Net Zero Teesside

Preliminary Environmental Information Report

Volume III - Appendices

Appendix 13C: Aquatic Desk Based Assessment

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

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13.C Aquatic Ecology Desk Based Assessment

13.1 Introduction

13.1.1 To assess the potential impact from the Proposed Development to the aquatic environment, this Aquatic Ecology Assessment report presents the baseline desk study data and includes the flowing information:

- Legislation and policy relevant to the aquatic environment (see Appendix 13A: Aquatic Ecology Legislation and Planning Policy in Preliminary Environmental Information (PEI) Report, Volume III for more detail);
- Methodologies for aquatic desk and field-based assessments;
- Technical competencies of ecologists undertaking the surveys;
- Limitations to the surveys undertaken and any assumptions made;
- Survey results; and
- The approach for determining the nature conservation importance of macrophytes, aquatic invertebrates and fish species recorded.

13.2 Legislation and Planning Policy Context

Legislation

13.2.1 The following legislation is considered relevant to the Proposed Development in relation to aquatic ecology interest features:

- The Water Framework Directive (WFD; EC Directive 2000/60/EC);
- The Wildlife and Countryside Act (WCA) 1981 (as amended);
- Ramsar The Convention on Wetlands;
- The Conservation of Habitat and Species Regulations 2017 (the Habitats Regulation);
- Natural Environment and Rural Communities (NERC) Act 2006 (as amended);
- The Bern Convention (1979);
- The Salmon and Freshwater Fisheries Act (1975); and
- The Eels (England and Wales) Regulations 2009.

Planning Policy

13.2.2 A summary of local planning policy relevant to nature conservation are detailed in the following documents (see Appendix 13A: Aquatic Ecology Legislation and Planning Policy in PEI Report, Volume III for more detail):

- Redcar Publication Local Plan (November 2016);
- Redcar and Cleveland Borough Council Local Validation Checklist (2015);
- Stockton-on-Tees Local Plan (1997, Retained Polices);
- Stockton-on-Tees Core Strategy Development Plan (2010);
- Tees Valley Green Infrastructure Strategy (2008);
- Tees Valley Priority Species and Habitats (2012); and
- Redcar and Cleveland Biodiversity Action Plans (BAP) (2018 to 2023).

13.2.3 Table 13C-1 provides a summary of the local planning policies relevant to the aquatic environment. These planning policies have been considered when assessing potential ecological constraints and opportunities identified by the desk study and field surveys, and when assessing requirements for further survey, design options and ecological mitigation.

Table 13C-1: Summary of Local Planning Policy

Document	Planning Policy	Purpose
Redcar and Cleveland Local Plan (2018)	Policy N4 – Biodiversity & Geological Conservation	Policy for the protection and enhancement of biodiversity and ecological features as a result of development. Reference and weight are given to internationally designated sites such as Teesmouth and Cleveland Coast Special Protection Area (SPA), and nationally designated sites, habitats and species. Policy also sets out protection of ecological features of value as wildlife corridors such as river corridors and hedgerows
	Policy N2 – Green Infrastructure	Sets out support for development which protects and improves the green infrastructure network of the region. Reference to the 'green wedge between Wilton Works and Redcar, extending North to the coast.'
	EN4 Sites of Importance for Nature Conservation	Sets out the Authority's policy that development should not negatively impact on Sites of Interest for Nature Conservation (SINCs, now Local Wildlife Sites LWS)
Stockton-on-Tees Local Plan (2019)	ENV5 – Preserve, Protect and Enhance Ecological Networks, Biodiversity and Geodiversity	Sets out the Authority's policy that development proposals will be supported where they enhance nature conservation and management, preserver the character of the natural environment and maximise opportunities for biodiversity.
	ENV6 Green Infrastructure, Open Space, green Wedges and Agricultural Land	The council will protect, create and enhance green infrastructure and it should be integrated where possible into new developments. Development within 'Green wedges' will only be supported where it would not adversely impact biodiversity.

Document	Planning Policy	Purpose
Stockton-on-Tees Core Strategy Development Plan (2010)	CS10 – Environmental Protection and Enhancement	Sets out the Authority's policy to protect Teesmouth and Cleveland Coast SPA, Saltholme, Seal Sands and Billingham and that development should protect and enhance biodiversity. Sets out policy of protecting and enhancing the existing green 'wedges' and green infrastructure.
Redcar and Cleveland Borough Council Local Validation Checklist (2015)		The checklist states that: "*Information should be provided on existing biodiversity interest and possible impacts. Where proposals are being made for mitigation and / or compensation measures information to support those proposals will be required. Where appropriate, accompanying plans should indicate any significant wildlife habitats or features and the location of habitats of any protected species. Information will also be required relating to protected species, any potential impacts and any mitigation proposals. This information might form part of an Environmental Statement, where one is necessary*."
Tees Valley Green Infrastructure Strategy (2008)		The strategy States that: 'Green infrastructure should be fundamental to the planning of major new development and re-development schemes…'. It also states that new development should protect and enhance wildlife sites and corridors where possible and management should promote wildlife linkages.
Tees Valley priority species and habitats. Redcar and Cleveland Biodiversity Action Plans (BAP)		The Tees Valley Biodiversity Action Plan targets priority aquatic habitats such as ponds, lakes, reservoirs, rivers and streams. These aquatic environments have the potential to provide important habitat for priority species such as bullhead (*Cottus gobio*), salmon (*Salmo salar*), brown trout (*Salmo trutta*), European eel (*Anguilla anguilla*), brook lamprey (*Lampetra planeri*), river lamprey (*Petromyzon marinus*) and sea lamprey (*Lampetra fluviatilis*).

1Green Wedges are areas of open space in the Tees Valley which link suburban and urban areas with the wider countryside and are part of the Tees Valley Green Infrastructure Strategy (Tees Valley Joint Strategy Unit, 2008)

13.3 Methodology

Desk Study

13.3.1 Records of protected and notable species, aquatic and riparian invasive and non-native species (INNS), WFD classifications and habitat surveys were obtained in December 2019 from a variety of sources documented below.

