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Environmental Report

Whitby Harbour PAR

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1 INTRODUCTION

This report has been produced in support of the Whitby Harbour Project Appraisal Report (PAR) to provide a baseline of the environment potentially affected by the proposed scheme. The report has been informed primarily by the Whitby Coastal Strategy 2 and, in particular, the accompanying Strategic Environmental Assessment (SEA), with more localised information provided, where required.

This information has been used to identify key environmental constraints and opportunities to inform the options appraisal process and to appraise the preferred option, providing appropriate avoidance and / or mitigation measures, where required. The preferred option for the present PAR comprises the repairs and scour protection to the Main Piers and the installation of a flood gate at the Battery Parade Slipway. The preferred option(s) for works to the East and West Pier Extensions will be assessed as part of a separate PAR application.

2 BASELINE ENVIRONMENT

2.1 Socio-economic context

2.1.1 Local community

Whitby is a seaside town and civil parish situated on the east coast of Yorkshire, at the mouth of the River Esk. The town has a population of over 14,000, making it the second largest settlement in the Borough of Scarborough, behind Scarborough itself, and the largest in the north of the Borough (Scarborough Borough Council 2012).

The major employment cluster serving Whitby is Whitby Business Park to the south east of the town; however, many of its residents look elsewhere for work both within and outside of the Borough, with Teesside being a major draw to the north (Scarborough Borough Council 2011). The harbour provides for the local fishing industry and for the North Sea cargo trade.

Facilities and services including emergency services (ambulance, fire and police), secondary schools, supermarkets, train station, petrol stations, medical services and hospital are located in Whitby; whilst A&E is provided by Scarborough or Middlesbrough.

Failure of the pier structures would result in 497 properties (of which 362 are residential) which would otherwise not be at risk from coastal erosion within the 100 year appraisal period becoming at risk. In addition 184 properties would suffer accelerated erosion rates due to the loss of the piers. Loss of piers would result in more severe wave climate within harbour,

increasing the damages from flooding to the 148 properties at risk in the 1 in 200 year event; 11 additional properties would also become at risk.

Overtopping discharges are in excess of target thresholds for serviceability on the main piers, presenting a significant hazard to public using the piers. On the extensions the overtopping discharges are in excess of target thresholds for avoidance of structural damage. The overtopping will worsen over time due to sea level rise.

2.1.2 Tourism and recreation

The coast and harbour at Whitby are valuable recreational facilities and provide the principal attraction for many visitors to the area. Whitby West Cliff beach is a Blue Flag beach and includes a number of resort facilities including beach huts, eateries and donkey rides. The beach is included in the 2010 Rough Guide Top 10 Beaches in England. In addition, Whitby West Cliff beach was awarded Keep Britain Tidy's 'Quality Coast' Award in 2011.

Numerous hotels, guest houses and holiday flats on West Cliff provide visitor accommodation, and Whitby Spa is a centre for tourist entertainment. These facilities support a substantial component of employment within Whitby and contribute to the revenue income of the area.

The tourism value of Whitby has been estimated as part of a tourism and leisure study (Planning Solutions Consulting Ltd., 2011). The Economic Impact Model produced as part of the study suggested some 1,040,100 day visits and 368,000 staying visitor days to the town. With an added estimated 10% for additional business and other tourism then this reaches some 405,000 staying visitor days. The Yorkshire Regional Visitor Survey 2009 / 10 determined the average spend per person per day for Whitby is £20.96 for day visitors and £48.03 for staying visitors. This provided an estimated value of total tourism revenue generated in Whitby as:

- Day visitors: £21.80 million
- Staying visitors: £19.45 million
- **Tourism Revenue: £41.25 million per annum**

Around 50% of visitors to Whitby enjoy both passive and active beach activities. Whilst it is difficult to place an exact value on environmental and coastal features it was very clear that the beach and coast at Whitby forms an integral part of its appeal and profile which was appreciated and valued by a very high proportion of visitors. The beach and coastline equated to an annual total equivalent value of just over £16 million (£16,050,269) or 39% of the estimated total tourism revenue to the local economy.

There has been significant investment to upgrade and make improvements to the visitor product within the Whitby, including the £2 million Whitby Marina development and £30 million investment in Raithwaite Hall Hotel, located between Whitby and Sandsend.

Coastal recreational opportunities within Whitby include walking along the beach, swimming, surfing, windsurfing, fishing, mountain biking, cycling, sea canoeing and sailing. The Cleveland Way, a 109 mile National Trail from the North York Moors to Filey, follows the coastline with the exception of a small section where Whitby Golf Course occupies the cliff tops. The Esk Valley Walk follows the River Esk from its source on the North York Moors to the coast at Whitby. The key tourism attractions within the study area are presented in **Table 2.1**.

Table 2.1 Key tourism and recreational attractions within the study area

Attraction	
Captain Cook Memorial Museum	Whitby Abbey
Pannett Park Art Gallery and Whitby Museum	Whitby Youth Hostel
Turnstone Gallery	Whitby Pavilion Complex
Whitby Golf Club	Whitby RNLI
Whitby Harbour	RNLI Whitby Museum
Fossiling	Whitby Piers
St. Mary's Parish Church, Whitby	Whitby Marina
Raithwaite Hall Hotel	Blue Flag beach - Whitby West Cliff
Cleveland Way National Trail	

There are a number of access points to the beach, from cliff-top roads between Upgang and Whitby Spa and from the end of Pier Road by the harbour. Henrietta Street provides access onto the rocky foreshore to the east of East Pier.

2.2 Critical infrastructure and material assets

In North Yorkshire County Council's Local Transport Plan 3, Whitby was named as one of North Yorkshire's most congested towns with serious congestion at times. Whitby suffers especially in the summer months and weekends from severe congestion and parking problems. In addition to transport infrastructure there are wider infrastructure needs relating to such issues as waste water, education and health facilities. Any development that comes forward must ensure that there is no adverse impact on existing infrastructure nor can it come forward until such time as adequate infrastructure is *in-situ*.

The study area includes a number of other assets and critical infrastructure which are at risk of flooding or coastal erosion:

- the quays, harbour-side roads and property within Whitby town centre;
- harbour defences (i.e. east and west piers and extensions);
- Whitby railway line and train station;
- lifeboat station on the River Esk; and,
- services (including Yorkshire Water, Transco, BT and Northern Electric).

2.3 Biodiversity, flora and fauna

There are no internationally or nationally designated sites for nature conservation that would be affected by the proposed scheme. The closest European site designated under the Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) to the proposed scheme is Beast Cliff - Whitby (Robin Hood's Bay) Special Area of Conservation (SAC), located approximately 8.5km along the coastline to the south east. The site is designated for its vegetated sea cliffs of the Atlantic and Baltic coasts. The combination of geology, topography and plant communities found on the site are unique and it is one of the best examples of vegetated sea cliffs on the north-east coast of England (JNCC 2012).

