



Net Zero Teesside – Environmental Statement

Planning Inspectorate Reference: EN010103

Volume III – Appendices

Appendix 13A: Aquatic Ecology Supplementary Desk Study and Field Survey Report

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



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Table of Contents

13A. Aquatic Ecology Supplementary Desk Study and Field Survey Report.....	13-1
13.1. Introduction.....	13-1
13.2. Legislation, planning policy and related guidance	13-3
13.3. Methodology.....	13-4
13.4. Results	13-14
13.5. Conclusions and nature conservation evaluation	13-23
13.6. References	13-27

Tables

Table 13A- 1: Description of standing and flowing waterbodies scoped in for detailed aquatic species surveys.....	13-6
Table 13A- 2: Survey sites, location, and aquatic survey methods*	13-8
Table 13A- 3: Fisheries survey site details for watercourses.....	13-9
Table 13A- 4: Summary of habitat conditions for ponds and watercourses scoped in	13-14
Table 13A- 5: Notable macroinvertebrate species recorded within 2 km from the Site	13-17

Annexes

Annex A: Relevant Waterbody Scoping
Annex B: Map of Sample Site Locations
Annex C: Site Photographs
Annex D: Whalley, Hawkes, Paisley & Trigg (WHPT) Metric
Annex E: Community Conservation Index (CCI)
Annex F: Lotic-Invertebrate Index for Flow Evaluation (LIFE)
Annex G: Proportion of sediment-sensitive invertebrates (PSI)
Annex H: Results from the fish (eDNA and electric fishing) surveys undertaken
Annex I: Results from the macroinvertebrate surveys undertaken
Annex J: Results from the macrophyte surveys undertaken
Annex K: Results of the PSYM analyses and classification

13A. Aquatic Ecology Supplementary Desk Study and Field Survey Report

13.1. Introduction

- 13.1.13. The purpose of this report is to accompany Chapter 13: Aquatic Ecology of the Environmental Statement (ES) for the Proposed Development (ES Volume I, Document Ref. 6.2).
- 13.1.14. It describes the approach and findings of the aquatic ecology desk study and aquatic macroinvertebrate, macrophyte and fish surveys of freshwater habitats undertaken in spring and summer 2020 in support of the Ecological Impact Assessment (EclA) for the Proposed Development.
- 13.1.15. This report does not seek to include recommendations, specify mitigation, or make an ecological impact assessment of the Proposed Development.
- 13.1.16. The ecological impact assessment is provided in the formal EclA provided as Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2), and this report comprises an Appendix to that chapter.
- 13.1.17. It should be noted that distances in this Appendix are from an earlier iteration of the Site boundary. As the boundary has been refined and reduced in size actual distances/location relative to the current development areas may be slightly greater/different than reported. In addition, the spatial coverage of surveys presented on Figure 13A-1 reflects the Site Boundary at the PEIR stage.
- 13.1.18. An initial Preliminary Ecological Appraisal (PEA) of the ecological constraints and opportunities associated with the Proposed Development was initially carried out by AECOM. The findings are compiled as a PEA report (see Appendix 12C: PEA, ES Volume III, Document Ref. 6.4), which should be referred to for a more detailed overview of the site conditions and habitats present.
- 13.1.19. The purpose of the work completed and this report is to:
- provide species data and information on the fish, macroinvertebrate¹, aquatic plant² species and assemblages within the relevant areas of the Proposed Development;

¹ Aquatic macroinvertebrates are those invertebrate species that are easily visible without magnification i.e. species and life stages greater than 0.5 mm in size (The British Standards Institution, 2012).

² Restricted to 'macrophytes' i.e. larger plants of fresh water which are easily seen with the naked eye, or which usually form colonies, including all aquatic vascular plants, bryophytes, stoneworts (Characeae) and macro-algal growths (The British Standards Institution, 2014).

- present the above data in a manner that allows the results to be used to support an assessment of relative nature conservation value, including review against relevant criteria;
- identify potential aquatic invasive non-native species (INNS) constraints to construction and operation of the Proposed Development; and
- inform the options for impact avoidance, mitigation and/ or compensation to be considered.

13.2. Legislation, planning policy and related guidance

- 13.2.13. The following wildlife legislation, planning policy and guidance is specifically relevant to the identification and assessment of potential constraints posed by the presence of fish, macroinvertebrate and aquatic plant species. At this stage of assessment, this legislation, policy and guidance is primarily listed to demonstrate that an appropriate level of survey and assessment has been undertaken to meet likely data requirements for future decision-making regarding these material considerations.
- 13.2.14. Wider relevant biodiversity legislation, policy and guidance is detailed in Appendix 12A: Legislation and Planning Policy (ES Volume III, Document Ref. 6.4)
- 13.2.15. The Wildlife and Countryside Act 1981 (as amended) affords:
- specific protection to a small number of aquatic macroinvertebrate species and their habitat under Schedule 5 of the Act;
 - specific protection for flora is listed on Schedule 8 (flora, fungi and lichens); and
 - the Act also contains measures for preventing the establishment of non-native species which may be detrimental to native wildlife, including prohibiting the planting and spread of plants listed in Schedule 9.
- 13.2.16. Certain freshwater habitats and fish, macroinvertebrate and aquatic plant species are also listed as 'Habitats of Principal Importance for Nature Conservation in England' and 'Species of Principal Importance for Nature Conservation in England' pursuant to Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act requires that local planning authorities have regard to the conservation of biodiversity in England, when carrying out their normal functions.
- 13.2.17. The Government has published standing advice (Natural England and Department of Environment, Food and Rural Affairs (Defra), 2019) to guide decision-makers on the determination of proposals with potential to affect protected species. The guidance sets out responsibilities and minimum requirements for survey and mitigation.
- 13.2.18. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transpose the requirements of The Water Framework Directive (WFD; EC Directive 2000/60/EC) into English law. Any proposed developments or activities that have the potential to affect the water environment require a WFD Assessment (WFDa). Compliance with the WFD means attainment of good ecological status, prevention of deterioration in status, and prevention of failure to achieve future attainment of good status where it is not already achieved within waterbodies. The WFD assessment for the Proposed Development is provided as Appendix 9D: WFD assessment (ES Volume III, Document Ref. 6.4).

13.3. Methodology

Desk study

- 13.3.13. An initial desk study was undertaken in 2018 as part of the PEA report in order to identify high-level baseline freshwater ecological conditions within the potential Zone of Influence (Zoi) of the Proposed Development.
- 13.3.14. This included information on statutory and non-statutory nature conservation designations, which was reviewed to identify designated sites and associated features of relevance to the scope of Chapter 13: Aquatic Ecology (ES Volume III, Document Ref. 6.2). This information is collated within Appendix 12C: Preliminary Ecological Appraisal Report (ES Volume III, Document Ref. 6.4) and is not duplicated here.
- 13.3.15. In addition, records of protected and notable species, aquatic and riparian invasive and non-native species (INNS) were obtained for a 2 km radius from the Site.
- 13.3.16. These records were obtained in December 2019 (and updated in December 2020) for the prior 10 years from a variety of sources as listed below:
- 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);
 - Environment Agency Ecology and Fish Explorer Database (Environment Agency, 2019);
 - 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.

Site Scoping

- 13.3.17. The PEA and desk study undertaken were used to inform the need for further survey scoping and detailed surveys of pond habitats, fish, macroinvertebrate and macrophyte surveys.