13.3.2 A 2 km radius from the proposed Site boundary was considered appropriate to obtain an indication of aquatic habitats and species relevant within the

wider landscape. Where returned, records from the last 5 years have been detailed in the assessment. Historic records (i.e. over 5 years old) are deemed too old to provide a reliable baseline as habitats and populations fluctuate in response to natural and human impacts. Nevertheless, in some instances, this information may be used for context where more recent records do not exist.

13.3.3 Sources of information:

- Environmental Records and Information Centre (ERIC) North-East, for non-statutory designations, priority habitats and protected and notable species records;
- Tees Valley Nature Partnership Website, for general information on Local Biodiversity Action Plan Priority Habitats and Species;
- Environment Agency data requests for the Tees area, including the National Fish Populations Database (NFPD);
- Multi-Agency Geographic Information for the Countryside (MAGIC) https://magic.defra.gov.uk/ was consulted in December 2019 to identify international and national statutory designations within 10 km, other statutory designations and designated habitats and species within 2 km of the proposed Site boundary;
- Preliminary Ecological Appraisal (PEA) Baseline Report (Appendix 12D in PEI Report, Volume III)
- Joint Nature Conservation Committee (JNCC) Website (UK Protected Sites). http://jncc.defra.gov.uk/, for Internationally Designated Sites, Special Protection Areas (SPA), Special Area of Conservation (SAC) and Ramsar Sites;
- Archived Natural England Website https://designatedsites.naturalengland.org.uk/SiteSearch.aspx, for citations for Nationally Designated Sites of Special Scientific Interest (SSSI) National Nature Reserves (NNR) and Local Nature Reserves (LNR); and
- Environment Agency (2009) River Tees Salmon Action Plan which sets out stock assessments and management actions for this species.

13.3.4 WFD assessment of waterbodies is based on a six-year cycle of assessment, the last cycle (Cycle 2) being in 2015 and WFD classifications of waterbodies within a 2 km radius of the Site are reported.

13.3.5 Under the WFD, surface water body status is classified based on chemical and ecological status or potential:

- Ecological status of waterbodies is classified according to relevant biological, physico-chemical, and hydromorphological parameters on a five-point scale as either ‘High’, ‘Good’, ‘Moderate,’ ‘Poor’ or ‘Bad’ Ecological Status. The classification system is based on a worst-case system ‘one-out all-out’ system, meaning that the overall ecological status is based on the lowest individual parameter score.

- Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015). This is assigned on a scale of 'Good' or 'Fail'. Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise surface water bodies are reported as being at 'Good' chemical status.

13.3.6 Ecological status is assigned to surface water bodies that are natural and considered by the Environment Agency not to have been significantly modified for anthropogenic purposes. The overall objective for natural surface waterbodies is to achieve 'Good' Ecological Status and 'Good' Chemical Status. Ecological Potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification; these are termed Heavily Modified Water Bodies (HMWBs).

13.3.7 River Habitat Survey (RHS) is a method designed to characterise and assess the physical structure of freshwater streams and rivers, including recognition of vegetation types and basic geomorphological principles and processes. RHS is carried out along a standard 500 m stretch of river channel, with observations made at ten equally spaced 'spot checks', with additional context provided by observations of land use and valley form in the river corridor. Surveyor training and accreditation facilitates accurate and consistent recording of features to allow standardised conclusions to be drawn. RHS is not designed to provide the level of detail needed for specialist surveys for specific flora or fauna; however, RHS can support recommendations for and findings of surveys for aquatic macroinvertebrates, macrophytes, fish and hydro-geomorphology. RHS surveys may be utilised to 'benchmark' top quality sites based on their catchment characteristics, investigate species habitat relationships (with fish passage as an example), contribute to environmental impact assessment, or inform proposed works to the river alongside hydro geomorphological and other assessments, including the requirement for watercourses to meet the requirements of WFD monitoring.

Assumptions and Limitations

Desk Study

13.3.8 The information collected from the desk study represents only those records returned from records centres and is therefore not considered to be a definitive list of aquatic habitats and species identified within the 2 km of the proposed Site boundary. If records have not been provided, this does not confirm absence from the study area.

13.3.9 The following are inherent limitations of a desk study which includes obtaining data from a Biological Records Centre (BRC):

- recorder bias - biological records are not a representation of the distribution of species within the study area, only records of those species, so the dataset provided by a BRC may be biased towards the

favoured locations / ‘patches’ of taxonomic preference of local recorders (and the locations / favoured ‘patches’ of those recorders) and the presence (or absence) of specialist recording groups within that county or vice county;

- incomplete data – the current dataset held by a BRC is considered to be the most accurate and most up-to-date representation of species within each BRC boundary although records are largely random. Where atlases which have systematically surveyed for taxonomic groups within a given area are available these records therein are a more accurate picture of species assemblage and distribution;
- data availability lag - resources at BRCs can be limited, which can lead to a lag between the time that records are submitted by recorders and the time that they are verified and entered into the database for that county. Additionally, special interest recording groups (which often hold their own datasets) may only submit their records annually (if at all) which causes further lag in dataset accuracy; and
- changes in data due to the verification process – where new information or specialist knowledge sheds light on the validity of recent or historical submitted records, the verification process may add or remove records which may alter the results of a desk study over time.

13.4 Results

Site Overview

13.4.1 The Site sits within the Tees Lower and Estuary Operational catchment that stretches from Croft-on-Tees to the North Sea and sites within the Northumbria River Basin District. Significant tributaries within the Operational Catchment include Lustrum Beck, which flows through Stockton and the Billingham/Bishopton Beck catchment. The largest conurbations in the Tees are formed by Stockton, Middlesbrough, Redcar and Hartlepool, as well as industrialised areas of Billingham, Seal Sands and South Bank. Physical modifications, point source waste water discharges and rural diffuse pollution are the most dominant impacts within the Tees Lower and Estuary catchment.