The River Esk is locally designated as a Site of Importance for Nature Conservation[1] (SINC), whilst small areas of mudflat Biodiversity Action Plan (BAP) habitat are present at the mouth of the river, as well as strips further into the upper harbour on alternate banks. A small area of saltmarsh is present in Spital Beck. To the east and west of the piers, the coastal cliff and slope is classified as Maritime Cliff and Slope BAP habitat. The SINC and BAP habitats are presented in **Figure 1.1**.

The SINC is approximately 5.5km in length, stretching from where the A169 Pickering to Whitby road crosses the River Esk to the harbour mouth in Whitby. It is a 'pre-existing' SINC, which means that it was included by Scarborough Borough Council in their Local Plan following the Phase 1 habitat surveys carried out in the 1980-1990's; however, has never been re-surveyed since the establishment of the North Yorkshire SINC Panel. Therefore there is no citation report or habitat mapping available.

Phase 1 survey information, in the form of target notes, was sourced from the North and East Yorkshire Ecological Data Centre. The survey was carried out in 1988, with target notes taken from the adjacent banks, rather than from the river itself, from the A169 crossing to where the A174 crosses the river. The river banks vary between woody slopes and neutral grassland 'floodplain' type habitats.

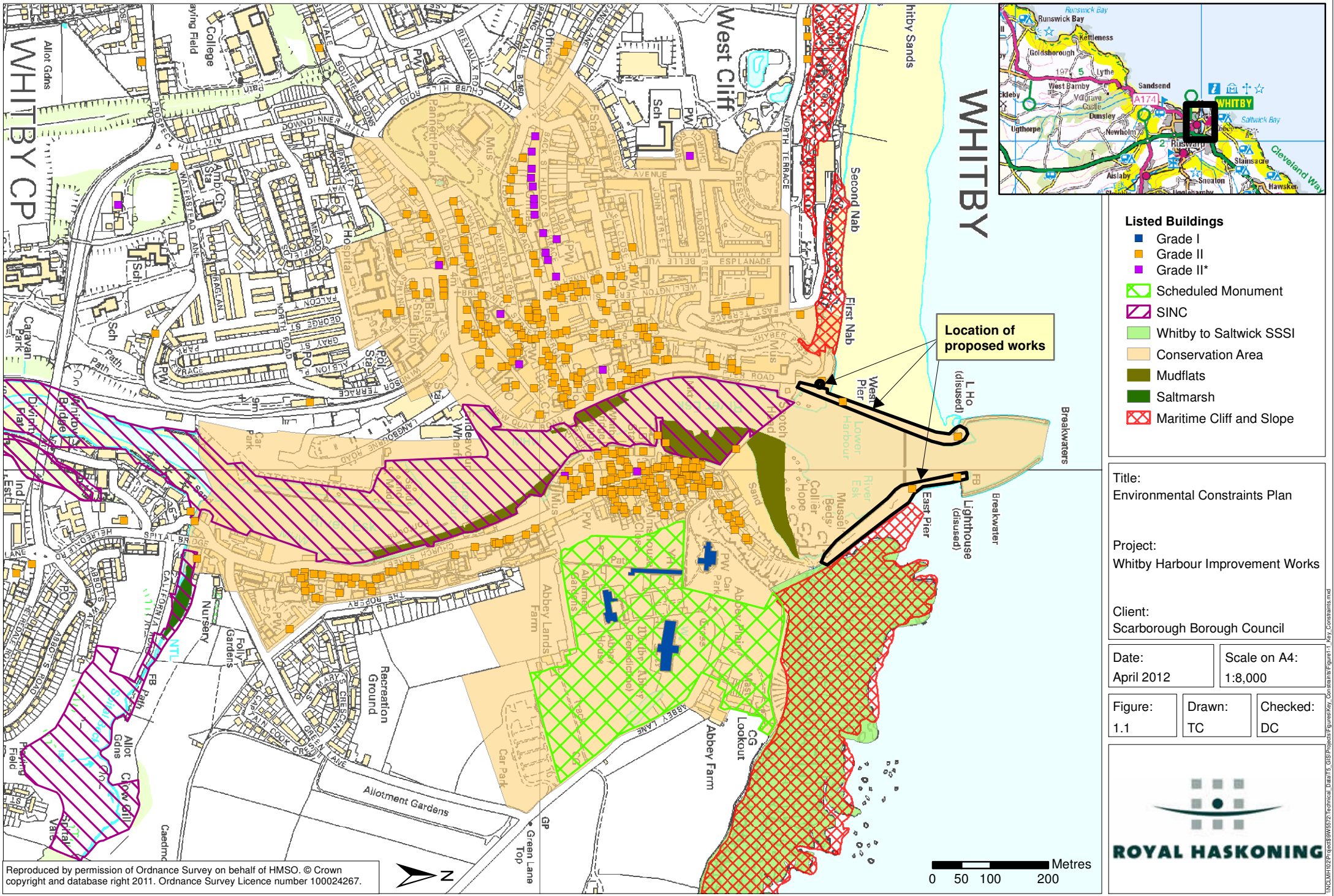
Fish species recorded in the Esk estuary include sea trout, five-bearded rockling, flounder, plaice, viviparous blenny, sea scorpion, cod, sand goby, sprat, smelt, sandeel, saithe, eel, whiting, pollock, pipefish, bream, stickleback, herring and mullet (Environment Agency, 2010). The EA has also recorded river lamprey in the river in low numbers.

The Esk is categorised as a principal salmon river, and it has long been valued for its salmon and sea trout. These species migrate through the estuary to reach spawning grounds upstream within the River Esk and its tributaries. The upstream migration of sea trout and salmon occurs during June to November and may extend into December following a dry summer and autumn (Andrew Delaney, EA, pers. comm.). Smolts go out to sea during April-June.

Whitby Harbour provides the base for a long–established, primarily shellfish coastal fisheries, including crab, lobster and prawns. The annual fishing income to Whitby was approximately £141,050 in 2007/08 (Royal Haskoning 2009). During 2008, approximately 100 different commercial vessels made entry into the harbour. It is assumed that the majority of these craft are fishing vessels.

Rocks, ledges and crevices on the Whitby Harbour piers provide high tide roosts for wading birds, especially purple sandpipers and turnstones, for which the Whitby coast is considered to be of national significance.

[1] A SINC is a non-statutory designation which seeks to protect areas of high wildlife value at a local level.



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Title:
Environmental Constraints Plan

Project:
Whitby Harbour Improvement Works

Client:
Scarborough Borough Council

Date:	Scale on A4:
April 2012	1:8,000

Figure:	Drawn:	Checked:
1.1	TC	DC

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2.4 Water

2.4.1 Bathing waters

The objective of the Bathing Waters Directive (76/160/EEC) is to protect public health and the environment from faecal pollution in areas designated as bathing waters. Designated bathing waters require regular water quality monitoring, carried out by the Environment Agency (EA), throughout the bathing season (15th May to 30th September) to ascertain whether they meet mandatory or guideline standards. Guideline standards are 20 times stricter than the mandatory standard, and meeting the guideline standard is one of the main criteria for the award of the European blue flag status.

