

EC DIRECTIVE 97/11 (as amended)
ROADS (SCOTLAND) ACT 1984 (as amended)
RECORD OF DETERMINATION

Name of Project:

Forth Road Bridge (FRB) Pier Cathodic Protection Works.

Location:

Forth Road Bridge north and south pier defences, located at:

NGR 312555, 680111 (North Pier)

NGR 312507, 679115 (South Pier)

DESCRIPTION OF PROJECT

BEAR Scotland has been commissioned by Transport Scotland to undertake Cathodic Protection works on the Forth Road Bridge (FRB) north and south pier defences (Appendix A, Figure 1).

The FRB is a three-span suspension bridge which spans the River Forth. The pier defences were constructed in 1999 using interlocking sheet piles to form linked cofferdam cells to protect the main towers from ship impact. The cells wrap around the exposed faces of the piers within the shipping channel and are filled with rock and the pierheads are capped with a concrete slab (Appendix A, Figure 2). The pierheads have perimeter guardrails to protect the work force and reduce the risk of material and waste being accidentally discarded into the Firth of Forth (Appendix A, Figure 3).

The Impressed Current Cathodic Protection (ICCP) system uses transformer rectifiers to power anodes protecting the steel sheet piles. Inspection works undertaken in 2015 determined that the ICCP system had a number of faults and sub-standard components which included:

- The 'transformer rectifiers' are rated as IP55 for indoor use and are therefore not suitable for an exposed estuary environment. As such, the transformer rectifiers are now in a very poor condition and are no longer providing current to internal anodes and are therefore not protecting the caissons.
- The external reference electrodes at the North Pier are faulty.
- The 35mm single core XLPE/PVC ring main cable, which supplies current for the internal large and small cells, is not suitable for carrying the maximum design current without overheating.

The following works will be carried out on the north and south pier defences to address issue identified above:

- Remove manhole covers (set within a concrete cover slab).
- Remove faulty/sub-standard transformer rectifier, reference electrodes and cables.
- Install and connect new transformer rectifier, reference electrodes and cable.
- Reset manhole covers.
- Connect new transformer rectifier to data acquisition module.

The works are programmed to take 15 days to complete (with 5 days contingency), beginning March 2021 (date TBC), with works taking place Monday to Friday from 08:00 to 17:00. Weekend working may be programmed at the contractor's discretion to optimise weather and operational activities. No traffic management will be required on the FRB due to the location of the pier defences in the Forth Estuary.

PROJECT PROCUREMENT

The scheme is executed by the operating company as site operations – ‘As of Right’ scheme.

DESCRIPTION OF LOCAL ENVIRONMENT

The sections below provide a brief description of the local environment in vicinity of the FRB north and south pier defences. The baseline information is based on a review of currently available information obtained from a desk-based study and historical information provided by the previous Operating Company (Amey).

The headings have been set out to follow the recently updated Design Manual for Roads and Bridges (DMRB) chapters for environmental assessment and do not reflect a ranking of impact severity. Unless otherwise stated, the study area considered for the assessment of potential impacts extends 300 m in each direction of NGR 312555, 680111 (North Pier) and NGR 312507, 679115 (South Pier).

1.0 Population and human health

Baseline information was collected through a desktop assessment containing data obtained from online web-based mapping tools including; Google Maps and Google Street View, Envirocheck, Ordnance Survey (OS), NatureScot, Scotland's Environment (SE), Scotland's Environment Scotland's Soils (SESS), Sustrans and the Road Traffic Statistic.

1.1 Properties (within distance bands)

There are no residential properties, sensitive land uses (e.g. schools, churches, hospitals, etc.), public open spaces, business or industrial premises or farmsteads within 300 m of the scheme extents.

1.2 Land use

The FRB north and south pier defences lie within the Firth of Forth, with surrounding land use located in both the City of Edinburgh and Fife Council local authority boundaries. At the time of writing, one planning application is recorded within 300 m of the scheme. The planning application (granted 6th January 2021), located within the City of Edinburgh Council¹ boundary, relates to installation of a gantry on the FRB². BEAR do not currently have any major projects programmed in vicinity of the FRB.

Land use within 2 km of the pier defences is categorised into the following³; (i) motorway, (ii) urban, (iii) recreation area, (iv) maritime installation, (v) designed landscape, (vi) managed woodland, (vii) medieval village, (viii) plantation, (ix) rough grazing, (x) industrial / commercial area, and (xi) quarry. The national scale land capability for agriculture⁴ for land north and south of the FRB is ‘Class 888 - urban⁵’. Land qualifying as urban has no agricultural value.

¹ <https://citydev-portal.edinburgh.gov.uk/idxpa-web/spatialDisplay.do?action=display&searchType=Application> (City of Edinburgh Council) [Accessed 19/01/21]

² The two existing FRB gantries have been removed for refurbishment. When reinstalled, an additional gantry will also be installed, such that there will be one gantry on each span. The new gantry will be largely identical to the existing gantries.

³ <https://map.hlamap.org.uk> (HLAmap) [Accessed 15/12/20]

⁴ http://map.environment.gov.scot/Soil_maps/?layer=1# (Scotland's Environment Scotland's Soils) [accessed 15/12/20]

⁵ The classification provides for seven grades of land based on its agricultural, forestry and recreational potential, with four of the classes further subdivided into divisions. The methodology considers climate, gradient, soil, wetness, erosion and pattern. The best and most versatile land is classified as Class 1, 2 and 3.1 as this is the land which is most flexible, productive and most likely to deliver future crops.

1.3 Non-motorised user & community facilities

National Cycle Network⁶ route 1 (NCNR1) crosses the Firth of Forth via a dedicated cycleway that runs along both sides of the FRB and a Core Path⁷ utilises the dedicated footpaths⁸, which run along both sides of the bridge. There are no Public Rights of Way⁹ (PROW), pedestrian crossing points (controlled or uncontrolled), bus stops, bridle paths or other community assets on the FRB and no private residencies or businesses are directly accessed from the FRB. Street lighting is present on the bridge.

1.4 Vehicle travellers

The FRB is a two-lane dual carriageway with an Annual Average Daily Traffic (AADT) flow (2019 data) of 640 (ID: 90005) comprised of:

- 17 two wheeled motor vehicles,
- 179 cars and taxis,
- 321 bus and coaches,
- 118 Light Goods Vehicles (LGVs), and
- 5 Heavy Goods Vehicles (HGVs).

As of September 2017, all other traffic has used the new Queensferry Crossing.

The AADT flow recorded for pedal cycles (2018 data) was 160.

2.0 Air quality

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Scotland's Environment (SE), Air Quality in Scotland (SEAQS), Google Maps and Google Street View, Envirocheck, EU Pollutant Release and Transfer Register (PRTR), and Ordnance Survey (OS).

Baseline air quality is mainly influenced by vehicles travelling along the FRB. Secondary sources are derived from vehicles travelling along the Queensferry Crossing, train movement on the Forth Bridge and coastal industrial processes at Rosyth Dockyard.

There are no Air Quality Management Areas¹⁰ (AQMAs) within 300 m of the scheme. Whilst no monitoring of air quality levels has been undertaken as part of this assessment, at the time of writing, automatic monitoring stations within the wider area record bandings in the 'green zone' (Low Index 1 - 3), and it is considered that these readings are representative of air quality within the scheme extents¹¹. Readings in the 'green zone' suggest that National Air Quality Strategy (NAQS) objectives are likely to be met and that air quality in the area

⁶ The National Cycle Network (NCN) is a network of cycle routes comprising minor routes, disused railways, pedestrian routes, canal towpaths and traffic calmed routes, created by the charity Sustrans. Given the mixed nature of routes that make up the NCN, sections of the network are also designated as Core Paths or Public Rights of Way.