Aquatic Habitats

13.4.2 There are natural, semi-natural and artificial (e.g. water storage reservoirs) waterbodies within 2 km of the proposed Development which are dominated by ponds, wetlands and coastal streams that flow directly into the River Tees or the North Sea near Hartlepool and Redcar.

13.4.3 There is a total of 139 water bodies (ponds, streams and ditches) within 200 m of the Site, of which 23 are artificial and automatically scoped out of further walkovers, 82 are ponds and 34 are running waterbodies, such as streams and ditches.

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Internationally Designated Habitats

13.4.4 Teesmouth and Cleveland Coast is a Special Protected Area (SPA) site designated under the EU Birds Directive to protect rare, vulnerable and migratory birds. It is also a Ramsar site because of its national and international important numbers of various species of water bird stage and winter at the site. The site supports a rich assemblage of invertebrates, including seven nationally rare species. Freshwater is a supporting habitat for birds and is therefore of indirect value so should be considered in the aquatic assessment.

13.4.5 In July 2018, Natural England launched a formal consultation on proposed extensions to The Teesmouth and Cleveland Coast SPA and Ramsar sites. Following consultation, these extensions were classified on the 16th January 2020. The SPA and Ramsar are now inclusive of areas such as the dunes and pools immediately north-east of the Power, Capture and Compression (PCC) Site. These areas have been included in the designation because overwintering birds use the pools for roosting, loafing and foraging; they are therefore essential to maintaining the integrity of the SPA / Ramsar and aquatic habitats will be considered for this reason.

Nationally Designated Habitats

13.4.6 Teesmouth and Cleveland Coast is a Site of Special Scientific Interest (SSSI), notified under Section 28C of the Wildlife and Countryside Act 1981, and is of special interest for many nationally important features to support the wider mosaic of coastal and freshwater habitats. Of specific interest to this aquatic assessment is ‘a diverse assemblage of breeding birds of sand dunes, saltmarshes and lowland open waters and their margins’.

13.4.7 South Gare and Coatham Sands SSSI is no longer considered a standalone Nature Conservation Designation and is now covered under Teesmouth and Cleveland Coast SPA and SSSI.

Non-Statutory Designated Habitats

13.4.8 There are no non-statutory designated sites whose reason for designation is due to aquatic habitats, species or their assemblage up to 2 km from the Site.

Water Framework Directive Classification

13.4.9 There is only one WFD ‘river’ waterbody within the proposed Site boundary and this is the ‘Tees Estuary South Bank’ (water body ID: GB103025072320), which includes several watercourses and drains present within the proposed Site boundary: Dabholm Gut, Main’s Dyke / The Mill Race, The Fleet, Kettle Beck and Kinkerdale Beck. It is designated as ‘Heavily Modified’ under the WFD with a Chemical Potential of ‘Good’ and an Ecological Potential of ‘Moderate’. It is the only ‘river’ WFD designated waterbody within of the proposed Site boundary of the proposed Development that has WFD Classification records. Other WFD waterbodies within the proposed Site boundary are the ‘Tees’ (waterbody ID GB510302509900), which is a ‘transitional’ waterbody and the ‘Tees Coastal’

(waterbody ID GB650301500005), which is a ‘coastal water’ waterbody and these are discussed in Chapter 14: Marine Ecology and Nature Conservation (PEI Report, Volume I).

13.4.10 There are other watercourses and drains within the proposed Site boundary, including Belasis Beck, near Billingham to the west of the study area, but these are not designated as part of a WFD waterbody. However, they appear to flow into Greatham Creek and eventually the River Tees, so should be considered as being part of the ‘Tees’ WFD waterbody.

13.4.11 In addition, there are other waterbodies within 2 km of the Proposed Development, as follows:

- ‘Cowbridge Beck from Source to North Burn’ (GB103025072380), which is not designated as an artificial or heavily modified waterbody and is currently of ‘Moderate’ Ecological Potential but 'Fail’ for Chemical Status;
- ‘Billingham Beck from Brierley Beck to Tees Es’ (GB103025076010), which is designated as a ‘Heavily Modified’ waterbody and is currently of ‘Good’ Ecological Potential and ‘Fail’ for Chemical Potential;
- ‘Marton West Beck Catchment (trib of Tidal Tees)’ (GB103025072210), which is designated as a ‘Heavily Modified’ waterbody and is currently of ‘Moderate’ Ecological Potential and ‘Fail’ for Chemical Potential; and
- ‘Skelton Beck Catch (Saltburn) trib of North Sea’ (GB103025071970), which is designated as a ‘Heavily Modified’ waterbody and is currently of ‘Good’ Ecological Potential and ‘Good’ Chemical Potential.

River Habitat Survey

13.4.12 Environment Agency RHS records exist for waterbodies close to the proposed Development and were accessed via the data.gov.uk open data resource. RHS records are over 10 years old, nevertheless, the results are summarised below and are listed in order of distance from the Proposed Development (closest first) as they give a representation of the types of waterbodies within the area of the Site.

13.4.13 ***Greatham Creek*** - Environment Agency RHS data exist from 18th June 1996 in Greatham Creek. The survey was conducted approximately 1.19 km north-west of the Site. Greatham Creek flows into the Seaston on Tees Channel (Tees Mouth) close to the proposed water intake for the proposed Development. This section of the creek had a Habitat Modification Class of 2 (Habitat Modification Score: 100), indicating the site was predominantly unmodified. The watercourse sat within a symmetrical floodplain meaning water would overtop both banks equally during spate. The creek was wide (20 m) and had one unvegetated point bar, typical of a meandering watercourse. No trees were recorded on the banks of Greatham Creek and channel vegetation was absent.