- 13.3.18. More than 137 waterbodies (see Figure 13-1: Surface Water Bodies within 200m in ES Volume II, Document Ref. 6.3 and Annex A, Table A.1) are present within the worst case Zol of the Proposed Development, initially defined as 200 m radius from the Site for fish, macroinvertebrates and macrophytes.
- 13.3.19. Nine of these waterbodies were artificial waterbodies, such as water storage tanks or cooling water ponds and were automatically scoped out of further surveys.
- 13.3.20. Further scoping for detailed aquatic surveys was then undertaken using a mixture of desk-based assessment, using Ordnance Survey (OS) mapping and aerial photographs, and field scoping surveys, which were undertaken in February 2020. This allowed scoping out of further detailed surveys still waterbodies that dry out, with the site surveys only being on permanent waterbodies.
- 13.3.21. As the design of the Proposed Development evolved and as the details of the works became clearer, it was possible to refine the Zol from the Proposed Development during construction, considering that the pathways for impacts vary depending of the type of works required. For waterbodies not located within the Site required for construction, consideration was also given to potential hydrological links to waterbodies within the Site.
- 13.3.22. Within proximity of the PCC Site, which will involve earthworks, the Zol during construction was defined as within and up to 50 m from the Site required for the works.
- 13.3.23. Where Connection Corridors construction works only involve above ground works using existing infrastructure, the Zol was defined as within the Site required for the works. This approach is considered precautionary as the area required for construction is likely to be narrower than the Site for Connection Corridors.
- 13.3.24. Throughout this scoping process: 86 waterbodies were scoped out as dry or being outside of the 200 m area from the current Site; an additional 31 were scoped out given that there is no likelihood of impacts based on the updated scope of works.
- 13.3.25. A total of 11 waterbodies (Table 13A-1) were scoped in for further assessment. Details of scoping decision are provided in Table A.1 - Annex A. Location of the surveys are provided as Figure B.1 (Annex B).
- 13.3.26. For some of the waterbodies scoped in the assessment (Belasis Beck, Holme Fleet, Waterbody 97, Pond 113 and Pond 114), no detailed fish, macroinvertebrate or macrophyte surveys could be undertaken as access was not available, but assessment was done on the basis of habitat and comparable local waterbodies and the potential for works to affect the ponds and watercourses.
- 13.3.27. The outbreak of the coronavirus (COVID-19) pandemic in spring 2020 and the subsequent government advice regarding workplace health and safety requirements has influenced the scope and approach to the ecological surveys planned for 2020.

13.3.28. This approach is seen to be consistent with the advice provided by Natural England within their 'Guidance on implications for Natural England's development management advice' (Natural England, 2020). This approach was also discussed on a site-specific basis and confirmed with Natural England throughout April 2020. A revised plan to undertake targeted surveys was finalised in May 2020 commencing soon after.

Table 13A- 1: Description of standing and flowing waterbodies scoped in for detailed aquatic species surveys

Waterbody	National Grid Reference (NGR)	Description – location (at the time of surveying- PEIR Stage)	Surveys undertaken
Pond 3 (Waterbody 3)	NZ 56506 25742	Large (3000 m ²) circular pond located in an industrial area on the northern area of the Proposed Development. Close proximity (<50 m) to the PCC Site	Fish, macrophyte and macroinvertebrate surveys
Pond 9 (Waterbody 9)	NZ 56710 26133	Large (20,000 m ²) rectangular shaped pond located on a sand dunes system (Coatham Sands) on the northern area of the Proposed Development. Close proximity to the PCC Site.	Fish, macrophyte and macroinvertebrate surveys
Pond 14 (Waterbody 14)	NZ 56986 25902	Large (10,000 m ²) rectangular shaped pond located on a sand dunes system (Coatham Sands) on the northern area of the Proposed Development. Close proximity (<50 m) to the PCC Site.	Fish, macrophyte and macroinvertebrate surveys
The Mill Race (Waterbody 30)	NZ 57823 23277	Small, linear ditch (1 m wide) which has been realigned and straightened over time to accommodate construction within the Site. Tributary of The Fleet. Within the Site for the construction of the CO ₂ Gathering Network and Water Connection Corridor.	Fish and macroinvertebrate surveys only
Dabholm Gut (Waterbody 31)	NZ 56480 23826	Artificial channel of approximately 1km length left following historical land reclamation to accommodate construction within the Site. Located within the Site boundary on the eastern area of the Proposed Development. Within the Site for the construction of the CO ₂ Gathering Network and Water Connection Corridor.	Fish and macroinvertebrate surveys
The Fleet (Waterbody 23)	NZ 56959 24105	Moderately sized (4 m wide, 1 m deep) linear, modified and historically realigned and straightened stretch. Tributary of Dabholm Gut. Located within the Site boundary on the eastern area of the Proposed Development. Within the Site for the construction of the CO ₂ Gathering Network and Water Connection Corridor.	Macroinvertebrate surveys, not considered suitable for fish
Belasis Beck (Waterbody 95 and 121)	NZ 47373 23267	Moderately sized wide beck within the Site that rises from ponds in Belasis Hall Technology Park and flows east for 2 km before its confluence with Holme Fleet within Salthome Nature Reserve at NZ 49071 23577. Tributary	No access

Waterbody	National Grid Reference (NGR)	Description – location (at the time of surveying- PEIR Stage)	Surveys undertaken
		of Holme Fleet. Within the Site for the construction of the CO ₂ Gathering Network.	
Unnamed Drain (Waterbody 97)	NZ 50876 24341	Moderately sized linear drain (~3m wide). Located within the Site boundary to the west of the Proposed Development. Within the Site for the construction of the CO ₂ Gathering Network.	No access
Holme Fleet (Waterbody 95)	NZ 49078 23549	Holme Fleet is a marshland channel that meanders between Cowpen Marsh and Port Clarence. It is around 5.6 km in length and flows through several marshland open waterbodies and reedbeds. Within the Site for the construction of the CO ₂ Gathering Network.	No access
Pond 113 (Waterbody 113)	NZ 51537 23640	Small pond on the western side of the Proposed Development. Within the Site for the construction of the CO ₂ Gathering Network.	No access
Pond 114 (Waterbody 114)	NZ 51332 23609	Small pond on the western side of the Proposed Development. Within the Site for the construction of the CO ₂ Gathering Network.	No access

Field surveys

- 13.3.29. Field surveys were undertaken on the waterbodies and using the methods shown on Table 2 below.
- 13.3.30. For macroinvertebrates, watercourse surveys were undertaken at sites representative of the range of habitats present in the wider sections of the river systems.
- 13.3.31. Fisheries surveys on Dabholm Gut and Mill Race were completed at sites where land access permitted. These surveys give a good representation of the habitat type and fish present in the river/ditches in the local area.
- 13.3.32. All surveys were undertaken during suitable weather conditions and within the optimal survey season for each survey type.

Table 13A- 2: Survey sites, location, and aquatic survey methods*

Survey Site	Aquatic survey methods		
	Fish	Macroinvertebrate	Macrophytes
Pond 3		eDNA (22/05/20)	PSYM (08/07/20)
Pond 9		eDNA (22/05/20)	PSYM (08/07/20)
Pond 14		eDNA (22/05/20)	PSYM (08/07/20)
The Mill Race	Electric fishing (07/07/20)	Standard Environment Agency (EA) method (22/05/20)	Scoped out
Dabholm Gut	Electric fishing (07/07/20)	Standard EA method (22/05/20)	Scoped out
The Fleet	Scoped out	Standard EA method (22/05/20)	Scoped out

Ponds

- 13.3.33. To assess their biological quality, Pond 3, Pond 9 and Pond 14 were surveyed following the Predictive SYstem for Multimetrics (PSYM) (Pond Action, 2002) method. Surveys were completed on the 8th July 2020, within the optimal PSYM survey season (summer).
- 13.3.34. PSYM is a standard method which provides an assessment of the biological quality of a pond, based on a range of environmental data and metrics derived from its macrophyte and macroinvertebrate assemblages. It allows the categorisation of the quality and 'biotic integrity' of a pond in a national context, by using environmental data to generate a range of 'expected' metrics for macrophyte and macroinvertebrate assemblages, which are then compared to the metrics calculated based on the results of a site survey.
- 13.3.35. The method involves the collection of physical data, macroinvertebrate sampling and macrophyte recording. Therefore, it is also useful in providing a picture of the value of macroinvertebrate and macrophyte communities and species within a pond.
- 13.3.36. Macroinvertebrate samples were collected using 'sweep sampling' for three minutes followed by a one-minute hand search of larger substrates (where possible) using a standard Freshwater Biological Association (FBA) pattern pond net (mesh size: 1 mm).
- 13.3.37. Pond macrophytes were surveyed by walking or wading the entire perimeter of the dry and shallow water areas of the water body and using a grapnel where necessary to sample and record submerged species. The aim of plant recording was to make a list of wetland plants present within the outer edge of the pond.