⁷ Core Paths can include; Public Right of Ways, footpaths, cycle tracks, paths covered by path agreements / orders, waterways, or crossing land to facilitate, promote and manage the exercise of access rights under the Land Reform (Scotland) Act 2003 (Sections 20 and 21), and are identified as such in Local Authority Core Paths plans.

⁸ Local paths hold no statutory designation and can be pavements adjacent to roads or off-road paths.

⁹ The National Catalogue of Rights of Way is maintained by ScotWays in partnership with NatureScot and local authorities (who can also retain their own records). Access along Public Rights of Ways are protected by the Countryside (Scotland) Act 1967, Section 46.

¹⁰ Under section 83(1) of the Environment Act 1995, Local Authorities have a duty to designate any relevant areas where air quality objectives are not (or are unlikely to be) being met as Air Quality Management Areas.

¹¹ <http://www.scottishairquality.scot/latest/> (Air Quality in Scotland) [accessed 16/12/20]

is relatively good. The European PRTR¹² online mapping tool does not identify any industrial or waste management sources within 1 km of the scheme extents.

3.0 Cultural heritage assessment

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS), Ordnance Survey (OS), Google Maps and Google Street View.

The FRB, including approach ramps and piers, is a Category A listed structure (ID: LB47778 Edinburgh and LB49165 Fife)¹³. A review of RCAHMS also identifies that one Category B listed building and one Category C listed building, North Queensferry Conservation Area¹⁴, five Canmore National Records (CNRs) and ten Canmore Maritime Records (CMRs) also lie within 300 m of the north and south pier defences. There are no World Heritage Sites¹⁵, Inventory Battlefields¹⁶, Scheduled Monuments, Garden and Designed Landscapes¹⁷, or any other historically designated sites within 300 m of the north and south pier defences.

4.0 Biodiversity

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Google Maps and Google Street View, Spatial Hub, Ordnance Survey, NatureScot and Scotland's Environment (SE).

All environmental features have been assessed with reference to prior knowledge and experience of trunk road bridge refurbishment project construction methods, and the potential environmental impacts associated with these types of works in order to provide a robust impact assessment decision-making process. The assessment therefore aims to characterise environmental impacts rather than placing a reliance only on magnitude. The character of an impact is used to inform the determination of whether or not the impact on the feature in question is a significant one.

Invasive non-native flowering plant species (INNS) have been scoped out from ecological evaluation due to their lack of conservation status and so are not discussed further in that context. INNS are however discussed in the context of their potential as a risk to biodiversity and, under the Wildlife and Countryside Act 1981 (as amended) (WCA), regarding legal responsibilities to prevent their transfer.

¹² A pollutant release and transfer register (PRTR) is an inventory of pollution from industrial sites and other sources. A PRTR is a national or regional environmental database or inventory of potentially hazardous chemical substances and/or pollutants released to air, water and soil and transferred off-site for treatment or disposal. The industrial or business facility quantify and report the amounts of substances released to each environmental medium (air, water, soil) or transferred off-site for waste management or wastewater treatment. <https://prtr.eea.europa.eu/#/home> [Accessed 16/12/20]

¹³ <https://hesportal.maps.arcgis.com/apps/Viewer/index.html?appid=18d2608ac1284066ba3927312710d16d> (Historic Environment Scotland) [accessed 16/12/20]

¹⁴ Conservation areas "are areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance" (S.61 Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997).

¹⁵ World Heritage Sites are cultural and/or natural sites considered to be of 'Outstanding Universal Value', which are important across countries and generations and have been inscribed on the World Heritage List by the World Heritage Committee.

¹⁶ Scotland's Inventory of Historic Battlefields is a list of Scotland's most important historic battlefields. Battlefields are landscapes over which a battle was fought. When a battlefield is included on the inventory it becomes a material consideration in the planning process. This means that it has to be taken into account when deciding planning applications.

¹⁷ Records of historic gardens and designed landscapes in Scotland are compiled and maintained by both Historic Scotland and Scottish Natural Heritage.

The study area for Natura 2000 (and other sensitive sites) was defined as an area extending to 2 km in all directions from the FRB north and south pier defences.

The FRB north and south pier defences lie within the Firth of Forth, which is a complex estuarine site stretching for over 100 km from the River Forth at Stirling eastwards past Edinburgh and along the coasts of Fife and East Lothian to a wide estuary mouth. A wide range of coastal and intertidal habitats is found within the site, including saltmarshes, dune systems, maritime grasslands, heath and fen, cliff slopes, shingle and brackish lagoons. Extensive mudflats occur particularly in the Inner Firth, notably at Kinneil Kerse and Skinflats on the south shore and Torry Bay on the north shore. Typically, the flats support a rich invertebrate fauna, with eelgrass (*Zostera spp.*) growing on the main mudflats. In the Outer Firth, the shoreline diversifies, with sandy shores, some rocky outcrops, mussel beds and some artificial seawalls. The North Berwick coast includes cliffs and dune grassland, with extensive dune systems at Aberlady. Several large urban areas, including Edinburgh, lie adjacent to the Firth of Forth and these include several areas of heavy industry. The Forth is also one of the most important shipping areas in Scotland. The Firth of Forth is important for a large number of wintering waders and wildfowl, many in nationally and internationally important numbers (NatureScot 2020¹⁸).

A number of designated sites were identified on NatureScot Sitelink¹⁹ that are located within 2 km of the FRB north and south pier defences. Long Craig Island for example, which forms part of the Forth Islands Special Protection Area (SPA) (EU Site Code UK9004171), lies 110 m north of the North Pier. Long Craig Island is also noted as a Site of Special Scientific Interest (SSSI) (EU Site Code 169962). The Firth of Forth SPA (EU Site Code UK9004411), Firth of Forth RAMSAR²⁰ (EU Site Code UK13017) and Firth of Forth SSSI (EU Site Code 169840) also lie within 300 m of the FRB North and South Piers. Two SSSI also lie within 1.2 km of the North Pier. Carlingnose SSSI (EU Site Code 135279) lies 0.98 km northeast of the North Pier and St Margaret's Marsh SSSI (EU Site Code 170133) lies 1.17 km northwest of the North Pier.

The Forth Islands SPA consists of seven islands, together with outlying rocky islets, in the Firth of Forth. The SPA conservation objectives are to avoid deterioration of the habitats of the qualifying species²¹ (Table 4.1) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained. The objective is also to ensure for the qualifying species that the following are maintained in the long-term: (i) population of the species as a viable component of the site, (ii) distribution of the species within site, (iii) distribution and extent of habitats supporting the species, (iv) structure, function and supporting processes of habitats supporting the species, and (v) no significant disturbance of the species²².

¹⁸ <https://rsis.ramsar.org/RISapp/files/RISrep/GB1111RIS.pdf?language=en>

¹⁹ <https://sitelink.nature.scot/map> (NatureScot) [Accessed 15/12/2020]

²⁰ Wetland of International Importance.