West Cliff is designated as a bathing water area. The water quality is currently classified by the EA as 'higher'. This means that the water meets the stricter UK standards of the Bathing Water Directive.

2.4.2 Water Framework Directive

The Water Framework Directive (WFD) (2000/60/EC) establishes a legal framework to protect and restore clean water across Europe and to ensure its long term sustainable use. WFD waterbodies that have the potential to be affected by the proposed scheme are presented in **Table 2.2**.

Table 2.2 WFD waterbodies within the study area (AWB - Artificial Water Body; HMWB - Heavily Modified Water Body)

Water body category	Water body name	Water body ID	Hydromorphological designation	Current overall status / potential	Status Objective
River	Whitby (North of Esk)	GB104027068690	Heavily modified	Moderate	Good by 2027
River	Rigg Mill Beck/Long Mill Beck catch (trib. of Esk)	GB104027068140	Not Designated AWB/HMWB	Poor	Good by 2027
Coastal	Yorkshire North	GB650301500003	Heavily modified	Good	Good by 2015
Transitional	Esk (E)	GB510402703400	Heavily modified	Moderate	Good by 2027
Ground water	Esk & Yorkshire Coast Ravenscar	GB40402G702300	N/A	Good	Good by 2015

Specific mitigation measures are set for waterbodies that have been classified as artificial or heavily modified in order to achieve the Environmental Objectives of the WFD. The only waterbody that has been set mitigation measures within the study area is the Whitby (North of Esk) river waterbody, as presented in **Table 2.3**.

Table 2.3 Specific mitigation measures for Whitby (North of Esk) river waterbody

Waterbody	Mitigation Measures	Status
GB104027068690 Whitby (North of Esk)	Educate landowners on sensitive management practices (urbanisation)	Not in place
	Alteration of channel bed (within culvert)	Not in place
	Re-opening existing culverts	Not in place

2.4.3 River and groundwater quality

None of the river waterbodies identified above are monitored for water quality by the EA. The EA has classified the bedrock underlying the study area as a 'Secondary A' aquifer, which are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers. These are generally aquifers previously classified as minor aquifers. There are no groundwater source protection zones (GSPZs) within the study area (Environment Agency, 2011).

2.5 Landscape / seascape character and visual amenity value

There are no designated 'Areas of Outstanding Natural Beauty' (AONB) within the study area.

2.5.1 National Character Areas

The Study Area falls within the North Yorkshire Moors and Cleveland Hills LCA (Character Area 25). The North York Moors and Cleveland Hills are a very clearly demarcated block of high land in the north east of the counties of Yorkshire and Cleveland. The most significant landscape features within LCA 25 and of relevance to the proposed scheme are (Natural England, 2012b):

- panoramic views over moorland ridges, dales, surrounding lowland vales and the sea; and,
- distinctive and dramatic coastal landscapes with high cliffs, small covers and bays, coastal towns and fishing villages.

The landscape setting of the coast at Whitby is defined by prominent sea cliffs, Sandsend Ness at its western limit and Whitby Abbey headland to the east. A broad, 4km long sandy shore is present between these features. On the cliff tops, the western edge of the built up area of Whitby gives way to an undeveloped coastal landscape between Upgang and East Row. Deep wooded valleys extend inland from coastal settlements of East Row and Sandsend, with Whitby Harbour marking the termination of the River Esk valley (Scarborough Borough Council, 2002).

The West Cliff area, initially developed in the Victorian period, can be termed a designed landscape, but has not previously been referred to as such (NAA, 2011). This landscape preserves a number of early seaside resort elements, such as sunken gardens, landscaped cliff-side paths and promenades. This part of the town grew in response to the growth in the tourist industry from the mid-19th Century onwards.

2.5.2 Seascape character

The proposed scheme is located adjacent to the North Yorkshire and Cleveland Heritage Coast[2]. A number of Heritage Coast targets were set nationally relating to landscape, public access and environmental health issues, which are still relevant today. The current management strategy for the heritage coast will continue to work towards such targets as follows:

Landscape conservation:

- The creation or retention of a strip of grassland or semi-natural vegetation along the heritage coasts behind the beach or cliff edge, normally accommodating the cliff path, or where appropriate in the landscape, a fields width;
- The removal or amelioration of eyesores identified in the management plan; and,
- The protection and enhancement of landscape features identified in the management plan.

Recreation:

- A continuous path stretching the length of the Heritage Coast; and,
- The whole of the public rights of way within the Heritage Coast to be properly managed.

Beach and water quality:

- All intensively used beaches on Heritage Coasts to be designated as bathing beaches; and,
- Litter clearance and collection related to the highest standards for amenity beaches.

2.6 Archaeology and cultural heritage

A Historic Environment Desk-based Assessment of the archaeological and cultural heritage assets was undertaken as part of the Whitby Coastal Strategy 2 (see **Appendix E** of the Strategy's SEA).

Whitby is an area of special architectural and historic interest and is designated as a Conservation Area **(see Figure 1.1)**. No character appraisal has been undertaken of this site. Any works within a Conservation Area requires prior consent by Scarborough Borough Council.

Scheduled Ancient Monuments (SAMs) are nationally important archaeological sites protected under the Ancient Monuments and Archaeological Areas Act 1979. Whitby Abbey SAM is located within the study area. An additional SAM, the alum quarry at Saltwick Nab, is present approximately 1.3km to the east of East Pier. The Grade II Gardens of Whitby Abbey House are also a Registered Park and Garden. SAMs and Registered Parks and Gardens are presented in **Figure 1.1**.

There are a total of 425 Listed Buildings within the study area, including 21 Grade II* Listed Buildings (see **Figure 1.1**). It should be noted that both main piers and Battery Parade wall are

[2] Heritage Coast is a non-statutory designation and is designed to cover the most unspoilt areas of undeveloped coastline around England and Wales.

Grade II Listed. In addition there are 63 Cultural Heritage, 82 Archaeological Event and four Defence of Britain sites present. The area around the piers and within the harbour mouth is also recognised as a non-designated wreck site, due to the large number of records for wrecks or other maritime incidents within the vicinity of Whitby.

2.7 Soils and geology

The Whitby to Saltwick Site of Special Scientific Interest (SSSI) covers the foreshore and cliffs at Whitby to the east of the East Pier and eastwards for a distance of approximately 1.5km to Saltwick Bay (see **Figure 1.1**). The SSSI is designated for geological interest and the most recent Natural England condition assessment reported that both Units 1 and 2 of the SSSI were in favourable condition (Natural England, 2009).