13.4.14 ***Unnamed tributary to The Fleet*** - The Environment Agency conducted an RHS on an unnamed tributary to the Fleet on 27th May 2008. The survey was conducted approximately 1.3 km east of the Site An upstream section of the watercourse lies within the proposed Site boundary. This section of the

watercourse had a Habitat Modification Class of 5 (Habitat Modification Score: 3780), indicating the site was severely modified. The channel was obviously re-sectioned and there was one minor bridge crossing. A minor bridge crossing is one which has no in-stream support and bank abutments less than 10 m. The watercourse was approximately 0.7 m deep and 3.5 m wide. No trees were recorded on the banks of the watercourse.

13.4.15 ***Ormesby Beck 1*** - RHS data exist for Ormesby Beck 1 from 19th May 1995, approximately 1.34 km south-east of the Site. Ormebsy Beck flows into the River Tees which is crossed by the Proposed Development. The surveyed section of Ormesby Beck had a Habitat Modification Score of 5 (Habitat Modification Score: 4290), indicating severe modification. The water depth was approximately 0.45 m and width 6 m. Significant impacts on the watercourse included channel and/or bank re-sectioning, reinforcement and one or more bridge crossings. No bankside trees were recorded along this section of Ormesby Beck and channel vegetation was absent.

13.4.16 ***Billingham Beck*** - Environment Agency RHS data exist for Billingham Beck from 14th October 2008. The surveyed reach was 2.0 km north-west of the Site. Billingham Beck flows into the River Tees which is crossed by the Site. This section of Billingham Beck had a Habitat Modification Class of 4 (Habitat Modification Score: 594), indicating the site is significantly modified. The watercourse sits within a shallow vee-shaped valley with trees scattered along both banks. The site was not obviously realigned or over-deepened, however, there was some reinforcement and re-sectioning. The water depth was 0.2 m and width 4 m. The invasive non-native species Himalayan balsam (*Impatiens glandulifera)* was present on the banks. Pressures on the watercourse included bridge crossings and poaching of the banks.

13.4.17 ***Skelton Beck*** - RHS data exist for Skelton Beck from the 18th June 1996. The surveyed reach was 2.0 km south of the Siteand there does not appear to be any hydrological connectivity between the Site and Skelton Beck. The beck lies on the opposite side of Eston Hills. This section of Skelton Beck had a Habitat Modification Class of 2 (Habitat Modification Score: 30), indicating the site is predominantly unmodified. The watercourse sits within a concave or bowl-shaped valley with trees scattered along both banks. The watercourse was narrow (0.3 m) and shallow (0.15 m). The invasive non-native species Himalayan balsam was recorded at the site and there was evidence of poaching.

13.4.18 ***Roger Dike*** - The Environment Agency conducted two RHS on Roger Dike on the 14th September 2007. The sites were contiguous and located 2.0 km east of the proposed Site boundary. The hydrological connectivity to the Site is unknown as Ordinance Survey maps do not show the entire route of the watercourse. Both sections of Roger Dike had a Habitat Modification Class of 1 (Habitat Modification Score: 0), indicating the site is pristine/semi-natural. The channel was not obviously realigned or over-deepened. Fifteen riffles and three unvegetated point bars were recorded over the 1 km reach. The wetted width was 1.5 – 3.2 m and depth 0.1 m. Trees were present along both banks for the entire surveyed reach. Current aerial imagery of the site suggests the watercourse may have been modified since the survey was

conducted, as this section of Roger Dike is straightened along an arable field boundary and crossed by the A174.

Fisheries Site Designations

13.4.19 There are no statutory, local non-statutory or other non-statutory designated sites whose reason for designation is due to their inhabitants of a fish species nor their assemblage within the vicinity of the Site. However, within the Tees Valley, there are both local priority habitats and species covered under the UK Biodiversity Action Plan (UK BAP) legislation which include fish. These are: “Rivers and streams” as priority habitats; and the priority fish species: salmon (*Salmo salar*), brown/sea trout (*Salmo trutta*), European eel (*Anguilla anguilla*), brook lamprey (*Lampetra planeri*), sea lamprey (*Petromyzon marinus*) and river lamprey (*Lampetra fluviatilis*). The rational for each of these are outlined below in Table 13C-2.

Table 13C-2: Description and Rational for the Fish UK BAP Habitats and Species within Tees Valley[1].

UK BAP priority habitat /species	Description/rational
Rivers and streams	Encompassing any flowing water such as major rivers and their tributaries and coastal gills. Rivers and streams are dynamic systems, which exhibit a mosaic of features such as riffles, pools, shingle beds and sandbars that support a diverse range of plants, animals, fish and invertebrates. There are few rivers which have not been physically altered by humans. These processes have resulted in degraded habitats supporting fewer species. This trend is now being reversed with opportunities to recreate naturally functioning systems being implemented. Watercourses act as important corridors that link together other wildlife features and provide safe routes for species to move between sites. The River Tees is the only major river in the Tees Valley. Since the 1970’s, the water quality has improved, with salmon returning in recent years.
Salmon	Once abundant in the Tees, salmon numbers declined with the growth of industry in the lower Tees to the extent that the river was devoid of salmon between the 1920s and 1983. A pollution incident in Teesdale revealed that some salmon still migrate through Teesside’s ‘anoxic plug’, however, cleaner industry has seen numbers gradually increase. Salmon are an anadromous species and can complete numerous migrations in a lifetime. The Tees barrage presents a barrier to the recovery of salmon in the river at both inward and seaward migrations. Furthermore, salmon need clean, aerated water and clean substrates to successfully spawn. Egg survival is compromised by water quality, which also has an impact on aquatic invertebrates, the primary food source of salmon fry.

