velocities. Smelt can swim in bursts of over 1 m s^{-1}: if water speeds across the width of the channel are over 0.3 m s^{-1} for the linear extent of the works, with no areas of lower flows in the margins, individuals may not be able to swim against this for sustained periods (Clough *et al*., 2004). If there are no areas to hold station, adult smelt may drop back into the estuary and their upstream spawning migration delayed during late winter/early spring. Modelling indicates that with the flood defence structures in place, the changes in-channel current speeds are predicted to remain within the present range. It is expected that although these flows at times are higher than smelt swimming capability (average speeds may reach 3 m s^{-1}), that individuals currently make use of structures and areas of low flow to hold station on the ebb tide, prior to being carried up on the subsequent flood tide. It is evident from inspection of the river channel habitats along the bank and nearby bed (See Habitat loss section below) that there are often such areas comprising small creeks and submerged structures such as fallen tree trunks	No

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		and revetment material. The area downstream of the encroachment sections within Area 1, (as shown in Photograph 2 in the Habitat loss section) is likely to continue to provide suitable habitat when the Scheme is in operation. In terms of assisting smelt in achieving favourable conservation status in the MCZ, any structures that provide areas of reduced water flow or back eddies, such as tree trunk sections or current deflectors, could be incorporated in addition to the terracing and planting. These measures would provide areas that would benefit both the smelt and their prey species. Brush wood type retaining material could be installed to retain sediments in areas expected to be subject to scour.	
	Changed water chemistry	During construction, pollution events may introduce fine sediments and construction related pollutants that can damage smelt habitat in the vicinity. Smelt are sensitive to reductions in water quality and are an important indicator species in this respect (Andrews, in Maitland, 2003). Given the tidal prism it is predicted that any pollutants lost from the site will be rapidly dispersed and diluted to background levels. The opportunity for pollution incidents will be reduced further by the implementation of pollution prevention methodologies, therefore there is a limited pathway for effect. Mitigation measures relating to water quality (pollution) impacts include best practice, i.e. implementing pollution prevention measures particularly when mixing and	No

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		installing concrete and using fuels and oils. This includes the use of drip trays or similar at plant compounds and refuelling areas to avoid any potential for contamination from vehicle fluids. With construction mitigation measures, any water quality deterioration as a result of the Scheme's activities are not capable of significantly affecting the smelt populations or any ecological or geomorphological processes that they are dependent on within the MCZ.	
	Changes in physical regime	Altering flood protection and the physical shape of the river can result in changes to the flow of water and subsequently patterns of sedimentation. However, as modelling indicates that with the flood defence structures in place, the in-channel current speeds are predicted to remain within the present range and any sedimentation changes are likely to be localised. As the spawning habitat for smelt is located further upstream, any sedimentation changes are not capable of significantly affecting the smelt populations or any ecological or geomorphological processes that they are dependent on within the MCZ.	No
	Disturbance	Underwater noise and other disturbances such as artificial light can disturb fish, acting as a barrier to their migration route through deflection or attraction or cause lethal effects	No

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		Smelt are hearing generalists (i.e. they have a swimbladder associated with hearing). These are classed as having a 'medium' hearing sensitivity (peak hearing threshold is 95 dB re 1uPa (Parvin *et al*., 2008). Installation of sheet piling will require pile driving which if carried out underwater would transmit noise through the water column. Potential effects on smelt from carrying out this work underwater include mortality, permanent or temporary tissue damage and hearing loss and behavioural changes (e.g. avoidance of migratory routes). For this reason, piling will be undertaken at low water and outside of smelt migratory and spawning season, with works commencing after 15th June, which would also mitigate against effects on larvae and post-larvae travelling downstream to the estuary. Artificial lighting can deflect some fish species and attract others which may affect smelt migration and foraging behaviour and increase predation effects. Changes in the lighting regime of the area will be mitigated by only working in daylight hours,	