The Whitby to Saltwick SSSI comprises two blocks of geological interest covering vertebrate palaeontology, palaeobotany and Toarcian exposures. Many of the best museum specimens of Middle Jurassic plant fossils originated in the cliffs to the south of Whitby. These came from a lens within the filled sandstone channels of the Saltwick Formation. The Upper Lias of the coast east of Whitby has yielded many specimens of plesiosaurs, ichtyosaurs and marine crocodiles (Natural England, undated).

Favourable condition of the geological features of the SSSI is maintained by the existing coastal processes through [natural] erosion of the rock platform. Changes to coastal processes, for example through the loss of the piers or the construction of nearshore structures, would alter the existing erosion rates, thus impacting on the SSSI. In the case of the piers, should they be lost, any effects to the SSSI would not be considered to be damaging, as this would help reinstate natural coastal processes. Rock platforms, however, can be damaged by smothering or covering by, in particular, rock armour.

3 ENVIRONMENTAL CONSTRAINTS

The following environmental constraints have been identified that could affect the options being considered:

- the foreshore area to the east and west of the piers is known to be well used by the public for tourism and recreational uses, therefore the proposed works have the potential to affect the tourism and recreational value of the area;
- critical infrastructure and material assets, in particular waste water services, car parks, harbour defences and lifeboat station;
- the River Esk is locally designated as a SINC. In addition, UK BAP habitats are present within the study area, including maritime cliff and slope, mudflat and saltmarsh habitats;
- the Esk is important habitat for migratory fish including sea trout and salmon;
- Whitby Harbour provides the base for long established coastal fisheries;
- Whitby Harbour provides foraging areas for bird species of European and national importance, whilst the piers provide high tide roosts for these species;
- there are five WFD waterbodies that could be affected by the proposed works. In addition, West Cliff beach is a designated bathing water;

- the proposed works have the potential to affect the local landscape / seascape character;
- the site is located adjacent to the Yorkshire and Cleveland Heritage Coast; as such, the proposed scheme will need to consider the Heritage Coast's objectives;
- there are a large number of features of archaeological importance within the study area, including the main piers and Battery Parade wall. There is therefore potential to cause disturbance to these known features of interest during construction. There is also the potential to encounter unknown features of archaeological interest during any rock stockpiling and excavation works;
- Whitby to Saltwick geological SSSI is located to the immediate east of East Pier. Any works that would alter the existing coastal processes have the potential to impact on this designated site;
- a construction method statement will be required to ensure suitable mitigation for construction works (e.g. materials to be used, timing of works, prevention of pollution etc);
- any construction project in England which started after 6th April 2008 and has a value of over £300,000 has a legal requirement to have a Site Waste Management Plan (SWMP) in place. The SWMP will detail how resources will be managed, and waste materials controlled, at all stages during the construction period; and,
- **Appendix F** provides an Indicative Landscape Plan showing the key environmental constraints.

4 ENVIRONMENTAL IMPACTS OF ALTERNATIVE OPTIONS

4.2 Short listed options

The structural issues relating to the main piers and extensions and the potential options for improvements have been considered in an Options Appraisal Report. This Options Appraisal Report does not include a comparative assessment of the Do Nothing (Option 1) and Do Minimum (Option 2) options, as these have been evaluated and eliminated in the Strategy Appraisal Report (StAR). The recommendation of the StAR was to implement a capital funded project to improve the condition of the main piers and the condition and performance of the pier extensions. A summary of the short listed options, as described in the Options Appraisal Report, is presented below.

4.1.1 Main piers

The main pier improvements are limited to a single option, **Option M1** (that includes a number of proposed activities). The structural repairs recommended for the main piers are to:

- Seal up any voids in the outer faces using mortar, concrete, sandstone insets or other temporary solutions.
- Stabilise any un-bound areas of outer blockwork using tie rods/plates.
- Use a cementituous grouting technique to infill voids immediately behind the wall face and beneath the upper surfaces, from bed rock level to below the surface level. Grout tubes to be installed through the walls and also the upper surface, at spacings to suit the technique and product used.

- Replacing badly eroded/weathered sandstone blocks and copings.
- Repairs to the concrete promenade surface of the west pier.
- Sealing and repairs to the sandstone promenade surface of the east pier.
- Refurbishment of the handrails on the west pier.

It has been assumed that with appropriate maintenance the proposed structural repairs will extend the residual life of the main piers by 100 years.

Scour protection works for the West Pier Bull-Nose are proposed in the form of sheet pile toe protection with concrete backfill. The piles being placed in pre-augured trenches. It has been assumed that the residual life of these assets is 50 years and that further intervention would be required to replace them at that time.

The StAR proposed that the performance improvements be achieved through a safety management approach. This approach included:

- Installation of access barriers at the entrance to both Main Piers and at the entrance to the west pier extension access bridge.
- Installation of a flood gate at the Battery Parade Slipway.
- Installation of warning signs at the access gates and flood gate locations.
- Implementing a new operational procedure for the piers whereby the Harbour Master's staff are responsible for the operation and maintenance of the access barriers and flood gate.

4.1.2 Pier extensions

The short listed options proposed to improve the condition and performance of the pier extensions are as follows:

Option 3 – M1 + E1

This option comprises the following:

- Sheet piles and concrete fill to all four faces of the pier extensions;
- Scour protection to extension bull-noses; and,
- Concrete repairs to faces of extensions.

Option 4 – M1 + E2

This option comprises the following:

- Half-height rock revetment to outer face of east pier extension;
- Sheet pile and concrete backfill scour protection to remaining three faces of the pier extensions;
- Scour protection to extension bull-noses; and
- Concrete repairs to faces of extensions.

Option 5 – M1 + E3

This option comprises the following:

- Half-height rock revetment to outer faces of east and west pier extensions;
- Sheet pile and concrete backfill scour protection to inner faces of east and west pier extensions;
- Scour protection to extension bull-noses; and
- Concrete repairs to faces of extensions.

Option 6 – M1 + E4

This option comprises the following:

- Half-height rock revetment to outer face of east pier extension;
- Sheet pile and concrete backfill scour protection to inner face of west pier extension;
- Void infilling on remaining two faces of the pier extensions;
- Scour protection to extension bull-noses; and
- Concrete repairs to all faces of extensions.

Therefore the combined options for the main piers and pier extensions short listed are;

- Option 3 – M1 + E1;
- Option 4 – M1 + E2;
- Option 5 – M1 + E3; and,
- Option 6 – M1 + E4.

4.2 Options appraisal

All options have the potential to affect navigation, foraging and roosting overwintering birds, and tourism and recreation during the construction works. Over-topping issues to the main piers are to be managed through the use of warning signs and barrier gates; these have the potential to affect the character and appearance of the Conservation Area. It should be noted that English Heritage was consulted to inform the optioneering process. Their requirements have been used to inform the design of the proposed works and to identify suitable mitigation measures, where required.