²¹ Forth Islands SPA Conservation Objectives. <https://apps.snh.gov.uk/sitelink-api/v1/sites/8500/documents/29> (NatureScot) [Accessed 15/12/2020]

²² Forth Islands SPA Conservation Objectives. <https://apps.snh.gov.uk/sitelink-api/v1/sites/8500/documents/29> (NatureScot) [Accessed 15/12/2020]

The Firth of Forth SPA is designated for five Annex I species (qualifying under Article 4.1 of the EU Birds Directive), five migratory bird species (qualifying under Article 4.2 of the EU Birds Directive), and its large overwintering waterfowl assemblage (ten individually cited species plus an additional sixteen wildfowl and Sandwich terns) (Table 4.2). The SPA conservation objectives are to avoid deterioration of the habitats of the qualifying species²³ or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained. The objective is also to ensure for the qualifying species that the following are maintained in the long-term: (i) population of the species as a viable component of the site, (ii) distribution of the species within site, (iii) distribution and extent of habitats supporting the species, (iv) structure, function and supporting processes of habitats supporting the species, and (v) no significant disturbance of species²⁴.

The Firth of Forth RAMSAR has been designated for its internationally important waterfowl assemblage (greater than 20,000 birds). The RAMSAR is a large coastal area comprising a complex of estuaries, mudflats, rocky shorelines, beaches and saltmarshes, including many fragmentary bits of shoreline considered to act as a single ecological unit. Several large urban areas, including Edinburgh, lie in proximity to the site and include areas of heavy industry and well-used maritime shipping lanes. The site provides habitat for large numbers of wintering waders and wildfowl, many in nationally and internationally important numbers. Over winter the site regularly supports internationally important populations of waterfowl assemblage²⁵.

The Firth of Forth SSSI stretches from Alloa to Crail on the north shore and to Dunbar on the south shore. It includes the estuary upriver from the Forth bridges and the firth east of the bridges.

St Margaret's Marsh SSSI lies on the northern shore of the Firth of Forth at Rosyth. The SSSI is noted for its coastal reedbed and saltmarsh, which supports locally important breeding bird communities. The SSSI represents 3% of Scotland's coastal reedbeds and the saltmarsh is the largest remaining saltmarsh in Central and West Fife²⁶.

Carlingnose SSSI is a small coastal site on the Firth of Forth and is cited for herb-rich calcareous grassland found on a hill-top plateau, which is becoming increasingly scarce in the Fife region. The site also supports an exceptionally high number of vascular plant species, several of which are considered rare at the local and national level²⁷.

The NBN online mapping tool records no mammal species of conservation significance within 300 m of the scheme (in the last 10 years) within 10 km grid squares NT17 and NT18. Fifty-nine bird species, including migratory overwintering waterfowl, wintering waders and wildfowl are recorded²⁸.

²³ Firth of Forth SPA Conservation Objectives. <https://sitelink.nature.scot/site/8499> (NatureScot) [Accessed 15/12/2020]

²⁴ Firth of Forth SPA Conservation Objectives. <https://sitelink.nature.scot/site/8499> (NatureScot) [Accessed 15/12/2020]

²⁵ https://rsis.ramsar.org/RISapp/files/RISrep/GB1111RISformer2001_EN.pdf?language=en

²⁶ St Margaret's Marsh SSSI. SSSI Citation. <https://apps.snh.gov.uk/sitelink-api/v1/sites/1659/documents/1> (NatureScot) [Accessed: 10/12/2020]

²⁷ Carlingnose SSSI. SSSI Citation. <https://apps.snh.gov.uk/sitelink-api/v1/sites/317/documents/1> (NatureScot) [Accessed: 10/12/2020]

²⁸ <https://scotland.nbnatlas.org/> (NBN Atlas) [Accessed 16/12/2020]

The Cathodic Protection works will occur on the FRB north and south pier defences therefore it is not expected that any INNS, as listed on Schedule 9 of the WCA 1981, will be encountered.

5.0 Landscape & visual effects

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Google Maps and Google Street View, Inventory of Gardens and Designed Landscapes, Ordnance Survey (OS), NatureScot and Scotland's Environment (SE).

The FRB passes over the lower Forth estuary, which is an active waterway, and views from the bridge are of large-scale exposed coastlines with harbours containing moored shipping vessels. Inland of the coastline, an array of urban and industrial zones are a feature of the landscape.

Excluding the FRB, the dominant structures in the landscape are the Queensferry Crossing and Forth Rail Bridge. Large shipping vessels sailing up the Forth estuary are also distinct features. North and south of the FRB, the A90 and A9000 spurs form large linear elements in the landscape that are distinct from surrounding landscape features. The spurs are characterised by cuttings through hills and large embankments with scrub woodland planting in places.

There are no areas of ancient woodland²⁹, native woodland, or any trees covered by a Tree Preservation Order within 300 m of the FRB north and south pier defences. There are no National Scenic Areas within 300 m of the FRB north and south pier defences.

6.0 Noise & vibration

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Scotland's Noise, Ordnance Survey (OS), Google Maps and Google Street View.

The FRB does not fall within a Candidate Noise Management Area (CNMA), as defined by the Transportation Noise Action Plan Road Maps³⁰. The day and night modelled noise level (Lden) for the carriageway along the FRB ranges from 75dB up to 80dB, whereas the night only modelled noise level (Lnight) ranges between 60dB and 70dB. The 'barrier' effect of the bridge deck ensures that traffic noise experienced by receptors directly below the FRB will experience levels lower than receptors slightly further away. That said, areas beneath and directly adjacent to the bridge abutments are subject to rhythmic low frequency noise caused by vehicles passing over bridge expansion joints.

²⁹ There are two types of ancient woodland: ancient semi-natural woodland and ancient replanted woodland. Ancient semi-natural woodland are sites that have retained the native tree and shrub cover and have not been planted (although it may have been managed by coppicing or felling and allowed to regenerate naturally). Ancient replanted woodland are sites where the original native tree cover has been felled and replaced by planting, usually with conifers and usually this century.

³⁰ <https://noise.environment.gov.scot/action-planning-round-two.html> (Scotland's Environment Scotland's Noise) [Accessed 16/12/2020]

7.0 Road drainage & the water environment

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Drinking Water Quality Regulator for Scotland (DWQRS), Google Maps and Google Street View, Ordnance Survey (OS), SEPA Flood Maps, SEPA Water Environment Hub, UK Soil Observatory and Scotland's Environment (SE).

The catchments of the River Forth and Firth of Forth Estuary cover a total area greater than 3600 km². The area can be split into two distinct sections; the River Forth drainage basin and those catchments that drain into the southern side of the Forth estuary. The North and South Piers lie within the Firth of Forth at the location of the Lower Forth Estuary transitional waterbody. The 38.6 km² Lower Forth Estuary transitional waterbody is classified³¹ (ID: 200435) and lies in the Scotland river basin district. The transitional waterbody possesses an overall classification of 'Good' and possesses an ecological classification of 'Good'. The transitional waterbody has also been assigned a Water Framework Directive 2000/60/EC (WFD) classification of 'Good' for fish. As the scheme lies within a transitional waterbody, there is no groundwater data available. The area around the Firth of Forth is subject to varying levels of coastal flooding risks³². That said, the inland sheltered effect of the estuary ensures that the likely cause of any coastal flooding in the Forth estuary is from storm surges³³. There is no likelihood of flooding on the north and south pier defence pierheads due to their height above the estuary.

The FRB is not located within a Nitrate Vulnerable Zone³⁴, and as the scheme lies within a transitional waterbody, there is no groundwater data available.

8.0 Geology & soils

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Spatial Hub, British Geological Survey (BGS) Superficial and Bedrock Geological map viewer, BGS Geoviewer, BGS UK Hydrogeology viewer and UK Soil Observatory Soils map viewer.