- 13.3.38. For analysis and categorisation described above, environmental, macroinvertebrate, macrophyte and environmental data were submitted to the Freshwater Habitats Trust (FHT).
- 13.3.39. In addition, environmental DNA (eDNA) surveys were completed for fish on the 22nd May 2020 on each pond using commercial eDNA extraction kits. For each pond, 20 water sub-samples were 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 was recorded.
- 13.3.40. The eDNA filters were sent to Nature Metrics for processing and data analysis.

Watercourses

- 13.3.41. The Mill Race, The Fleet and Dabholm Gut were surveyed for fish and macroinvertebrates at sites described in Table 3 below.
- 13.3.42. Macroinvertebrate surveys were conducted at sites deemed representative of the range of habitats present within stretches of these watercourses potentially impacted by the Proposed Development. Macroinvertebrate surveys were carried out within the optimal spring (22nd May 2020) survey season for macroinvertebrate sampling for the watercourses listed in Table 13A-1. Weather conditions at the time of the survey were dry and the watercourses were not in spate.
- 13.3.43. At each sample site a macroinvertebrate sample was taken by an experienced aquatic ecologist, using a standard Freshwater Biological Association (FBA) pattern pond net (mesh size: 1 mm), in line with the standard Environment Agency methodology (Environment Agency 2014). The instream habitats were 'sweep sampled' for three minutes as kick sampling (followed by a hand search) was not possible due to soft silt substrate and/or watercourse depth.
- 13.3.44. Both semi-quantitative and quantitative electric fishing surveys were completed at Mill Race and Dabholm Gut at locations showed on Table 3 below. Surveys were carried out on the 7th July 2020 using two operatives (one anode operator and one netting fish).

Table 13A- 3: Fisheries survey site details for watercourses

Site	Upstream survey extent	Downstream survey extent	Survey date	Length (m)	Mean width (m)	Area (m ²)
Mill Race	NZ 57823 23277	NZ 57763 23348	07/07/2020	95	0.5	47.5
Dabholm Gut	NZ 56668 23714	NZ 56606 23753	07/07/2020	75	1	75

- 13.3.45. A Smith-Root LR-24 Electrofisher backpack was employed fishing in an upstream direction between stop nets and/or pre-existing barriers as per the European Committee for Standardization (CEN, 2003; 2006) and Environment Agency (EA, 2016) methodology. The length of each watercourse surveyed varied due to pre-existing barriers (Mill Race) and dense in-stream reed (*Phragmites australis*) growth (Dabholm Gut).

- 13.3.46. All fish immobilised were captured using hand-nets and transferred to holding tanks prior to data collection. Where multiple runs were completed, fish from each run were kept separate. Fish were identified to species level, measured to fork length (mm) and held in oxygenated tanks before being released at the site unharmed, close to where they were captured following completion of data collection.
- 13.3.47. Instream habitat surveys were conducted for each survey site to collect information on a variety of habitat characteristics important for fish. Average water depth (to the nearest 0.1 m) and wetted river width (to the nearest 0.1 m) were recorded. Substratum [bedrock, boulders (> 25.6 cm longest axis length), cobbles (6.4–25.6 cm), pebbles (1.6–6.4 cm), gravel (0.2–1.6 cm), fine sand (< 0.2 cm)] and flow (riffle, run, pool, glide or no perceptible flow) categories were recorded as a percentage according to their contribution by surface area.

Laboratory analysis of macroinvertebrate samples

- 13.3.48. For both the watercourses and the ponds, the samples were preserved in 70% industrial methylated spirit (IMS) for laboratory processing.
- 13.3.49. Detailed sorting of the entire samples was carried-out by a trained and experienced taxonomist in the laboratory using stereo-microscopes (under low power) and appropriate identification keys in line with Environment Agency (2014) guidance. Macroinvertebrates were identified to 'mixed taxon level',³ which is to species level (where practicable) for the majority of groups.
- 13.3.50. Macroinvertebrates removed from the samples have been preserved and will be stored until they will no longer be required.

Data analysis

Macroinvertebrates

- 13.3.51. For watercourses, to provide an indication of the conservation value and sensitivity of macroinvertebrate communities and species, the macroinvertebrate data was analysed using the following pressure-specific biotic indices (more information on these is provided in Appendices D to G):
- Whalley, Hawkes, Paisley and Trigg (WHPT) Average Score Per Taxon (ASPT) and Number of Taxa (NTAXA) metrics - used as indicators of organic pollution/ general degradation in rivers;
 - Proportion of Sediment-sensitive Invertebrates (PSI) scores – used to indicate the level of sedimentation at a site (watercourses only);
 - Lotic Invertebrate index for Flow Evaluation (LIFE) scores – used to evaluate the flow regime at a site (watercourses only);
 - Community Conservation Index (CCI) – used to indicate the conservation value of macroinvertebrate communities at a site (watercourses and ponds).

³ As described in Environment Agency (last issue: 2014) Freshwater macroinvertebrate analysis of riverine samples, Operational instruction 024_08

13.3.52. For ponds, the macroinvertebrate data was analysed in terms of Community Conservation Index (CCI) and of the metrics used within the PSYM methodology (Biological Monitoring Working Party (BMWP) ASPT and NTAXA) only, as the PSI and LIFE indices are not designed for standing waters.

Macrophytes

13.3.53. The macrophyte data was analysed using the range of metrics used within the PSYM methodology, as follows:

- Number of submerged and emergent plant species - a count of the number of submerged and emergent plant species within a pond (floating leaved not included as the abundance does not decline with increasing degradation);
- Trophic ranking score – a measure of the trophic rank/nutrient status of a pond; and
- Uncommon species index – the number of rare plants within the pond.

13.3.54. It is important to note that the PSYM methodology differentiates between common and uncommon species to classify the quality of a pond habitat, however, this does not mean that an uncommon species is necessarily rare or restricted in range.

Fish

13.3.55. Where multiple runs were completed, density estimates were derived from estimates of absolute abundance based on the three-catch removal method. Estimates of population sizes were calculated by the Maximum Likelihood Method (Carle & Strub 1978). In all cases the population densities were expressed as numbers/100 m². Where sampling for certain species were inefficient or catches were not suitable for depletion estimates minimum density estimates (numbers caught per 100m²) were recorded.

13.3.56. Where the number of fish captured were sufficient, length distributions were produced. This methodology involves assigning each fish length of a species into 5 mm size class and determining the total number of fish in each size class.

Ponds

13.3.57. For analysis and categorisation of the ponds, environmental, macroinvertebrate, macrophyte and environmental data were submitted to the Freshwater Habitats Trust (FHT).

Nature Conservation Evaluation

13.3.58. Evaluation of the relative nature conservation value of the identified ecological features within a site (encompassing nature conservation designations, ecosystems, habitat and species) is required to inform EclA.

13.3.59. This report presents the evaluation of aquatic habitats, fish, macroinvertebrate and aquatic plant species and assemblages, while the impact assessment is presented in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2).