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		therefore additional lighting would not be required under normal construction conditions. With construction mitigation in place, the levels of underwater noise and disturbance from lighting as a result of the Scheme's activities are not capable of significantly affecting the smelt populations or any ecological or geomorphological processes that they are dependent on within the MCZ.	
	Habitat loss	It is currently estimated that the scheme will result in the permanent loss of 0.002 km^2 of MCZ habitat during operation. It is unlikely that smelt will spawn in the waters near to the scheme; the mapped tidal limit for MHW and fish catch composition are of mainly marine/estuarine species indicating that smelt would be most likely to travel further upstream to lower salinity water near the spring tidal limit. Even though smelt can spawn in brackish waters within the tidal reaches of the Thames, the clear route to the head of the upper spring tides in the Ribble east of Preston, any spawning activity would be expected to occur there, as stated earlier. Inspection of the river banks to be replaced with Redi-rock planted terracing in the most upstream section of the northern bank (Area 1) to be replaced by Redi-rock planted terracing at Riverside to the rail bridge has generally almost vertical banks. This offers moderate fish refuge depending on the tidal height, with some vegetation	No

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		around the high water mark. Crevices and accumulations of revetment material and the presence of short wooden post structures and submerged tree trunk sections are likely to provide refuge areas and habitat for fish. The habitat improves immediately upstream of this section by the rail bridge with a vegetated bank of a more shallow gradient. The bank along the central encroachment stretch of Area 1 (at Riverside, upstream of Penwortham old bridge) offers a range of habitat with some steep sides with vegetation (sometimes short) along the upper tidal limit. Submerged tree trunks, exposed tree roots, eroded stands of vegetation and mud at lower tidal levels are also present. It offers moderate value smelt habitat when inundated as bank are comparatively steep. The bankside habitat on the furthest downstream bank to be replaced by Redi-rock planted terracing (downstream of Penwortham old bridge, Area 1) provides relatively poor fish refuge habitat at most tidal states compared to immediately downstream. It consists of broken up stone revetment with less vegetation present and less opportunity for low flow areas, although at the highest tide there is refuge within the bankside vegetation (Photograph 1).	

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		 Photograph 1 Downstream of Penwortham old bridge, Area 1: example habitat to be replaced Immediately downstream of this encroachment stretch within Area 1, the bank provides relatively good fish habitat particularly at mid to high water with habitat heterogeneity under overhanging trees (wood, eroded clumps of vegetation and mud substrate). Similarly, the wider area within Area 1, downstream of the encroachment areas (i.e. between Liverpool Road Bridge and the encroachment downstream of Penwortham old bridge) contains areas of relatively good fish refuge habitat that will	

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		be retained as part of the scheme. It comprises a relatively shallower gradient, mud substrate and eroded clumps of vegetation with creek-like crevices. (Photograph 2).  Photograph 2 Bank/intertidal habitat in Area 1, downstream of encroachment areas. The bankside habitat on the southern bank (Area 2) to be replaced by Redi-rock comprises eroded mudflats, some marginal vegetation and offers potential fish refuge around high water.	

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		Although these stretches of banks are to be replaced, the Redi-rock planted terracing habitat will offer comparable value for fish refuge in the long term, as it would provide a permanent and more robust base for planting, particularly if retaining media were incorporated (i.e. brush). As the conservation objective for smelt is to return to favourable condition and with no smelt recorded in TraC surveys between 2014 and 2018, this habitat enhancement incorporated into the new flood defences will assist in this. Guidance for the tidal Thames (ZSL, 2016) suggests the installation of terracing or sloping faces to make developments more fish friendly. The Redi-rock terracing proposed would provide habitat of this type and make the flood defence face less steep and provide more features than standard vertical flood defence structures. This terracing will be seeded with tussock forming grasses which on the lower levels will help trap and retain sediment. Coir rolls will be seeded with species such as Phragmites. Where possible flow deflectors and/or fixed tree trunk sections can also provide areas of slower flow or back-eddies, which are important to allow fish to hold station particularly on their upstream migrations. Any habitat loss relating to migratory adult as well as juvenile habitat e.g. shallow vegetated margins can be mitigated through these measures such as terracing and marginal planting. The area lost is considered to be very small, constituting 0.01% of	