In addition to its biological interest, the Firth of Forth SSSI is important for the wide range of geology that can be found, especially in the firth west of the three bridges where the coastline is rockier. The SSSI geological and geomorphological diversity includes an array of recorded fossil deposits, volcanic rocks, minerals, strata exposures and raised beaches (Table 8.1). Of the nine geological or geomorphological features, six are in

³¹ The Scottish Environment Protection Agency (SEPA) have developed a surface waterbody classification system in line with the requirements of the River Basin Management Plan in accordance with Annex V of the European Union Water Framework Directive 2000/60/EC (WFD), which is applied to all significant surface waterbodies in Scotland. This system is based on an assessment of key chemical and ecological indicators. The classification system categorizes waterbodies into the following bands; High, Good, Moderate, Poor, Bad.

³² <http://map.sepa.org.uk/floodmap/map.htm> (SEPA Flood Map) [Accessed 15/12/2020]

³³ https://www2.sepa.org.uk/frmstrategies/pdf/lpd/LPD_10_Sources.pdf#:~:text=In%20the%20Forth%20Estuary%20Local%20Plan%20District%2C%20river, flooding%20is%20outlined%20in%20Table%201.%20Total%20number (SEPA Flood Risk Management Strategy – Forth Estuary Local Plan District) [Accessed 16/12/2020]

³⁴ A Nitrate Vulnerable Zone defines areas designated under the EU Nitrates Directive that are at risk of pollution from nitrates used in agricultural practice.

favourable condition, with three being unfavourable. All three unfavourable features are obscured in some way, either by graffiti or dumped material³⁵.

Table 8.1. Firth of Forth SSSI Geological notified features

Stratigraphy:	Lower Carboniferous [Dinantian – Namurian (part)] Upper Carboniferous [Namurian (part) - Westphalian]
Igneous petrology:	Carboniferous – Permian Igneous
Mineralogy:	Mineralogy of Scotland
Palaeontology:	Arthropoda (excluding insects & trilobites) Palaeozoic Palaeobotany Permian - Carboniferous Fish/Amphibia
Quaternary geology and geomorphology:	Quaternary of Scotland
Geomorphology:	Coastal Geomorphology of Scotland

The bedrock geology under the North Pier consists of Calders Member (sedimentary rock cycles, Strathclyde group type) which has a lithological description of 'a succession of black to grey mudstones, grey siltstones and white, grey and pink sandstones with thin beds of grey argillaceous limestones and dolostone (cementstone), and algal-rich black to grey oil-shales with some lapilli-tuff beds'³⁶. The bedrock geology under the South Pier consists of Hopetoun Member (sedimentary rock cycles, Strathclyde group type) which has a lithological description of 'a sequence of black to grey mudstones, grey siltstones, white, grey and pink sandstones and white to pale-greenish grey calcareous mudstones ('marl') with thin beds of black to grey oil-shales, coals (Hurler, Two Foot and Houston seams), grey to white, pure to argillaceous limestones and dolostones that comprise the upper part of the West Lothian Oil-Shale Formation³⁷. There is no superficial geology recorded under the North and South Piers³⁸.

9.0 Material assets & waste

Baseline data has been obtained from the Design Engineer.

The scheme is executed by the operating company as site operations – 'As of Right' scheme therefore a Site Waste Management Plan (SWMP) is not required.

The materials required for the project include:

- 690 mm x 545 mm x 6 mm chequered plate cover
- 350 mm chequered thick plate cover with 20 mm insert
- Angle iron frame
- BZP self-tapping fixings
- 175 mm x 6 mm thick chequered plate cover with fixing holes
- 50 mm² and 95 mm² Single Core XLPE/PVC Black Cable (two drums)
- Ag/AgCl 0.5 M KCL electrode c/w 20M of 1 x 10 mm² XLPE/PVC Red Cable

The equipment required for the project include:

- Teleboom crane mounted vessel and workboat
- 110VAC generator, 110VAC lights and 110VAC extension leads

³⁵ Firth of Forth SSSI. Site Management Statement. <https://apps.snh.gov.uk/sitelink-api/v1/sites/8163/documents/3> (NatureScot) [Accessed 15/12/2020]

³⁶ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=CDE> (British Geological Survey) [Accessed 15/12/2020].

³⁷ <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=HON> (British Geological Survey) [Accessed 15/12/2020].

³⁸ <http://mapapps.bgs.ac.uk/geologyofbritain3d/> (British Geological Survey) [Accessed 15/12/2020].

- Hand tools including, drills, saws, wire cutters, spanners and cable crimpers
- Angle grinder and associated equipment (If required)
- 36/42VDC or 110VAC percussion drill equipment
- Cabling management equipment including cable drum stands, spindle, duct guides, rollers and pulling rod
- Propane/butane torch

The following fuel and/or chemicals will be stored on the bridge-deck (in the site compound) for the duration of the scheme:

- Diesel
- Petrol
- Gas
- Oil

The main waste produced during the construction phase will be concrete and plastic from the existing manhole covers, and copper from electrical cabling.

10.0 Climate

Fuel will be required for transportation to and from the scheme which will lead to greenhouse gas emissions. Any release of greenhouse gas emissions can contribute to climate change. The project is unlikely to be affected by the impacts of climate change, other than increasing likelihood of extreme weather events leading to issues with work taking place on site.

DESCRIPTION OF THE MAIN ENVIRONMENTAL IMPACTS OF THE PROJECT AND PROPOSED MITIGATION

As a result of a desktop study and site visit, issues requiring consideration have been identified and potential effects, their magnitude and overall significance (based on the sensitivity of receptor) have been considered in terms of both construction and operational effects. Residual effects are based on consideration of potential impacts (i.e. impacts in the absence of mitigation, and with mitigation implemented). Compliance with environmental mitigation measures detailed in Marine Licence³⁹ (MS-00008903), which is a recent extension to a five-year Marine Licence secured in October 2015 (05568/15/0), will form part of the mitigation measures in place to minimise environmental impacts. Compliance measures also include adherence to the Construction Noise Management Plan (CNMP), which formed part of the original five-year Marine Licence (05568/15/0).

Headings have been set out to follow the recently updated DMRB chapters for environmental assessment and do not reflect a ranking of impact severity. Based on the nature of the works, unless otherwise stated, the demarcation of the study area for the assessment of potential impacts is limited to all land within 300 m of the North and South Piers.

11.0 Population and human health (properties, land use, vehicle travellers, NMU & community facilities)

There are no properties within 300 m of the scheme extents, no access will be restricted to properties during the works and there will be no loss of land or change in land use as a result of the works.

The FRB is currently closed to southbound traffic⁴⁰, with all traffic utilising a contraflow on the northbound lanes. However, AADT flow is low and no traffic management has been arranged for the FRB north and south pier defence works. As such, no temporary effects on traffic movement is predicted from the works.

Site access for equipment and materials that can be hand-carried to the south pier will be via the lift in the southeast main tower. Access to the north pier will be via the footpath/cycleway and the underdeck access to the lift in the northeast main tower. Heavier equipment and materials will be taken to the pierheads via a workboat or crane mounted boat. Welfare facilities and a lay-down area for hand-carried materials will be accommodated within the footpath/cycleway, thus ensuring safety of the workforce.

The following mitigation measures will reduce impacts of works on vehicle travellers and non-motorised users⁴¹ (NMUs) using the FRB during the construction phase:

- Appropriate measures will be implemented to permit the safe passage of pedestrians and cyclists of all abilities utilising the footpath/cycleway, which also accommodates NCNR1 and a Core Path.