- 13.3.60. The method of evaluation that has been utilised has been developed with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the UK and Ireland – Terrestrial, Freshwater and Coastal and Marine – Second Edition* (CIEEM, 2019). These guidelines give advice on scoping and carrying out environmental assessments and place appraisal in the context of relevant policies. Data received through consultation, desk-based studies and field-based surveys are used to allow ecological features of nature conservation value or potential value to be identified, and the main factors contributing to their value described and related to available guidance.
- 13.3.61. Aquatic macroinvertebrate/plant communities and individual species can be of nature conservation value for a variety of reasons, and their relative value should always be determined on a case by case basis to demonstrate a robust assessment process. Value may relate, for example, to the uniqueness of the assemblage, or to the extent to which species are threatened throughout their range, or to their rate of decline. The value of the species assemblages associated with the site has been defined with reference to the geographical level at which it is considered to matter.
- 13.3.62. This assessment has been made with reference to published guidance and criteria where available e.g. criteria to assess relative value within the context of Redcar and Cleveland are given in 'Guidelines for the selection of Local Wildlife Sites (LWS) in the Tees Valley (Tees Valley Biodiversity Partnership, 2010) and nationally in Guidelines for the Selection of Biological Sites of Special Scientific Interest (SSSIs) (Bainbridge *et al.*, 2013).
- 13.3.63. The identified guidance and criteria are not definitive and other criteria have been applied as relevant and appropriate to reach a decision on relative nature conservation value. For example, the previously described CCI index has been used to inform assessment of nature conservation value for aquatic macroinvertebrates.
- 13.3.64. Certain aquatic macroinvertebrate and aquatic plant species are listed as 'Species of Principal Importance for Nature Conservation in England' pursuant to Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act requires that local planning authorities have regard to the conservation of biodiversity in England, when carrying out their normal functions.
- 13.3.65. Historic records of macroinvertebrates and macrophytes at the chosen sites were checked where possible against the above relevant legislation reviews for specific macroinvertebrate and macrophyte groups before surveys and records gained through surveys were also checked.

Limitations

- 13.3.66. 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 present within the 2 km of the Site. If records have not been provided, this does not confirm absence from the study area.

- 13.3.67. The area of each electric fishing survey site differed between watercourses due to overgrown vegetation restricting access in some watercourses. Therefore, fish numbers recorded in some watercourses could underrepresent the abundance of the population present, although the assemblage of species was represented.
- 13.3.68. Given the nature of aquatic macroinvertebrate surveys it is not possible to be certain that all of the species present in a waterbody will be detected. Where juvenile or damaged specimens were collected, species level identification is not always possible. Not all macroinvertebrate species that use waterbodies are present at all times of year and therefore some may be overlooked when surveying. Other species that may be present at other times of year, sporadically and/or in low numbers may not have been recorded. This is not considered a significant limitation here as standard methods were applied and the data collected is considered representative of the conditions present and appropriate for assessment of value.
- 13.3.69. Sampling of watercourses for macroinvertebrates, was limited by time constraints and could only be completed in spring, and not in autumn (both seasons are usually recommended). An additional autumn survey would have provided a more complete data set against which the ecological value could have been assessed. Therefore, it is possible that some groups, such as mayfly larvae, are under-represented in the data set collected, with consequently a potential under-estimation of the conservation value of the watercourses surveyed.
- 13.3.70. Sweep sampling was undertaken on all watercourses due to safety considerations and is generally considered to be suboptimal compared to 'kick sampling', however this is still a recognised collection method. Again, in principle, this could lead to under-estimating macroinvertebrate diversity in the watercourses surveyed. Nonetheless, as all three watercourses sampled had assemblages of indicative of poor to moderate biological water quality and characterised by species tolerant of heavily sedimented conditions it is unlikely that the survey under-estimates the macroinvertebrate diversity.
- 13.3.71. There was no access available for detailed surveys at Pond 1, Pond 113 and Pond 114, Belasis Beck and Holme Fleet, but based on aerial photographs, the habitats appear to be typical of pond and watercourse habitats within the wider area and similar to those surveyed. A precautionary approach has been taken (see paragraph 13.5.8) to reduce the risk of under-estimation of the conservation value of those ponds.

13.4. Results

Nature Conservation Designations

13.4.13. Review of the information collated in Appendix 12C: PEA Report (ES Volume III, Document Ref. 6.4) identified no sites that are designated for aquatic habitats, species or their assemblage were present within a 15 km radius from the Site.

Habitats

13.4.14. The PEA and desk study indicated that, although the watercourses and ponds scoped in the assessment are not priority habitats under Section 41 of the NERC Act 2006, they are covered by the Tees Valley Local Biodiversity Action Plan (LBAP).

13.4.15. Table 4 below summarised the habitat conditions at the time of the site surveys within the waterbodies scoped in.

Table 13A- 4: Summary of habitat conditions for ponds and watercourses scoped in

Waterbody	Habitat description
The Mill Race	Run habitat, with the bed dominated by silt and clay. Woody debris (10%) and filamentous algae (5%) present within the watercourse. Bed stability is soft but stable. The watercourse is heavily shaded by overhanging trees and vegetation. It is 1 m wide, 10 cm deep and flowing at approximately 10 to 25 cm/sec, with clear water. The banks are steeply sloping, vegetated and composed of earth. Vegetation on both bank tops is complex comprising mainly of trees, brambles, nettles, thistles and grasses. Surrounding land use consists of a broadleaved woodland and scrub with a road, footpath and buildings nearby. In-channel culverts present upstream and downstream of survey location (Annex C, Plates C.1 & C.2).
Dabholm Gut	Run habitat, with the bed dominated by silt and clay. Macrophytes (40%) and filamentous algae (20%) present within the watercourse. Macrophytes are dominated by <i>Phragmites australis</i> . Bed stability is soft but stable. The watercourse is lightly shaded by overhanging trees and vegetation. It is 3 m wide, 70 cm deep and flowing at approximately less than 10 cm/sec, with clear water. The banks are gently sloping, vegetated and composed of earth. Vegetation on both bank tops was complex comprising mainly of trees, brambles, nettles and grasses. Surrounding land use consists of scattered broadleaved trees and scrub with a nearby road and buildings. (Annex C, Plates C.3 & C.4).
The Fleet	Run habitat, with the bed dominated by silt and clay. Macrophytes (60%) present within the watercourse. Macrophytes are dominated by <i>Sparganium erectum</i> . Bed stability is soft and dangerous. The watercourse is unshaded and has moderately turbid water. It is 4 m wide, over 1 m deep and flowing at approximately less than 10 cm/sec. The banks are steeply sloping, vegetated and composed of earth. Vegetation on the left bank top is complex comprising mainly of trees, brambles, nettles and grasses, and simple on the right bank top, comprising nettles, brambles and grasses. Surrounding land use consists of scattered broadleaved trees, tall herbaceous plants and scrub with a nearby road and buildings. (Annex C, Plates C.5 & C.6).
Pond 3	Pond 3 is a large (3000 m ²) circular pond with a fringe of emergent macrophytes along the banks (10% cover) and one central vegetated island. The water levels were low at the time of survey, slightly turbid and the pond is

Waterbody	Habitat description
	unshaded. The dominant substrate types within the pond are clay, silt and sand. (Annex C, Plates C.7 and B.8)
Pond 9	Pond 9 is a large (20,000 m ²) rectangular shaped pond with emergent macrophytes throughout (80% cover). The water levels were low at the time of survey, slightly turbid and the pond is unshaded. The dominant substrate types within the pond are clay, silt and sand. (Annex C, Plate C.9)
Pond 14	Pond 14 is a large (10,000 m ²) rectangular shaped pond with a fringe of emergent macrophytes along the banks (10% cover). At the time of survey, the water levels were low resulting in two discreet areas of standing water. The water was clear, and the pond is unshaded. The dominant substrate types within the pond are clay, silt and sand. (Annex C, Plates C.10 and C.11)

Fish

Desk Study

- 13.4.16. A number of fish species are covered by the Tees Valley Local Biodiversity Action Plan (LBAP): Atlantic salmon (*Salmo salar*), brown/sea trout (*Salmo trutta*), European eel (*Anguilla anguilla*), brook lamprey (*Lampetra planeri*), sea lamprey (*Petromyzon marinus*) and river lamprey (*Petromyzon fluviatilis*). Some of the species identified are also national priorities for nature conservation through their listing on Section 41 (S41) of the NERC Act.
- 13.4.17. Although these might be present and use watercourses in the local area, no records were returned from the desk-study, with the exception of European eel (*Anguilla anguilla*), in Ormsby Beck, at a site located 2km from the Site. Although this site is a considerable distance away, it can be used as a proxy site to predict the fish species assemblages in the absence of additional data when assessing the impact of the Proposed Development.
- 13.4.18. Migratory fish species such as European 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 (ES Volume III, Document Ref. 6.4).
- 13.4.19. Records for another twelve fish species were returned within 2 km from the Site for the ten years prior the desk-study being undertaken (2010-2020). These records were limited to outside of the Site in the River Tees (Tees Barrage), Ormsby Beck and an unnamed fishing pond.
- 13.4.20. These included the following common species: 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 x Abramis brama*), three-spined stickleback (*Gasterosteus aculeatus*), stone loach (*Barbatula barbatula*), common Carp (*Cyprinus carpio*) and two ornamental species: goldfish (*Carassius auratus*) and orfe (*Leuciscus idus*).