UK BAP priority habitat /species	Description/rational
Brown/sea trout	Numbers of brown trout in the Tees have declined as a result of degraded and fragmented habitat, barriers to migration and pollution. Both resident and anadromous brown trout need good connectivity between a variety of habitats to complete their life cycle, furthermore they require clean, aerated water and substrates to successfully spawn. Egg survival is compromised by water quality, which also has an impact on aquatic invertebrates, the primary food source of juvenile trout.
European eel	Eels are catadromous living their adult life in freshwater and migrating to the marine environment to spawn. Recruitment of the European glass eels has declined by between 95 - 99% since 1979. It is listed as critically endangered by the IUCN. Numerous factors are responsible for the decline in eel numbers and include barriers to migration, hydropower turbines, loss of wetland habitat and the introduction of the parasitic nematode *Anguillicola crassus*. The Tees Barrage has some opportunity for glass eel migration incorporated into its design but escapement of adult silver eels around the barrage is unknown. Very little is known about the current population and extent of eels in the Tees.
Brook lamprey	The brook lamprey is a primitive, jawless fish resembling an eel, and is the smallest of the lamprey found in the UK. It is a non-migratory freshwater species, occurring in streams. The brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the ammocoete larvae. It spawns mostly in parts of the river where the current is not too strong. It is found in the Leven and Skerne tributaries. Degraded habitat and spawning gravels are key factors in their decline.
Sea and river lamprey	The sea and river lamprey are primitive, jawless fish resembling an eel. The UK lamprey populations are considered important for the conservation of the species at an EU level. The sea lamprey is the largest of the lampreys found in the UK, while the river lamprey is substantially smaller. They are anadromous species living their adult life in coastal margins and estuaries, migrating upstream to head waters to spawn. Sea and river lamprey need clean gravels for spawning, and marginal silt or sand for the burrowing juvenile ammocoetes. Features such as weirs and dams, as well as polluted sections of river, may impede migration to spawning grounds. The Tees barrage presents a considerable barrier to migrating lamprey.

[1]*Tees Valley Nature Partnership document "Tees Valley Priority Habitats and Species"*

Fish Species

13.4.20 A total of 8 non-protected/non-notable species were recorded within the desktop study extent in the past three years at one site, the Tees Barrage: bream (*Abramis brama*), chub (*Leuciscus cephalus*), dace (*Leuciscus leuciscus*), gudgeon (*Gobio gobio*), perch (*Perca fluviatilis*), pike (*Esox lucius*), roach (*Rutilus rutilus*), and roach x bream hybrid (*Rutilus rutilus x Abramis brama*) (Table 13C-3).

13.4.21 Historical fish data greater than three years old (less than ten years old) recorded fish data from two additional sites: Ormsby Beck and an unnamed fishing pond (Table 13C-3). Of these species, three-spined stickleback (*Gasterosteus aculeatus*) and stone loach (*Barbatula barbatula*) were present in Ormsby Beck. Common Carp (*Cyprinus carpio*), and two ornamental species goldfish (*Carassius auratus*) and orfe (*Leuciscus idus*) were recorded at an unnamed fishing pond in 2010. Goldfish is a non-native species used originally for ornamental purposes.

Table 13C-3: Non-protected/Notable Fish Species Identified During the Desktop Study

Fish species	Last year observed	Locality	National Grid Reference	Data provider
Bream	2019	Tees Barrage	NZ4617719106	Environment Agency
Perch	2019	Tees Barrage	NZ4617719106	Environment Agency
Roach	2019	Tees Barrage	NZ4617719106	Environment Agency
Dace	2018	Tees Barrage	NZ4617719106	Environment Agency
Gudgeon	2018	Tees Barrage	NZ4617719106	Environment Agency
Roach x bream hybrid	2018	Tees Barrage	NZ4617719106	Environment Agency
Chub	2017	Tees Barrage	NZ4617719106	Environment Agency
Pike	2016	Tees Barrage	NZ4614319088	Environment Agency
Stone loach	2015	Ormsby Beck - North Ormsby	NZ5079419592	Environment Agency
Three-spined stickleback	2015	Ormsby Beck - Berwick Hills	NZ5096718261	Environment Agency
Common Carp	2010	Unnamed fishing pond	NZ5500025000	Environmental Records Information Centre North East
Goldfish	2010	Unnamed fishing pond	NZ5500025000	Environmental Records Information Centre North East
Orfe	2010	Unnamed fishing pond	NZ5500025000	Environmental Records Information Centre North East

13.4.22 Parts of the sites 'RSPB Saltholme Reserve' and 'Saltholme Pools area' are located within the site boundary and could be directly impacted by the Proposed Development. There are multiple observation records of three-spined stickleback between 2010 – 2015 from Dormans Pool, within the RSPB Saltholme Reserve in 2017. Three-spined stickleback are ubiquitous and unlikely to be affected by the development unless there will be a direct reduction in habitat and/or water quantity and quality.

13.4.23 Ormsby beck has been surveyed by the Environment Agency at two locations, ‘North Ormsby’ and ‘Berwick Hills’ located 2 km and 3 km south of

the Site respectively. Here two non-protected species were identified, three-spined stickleback and stone loach and one protected species, European eel. Although this site is a considerable distance away for any direct impacts of the Proposed Development, it can be used as a proxy site to predict the fish species assemblage in the absence of additional data when assessing the impact of the Proposed Development. If the final Proposed Development includes discharging water into an adjacent beck, this is likely to have a direct impact on both water quantity and quality and consequently a direct impact upon the fish assemblage.

13.4.24 All these fish species, apart from those unique to the unnamed fishing pond, have the potential to be within the area for the Proposed Development.

13.4.25 Migratory fish species such as eel and sea trout are known to be present further up in the Tees catchment and are addressed in Chapter 14: Marine Ecology and Nature Conservation (PEI Report, Volume I).

Aquatic Macroinvertebrate

13.4.26 Data requests returned no records for designated aquatic macroinvertebrates species within a 2 km radius from the Site within the past 3 years.

13.4.27 However, in the past five years (2015), there were records for two notable species of aquatic beetles (*Cercyon littoralis* and *Noterus crassicornis*) within the proposed Site boundary, in ponds near Coatham Sands. There are older records (1990 to 2007) for another eight notable aquatic beetle species within the proposed Site boundary, essentially in ponds near Coatham Sands and in Saltholme Nature Reserve (Table 13C-4). These are as follows: *Agabus conspersus*, *Enochrus bicolor, Haliplus apicalis, Helochares punctatus, Helophorus nubilus, Ilybius subaenus*, *Grypus equiseti* and *Phytobius leucogaster*. Some of these only have aquatic larval stage and are terrestrial as adults.