It is understood that where sheet piling is to be installed that the method of installation would be through pre-augured trenches rather than percussive piling methods. This method generates significantly lower levels of airborne and underwater noise than percussive methods. In order to prevent damage to the pier extension during the construction of the rock revetment(s), where proposed, it is assumed that the rock will be placed using, for example, a long reach excavator, rather than being tipped from a barge. This also reduces the noise and vibration impacts, both

airborne and underwater, that could arise from tipping activities and also minimises the potential to injure and kill fish, in particular migratory fish, during placement.

The potential key positive and negative environmental impacts of the detailed options being considered are presented in **Table 4.1**. Only the potential impacts that differ between the options are presented here allowing for a comparison of each option's positive and negative impacts against each other. Mitigation measures and enhancement opportunities have also been proposed, where required.

Table 4.1 Key positive and negative environmental impacts of short listed options

Key Positive Impacts	Key Negative Impacts	Mitigation / Enhancement Opportunity
Option 3 – Do Something M1 + E1		
No rock revetment on the west face of the West Pier, whose visibility could affect the character and appearance of the Conservation Area.	Works have no potential to reduce over topping issues. This issue is to be managed using warning signs and closing the piers.	Construction works should follow industry best practice guidance (i.e. CIRIA).
No rock temporarily stored on the beach.	All four faces of the Pier Extensions have an estimated residual life of only 50 years.	Works should be undertaken so as to be considerate of sensitive periods for tourism, migratory fish and birds.
	This option requires the most pre-auguring to place the sheet piling, extending the programme of around four years.	Production of a construction method statements will ensure suitable mitigation for construction works (e.g. materials to be used, timing of works, prevention of pollution, prevention etc.).
	Pre-auguring works will disturb sediments, which may have associated contaminates. This potential issue is considered to be the highest for this option.	A SWMP will be implemented prior to the commencement of works.
	Pre-auguring works will result in arisings. Beneficial use will need to be considered or, if this is not possible, disposal options. Should the sediments be contaminated, this will affect the cost and the beneficial use and disposal options that can be considered. This option would produce the most arisings.	Liaise with harbour master to avoid / mitigate any effects to navigation.
Option 4 – Do Something M1 + E2		
Reduced overtopping to East Pier Extension resulting from the placement of rock revetments.	This option involves more sheet piling, and associated pre-auguring, than Option 6, extending the programme to around three years.	As for Option 3,
The east face of the East Pier Extension will have an estimated residual life of 100 years, thus reducing the level of intervention required to maintain this side of the pier.	Rock to be used for the revetment may need to be unloaded on the beach prior to being put in place.	Works should be designed so as to minimise the visibility of the rock revetment.

Key Positive Impacts	Key Negative Impacts	Mitigation / Enhancement Opportunity
No rock revetment on the west face of the West Pier Extension, whose visibility would affect the character and appearance of the Conservation Area.	Works have no potential to reduce over topping to West Pier Extension. This issue is to be managed using warning signs and closing the piers.	
	Pre-auguring works will disturb sediments, which may have associated contaminates.	
	Pre-auguring works will result in arisings. Beneficial use will need to be considered or, if this is not possible, disposal options. Should the sediments be contaminated, this will affect the cost and the beneficial use and disposal options that can be considered.	
Option 5 – Do Something M1 + E3		
Reduced overtopping to East and West Pier Extensions resulting from the placement of rock revetments	Rock on outer face of West Pier considered to be unsuitable by English Heritage due to the visibility of the rock affecting the character and appearance of the Conservation Area.	As for Option 4.
The outer faces of the Pier Extensions will have an estimated residual life of 100 years, thus reducing the level of intervention required to maintain these sides of the piers.	Rock revetment along the seaward face of the West Pier Extension would affect local anglers.	
	Rock to be used for the revetment may need to be unloaded on the beach prior to being put in place.	
	Pre-auguring works will disturb sediments, which may have associated contaminates.	
	Pre-auguring works will result in arisings. Beneficial use will need to be considered or, if this is not possible, disposal options. Should the sediments be contaminated, this will affect the cost and the beneficial use and disposal options that can be considered.	
Option 6 – Do Something M1 + E4		
Reduced overtopping to East Pier Extension resulting from the placement of rock revetments.	Rock to be used for the revetment may need to be unloaded on the beach prior to being put in place.	As for Option 4.
The east face of the East Pier Extension will have an estimated residual life of 100 years, thus reducing the level of intervention required to maintain this side of the pier.	The proposed approach of localised infilling of voids would, whilst reducing the level of capital works required for year 2, reduce the time for the next capital works are required by 10 years (to Year 60), compared to the other three options (year 70).	
No rock revetment on the west	Works have no potential to reduce over topping	

Key Positive Impacts	Key Negative Impacts	Mitigation / Enhancement Opportunity
face of the West Pier Extension, whose visibility would affect the character and appearance of the Conservation Area.	to West Pier Extension. This issue is to be managed using warning signs and closing the piers.	
Anticipated shortest construction programme of around two years.		
Pre-auguring works with disturb sediments, which may have associated contaminates. This potential issue is considered to be the lowest for this option.		
Pre-auguring works will result in arisings. Beneficial use will need to be considered or, if this is not possible, disposal options. Should the sediments be contaminated, this will affect the cost and the beneficial use and disposal options that can be considered. This option would produce the least arisings.		

Option 5 is considered to be environmentally unacceptable due to the presence of rock along the outer face of the West Pier Extension, which would affect the character and appearance of the Conservation Area.

Whilst Option 3 does not include a rock revetment, with its associated effects, this option is considered to have the longest programme, at around four years, as a result of the sheet piling works that are required. These works would result in the largest amount of arisings, produced during the pre-auguring works, which would need to be suitably disposed of and which have the potential to be contaminated. Option 3 would require the highest level of capital intervention as all four faces of the Pier Extensions would have residual lives of only 50 years. Furthermore, Option 3 does not provide any reduction to the effects of wave overtopping of the Pier Extensions, resulting in the requirement for higher levels of maintenance works, should over-topping damage the surface of the piers.

Option 4 involves significantly more sheet piling works compared to Option 6, which would extend the programme by an estimated 12 months. This option would also result in more arisings as a result of the pre-auguring works, which have the potential to be contaminated. As such, Option 6 is preferred over Option 4 and is the environmentally preferred option.

5 ENVIRONMENTAL EFFECTS OF THE PREFERRED OPTION

This section provides an overview of the potential effects that could arise as a result of the preferred option and describes the measures that have been identified to date to avoid or mitigate these effects throughout the development of the scheme, where appropriate.