Field Study

- 13.4.21. No fish species were detected in Pond 9. Assuming that the eDNA analyses undertaken reflect species currently present rather than former presence, the results of the eDNA surveys carried out (Annex H, Table H.1) on Pond 3 and Pond 14 demonstrate that:

- Pond 3 supports a total of six species, including common carp (*Cyprinus carpio*) perch (*Perca fluviatilis*), rudd (*Scardinius erythrophthalmus*), roach (*Rutilus rutilus*), European eel (*Anguilla anguilla*) and dace (*Leuciscus leuciscus*);
 - Pond 14 supports two fish species: three-spined stickleback (*Gasterosteus aculeatus*) and minnow (*Phoxinus phoxinus*).
- 13.4.22. For watercourses, three-spined stickleback was the only fish species captured at Mill Race in low densities, with three individuals per 100 m² (Annex H, Table H.2).
- 13.4.23. Two species were captured at Dabholm Gut, of these three-spined stickleback were the dominant species in addition to a low number of European eel, with densities at 62.67 and 5.33 per 100 m² respectively (Annex H, Table H.2).
- 13.4.24. In Dabholm Gut, three-spined stickleback ranged from 15 – 55 mm in length and where abundant comprised of two distinct size classes. Individuals in the small class <35 mm were more abundant than those the larger individuals, likely representing the 1+ and 2+ age groups.
- 13.4.25. In Dabholm Gut, European eel ranged from 110 – 250 mm in length and comprised of two size classes. Individuals in the larger class >200 mm were more abundant than the smaller individual.
- 13.4.26. Regarding Dabholm Gut, the composition of the fish assemblage is probably typical for a very small lowland stream/ditch which is subjected to saline ingress being in such proximity to the tidal reach. However, the lack of intertidal species such as European flounder (*Platichthys flesus*) suggests there is at least a partial barrier to fish movements.
- 13.4.27. Fish species richness and densities were found to be higher at Dabholm Gut than the Mill Race. The reason for their intra-site differences in fish assemblage is believed to be the result of number culverts noted on site which likely prevent upstream fish passage unless under high flows i.e. Q10 flows. Furthermore, both Dabholm Gut and Mill Race are subjected to annual dredging with evidence of a high loading of silts and fines.
- 13.4.28. The low abundance of fish in the Mill Race is probably a result of its size and habitat characteristics. The habitat at the Mill Race is characterised as a heavily modified channel (approx. 0.5 m wide) with steep banks and artificial hard base covered in a shallow layer of small gravels and sand. Overall, instream habitat was lacking but heavy shading was provided by the surrounding riparian vegetation and trees. The channel was predominantly a riffle throughout its course with average depths of < 5 cm apart from an isolated pool at the upstream extent which results from the drop of a small weir (approx. 0.3 m head height) at the exit of a culvert eroding a shallow pool (approx. 0.2 m deep).
- 13.4.29. Dabholm Gut was noted as being much wider and deeper with averages of 1.5 and 0.3 m respectively with instream habitat from cobbles and vegetation (common reed *Phragmites australis*). Dabholm Gut is relatively exposed with little shading which resulted in high quantities of filamentous algae.

Macroinvertebrates

Desk Study

13.4.30. The desk study identified the presence of six notable macroinvertebrate species (Table 6) within 2 km of the Site within the last 10 years prior to the desk study being undertaken (2010-2020).

Table 13A- 5: Notable macroinvertebrate species recorded within 2 km from the Site

Common name	Latin Name	Location	Year	Nature Conservation Status (GB)	Notes on ecology
Spattered diver	<i>Agabus conspersus</i>	Cowpen Marsh	2015	Nationally Scarce Excludes Red Listed taxa2	Confined to brackish waters, usually amongst vegetation in coastal lagoons and ditches (Foster et al., 2011)
Water scavenger beetle	<i>Cercyon (Cercyon) littoralis</i>	Coatham Dunes	2015	Nationally Scarce. Excludes Red Listed taxa2	Found in decaying wrack on the beach (Foster et al., 2014)
Smaller Noterus	<i>Noterus crassicornis</i>	Seal Sands and Cowpen Marsh	2015	Nationally Scarce Excludes Red Listed taxa2	This flightless species inhabits base-rich lakes, ponds and grazing level drainage ditches. (Foster et al., 2011)
Truefly	<i>Dolichopus arbustorum</i>	Cowpen Marsh	2015	Nationally Scarce. Excludes Red Listed taxa2	Terrestrial adult but larvae are aquatic. Immature stages not well known but found in damp soils or inter-tidal zones of the sea shore (Smith, 1989)
Truefly	<i>Rhaphium lanceolatum</i>	Cowpen Marsh	2015	Nationally Scarce. Excludes Red Listed taxa2	Terrestrial adult but larvae are aquatic. No details about this species but other <i>Rhaphium</i> species have been found in sand at the edge of ponds (Smith, 1989)
Mollusc	<i>Hydrobia acuta subsp. neglecta</i>	Greenabella	2015	Nationally Scarce. Includes Red Listed taxa. Near threatened	Found in brackish pools or lagoons along the coast (The Conchological Society of Great Britain and Ireland website)

13.4.31. However, none of these species are currently considered threatened and have statutory protection. They are all typical of habitats present within the wider area and therefore not considered to be locally restricted in range.

13.4.32. In addition, the Site boundary for the Proposed Development has been reduced since the desk study was undertaken, these records are no longer within the Zol of the Proposed Development.

Field Study

Pond 3

- 13.4.33. The sample collected had a relatively high diversity (Annex I, Table I.1), with 32 taxa recorded, 13 taxa having been identified to species level and 19 taxa to genus level or higher.
- 13.4.34. The taxa recorded included a range of taxa typical of lowland ponds, including snails (*Bithynia tentaculata*, *Gyraulus albus*), leeches (*Helobdella stagnalis*), crustaceans (*Crangonyx* sp.), true bugs (*Gerris* sp., *Nepa cinerea*), mayflies (*Caenis horaria*, *Caenis robusta*), caddisflies (*Agraylea multipunctata*, *Athripsodes aterrimus*) and damselflies (*Ischnura elegans*). These included some clean water indicators such as the caddisfly *Mystacides longicornis* and the mayfly *Caenis horaria*. The relatively high diversity and presence of clean water indicators are reflected in the moderate BMWP score (75.0) and ASPT value (4.7).
- 13.4.35. The CCI score for the sample collected is indicative of a 'Fairly High' (10.4) conservation value due to the pond supporting a community of high taxon richness. However, most species recorded are relatively common, with a few exceptions including the mayfly *Caenis robusta*, the caddisfly *Agraylea sexmaculata* and the lesser water boatman *Micronecta scholzi*. All three of these species are classified as "Local" or locally important under the CCI index, but do not have any statutory or non-statutory protection are relatively widespread in England or increasing in range (Macadam, 2016; Wallace et al., 2010, Cook, 2015).