13.4.28 The WFD monitoring data from 2016 for Dabholm Cut (part of the 'Tees Estuary South Bank' WFD waterbody) at NZ 56570 23772 indicates that the watercourse / drain is of very poor quality (WHPT 17.6 to 19.5, ASPT 3.3 to 3.5, very low diversity) and no species of conservation interest were recorded.

13.4.29 In addition, in the past five years, there are records for an additional ten designated species of aquatic invertebrates (*Helophorus fulgidicollis, Heterocerus flexuosus, Ochthebius auriculatus Pelenomus zumpti, Phytobius leucogaster, Tournotaris bimaculatus* (beetles), *Dolichopus arbustorum, Rhaphium lanceolatum, Stratiomys singularior* (trueflies) and *Hydrobia acuta subsp. neglecta* (snail)) within a 2 km radius from the Proposed Development, essentially in ponds in Cowpen Marsh (Table 13C-4). Again, some of these beetle species only have aquatic larval stage and are terrestrial as adults.

13.4.30 Without the data for Dabholm Cut discussed above, the Environment Agency data request for the Tees area supplied no aquatic macroinvertebrate data

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within 2 km of the Site, indicating that no routine monitoring has been undertaken. Most aquatic macroinvertebrate indices available from the Environment Agency data request were over 2 km from the Site, with monitoring points 7 to 15 km from the proposed Siteboundary and on watercourses not necessarily connected to the River Tees or tributaries of the River Tees (Whitton Beck, Shotton Beck, Lustrum Beck, Saltburn & Skelton, Leven, Grange Beck, Broughton Beck, Brierly Beck).

Table 13C-4: Historical Data Showing Designated Aquatic Macroinvertebrate Species Within 2 Km of the Site.

Species	Date and distance of record	Designation	Notes on ecology
Within the proposed Site boundary			
Cercyon littoralis	2015 record from pond near Coatham Sands	Nationally Scarce Excludes Red Listed taxa	In decaying wreck on the beach. Recorded from January to October, peaks in May and July.
Noterus crassicornis	2015 record from pond in Seal Sands area. Older (1987, 1990, 1995) records in proposed Site boundary, in ponds near Coatham Sands. 2015 records approximately 1 km away from the proposed Site boundary, in Cowpen Marsh.	Nationally Scarce Excludes Red Listed taxa	In permanent, base-rich lakes, ponds and grazing level drainage ditches. Reported throughout the year, peaking in May and September.
Enochrus bicolor	2004 record from pond near Coatham Sands. Older (1978 – 2008) records from ponds/drains in Cowpen Marsh, approximately 1 km away from the proposed Site boundary	Nationally Scarce Excludes Red Listed taxa	Common in brackish water, confined to coastal ponds and slow flowing ditches. In ponds with more than 50% sea water. Recorded all months expect December, peaks in June and August.
Haliplus (Haliplinus) apicalis	1990-1995 records in ponds near Coatham Sands. And 2003-2008 records from large ponds/lakes in Salthome Nature Reserve 1970 to 2008 records from ponds/drains in Cowpen Marsh, approximately 1 km away from the proposed Site boundary	Nationally Scarce Excludes Red Listed taxa	Found in brackish waters such as coastal lagoons, puddles and drainage ditches. Reported in all months, very strong peak in May.
Helochares punctatus	2004 record in pond near Coatham Sands	Nationally Scarce Excludes Red Listed taxa	On moist peat in wet heath, in bogs and in acid pools. Recorded throughout the year, with peaks in April and August / September.
Helophorus (Empleurus) nubilus	1991-1995 records in ponds near Coatham Sands. 1996 record in Cowpen Marsh, approximately 1 km away from the proposed Site boundary	Nationally Scarce Excludes Red Listed taxa	Pond margins. Records for all months, expect March, with peak in September.

Species	Date and distance of record	Designation	Notes on ecology
Ilybius subaeneus	1991 to 1995 records from ponds near Coatham Sands	Nationally Scarce Excludes Red Listed taxa	Found in permanent water amongst vegetation, often in in mineral workings and in areas of mining subsidence, and natural coastal pools Recorded throughout the year except March and December, peaking in June.
Agabus conspersus	2004 record from pond in Salthome Nature Reserve. 2015 record approximately 1 km west of the proposed Site boundary, in Cowpen Marsh Pond. Older records (2000-2008) from Cowpen Marsh and Coatham Sands.	Nationally Scarce Excludes Red Listed taxa	Confined to brackish waters, usually amongst vegetation in coastal lagoons and ditches. Recorded throughout the year except February, peaking in June and August.
Grypus equiseti	Several records from 1990 to 1995 in Coatham Sands area	Nationally Notable B	Terrestrial adult but aquatic larvae
Phytobius leucogaster	2003 records in proposed Site boundary in Salthome Nature Reserve. Other records (2006-2008) in Cowpen Marsh, approximately 1 km away from the proposed Site boundary.	Nationally Notable B	Terrestrial adult but aquatic larvae
Within a 2 km radius from the proposed Development			
Dolichopus arbustorum	2015 record approximately 1 km away from the proposed Site boundary, in Cowpen Marsh	Nationally Scarce. Excludes Red Listed taxa	
Helophorus fulgidicollis	1979 to 2008 records in ponds/drains in Cowpen Marsh, approximately 1 km away from the proposed Site boundary	Nationally Scarce. Excludes Red Listed taxa	Confined to brackish water.
Hydrobia acuta subsp. neglecta	2015 record approximately 1 km away from the proposed Site boundary, in Cowpen Marsh	Nationally Scarce. Includes Red Listed taxa Near Threatened	
Ochthebius (Asiobates) auriculatus	2006 record approximately 1 km away from the proposed Site boundary, near Cowpen Marsh	Nationally Scarce. Excludes Red Listed taxa	
Stratiomys singularior	2015 records approximately 1 km away from the proposed Site boundary, near Cowpen Marsh	Nationally Notable Least concern	
Pelenomus zumpti	Records (1996 to 2006) in Cowpen Marsh area	Nationally Notable A	Terrestrial adult but aquatic larvae
Tournotaris bimaculatus	2006 record from Cowpen Marsh area	Nationally Notable B	Terrestrial adult but aquatic larvae

Macrophytes

13.4.31 The desk-based study revealed no rare or notable species have been recorded within the proposed Site boundary or within the search area (either recently or historically).