It is proposed that the preferred option is carried out in three phases. The main piers have been assessed as being the most vulnerable of the assets due to their current condition and likelihood of failure. As such the main piers works have been prioritised, with works to be designed and carried out in years 3 and 4 (Phase 1). Phase 1 also includes the placement of the flood gate at Battery Parade slipway. The scour protection works to the west face of the west pier extension, construction of the breakwater along the western face of the east pier extension and repairs to the remaining two faces of the pier extensions are to be delayed until year 20 (Phase 2). A capital scheme to install scour protection to two the eastern faces of the pier extensions and to replace the scout protection on the western face of the west pier extension is proposed in year 60 (Phase 3). **The PAR for which this report informs considers Phase 1 only**. Phases 2 and 3 will be subject to separate PAR applications. The proposed works relating to Phase 1 of the preferred option can be seen in **Figure 1.2**.

It has been assumed that works to the main piers would be carried out on one pier at a time to avoid the potential adverse impact on tourism.

Given the nature and location of the proposed scheme, the following aspects are considered relevant:

- Coastal processes;
- Soils and geology;
- Biodiversity, flora and fauna;
- Noise and vibration;
- Water;
- Archaeology and cultural heritage;
- Landscape, seascape and visual amenity value; and,
- Tourism and recreation.

In addition to the receptor specific measures set out below to avoid / mitigate any adverse effects that could arise through the implementation of the preferred option, best practice guidance will be adhered to, in particular:

- Pollution Prevention Guidelines - Works in, near water: PPG 5 (Environment Agency 2007); and,
- CIRIA Coastal and Marine Environmental Management Site Guide (CIRIA report C584) (CIRIA 2003).

5.1 Coastal processes

Re-pointing and grout infilling will repair the walls of the main piers and will not extend the structures seaward. These activities are therefore deemed to have no potential to affect existing coastal processes. Scour protection to the west and east pier bullnoses is proposed in the form of sheet pile toe protection with concrete backfill. This scour protection will result in the seaward extension of the bullnose by a maximum of approximately 2m from its current position. This small, localised extension is considered to have negligible potential to affect existing coastal processes.

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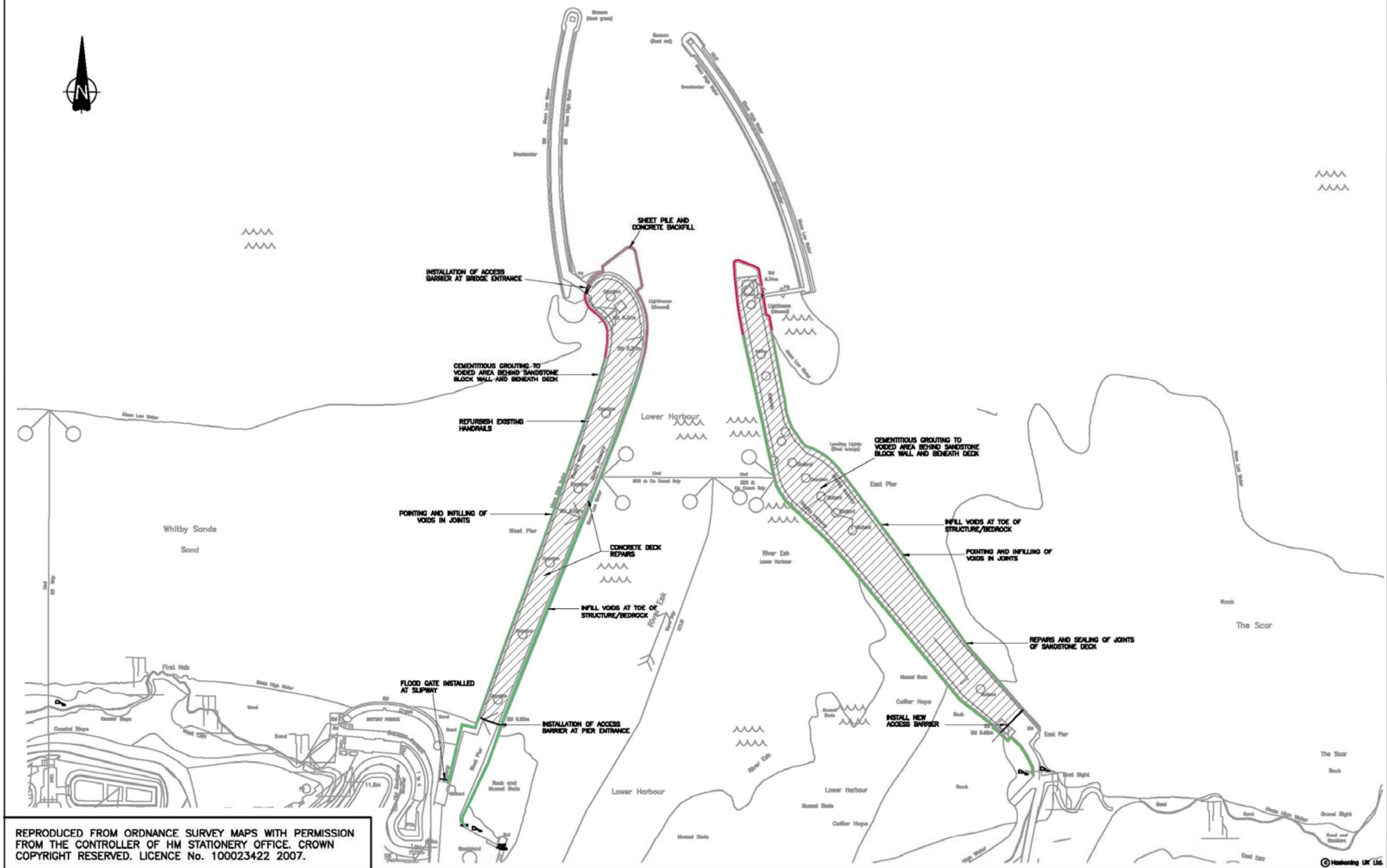

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TITLE	PROJECT					
CAPITAL WORKS PROPOSED YEARS 3 AND 4 NEXT INTERVENTION – 100 YEARS	OPTION M1 MAIN PIERS WORKS PLAN VIEW	ROYAL HASKONING — HASKONING UK LTD, COASTAL AND RIVERS DIVISION, Rightwell House, Bretton, Peterborough PE3 8DW, +44 (0)1733 334455 Telephone, +44 (0)1733 262243 Fax, info@peterborough.royalhaskoning.com E-mail, www.royalhaskoning.com Internet	Job No. IL	DATE MARCH 2012	SCALE NO SCALE	
			ACAD Ref.	CHECKED PK	PASSED PK	
			DRAWN IL	DRG No. FIG 1.2		REV

5.2 Soils and geology

As stated above the proposed works are considered to have negligible potential to affect coastal processes, therefore during the operational phase of the scheme, the Whitby to Saltwick SSSI is not expected to be affected.

During the construction phase, there is the potential for construction plant and machinery to be located within the SSSI boundary in order to carry out the repair works to the main piers. Measures will need to be put in place to ensure that the SSSI is not damaged, such as ensuring that all machinery and vehicles have pneumatic tires, minimise the footprint of the affected areas, agreed locations of plant equipment and spreading the weight of any loads where possible. Assent will be required from Natural England for any works likely to damage the SSSI.