Pond 9

- 13.4.36. Diversity was moderately high within the sample collected (Annex I, Table I.2), with 18 taxa recorded, six taxa having been identified to species level and 12 taxa to genus level or higher.
- 13.4.37. These included a range of taxa typical of lowland ponds, such snails (*Radix balthica*), leeches (*Haemopsis sanguisuga*), mayflies (*Cloen dipterum*), beetles (*Agabus nebulosus*) and dragonflies (*Aeshna mixta*, *Sympetrum striolatum*). The moderate diversity and presence of clean water indicators such as the dragonflies *Aeshna mixta* and *Sympetrum striolatum* are reflected in the moderate BMWP score (48.0) and ASPT value (4.8).
- 13.4.38. The CCI score for the sample collected is indicative of a 'Moderate' (5.5) conservation value with all species recorded being relatively common, except for the horse leech *Haemopsis sanguisuga* which is 'Occasional' (Conservation Score 4) under the CCI index but does not have any statutory or non-statutory protection.

Pond 14

- 13.4.39. Diversity was relatively high within the sample collected (Annex I, Table I.3), with 27 taxa recorded, 11 taxa having been identified to species level and 16 taxa to genus level or higher.
- 13.4.40. These included a range of taxa typical of lowland ponds, such as snails (*Radix balthica*, *Galba truncatula*), mayflies (*Cloen simile*), caddisflies (*Limnephilus*

lunatus, *Oecetis ochracea*), beetles (*Hydroglyphus geminus*, *Hygrotus inaequalis*) and dragonflies (*Sympetrum striolatum*). The relatively high taxonomic diversity and presence of a few clean water indicator taxa, such as the caddisfly *Oecetis ochracea* and the common darter *Sympetrum striolatum* are reflected in the moderate BMWP score (67.0) and APST value (4.5).

- 13.4.41. The CCI score for the sample collected is indicative of a 'Moderate' (9.5) conservation value with all species recorded being relatively common, with the exception of the beetle *Hydroglyphus geminus*. The species is classified as "Local" or locally important under the CCI index, but does not have any statutory or non-statutory protection.

The Mill Race

- 13.4.42. Diversity was moderate within the sample collected (Annex I, Table I.4), with 23 taxa recorded, 13 taxa having been identified to species level and 10 taxa to genus level or higher.
- 13.4.43. The sample mainly consists of pollution tolerant taxa, including some snails (*Radix balthica*, *Potamopyrgus antipodarum*), mussels (*Pisidium* sp.), crustaceans (*Gammarus pulex*, *Asellus aquaticus*), true bugs (*Plea minutissima*, *Sigara dorsalis*) and beetles (*Halipus flavicollis*, *Halipus lineaticollis*, *Halipus obliquus*). This is reflected in the relatively low ASPT value (4.1), indicative of a poor to moderate water biological quality.
- 13.4.44. The CCI score is indicative of 'Low' (4.8) conservation value, with only common species recorded and the absence of statutory or non-statutory designated species and of species of conservation interest, with the exceptions being the backswimmer *Plea minutissima* and the beetle *Halipus obliquus*, which are considered 'Occasional' (Conservation Score 4) under the CCI index, but do not have any statutory or non-statutory protection.
- 13.4.45. In terms of flow sensitivity, the LIFE scores are indicative of communities adapted to slow flowing or standing waters, with the majority of taxa (67%) primarily associated with slow or standing water (Flow group IV), such as *Radix balthica*, *Halipus flavicollis* and *Limnephilus lunatus*. This also means that the communities would also have a low sensitivity to reduced flows.
- 13.4.46. The PSI score is indicative of 'heavily sedimented' conditions, with 61% of the species recorded being highly insensitive to fine sediment cover.

Dabholm Gut

- 13.4.47. Diversity was relatively high within the sample collected (Annex I, Table I.5) with 31 taxa recorded, 11 taxa having been identified to species level and 20 taxa to genus level or higher. These taxa include various snails (*Radix balthica*, *Potamopyrgus antipodarum*, *Lymnaea stagnalis*, *Armiger crista*), mussels (*Pisidium* sp.), crustaceans (*Gammarus zaddachi*, *Asellus aquaticus*), true bugs (*Sigara* sp.), beetles (*Elmis aena*, *Oulimnius* sp.) and caddisflies (*Limnephilus lunatus*, *Lype phaeopa*).
- 13.4.48. The lack of clean water indicators is reflected in the moderate ASPT value (4.0), indicative of a watercourse of poor to moderate water biological quality.

- 13.4.49. The CCI score is indicative of a ‘Low’ (4.1) conservation value, with only common species recorded and the absence of statutory or non-statutory designated species and of species of conservation interest.
- 13.4.50. In terms of flow sensitivity, the LIFE scores are indicative of communities adapted to slow flowing or standing waters, with the majority of taxa (68%) primarily associated with slow or standing water (Flow group IV), such as *Radix balthica*, *Ischnura elegans* and *Limnephilus lunatus*. This also indicates that the communities would have a low sensitivity to reduced flows.
- 13.4.51. The PSI score is indicative of ‘heavily sedimented’ conditions, with approximately 67% of taxa recorded being highly insensitive to fine sediment cover.

The Fleet

- 13.4.52. Diversity was moderate within the sample collected (Annex I, Table I.6), with 25 taxa recorded, 9 taxa having been identified to species level and 16 taxa to genus level or higher. These taxa included some snails (*Radix balthica*, *Potamopyrgus antipodarum*), crustaceans (*Asellus aquaticus*), true bugs (*Sigara sp.*), damselflies (*Ischnura elegans*) and beetles (*Gyrinus substriatus*, *Nebrioporus elegans*, *Agabus didymus*, *Helophorus brevipalpis*).
- 13.4.53. The lack of clean water indicators is reflected in the low ASPT value (4.0), indicative of a watercourse of poor to moderate water biological quality.
- 13.4.54. The CCI score is indicative of a ‘Low’ (4.0) conservation value due to most species being relatively common, except for the true bug *Plea minutissima* which is considered ‘Occasional’ (Conservation Score 4) under the CCI index but does not have any statutory or non-statutory protection.
- 13.4.55. In terms of flow sensitivity, the LIFE scores are indicative of communities adapted to slow flowing or standing waters, with the majority of taxa (60%) primarily associated with slow or standing water (Flow group IV), such as *Radix balthica*, *Ischnura elegans* and *Helophorus brevipalpis*. This also indicates that communities would also have a low sensitivity to reduced flows.
- 13.4.56. The PSI score is indicative of ‘heavily sedimented’ conditions with approximately 62% of taxa recorded being highly insensitive to fine sediment cover.

Macrophytes

Desk Study

- 13.4.57. The PEA and desk-based study revealed that no rare or notable species have been recorded within the Site or within the desk study area (either recently or historically).
- 13.4.58. A range of common macrophyte records were returned by ERIC, with recent records being 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.

Field Study

Pond 3

- 13.4.59. Pond 3 supports a diverse macrophyte community, with a total of 24 species recorded within the outer pond edge (Annex J, Table J.1), 22 of which are emergent macrophytes species and two submerged macrophyte species.
- 13.4.60. In terms of the PSYM methodology, five species recorded within the pond including spiked water milfoil (*Myriophyllum spicatum*), hornwort (*Ceratophyllum demersum*) and lesser bulrush (*Typha angustifolia*) are relative uncommon in the national pond database used for PSYM. Nevertheless, these are relatively common in England and none of the species have statutory protection. Ragged robin *Lychnis flos-cuculi* is listed as 'Near Threatened' in England based on International Union for Conservation of Nature (IUCN) categories (Stroh et al., 2014) and is also present on the list of wetland species used for the selection of LWS in the Tees Valley (Tees Valley Biodiversity Partnership, 2010).
- 13.4.61. In addition, three other species present on the list of wetland species used for the selection of LWS in the Tees Valley were recorded: sneezewort *Achillea ptarmica*, yellow iris *Iris pseudocarus* and greater bird's-foot-trefoil *Lotus pedunculatus*.

Pond 9

- 13.4.62. Pond 9 supports a diverse community of macrophyte species (Annex J, Table J.2), with a total of eighteen species recorded within the outer pond edge, of which thirteen species of emergent macrophytes and five submerged macrophyte species.
- 13.4.63. In terms of the PSYM methodology, there were seven 'uncommon' species recorded within the pond, including small pondweed (*Potamogeton berchtoldii*), water crowfoot (*Ranunculus aquatilis*) and horned pondweed (*Zannichellia palustris*).
- 13.4.64. Nevertheless, these are relatively common in England, none of the species have statutory protection and the community recorded is typical of standing waters.