³⁹ As FRB Cyclic, Routine and Planned Maintenance works are undertaken over the Lower Forth Estuary, within the Mean High Water Springs (MHWS), a Marine Licence is required under Part 4 of the Marine (Scotland) Act 2010 and Part 4 of the Marine and Coastal Access Act 2009. A five-year Marine Licence application was therefore secured on October 25th, 2015 by the previous Operating Company (Amey). The current licence expired on 25th October 2020, therefore a licence extension (until 31st March 2021) has been secured (MS-00008903) to permit a new five-year Marine Licence application to be submitted. Extensive consultation with a range of stakeholders is currently being undertaken to support the application for the new five-year Marine Licence.

⁴⁰ A Works Contract is currently underway to replace the FRB expansion joints.

⁴¹ For the purposes of this report, NMUs are considered to be all non-motorised traffic, including pedestrians, cyclists and equestrians (with particular consideration of the needs of those with disabilities).

- Journey planning information will be made available for drivers online at the trafficscotland.org website. Journey planning information will also be available for drivers online through BEARs social media platforms.

12.0 Air quality

During the construction phase, activities undertaken on site could potentially have some localised and short-term air quality impacts in proximity to the works. The construction phase will, for example, require a range of equipment, vehicles (including river transportation), and non-road mobile machinery⁴² (NRMM) which will contribute to local dust and air pollutants.

However given the duration, size and scale of the works, and the low-risk nature of the construction activity, and the effectiveness of mitigation in place following 'Best Practicable Means' and 'Best Practice Guidelines'⁴³, effects on air quality during construction are not anticipated to be significant. Moreover, any minor impacts will be intermittent, temporary, and short-lived and only last for 15 days (with possible 5 days contingency). The following mitigation measures will also be implemented to ensure potential impacts are not significant:

- Good housekeeping will be employed throughout the works. The pier defence pierheads, for example, will be cleared of all waste materials at the end of each working day.
- All construction vehicles will comply with relevant EU standards e.g. (i) vehicles will be maintained, ensuring engines and catalysts work efficiently, and (ii) all vehicles will comply with MOT emission standards.
- Vehicle equipment and NRMM will be switched off when stationary to prevent exhaust emissions. If any emissions of dark smoke should occur (except at start up), the vehicle equipment or NRMM involved will be taken out of service immediately and any defect rectified before use. All equipment and NRMM will also have been regularly maintained, paying attention to the integrity of exhaust systems.
- Cutting, grinding and sawing equipment will be fitted or used in conjunction with suitable dust suppression techniques e.g. water spray or local exhaust ventilation system that fits directly onto tools.
- Regular monitoring (e.g. by engineer or Clerk of Works) will take place when dust, particulate matter and exhaust emissions (DPMEE) generating activities are occurring. In the unlikely event that unacceptable DPMEE are emanating from the site, the operation will, where practicable, be modified and re-checked to verify that the corrective action has been effective. Actions to be considered include: (a) minimizing cutting and grinding on-site, (b) reducing the operating hours, (c) changing the method of working, etc.
- Upon completion of the works, the working area will be cleaned.

The works will not result in any significant impacts on air quality during the operational phase.

13.0 Cultural heritage assessment

Consultation was undertaken with the City of Edinburgh Council by the previous Operating Company (Amey) regarding consent requirements for maintenance works on the Category A listed structure. The consultation

⁴² Non-Road Mobile Machinery is a broad category which includes mobile machines, and transportable industrial equipment or vehicles which are fitted with either an internal spark ignition petrol engine, or a compression ignition diesel engine and not intended for transporting goods or passengers on roads. Examples of non-road mobile machinery include, but are not limited to: (i) generators, (ii) bulldozers, (iii) pumps, (iv) construction machinery, (v) mobile cranes, etc.

⁴³ Institute of Air Quality Management. (2014). Guidance on the assessment of dust from demolition and construction (version 1.1).

process concluded that all maintenance work concerned with the FRB, that is undertaken on a like-for-like basis, does not require Listed Building Consent. No significant adverse impacts on the cultural heritage or material assets of the FRB are therefore predicted as the works are purely maintenance and restricted to upgrading, on a like-for-like basis, the Cathodic Protection system. However, if during the works it is assessed that 'new' engineering works are deemed necessary to complete the scheme, consultation will take place with the City of Edinburgh Council to discuss requirements for Listed Building Consent.

There is no connectivity between the scheme and the North Queensferry Conservation Area or listed buildings located north and south of the FRB. Moreover, the works do not include any alterations that would affect the historic and architectural character of these features.

14.0 Biodiversity

All works are contained to the FRB north and south pier defence pierheads therefore no direct land take or clearance within the designated sites is required, and the works will therefore not result in loss or function (e.g. habitat loss or species fragmentation) of the designated sites. There is also no requirement for resources from the designated sites. Moreover, it is not anticipated that the works will result in changes to water quality provided pollution control measures outlined in Section 17.0 'Road drainage and the water environment' are followed. Pierhead perimeter guardrail also reduces the risk of material and waste being accidentally discarded into the Firth of Forth.

When granting Marine Licence (05568/15/0), Marine Scotland, at the request of NatureScot, stipulated that a baseline noise survey should be carried out and a Construction Noise Management Plan (CNMP) established (for the five-year Marine Licence) which would be mandatory for any works undertaken within 400 m of Long Craig Island SSSI between 1st May and 15th August. The requirements for noise monitoring and management was to ensure that potential noise effects from maintenance activities did not affect the population of breeding Roseate tern on Long Craig Island. The measures detailed within the CNMP are currently being evaluated with relevant stakeholders to support the new five-year Marine Licence application. Feedback will be reviewed and the CNMP will be updated where necessary. The programme of works runs from March 2021 (date TBC) and lasts for 15 days (with 5 days contingency). The works are therefore outwith the CNMP stipulated timeframe for noise monitoring and management. However, it is likely that NRMM will lead to a slight increase in noise in the area surrounding the works. This could potentially disturb local wildlife.

The following 'Best Practicable Means' and 'Best Practice Guidelines' mitigation measures will be implemented to ensure potential impacts on wildlife and designated sites are not significant.

- All mitigation measures detailed within Section 12.0 'Air quality', Section 16.0 'Noise and vibration' and Section 17.0 'Road drainage and the water environment' will be followed to protect wildlife and designated sites.
- BEAR Scotland will appoint an Environmental Clerk of Works (EnvCoW) to visit the site periodically to supervise operations onsite to ensure appropriate environmental safeguards are being adhered to. The EnvCoW will undertake an initial day-one site visit to review site

management practices, provide toolbox talks and highlight the requirements of the Marine Licence. Following this, site visits are anticipated to be arranged weekly.

- Material, plant, equipment, NRMM and personnel will be constrained to the north and south pier defence pierheads, thereby eliminating damage to designated sites and potential direct mortality and disturbance to species. The pier defence pierheads will also be cleared of all waste materials at the end of each working day.
- If during works unforeseen disturbance of protected species becomes evident, works will cease, and appropriate mitigation measures will be discussed, agreed and implemented with stakeholders e.g. NatureScot, SEPA, Marine Scotland, etc.
- BEAR Scotland's Environmental Team will be contacted to allow consideration of potential environmental effects if unplanned works will be undertaken outwith the agreed working areas, or there is any deviation from the agreed programme and/or method of working.

Based on the like-for-like maintenance nature of the works, there will be no operational impacts to the FRB upon completion of the works. As such, it is not anticipated that there will be any impacts on designated sites or their qualifying features during the operational phase.