The proposed scour protection works to the bull noses of the main piers have the potential to disturb sediment, which have the potential to be contaminated. As such, it is proposed that a marine sediment quality survey be undertaken in order to determine the physical and chemical quality of the sediments that have the potential to be disturbed. This information could also be used to inform the beneficial use and disposal options for the arisings from the pre-auguring works.

5.3 Biodiversity, flora and fauna

The proposed works are located in close proximity to the rocks, ledges and crevices in the pier structures used as high tide roosting locations by birds, and also to foraging birds within the harbour area. The works have the potential to cause disturbance to these birds through noise and vibration created by construction machinery and through visual impacts. It is considered that any birds affected by the proposed scheme would be displaced to other parts of the piers, including the pier not closed for works at the time of disturbance, or nearby cliffs. The proximity and size of locations within and adjacent to the harbour with potential high tide roosts is such that this displacement is not considered likely to adversely affect roosting birds. In order to reduce any adverse effects to foraging birds, measures to minimise potential noise and vibration impacts are recommended as described in **Section 5.4**. Where possible, works will be undertaken to avoid sensitive periods for roosting birds. Condition 9.9 of the FEPA Licence granted for the recent east pier extension works stated that no piling works shall be undertaken during the three hour period following low water in any given year from between 1 March and 30 November. It is assumed that these works refer to percussive piling methods.

Construction noise may also affect wintering/passage waders, in particular turnstone and purple sandpiper, which use the piers to roost. In order to understand the use of the area by these birds, an over wintering bird survey is proposed. The findings of the survey should be used to identify suitable mitigation measures, where necessary, in order to avoid / minimise any adverse effects to these species.

Method statements for the works to the main piers should be discussed and agreed with Natural England and North Yorkshire County Council's (NYCC) Ecologist.

The scour protection works also have the potential to affect migratory fish species, though noise and vibration and the potential release of contaminated sediments. As salmonid and lamprey migration mostly takes place during the night, works should be undertaken during daylight hours

only. The potential for migratory fish to be affected by contaminated sediments and the identification of mitigation measures, if required, would be determined by the marine sediment survey (see **Section 5.2**).

Further consultation should be undertaken with the local EA Fisheries Enforcement Officer to inform measures to avoid and / or minimise adverse effects to migratory fish.

The River Esk SINC and areas of mudflat BAP habitat have the potential to be indirectly affected through the release of contaminated sediments during the scour protection works to the bullnoses. The significance of this potential issue and any mitigation measures that may be required would be determined by the marine sediment survey (see **Section 5.2**).

The findings of the sediment quality survey and the identification of any mitigation measures, if required, should be discussed and agreed with local EA Fisheries Enforcement Officer and NYCC Ecologist.

5.4 Noise and vibration

There are a number of environmental receptors in and around the harbour which may be sensitive to the effects of noise and vibration. In addition to the potential presence of foraging birds, there are a number of commercial and residential properties within close proximity to west pier on Pier Road and Khyber Pass. Whitby West Cliff beach is a popular location for sunbathing and other beach based activities which are sensitive to the impact of noise. There is also potential for noise to adversely impact upon visitors to Battery Parade, particularly during the installation of the Battery Parade slipway flood gate.

Sheet piles for scour protection will be placed in pre-augured trenches; however, there may be a need to set the piles in the rock using percussive piling. Anticipated noise levels at source are anticipated to be approx. 80dba for vibro-piling the sheet piles into the pre-augured trenches, whilst any percussive piling to fix the piles is anticipated to be approx.110bda at source.

As a result scour protection works to the bullnoses are considered unlikely to result in significant noise emissions. The greatest sources of airborne noise are likely to result from the transportation of material and plant machinery. In order to minimise potential noise and vibration impacts to sensitive receptors, the following best practice measures are recommended:

- ensure plant machinery is switched off when not in use;
- ensure that covers and hatches are properly secured and that there are no loose fixings causing rattling;
- ensure equipment is properly maintained and operated by trained staff;
- use silenced equipment where possible, in particular silenced generators; and,
- provide local residents with contact details of a site representative in the event that noise or vibration nuisance is perceived, and that any complaints are dealt with pro-actively and resolutions communicated to the complainant.

With the implementation of mitigation measures noise emissions are not expected to result in significant adverse effects to environmental receptors.

5.5 Water

WFD compliance assessment

Due to the limited nature of the proposed works, the groundwater waterbody is not considered to have the potential to be affected by the proposed works.

The proposed scheme comprises repair works to existing structures and the installation of scour protection to protect existing assets. The proposed installation of scour protection will extend the existing defence line seaward by a maximum of approximately 2m. This change to the coastal waterbody's geomorphology is considered to be negligible.

Potential adverse effects to the coastal and transitional waterbodies could result through accidental spills and leakages and through the release of contaminates from material used for the repair works and during the pre-auguring for the sheet piling works.

In addition to adhering to best practice and pollution prevention guidance, only material approved for use in the marine environment will be used for the repair works. The potential for the waterbodies to be affected by the potential release of sediment and associated contaminants during the pre-auguring works would be determined by the marine sediment quality survey (see **Section 5.2**). This survey will help inform the proposed scheme's potential to affect the chemical and biological potential of the two waterbodies, and to identify suitable mitigation measures where appropriate.

In light of the above, it is considered that the proposed scheme has the potential to affect the WFD waterbodies through the potential release of contaminants during the pre-auguring works. In order to understand this potential impact, a marine sediment quality survey is proposed to be undertaken. The specification of the survey should be discussed and agreed with the EA.

5.6 Archaeology and cultural Heritage

Consultation with NYCC Archaeologist and English Heritage confirmed that the preferred option will not have an adverse effect on the character or appearance of the Conservation Area, providing the following recommendations are followed (Chris Hall, pers. comm.);

- Regarding the placement of an access barrier and warning signs at the entrances to the east and west piers, the design and siting will be critical. With regard to the east pier, it was proposed that any gate is sited at the bottom of the concrete slope so as to be kept free from the pier. There is a need for the warning signs on the pier complex, as a whole, to be brought into a uniform design and this design to be used for any new signage and the replacement of the old.
- Regarding the repairs to the surface of the east main pier, it was suggested that re-pointing (in a suitable mortar) is undertaken with selective cutting out of old repairs which had been carried out in concrete, or inappropriate repairs in stone, and the re-instatement of appropriate new stone (Aislaby or Lowther Cragg). The surface should be fully recorded.
- Railings along the full length of the east pier would adversely impact upon its simplicity of form and detract from its historic significance. Replacement of the existing railings

should be to a simple robust design not a replication of the promenade railings on the west pier.

- Site flood gate at Battery Parade slipway between the end of the parapet walls, having as little physical impact on the historic stonework as possible and kept as low as possible consistent with the prevention of water inundation.