Pond 14

- 13.4.65. Pond 14 supports a diverse macrophyte community, with a total of twenty species recorded within the outer pond edge (Annex J, Table J.3), sixteen of which are emergent macrophytes species and four submerged macrophyte species.
- 13.4.66. In terms of the PSYM method, there were five uncommon species recorded within the pond including sea club-rush (*Bolboschoenus maritimus*), spiked water milfoil (*Myriophyllum spicatum*) and horned pondweed (*Zannichellia palustris*).
- 13.4.67. Nevertheless, these are relatively common in England and none of the species have statutory protection and the community recorded is typical of standing waters.

- 13.4.68. In addition, marsh pennywort (*Hydrocotyle vulgaris*), present on the list of wetland species used for the selection of LWS in the Tees Valley (Tees Valley Biodiversity Partnership, 2010) was also recorded.

Invasive Non-Native Species

Desk Study

- 13.4.69. The PEA and desk-study identified records for a range of aquatic INNS species listed on Schedule 9 of the Wildlife & Countryside Act within the study area: 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 nuttallii*). In addition, there were records for species that are commonly found within riparian habitats including Himalayan balsam, Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*).
- 13.4.70. Apart from floating pennywort (*Hydrocotyle ranunculoides*), which was recorded in the Fleet during the PEA, none of these records are present within the Site with the other species recorded > 1.5 km from the Site.

Field Study

- 13.4.71. No invasive non-native species were recorded in Pond 9, however, the following invasive non-native species were recorded from the other waterbodies surveyed:
- the New Zealand mud snail *Potamopyrgus antipodarum* in Pond 14, The Mill Race, Dabholm Gut and The Fleet;
 - Crangonyx sp. (floridanus/pseudogracilis) in Pond 3; and
 - floating pennywort (*Hydrocotyle ranunculoides*) in The Fleet.

PSYM analysis

- 13.4.72. The PSYM analyses and categorisation data for Pond 3, Pond 9 and Pond 14 is provided as Annex K (Table K.1).
- 13.4.73. While for Pond 9, the number of macrophyte species recorded was similar to expected, for Pond 3 and Pond 14, it was above the expected number of species.
- 13.4.74. Trophic rank scores (TRS) were above expected (8.79 to 8.94), which is likely to reflect the fact that the ponds are all in latter stages of succession to swamp.
- 13.4.75. In terms of macroinvertebrates ASPT values were slightly below values expected for similar ponds, as were the number of Coleoptera and Odonata and Megaloptera species recorded.
- 13.4.76. This data results in none of the ponds being classified as priority ponds and classifying as follows:
- Pond 3 is of 'Moderate' quality (index of biotic integrity 67%);
 - Pond 9 is of 'Moderate' quality (index of biotic integrity 67%); and

- Pond 14 is of 'Moderate' quality (index of biotic integrity 72%).

13.5. Conclusions and nature conservation evaluation

- 13.5.13. This section provides a final assessment of the fish, macroinvertebrate and macrophyte species and assemblages recorded in association with the Site, to translate the preceding analysis to the geographic scale of nature conservation value used for EclA.
- 13.5.14. There is no reasonable likelihood of the features present being of international nature conservation importance, so this can be discounted. This is on the basis that the site lacks the following:
- species of European Union concern as listed on Annexes II and IV of the Habitats Directive (Council Directive 92/43/EEC); or
 - species considered notable in an international context (e.g. species for which Great Britain holds a substantial part of the international population, or species which are restricted to Great Britain).

Ponds

- 13.5.15. The results of the PSYM analyses and categorisation demonstrate that ponds surveyed do not meet the criteria for UK priority habitats (UK BAP, 2008) or Local Wildlife Sites (Tees Valley Biodiversity Partnership, 2010).
- 13.5.16. Pond 3 is typical of other ponds in the wider area. However, it falls just short of meeting the wetlands qualifying criteria for LWS, with the presence of four macrophyte species used for the selection of LWS in the Tees Valley (Tees Valley Biodiversity Partnership, 2010). In addition, the ragged robin (*Lychnis flos-cuculi*), Near Threatened in England was also recorded. Though the species appears to have been recently declining in range (Stroh et. al, 2014), it is however still widespread in England, is not considered to be threatened and has no statutory protection.
- 13.5.17. European eel eDNA was also detected in the pond. European eel is a UK Biodiversity Action Plan (BAP) priority species and is categorised as critically endangered (Jacoby and Gollock, 2014) after a decline in stocks since the 1980s (Wirth and Bernatchez, 2003). This decline is because of a range of factors, including overexploitation, disease and parasites, habitat loss, barriers to migration and climate change effects. The species is protected under the Eels (England and Wales) Regulations 2009 (The Regulations) and other legislation such as Convention on Migratory Species (CMS) or the Bonn Convention – Appendix II species, Section 41 (S41) species under the Natural Environment and Rural Communities (NERC) Act 2006; and EU CITIES Appendix II species.
- 13.5.18. However, given that the pond does not have any inflow or outflow and is physically isolated from other waterbodies (i.e. more than 1.5 km away from the nearest watercourse), any eels present would either be as a result of intended direct introductions or were transported into it during a high flows event. As this species is catadromous and requires migrating from freshwater

to the marine environment to spawn there is no possible mechanism for Pond 3 as a habitat to contribute to the wider conservation of this species. Therefore, Pond 3, on the basis of its other attributes, is considered to be of District nature conservation value.

- 13.5.19. Pond 9 and Pond 14 support common and widespread fish, macroinvertebrate, macrophyte species and are likely to be of poor water quality, based on the macroinvertebrate data collected. They are however the last remaining perennial ponds within the Coatham Sands dune system and are therefore considered to be of District value for their nature conservation value and the habitat they provide for fish, macrophytes and macroinvertebrates.
- 13.5.20. Other ponds could not be surveyed, but based on aerial photographs, they are typical of pond habitats within the wider area. Given the past and current industrial use of the site, they are likely to be of relatively poor water quality. Given the habitat information available, they are not considered likely to be better than the ponds which were surveyed, and so, on a precautionary basis, are assumed to be of up to District value for the habitat they provide for aquatic organisms.

Watercourses

- 13.5.21. Baseline data collected for Dabholm Gut, The Mill Race and The Fleet indicate that they support a range of common and widespread macroinvertebrate and fish species (Dabholm Gut, Mill Race).
- 13.5.22. Given this and the fact that they are typical of watercourse habitats present in the wider area, The Mill Race and the Fleet are not considered to be of more than Local value.
- 13.5.23. However, European eel (*Anguilla anguilla*), was also recorded in Dabholm Gut. For Dabholm Gut, the population of European eel does not match the criteria for communities of national importance (CIEEM, 2018), as the sole presence of European eel is neither enough for the protection of a site as a SSSI (Bean et. al, 2018) nor as a UK priority habitat (UK BAP, 2011). In addition, as the watercourse is only an approximately 1 km channel, culverted in places and receiving the final effluent from Bran Sands WWTW, it is not considered to have a major value to the eel populations of the Tees River. Therefore, the watercourse is considered to be of District value for nature conservation.
- 13.5.24. Other watercourses could not be surveyed, but, based on aerial photographs, they are also typical of the range of habitats present in the local area. Given the past and current industrial use of the Site, they are also considered likely to be of poor water quality. These habitats where no baseline data are available are not considered to be of more than District Value for nature conservation and the habitat they provide to aquatic organisms.

Fish

- 13.5.25. With the exception of European eel, none of the species covered by the Tees Valley Local Biodiversity Action Plan (LBAP) were encountered within the desk study and site surveys.