15.0 Landscape & visual effects

During the 15-day construction period, there will be intermittent short-term impacts on the visual amenity of the area due to the presence of equipment, materials and NRMM.

The following mitigation measures will reduce the visual impacts of the works:

- Good housekeeping will be employed throughout the works. Waste, for example, will be removed from the works site at the end of each working day.

Based on the like-for-like maintenance nature of the works, there will be no operational impacts to the FRB upon completion of the works.

16.0 Noise & vibration

During the construction phase, activities undertaken on site could potentially have some localised and short-term noise impacts in proximity to the works. The works will, for example, require a range of equipment, vehicles (including river transportation), and NRMM. Any temporary short-term increase in noise levels may cause disturbance to local wildlife. However, any increases will be intermittent and will only last for the duration of the works. The works are also taking place outwith the breeding season of the Roseate Tern on Long Craig Island (1st May to 15th August). The works are therefore outwith the requirements for noise monitoring and management, as stipulated in the CNMP (refer to Section 14.0).

With mitigation in place following 'Best Practicable Means' and 'Best Practice Guidelines', as described within BS 5228-1⁴⁴ and BS 5228-2⁴⁵, effects on noise during construction are not anticipated to be significant. Any minor impacts will also be intermittent, temporary and only last for 15 days (with possible 5 days contingency). Given the nature of the works, no ground-borne vibration impacts have been forecast.

⁴⁴ BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise.

⁴⁵ BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Vibration.

The following mitigation measures will also be implemented to ensure potential noise impacts are not significant:

- If unacceptable noise is emanating from the site the operation will, where possible, be modified and re-checked to verify that the corrective action has been effective. Actions to be considered include (a) minimizing cutting and grinding on-site, (b) reducing the operating hours, (c) repositioning equipment, (d) changing the method of working etc. Corrective actions will be actioned through the non-conformance reporting procedure, which ensures a root-cause analysis is carried out on each incident. The non-conformance procedure also ensures that appropriate corrective and preventative action measures are agreed and implemented in a timely fashion with all parties and are recorded, actioned through to closeout, and fully auditable and traceable.
- If equipment or NRMM not assessed by this RoD are required to complete the works, then an immediate review will take place between the Clerk of Works, Senior Engineer and BEARs Environmental Team, as appropriate.
- Equipment and NRMM with directional noise characteristic will (where practical) be shut down in intervening periods between site operations.
- Drop heights will be kept to a minimum to minimise noise when unloading.
- Equipment and NRMM will be started sequentially rather than all together.
- All equipment and NRMM used onsite will have been regularly maintained, paying attention to the integrity of silencers and acoustic enclosures.
- The use of grinders, impact wrench's, jackhammers, chipping hammers, etc. will be avoided (except where there is an overriding justification), and if used will be fitted with mufflers or silencers of the type recommended by the manufacturer.
- All compressors will be 'sound-reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed when in use.

The works will not result in any significant impacts on noise during the operational phase.

17.0 Road drainage & the water environment

Any construction work above a waterbody has inherent risk factors. Potential risks to the Lower Forth Estuary from the cathodic protection works include spills from equipment, NRMM and river transportation, and dirty water runoff from the designated laydown area. There is no requirements for in-water works.

Provided the following mitigation measures are adhered to during the works, potential risk factors are not anticipated to be significant:

- All mitigation measures detailed within Section 14.0 'Biodiversity' will be followed to protect the water environment.
- Consideration will be given to work patterns in relation to wet weather and strong winds. Periods of heavy rainfall and strong winds will be avoided and after heavy rainfall, inspection and maintenance of all controls will be undertaken.
- The abstraction or transfers of water, or the washing of tools in the Lower Forth Estuary is not permitted.
- No discharges into the Lower Forth Estuary will be permitted.
- The FRB footpath/cycleway, boat suppliers' yard/mooring marina and north and south pier defences will all be utilised as laydown areas. Refuelling, where possible, will take place in the FRB footpath/cycleway laydown area or at the boat suppliers' yard or mooring marina. Equipment, material, NRMM, etc. will also be bunded appropriately within the laydown areas in order to comply with SEPA Guidance for Pollution Prevention (GPP) 5 'works and maintenance in or near

water' and to minimise pollution risk. Generators, and other NRMM, where there is a risk of leakage of oil or fuel, will also have internal bunding OR will have a secondary containment system (e.g. drip trays, plant nappies, etc.) placed beneath them that meets 110% capacity requirements.

- All site personnel will be made aware of site spillage response procedures and in the event of a spill, all works associated with the spill will STOP, and the incident reported to the Clerk of Works. Small spills that did not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact would most likely not be required to be notified to SEPA, NatureScot, Marine Scotland or other stakeholders. However, all such incidents will be recorded and reported to BEAR Scotland's Environmental Team. In the event of a 'serious incident'⁴⁶, SEPA, NatureScot and Marine Scotland will be notified without delay. Such notification will include: (i) the time and duration of the incident, (ii) a description of the cause of the incident, (iii) any effect on the environment as a result of the incident, and (iv) any measures taken to minimise or mitigate the effect and prevent a recurrence.
- Spill kits will be available and replenished onsite when required.
- All NRMM used onsite will have been regularly maintained, paying attention to the integrity of oil tanks, coolant systems, gaskets etc. A checklist will be present to make sure that the checks have been carried out.
- Regular visual pollution inspections of the designated laydown areas and work site (particularly near pierhead perimeter) will be conducted (e.g. site walkover by engineer or Clerk of Works), especially after periods of heavy rain.

18.0 Geology & soils

As the works will take place entirely on the north and south pier defences of the FRB, there will be no impact on geology and soils.

19.0 Material assets & waste

There will be limited consumption of materials and natural resources or generation of waste associated with the works and none of the activities will require any resources from the Natura 2000 sites.

The scheme is executed by the operating company as site operations – 'As of Right' scheme therefore a SWMP is not required.

All wastes removed from site will be consigned, transported and disposed of in full accordance with all relevant UK legislation e.g. Duty of Care⁴⁷ requirements apply e.g. evidence of material transfer notes and/or waste exemption certificates will be supplied by a licenced waste carrier.

Provided the following mitigation measures are followed, environment impacts from the use of materials and natural resources and disposal of waste during the construction phase are not anticipated to be significant:

- If hazardous substances must be used on site, each substance will be required to undergo assessment under the Control of Substances Hazardous to Health (COSHH) Regulations 2002.

⁴⁶ 'serious incident' means: (i) any accident, spillages, or uncontrolled discharge which has had, or could have, an adverse impact on the water environment, or (ii) any malfunction, breakdown or failure of plant or techniques which has had an adverse impact on the water environment, or (iii) any event, such as force majeure or action taken to save human life or limb, which results, or is likely to result, in a breach of contract or any condition of a licence.

⁴⁷ The 'Duty of Care' requires that a waste holder (producer, carrier or disposer) takes all reasonable steps to ensure that waste is described in a way that permits its safe handling and management and that any transfer of waste is accompanied by a written description of the waste, including an EWC code.

Hazardous substances (if required) will also be clearly labelled and stored in line with COSHH safety data sheets within the designated laydown areas, at least 10 m from pierhead perimeter (where possible).