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		the MCZ area as a whole. With construction mitigation and operational enhancement measures, the level of habitat loss and deterioration as a result of the Scheme's activities are not capable of significantly affecting the smelt populations or any ecological or geomorphological processes that they are dependent on within the MCZ.	
	Habitat/community simplification	Changes to the bankside habitats could result in a less diverse range of vegetation and substrate types which could be utilised by smelt when inundated on each tidal cycle. This effect would be mitigated through the planting of different plant species across the terrace structure and the installation of brush-type material and potentially tree trunk sections to add habitat heterogeneity. With these operational enhancement measures, the level of habitat simplification as a result of the Scheme's activities are not capable of significantly affecting the smelt populations or any ecological or geomorphological processes that they are dependent on within the MCZ.	No
	Physical damage	Physical damage to bankside vegetation and poaching owing to construction activities could reduce the amount of intertidal habitat utilised by the smelt particularly on their upstream migrations. However, this effect would be localised and temporary and mitigated by the installation of the new Redi-rock planted terracing. Furthermore, as in-river works avoid the spawning migration window the Scheme's activities are not capable of significantly affecting the smelt populations or any ecological or	No

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		geomorphological processes that they are dependent on during their migrations within the MCZ.	
	Turbidity	During construction, runoff and sedimentation owing to the embankment works and installation of structures in and around the river may effect smelt habitat in the vicinity by smothering substrate and reducing visibility, along with physiological effects e.g. through effects on respiration. With appropriate mitigation in place to reduce sediment release such as working in the dry where possible, incorporation of bunds/sediment curtains etc and treatment of run-off as part of a sediment control plan in accordance with CIRIA (2006), effects on water quality and substrate will not affect smelt utilising the waters around the Scheme. Therefore, any changes in water quality owing to turbidity are not capable of significantly affecting the smelt populations or any ecological or geomorphological processes that they are dependent on within the MCZ.	No
	In-combination and cumulative effects	There are a number of marine licences currently granted in the Ribble Estuary for the RSPB, and they include activities such as management of creeks, wet grassland for breeding waders and management of coastal saltmarsh in Hesketh Out Marsh West and Crossens Inner Marsh. These activities would occur at specific windows until December 2024. It is considered that these works such as ditch management would	No

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		themselves be subject to environmental mitigation measures (such as being dependent on weather conditions) and would not significantly affect any adult smelt in the outer estuary (e.g. acting as a barrier to migration) as this area is not constrained by a river channel. There is another licence granted until February 2021 (J Wareing and Son) for repair works to St Annes Pier in Lytham St Annes in the mouth of the Ribble Estuary. Natural England have stated that proposal was unlikely to affect any statutorily protected nature conservation sites. It is not expected that the construction phase will overlap with the construction of the Ribble Crossing proposed scheme, which, if it went ahead would be from 2026 onwards. In terms of cumulative effects within the scheme, the subsequent phases of flood defence works (Phases 3-5) do not have a requirement for stretches of encroachment into the river channels. It is therefore expected that there would be no pathway to affect smelt conservation objectives.	

Protected feature	Risk (Pressure)	Assessment of the risk of hindering the conservation objectives	Is there a risk? Yes or No
		Therefore, it is considered that the project alone could not conceivably add significantly to any in-combination effects alone or in combination with other proposals or projects	

6. Information / Advice (if applicable)

This section summarises the information and/or advice requested/received during the screening assessment.

Environment Agency internal advice and consultation (if applicable)

Rebecca Tinsley, Adam Waugh, Darren Bedworth and Amanda Lord-Knowles have been consulted with in the production of this screening assessment.

Natural England information / advice (if applicable)

Stephen Ayliffe and Dave Ottewell have been consulted with, in the production of this screening assessment.

Third party information / advice (if applicable)

Steve Coates was consulted with as a specialist on smelt aspects.

7. Decision

The Environment Agency concludes that there is no significant risk of hindering the achievement of the conservation objectives of the Marine Conservation Zone.

Name of Environment Agency officer: Isabel Lee Elliot (Jacobs) for the EA

Job title: Principal Marine Ecologist

Date: 12/11/2020

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