13.4.32 A range of common macrophyte records were returned by ERIC (Table 13C-5). Recent records were limited to Coatham Marsh (approximately 1 km east of the Site). The Environment Agency data request for the Tees area supplied no relevant macrophyte data.

Table 13C-5: Macrophyte Records Within A 2 Km Radius from the Site Within the Past 3 Years.

Macrophyte species	Year recorded	Locality	National Grid Reference	Data provider
Water-plantain (*Alisma plantago-aquatica*)	2018	Coatham Marsh	NZ 588 246	ERIC
Common Water-starwort (*Callitriche stagnalis*)	2018	Coatham Marsh	NZ 588 246	ERIC
Cuckooflower (*Cardamine pratensis*)	2018	Coatham Marsh	NZ 588 246	ERIC
Yellow Iris (*Iris pseudacorus*)	2018	Coatham Marsh	NZ 588 246	ERIC
Bulbous Rush (*Juncus bulbosus*)	2018	Coatham Marsh	NZ 588 246	ERIC
Water Mint (*Mentha aquatica*)	2018	Coatham Marsh	NZ 588 246	ERIC
Water Forget-me-not (*Myosotis scorpioides*)	2018	Coatham Marsh	NZ 588 246	ERIC
Common Reed (*Phragmites australis*)	2018	Coatham Marsh	NZ 588 246	ERIC
Common Water-crowfoot (*Ranunculus aquatilis*)	2018	Coatham Marsh	NZ 588 246	ERIC
Celery-leaved Buttercup (*Ranunculus sceleratus*)	2018	Coatham Marsh	NZ 588 246	ERIC
Common Club-rush (*Schoenoplectus lacustris*)	2018	Coatham Marsh	NZ 588 246	ERIC
Bittersweet (*Solanum dulcamara*)	2018	Coatham Marsh	NZ 588 246	ERIC

13.4.33 During the PEA (AECOM, 2019) a range of common macrophytes were also recorded from ‘Wildlife Pond’, ‘Long Pond; ‘Power Station Pond’ and ‘Steel House Pond’.

Invasive Non-Native Species

13.4.34 A range of species listed on Schedule 9 of the Wildlife & Countryside Act were recorded. This includes aquatic plant INNS in addition to species that are commonly found within riparian habitats (Table 13C-6). Of the records

returned, only Nuttall's Waterweed (*Elodea nuttalii*) is present within the Proposed Development with the other species recorded > 1.5 km from the boundary.

Table 13C-6: Invasive Non-Native Species Records Within A 2 Km Radius from the Site Within the Past 3 Years.

INNS species	Year recorded	Locality	National Grid Reference	Data provider
Japanese knotweed (*Fallopia japonica*)	2017	North Ormesby	NZ507203	ERIC
Giant hogweed (*Heracleum mantegazzianum*)	2017	North Ormesby	NZ507203	ERIC
Indian balsam (*Impatiens glandulifera*)	2017	North Ormesby	NZ507203	ERIC
Nuttall's waterweed (*Elodea nuttalii*)	2018	'Steel House Pond'	NZ575240	AECOM PEA

13.4.35 A range of historic aquatic INNS records were also returned by ERIC including water fern (*Azolla filiculoides*), New Zealand pigmyweed (*Crassula helmsii*), parrot's feather (*Myriophyllum aquaticum*), floating pennywort (*Hydrocotyle ranunculoides*), Canadian waterweed (Elodea canadensis), Nuttall's waterweed (*Elodea nuttalii*). In addition to species that are commonly found within riparian habitats including Himalayan balsam, Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*).

13.5 Summary

13.5.1 The Preliminary Ecological Appraisal (AECOM, 2018) highlighted that running waters within the proposed Site boundary are frequently found within highly modified and canalised channels, with bankside habitats often located between buildings and hard standing or pipework, road, rail or other industrial infrastructure. This may limit the potential for these habitats to support notable species and/or communities of fish, aquatic macroinvertebrates and macrophytes. However, there is limited historical aquatic data available to support this and aquatic baseline surveys are necessary to gather more robust data.

13.5.2 There is only one WFD river waterbody within the proposed Site boundary and this is the Tees Estuary South Bank (GB103025072320). Routine WFD monitoring is therefore limited in the area, restricting the availability of existing aquatic data sets for the area.

13.5.3 Teesmouth and Cleveland Coast is a SSSI notified under Section 28C of the Wildlife and Countryside Act 1981 and is of special interest for '*a diverse assemblage of breeding birds of sand dunes, saltmarshes and lowland open waters and their margins'*. However, the focus of this designation is how the habitat provides for birds. No statutory, local non-statutory or other non-

statutory designated sites whose reason for designation is due to aquatic habitats, species or their assemblage up to 2 km from the Site.

13.5.4 The rivers and streams within the Tees Valley are classified as UK BAP priority habitats and salmon, brown/sea trout, European eel, brook lamprey, sea lamprey and river lamprey are classified as UK BAP priority species. There were no notable fish species recorded within 2 km of the proposed Development boundary within the past three years, however, fisheries data was limited, and further baseline surveys are needed to gather a robust data set to inform the PEI.

13.5.5 It is important to note migratory fish species travelling between the coast and the River Tees are considered in Chapter 14: Marine Ecology and Nature Conservation (PEI Report, Volume I).