With the exception of the replacement of the concrete repairs, point two, these recommendations have been incorporated into the design of the proposed scheme. Method statements for all works to the piers should be discussed and agreed with NYCC Archaeologist and English Heritage.

The replacement of the concrete does not materially affect the management of flood and erosion risk and therefore this must be considered as improving the historic environment of the harbour, thus enhancing the area.

This consultation also identified that Listed Building consent would not be required for the works to the piers.

5.7 Landscape, seascape and visual amenity value

The proposed works will temporarily affect the local landscape / seascape character and amenity value. In addition to adhering to best practice guidance, the following measures are proposed to minimise any adverse effects:

- locally advertising the proposed works;
- conducting the major works outside of the peak tourism period where possible;
- informing local residents of the proposed works; and,
- undertaking phased repairs with only one pier closed at a time.

In order to protect the landscape / seascape character during the operational phase of the scheme, the mitigation measures recommended for the historic environment should be adhered to.

5.8 Tourism and recreation

The proposed works have the potential to affect recreational users of the area through increased noise and vibration, increased traffic, and visual impacts. It will be necessary to close the main piers during the works. It is proposed that repairs will be phased and only one pier will be closed at a time in order to reduce the scheme's potential to affect tourism and recreation. Repairs are anticipated to take two years, one year per pier.

There are a number of commercial properties within close proximity to West Main Pier on Pier Road and Khyber Pass. As discussed in **Section 5.4** there is potential for noise generated during the works, including noise from the installation of the flood gate at the Battery Parade slipway, to impact upon these tourist establishments.

With the avoidance and mitigation measures proposed for noise and vibration, and landscape, seascape and visual amenity value, the potential adverse effects to tourism and recreation are considered to be minor.

6 REVIEW OF REGULATORY REQUIREMENTS

6.1 Marine and Coastal Access Act 2009

Part 4 of the Marine and Coastal Access Act (MCAA) 2009 provides the framework for the current marine licensing system for works below the level of mean high water spring (MHWS) tides. Consultation with the Marine Management Organisation (MMO) has confirmed that a Marine Licence is required for the proposed scheme.

6.2 Town and Country Planning Act 1990

The Town and Country Planning Act 1990 is the principle legislation that governs planning permission and planning law in England and Wales. The procedural rules and regulations of this Act are set out in a number of Statutory Instruments (SIs). It is assumed that planning permission will be required to permit the proposed works.

6.3 Wildlife and Countryside Act 1981

Under the terms of Section 28(4)b of the Wildlife and Countryside Act 1981 as amended by Schedule 9 to the Countryside And Rights Of Way Act 2000, any operations within, or adjacent to, a SSSI requires assent from Natural England, when coastal authorities are carrying out their functions which may have the potential to damage an SSSI. Should construction machinery and equipment need to be placed within the SSSI, assent should be obtained from Natural England.

6.4 Land Drainage Act 1991 and Water Resources Act 1991 and associated byelaws

Prior written consent from the Environment Agency is required for any works in, under or near a watercourse or flood defence structure on any main river. The River Esk is classified as a main river up to the A171 road bridge by the Environment Agency; therefore, the proposed works are outside of the main river boundary. It is considered that an application for ‘Consent for Works affecting watercourses and / or flood defences’ would not be required.

6.5 The Crown Estate Act 1961

Consultation with the Crown Estate identified that the seedbed surrounding the footprint of the works is in the ownership of the Crown Estate. As such, it is likely that consent from the Crown Estate will be required to permit the proposed scour protection works to the main pier bullnoses.

6.6 Habitats Regulations Assessment

The Conservation of Species and Habitats Regulations 2010 (the Habitats Regulations) implement EC Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (the Habitats Directive). In accordance with Section 61 of the Habitats Regulations, Appropriate Assessment (AA) is required for any plan or project, not connected with the management of a European site, which is likely to have a significant effect on the site either

alone or in combination with other plans and projects. European sites comprise Special Protection Area (SPA), as designated under Council Directive 79/409/EEC (the Wild Birds Directive), or a Special Area of Conservation (SAC), as designated under the Habitats Directive. AA is also required as a matter of government policy for potential SPAs, candidate SACs and listed Ramsar sites for the purpose of considering development proposals affecting them (ODPM, 2005).

The closest European designated site to the proposed scheme is Beast Cliff - Whitby (Robin Hood's Bay) Special Area of Conservation (SAC), located approximately 8.5km along the coastline to the south east. Due to the distance of the works from Robin Hoods Bay SAC the project is not likely to have a significant effect on the designated site and an AA is not required.

6.7 Water Framework Directive

The WFD establishes a legal framework to protect and restore clean water across Europe to ensure its long-term, sustainable use. One of the aims of the WFD is to ensure that all European waterbodies are of Good Ecological Status/Potential by 2015 by the setting of Environmental Quality Objectives (EQO's), including water chemistry, ecological and hydromorphological quality needs. The Environment Agency has a duty to consider the implications of proposals under the WFD. Consideration of the implications of the proposed scheme under the WFD has been undertaken (see **Section 5.5**). With the adherence to best practice guidance and the undertaking of a marine sediment survey (see **Section 5.2**), no significant effects are anticipated to the status of the WFD waterbodies present; however, a more detailed WFD compliance assessment is proposed once the findings of the marine sediment survey are known.

6.8 Requirement for Environmental Impact Assessment

The requirement for an Environmental Impact Assessment (EIA) is established by European Community Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (the EIA Directive), which has been substantially amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC. The Directive has recently been codified in the interests of clarity and a consolidated Directive (2011/92/EU) came into force in February 2012. The EIA Directive, as amended, is implemented via various Regulations; the following are applicable to the proposed scheme.

Marine Works (EIA) Regulations 2007

The Marine Works (EIA) Regulations 2007, as amended[3], transpose the EIA Directive in relation to activities which are regulated under the MCAA 2009. A screening opinion issued by the MMO determined that the preferred scheme would not require an EIA to support an application for a marine licence.

Town and Country Planning (EIA)(England and Wales) Regulations 1999

The Town and Country Planning (EIA) (England and Wales) Regulations 1999, as amended[4], transpose the EIA Directive for some schemes that require planning permission under the Town

[3] as amended by Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2011

[4] as amended by the Town & Country Planning (Environmental Impact Assessment)(Amendment) Regulations 2006 (SI 2006 No. 3295) and the Town & Country (Environmental Impact Assessment)(Amendment) (England) Regulations 2008 (SI 2008 No. 2093).

and Country Planning Act 1990. Generally, EIA can be required for the following categories of development:

1. Major developments that are of more than local importance.
2. Other developments that are proposed for particularly sensitive and vulnerable locations.
3. Developments with unusually complex and potentially adverse environmental effects.

A screening opinion issued by Scarborough Borough Council determined that the preferred scheme would not require an EIA to support a planning application.

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