- COSHH waste will NOT be mixed with general waste and/or other recyclables.
- COSHH waste and/or special waste (if required) will be removed from site by a specialised waste carrier.
- If any substance used on site displays the 'Dangerous to the Environment' COSHH symbol, then the following controls will be implemented: (i) the substance will not be permitted to enter surface drains, (ii) any spillages will be contained using bunding and then absorbed with an absorbent material (e.g. dry sand or earth) and then collected and stored in a suitable container which is properly labelled and sealed securely in preparation for disposal, (iii) spillages or uncontrolled discharges will be immediately reported to SEPA.
- The site will be monitored regularly for signs of litter and other potential contaminants and litter will be removed before and after works take place. The site will also be left clean and tidy.
- Wastewater from welfare facilities (if required) will be subject to effluent treatment followed by tanker removal.

20.0 Climate

The Climate Change (Scotland) Act sets out the target and vision set by the Scottish Government for tackling and responding to climate change. The Act includes a net-zero target for greenhouse gas emissions before 2045 (from the baseline year 1990)⁴⁸. In response, BEAR Scotland, working on behalf of Transport Scotland, undertake carbon monitoring of our major projects and operational activities. Emissions from our activities are recorded using Transport Scotland's Carbon Management System. BEAR Scotland also undertakes resource efficiency activities to manage and reduce emissions contributing to climate change. Actions and considerations for the routine maintenance works are detailed in Section 19 'Material assets & waste'.

The works will be undertaken utilising a day-time work pattern (08:00 – 17:00) and there is no requirement for additional lighting. In addition, local contractors and suppliers will be used as far as practicable to reduce fuel use and greenhouse gas emitted as part of the works.

Works to refurbish the Impressed Current Cathodic Protection system will extend the maintenance intervals required for future works on the north and south pier defences. In doing so, the service life of the structure is also extended.

21.0 Risk of major accidents or disasters

The FRB is not located within a geographical region that is subject to natural disasters and the likelihood of any risks from flooding will be minimised by ensuring works do not take place in periods of wet weather or strong winds.

Works will be undertaken on the north and south pier defences, where risk of collision from vessels is possible. However, all works will be undertaken in accordance with conditions set out in the Marine Licence (MS-00008903), which ensures a Notice is issued to Mariners in advance of the start date and that the works are

⁴⁸ The Climate Change Act was amended in Scotland in 2019 from an 80% reduction by 2050, to a net-zero target by 2045.

marked as required by the North Lighthouse Board, therefore any risk of collision from vessels within the Lower Forth Estuary will be minimised.

Release of pollutants during works, or as a result of an accidental spillage, have the potential to affect all habitats and species present within the Lower Forth Estuary. The key issue with respect to pollution is the procedures put in place to minimise the risk of contaminants entering the Forth Estuary in sufficient concentrations to cause adverse effects on site integrity. A Site Environmental Management Plan (SEMP) will therefore be produced by BEAR Scotland which will set out a framework to reduce the risk of adverse impacts from construction activities on sensitive environmental receptors. The SEMP will set-out a process for recording environmental risks, commitments and constraints and will identify the procedures and measures that will be used to manage and control these aspects. In addition, the SEMP seeks to ensure compliance with environmental legislation, government policy, and scheme-specific environmental objectives. The SEMP will also formalise a mechanism for monitoring, reviewing and auditing environmental performance and compliance. As such, any sub-contractors will comply with all conditions of the SEMP during works and may be subject to audit throughout the contract.

A Designer's Risk Register will also be prepared by BEAR Scotland, which addresses potential environmental risks. Activity-specific RAMS will also be produced and will recognise and highlight environmental risks and detail how these will be addressed, as well as contingency plans to deal with environmental incidents. RAMS will be produced by sub-contractors and will also be approved by BEAR Scotland prior to works commencing.

Considering the above, it is judged that the residual effects of the scheme to risks from major accidents or disasters is low.

22.0 Cumulative effects

Due to the nature of the proposed planning application (Section 1.2 – Land Use), no significant effects are likely that may result in 'in-combination' or 'cumulative effects'.

FRB maintenance works are delivered through annual Cyclic, Routine and Planned Maintenance programmes. Separate 'Works Contracts' are also undertaken on a needs basis e.g. expansion joint replacement. However, there are no major projects currently at the planning stage that will be carried out by BEAR Scotland or sub-contractors on the FRB, or in the immediate vicinity of the bridge/piers during 2020/2021, that could result in 'in-combination' or 'cumulative effects'.

The cathodic protection works also protect against future deterioration of the structure. Consequently, carrying out these works now will reduce the need for major works at a future date. This in turn will minimize the extent of work required on the FRB. Therefore, it is not expected that the works will contribute to long-term significant cumulative effects on the environment in vicinity of the FRB.

EXTENT OF EIA WORK UNDERTAKEN AND DETAILS OF CONSULTATION

The following environmental parameters have been considered within this RoD:

- Population and human health (properties, land use, NMU & community facilities)
- Air quality
- Cultural heritage assessment
- Biodiversity
- Landscape & visual effects
- Noise & vibration
- Road drainage & the water environment
- Geology & soils
- Material assets & waste
- Climate
- Risk of major accidents or disasters
- Cumulative effects:

As FRB Pier Cathodic Protection works are undertaken over the Lower Forth Estuary, within the Mean High Water Springs (MHWS), a Marine Licence is required under Part 4 of the Marine (Scotland) Act 2010 and Part 4 of the Marine and Coastal Access Act 2009. A five-year Marine Licence application was therefore prepared in March 2015 by the previous Operating Company (Amey). The application, as submitted, included an HRA and environmental risk assessment of all FRB Cyclic, Routine and Planned Maintenance activities on the FRB as part of the 4th Generation Term Contract for Management and Maintenance of the Scottish Trunk Road Network. As the impacts of FRB Cyclic, Routine and Planned Maintenance works have been covered by the HRA, an Appropriate Assessment is not required for this RoD.

The previous five-year Marine Licence (05568/15/0) expired on 25th October 2020, therefore an extension of the licence until 31st March 2021 has been secured (MS-00008903) to permit a new five-year Marine Licence application to be submitted. Extensive consultation with a range of stakeholders is currently being undertaken to support the application for the new five-year Marine Licence.

STATEMENT OF CASE IN SUPPORT OF A DETERMINATION THAT A FORMAL EIA AND EIAR IS NOT REQUIRED

The works are considered to constitute a relevant project falling within Annex II of the Environmental Impact Assessment Directive 2014/52/EU because the north and south pier defences are located within the Lower Forth Estuary, and therefore has connectivity to, several 'sensitive areas'.

The scheme has been subject to screening using the Annex III criteria to determine if a formal Environmental Impact Assessment (EIA) is required under the Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017. Screening using Annex III criteria, reference to the current five-year Marine Licence (MS-00008903) and review of available information has not identified the need for an EIA.

The project will not have significant effects on the environment by virtue of factors such as:

- **Characteristics of the scheme**
 - The total working area is less than 1ha.