13.5.6 In addition to those within the proposed Site boundary, there are another four ‘river’ WFD waterbodies within a 2 km radius from the proposed Development: 'Cowbridge Beck from Source to North Burn' (GB103025072380), 'Billingham Beck from Brierley Beck to Tees Es' (GB103025076010), 'Marton West Beck Catchment (trib of Tidal Tees)' (GB103025072210) and 'Skelton Beck Catch (Saltburn) trib of North Sea' (GB103025071970), which is designated as a 'Heavily Modified' waterbody and is currently of 'Good' Ecological Potential and 'Good' Chemical Potential.

13.5.7 However, there is not associated monitoring points and associated macrophyte data within 2 km of the Site. Although, no notable or protected macrophyte species were recorded it is possible that some occur in association with the site. Given that a range of notable macroinvertebrate species have been recorded, this may indicate habitats where notable plant species or plant communities also occur in association with the invertebrates. It is recommended that more information on all waterbodies is gathered during a walkover.

13.5.8 There is only one WFD monitoring point within 2 km of the Proposed Development and therefore very limited aquatic macroinvertebrates data. However, local biodiversity data records did report two aquatic invertebrate species of conservation interest within the redline boundary in the past five years and records for another ten designated species within 2 km of the Site. In addition, older records (> 5 years old) identified an additional eight species of conservation interest within the proposed Site boundary. Due to the limited data set and potential of protected and notable species being present, it is important for further baseline surveys to be scheduled for waterbodies within the proposed Site boundary and up to 200 m:

- the area near Coatham Sands to the north of the site: several coastal ponds – recent (<5 years) records of notable beetle species;
- the area to the south of Seal Sands and to the east of Cowpen Marsh: a few ponds/lakes on the proposed Site boundary - recent (<5 years) record of a notable beetle species there – also records of several notable beetles and truefly species in Cowpen Marsh;

- the Salthome Nature Reserve to the south west of the site: a lot of drains and ponds / lakes and also a watercourse (Belasis Beck / Holme Fleet) – several older (>10 years old) of notable beetle species in the area; and
- the north east area: several watercourses (Dabholm Cut, The Mill Race, The Fleet), which are in Tees Estuary (S Bank) (GB103025072320) but for which there appears to be no / very limited baseline data.

13.5.9 Invasive non-native plant species listed on Schedule 9 of the Wildlife & Countryside Act were recorded and therefore it is possible that a range of INNS occur in association with the site. It may be possible to highlight waterbodies with certain INNS during the walkover, however, if this is conducted outside of the seasonal growing window, some species may be missed. Further surveys would be required on any waterbodies where there is associated works (as there would be a risk of spread).

13.5.10 Within 200 m of the Site, 139 waterbodies (including ponds and rivers/streams/drains) have been identified.

13.5.11 Given the industrial context and that many of the running water sites are heavily modified, canalised channels and artificial having little biodiversity value, 23 artificial waterbodies have been scoped out of walk over survey and further aquatic assessment.

13.6 Recommendations

13.6.1 Walkover surveys are recommended to assess the requirement for fish, aquatic macroinvertebrate, macrophyte and INNS surveys for 116 waterbodies to collect baseline information to inform the EIA.

13.6.2 For those waterbodies scoped in for further fisheries assessment the following methods should be used:

- Ponds – environmental DNA (eDNA) surveys will be completed for fish in all ponds scoped into the assessment. For each pond 20 water sub-samples will be taken from around the margins of the pond with a clean bottle before being mixed and filtered. The total volume of pond water passed through the filter will be recorded. The eDNA filters should be sent to an eDNA specialist for processing and data analysis. The results will identify presence of fish species within each water body;
- Rivers/ditches – single run electric fishing surveys should be carried out on freshwater water bodies in line with the standard Environment Agency methodology to gather data on the presence or absence of fish species. Where rivers/ditches have a saline influence, seine netting and fyke netting will be used to capture fish. Instream fish habitat assessment will also be conducted for each site to collect information on a variety of habitat characteristics important for fish; and
- RHS – should be considered for any rivers/ditches that have the potential to be culverted on realigned. This involves characterising and assessing the physical structure of freshwater streams and rivers,

including recognition of vegetation types and basic geomorphological principles and processes.

13.6.3 For those water bodies scoped in for further macroinvertebrate assessment the following methods should be used:

- Ponds – Macroinvertebrates surveys will follow predictive system of multi metrics (PSYM) methodology, albeit surveys will be completed outside the optimal survey period for this methodology due to seasonal constraints;
- Rivers/ditches – Macroinvertebrates will be ‘kick/sweep sampled’ for three minutes follows by a one-minute hand search of larger substrates using a standard Freshwater Biological Association (FBA) pattern pond net (mesh size: 1 mm) in line with the standard Environment Agency methodology. In-channel habitats will be ‘kick sampled’ where practicable, or ‘sweep sampled’, for three minutes followed by a one-minute hand search of larger substrates; and
- The data provided will allow characterisation of invertebrate communities and enable the biological quality of freshwater habitats to be characterised. Macroinvertebrates will be identified to species level (where practicable) for the majority of groups, using stereo-microscopes (under low power) and appropriate identification keys. Invertebrate data will be analysed to calculate pressure-specific biotic indices for each site: Whalley, Hawkes, Paisley and Trigg (WHPT), Average Score Per Taxon (ASPT) and Community Conservation Index (CCI), Proportion of Sediment-sensitive Invertebrates (PSI) and Lotic Invertebrate index for Flow Evaluation (LIFE). The survey will also identify any INNS or nuisance species that may be present.

13.6.4 For those waterbodies scoped in for further macrophyte assessment the following methods should be used:

- Ponds – PSYM to record botanical diversity to allow appraisal of wider nature conservation value;
- Rivers – River corridor Survey plus LEAFPACS2 to collect riparian corridor habitat and a list of macrophytes present; and
- Ditches – Detailed species lists of macrophytes are recorded within a 20 m section, the plants growing in the ditch and on its banks are recorded. A rapid ‘sweep-up’ to record additional species present in the rest of the ditch is carried out after the 20 m section has been surveyed.