- The works are temporary and short-term (15 days, with 5 days contingency).
 - Works are limited to replacement of the cathodic protection system and will be delivered on a 'like-for-like' basis and will therefore not damage, modify, or alter the character or footprint of the Category A listed FRB.
 - No nationally or internationally designated nature conservation sites will be significantly affected by the proposed works.
 - Land use will not change as a result of the works.
 - The scheme is not located within any areas designated for landscape interests.
 - There are no requirements for in-water works.
 - There is no likelihood of flooding on the north and south pier defence pierheads due to their height above the estuary.
 - A Marine Licence has been obtained for all maintenance works on the FRB. Marine Scotland undertook consultation with NatureScot who considered no significant impacts with mitigation implemented. The application, as submitted, included an HRA and environmental risk assessment of all FRB Cyclic, Routine and Planned Maintenance activities on the FRB as part of the 4th Generation Term Contract for Management and Maintenance of the Scottish Trunk Road Network. As the impacts of FRB Planned Maintenance works have been covered by the HRA, an Appropriate Assessment is not required for this RoD.
 - There will be limited consumption of materials and natural resources, and limited waste or generation associated with the works.
 - Cathodic protection works will protect against future deterioration of the structure, thus minimising the extent of future works required on the FRB.
- **Location of the scheme**
- All works are confined to the FRB north and south pier defences, which lie within 300 m of the Firth of Forth SPA, RAMSAR and SSSI, and the Forth Islands SPA and Long Craig Island SSSI.
- **Characteristics of potential impacts of the scheme**
- There will be no short-term or long-term NMU impacts.
 - No change is predicted in respect to the vulnerability of the FRB to the risk (or severity) of major accidents or disasters.
 - With good practice pollution prevention measures implemented onsite, there is a negligible risk of a pollution event, and any potential impacts of the works are expected to be temporary, short-term, and limited to the construction phase.
 - The SEMP, Designer's Risk Register, and activity-specific method statements include plans to address environmental incidents.
 - Measures will be in place to ensure appropriate removal and disposal of waste.
 - No impacts on the environment are expected during the operational phase.

Mitigation measures detailed above and compliance with mitigation stipulated in requirements of Marine Licence MS-00008903 will ensure no significant negative impacts on sensitive receptors.

Appendix A: Scheme location and site photographs

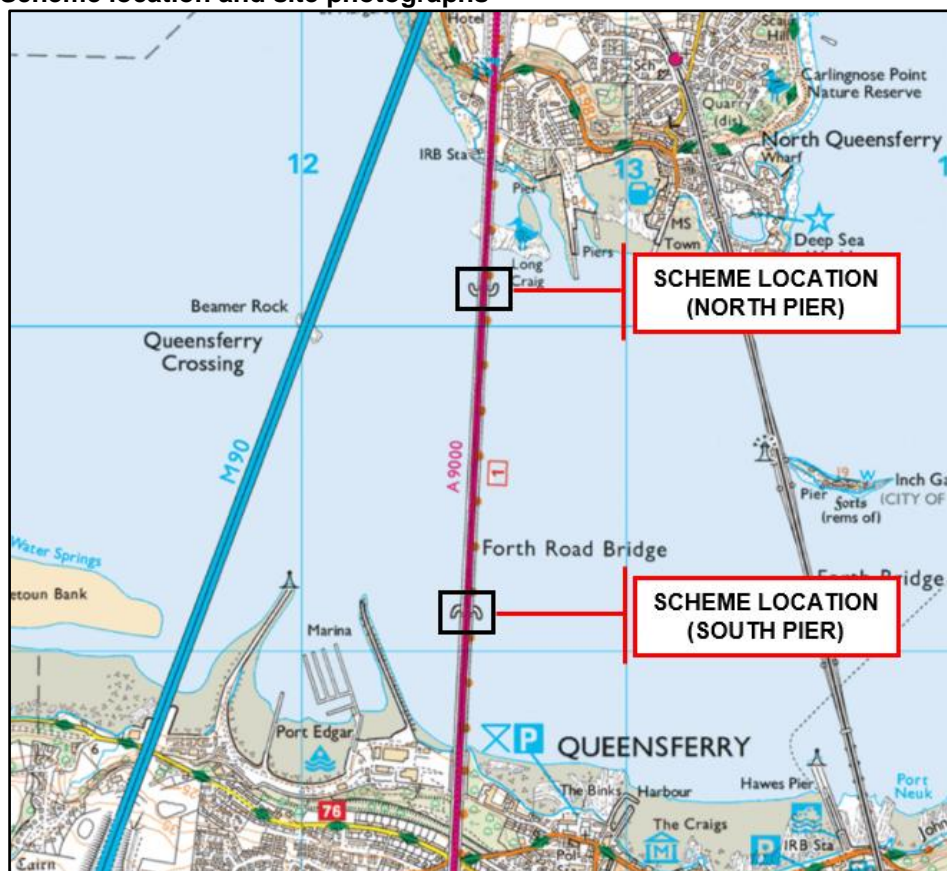


Figure 1. A90 Forth Road Bridge (highlighting scheme extents). Source: Grid Reference Finder. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2020.

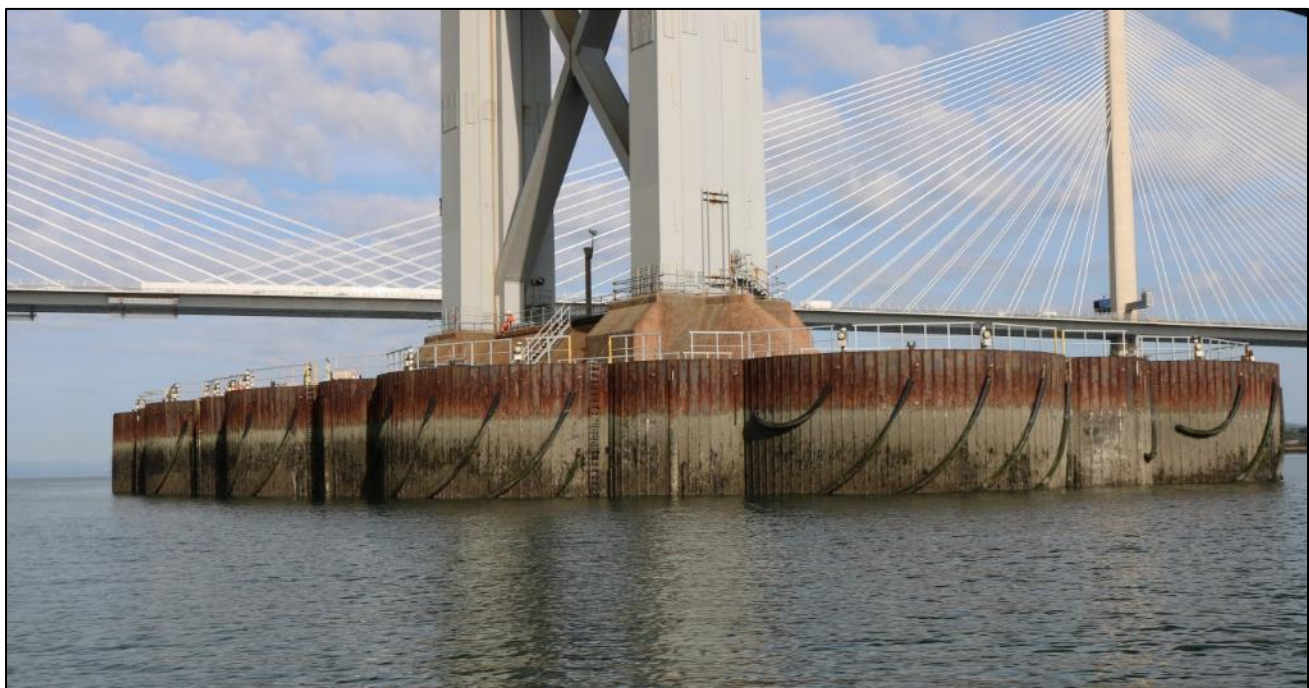


Figure 2. The Forth Road Bridge (North Pier). Source: BEAR Scotland.



Figure 3. The Forth Road Bridge (North Pier pierhead). Source: BEAR Scotland.



Figure 4. The Forth Road Bridge (South Pier pierhead). Source: BEAR Scotland.