- 13.5.26. European eel was the only notable species recorded across the waterbodies surveyed. They were only recorded in Dabholm Gut and European eel eDNA was also detected in Pond 3.
- 13.5.27. As discussed above, European eels are protected by legislation in the UK. All other species are protected under The Salmon and Freshwater Fisheries Act (1975) which aims to protect all migratory and freshwater fish stocks from activities that could result in direct mortality, barriers to migration and degradation of habitats. The Proposed Development should therefore consider mitigation that will protect all other fish species present in Dabholm Gut, Mill Race and Ponds 3 and 14. All species are however typical of habitats present in the wider area and therefore unlikely to be restricted in range in the wider area.
- 13.5.28. Overall, it is considered that the fish populations present within the waterbodies present within the Zol of the Proposed Development are of no more than District value for nature conservation.

Macroinvertebrates

- 13.5.29. Notable macroinvertebrate species (see Section 13.4) for which records were returned during the desk-based study outside of the Site, are not protected and not considered to be threatened. They were not encountered during the surveys within any of the waterbodies surveyed.
- 13.5.30. From the results of the field surveys, macroinvertebrate communities sampled had moderate to relatively high diversity, with all species recorded being relatively common. This resulted in the macroinvertebrate communities of Pond 9, Pond 14, the Mill Race, The Fleet and Dabholm Gut being of low to moderate conservation value, based on the Community Conservation Index.
- 13.5.31. For Pond 3, the CCI score (10.4) is indicative of 'Fairly High' conservation value, which is due to the presence of three species considered as 'Local' within the CCI index (the mayfly *Caenis robusta*, the caddisfly *Agraylea sexmaculata* and the lesser water boatman *Micronecta scholzi*). These species do not however have any statutory or non-statutory protection and are relatively widespread in England or increasing in range (Macadam, 2016; Wallace et al., 2010; Cook, 2015). As such, CCI score for Pond 3 is considered likely to inflate the significance of these species and because of the presence of similar pond habitats within the wider area, there are no reasons to expect that these species are restricted in range in the local area.
- 13.5.32. Therefore, the macroinvertebrate communities and species within the Zol of the Proposed Development are only considered to be of no more than District value.

Macrophytes

- 13.5.33. No notable plant species were recorded from any of the waterbodies with the exception of ragged robin (*Lychnis flos-cuculi*), Near Threatened in England in Pond 3. Though the species appears to have been recently declining in range (Stroh et. al, 2014), it is however still widespread in England, is not considered to be threatened and has no statutory protection.

- 13.5.34. All of the other macrophyte species are common and typical of the habitats present within the wider area and therefore unlikely to be restricted in range in the local area. None is threatened or legally protected.
- 13.5.35. Therefore, macrophyte species and communities present within the ZoI of the Proposed Development are not considered to be of more than District value.

Invasive Non-native Species

- 13.5.36. A single invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act (WCA, 1981) was recorded, floating pennywort *Hydrocotyle ranunculoides* within The Fleet. The Act makes it illegal to cause the spread of this species in the wild. Measures to prevent this should therefore be identified in the EclA of the Proposed Development.
- 13.5.37. Two other non-native species were recorded (the New Zealand mud snail *Potamopyrgus antipodarum*, the crustacean *Crangonyx pseudogracilis/floridanus*), although neither listed on Schedule 9 of the Wildlife and Countryside Act. Therefore, it is recommended that the detail design also consider this risk so that the Proposed Development is resilient to potential additional INNS risks.
- 13.5.38. The Construction Environmental Management Plan (CEMP) will set out any necessary measures to minimise the risk of off-site spread of the identified INNS during construction. There would be a potential risk of spread of these species to waterbodies elsewhere in the landscape e.g. through movements of plant and machinery during and after the construction period if work was carried out in locations with INNS. The risk is addressed in Chapter 13: Aquatic Ecology (ES Volume I, Document Ref. 6.2). INNS may also be relevant during decommissioning and this should be reappraised at that time based on current survey information and with reference to legal requirements at that time.

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Annex A: Relevant Waterbody Scoping

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
1	Wildlife Pond	Out	PEA (Appendix 12C: PEA (ES Volume III, Document Ref. 6.4)	Site Dry
2	The Long Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
3	Power Station Pond. Small pool at Teesside Works, Redcar	In	Proposed Development design details	Within close proximity to the PCC Site
4	Steel House Pond. Lake near Steel House	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
5	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020	No waterbody (dry)
6	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020	No waterbody (dry)
7	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020	No waterbody (dry)
8	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020	No waterbody (dry)
9	One of a series of pools at South Gare and Coatham Dunes	In	Scoping visit February 2020	Within Site for the Connection Corridors
10	One of a series of pools at South Gare and Coatham Dunes	Out	Scoped out due to changes in Proposed Development design and Site boundary	> 200 m from Site
11	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020	No waterbody (dry)
12	Large, reed dominated pond next to Bran Sands	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
13	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020 and Proposed Development design details	No waterbody (dry) and outside of the Site for construction of the PCC Site and Connection Corridors
14	One of a series of pools at South Gare and Coatham Dunes	In	Proposed Development design details	Within close proximity to the PCC Site
15	One of a series of pools at South Gare and Coatham Dunes	Out	Scoping visit February 2020	No waterbody (dry)
16	Small pool at Teesside Works, Redcar	Out	Scoped out using Google Earth	No waterbody (dry) and outside of the Site for construction of the PCC Site and Connection Corridors
17	Small pool west of Cleveland Golf Links	Out	Scoping visit February 2020	No waterbody (dry)
18	Very large waterbody north of Dabholm Gut	Out	Scoped out based on Proposed Development design details	Within the Site for construction of the CO2 Gathering Network and Connection Corridors, however the crossing will only involve underground works via HDD so no impacts
19	Pond	Out	Scoped out using Google Earth	Artificial
20	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
21	Pond	Out	Scoped out using Google Earth	Artificial
22	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
23	The Fleet	In	Proposed Development design details	Within Site for the Connection Corridors
24	Pond	Out	Scoped out using Google Earth	Artificial
25	The Fleet	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
26	Pond	Out	Scoped out using Google Earth	No waterbody (dry)
27	Square concrete reservoir south-west of sewage works	Out	Scoped out using Google Earth	Artificial

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
28	Square concrete reservoir south-west of sewage works	Out	Scoped out using Google Earth	Artificial
29	Pond	Out	Scoped out using Google Earth	Artificial
30	The Mill Race	In	Proposed Development design details	Within Site for the Connection Corridors
31	Dabholm Cut	In	Proposed Development design details	Within Site for the Connection Corridors
32	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
33	Small pool south of sewage works	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
34	Pool south-east of sewage works	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
35	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
36	Square waterbody within PD ports site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
37	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
38	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
41	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
42	Small pond west of Foxrush Farm	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
43	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
44	Natural pool with island north-west of pipelines	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
45	Pond	Out	Scoped out using Google Earth	No waterbody (dry)
46	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
47	Lackenby Channel	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
48	Pond	Out	Scoped out using Google Earth	No waterbody (dry)
49	Main's Dyke	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
50	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
51	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
52	Narrow ditch with standing water south of Southway Road	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
53	Small pond north of roundabouts	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
54	Small pond north of roundabouts	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
55	Knitting Wife Beck	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
56	Kinkerdale Beck	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
57	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
		Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
59	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
60	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
63	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
62	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
63	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
64	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
65	Kettle Beck	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors and upstream of works
66	Small pond south of Lazenby power station	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
67	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
68	Very small pond in woodland	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
69	Concrete reservoir near Old Lackenby	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
70	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
71	Large waterbody immediately south of Greatham Creek	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
72	Long thin waterbody/drain in centre of Seal Sands site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
73	Semi-natural pool immediately north of BP exploration site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
74	Long thin waterbody/drain in centre of Seal Sands site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
75	Semi-natural pool immediately north of BP exploration site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
76	Ditch	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
77	Ditch	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
78	Rounded waterbody in centre of Seal Sands Site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
79	Small round pool in centre of Seal Sands site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
80	Pool to north-east of Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
81		Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
82	Pool to north-east of Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
83	Rounded waterbody in centre of Seal Sands Site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
84	Long thin waterbody/drain in centre of Seal Sands site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
85	Pool to north-east of Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
86	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
87	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site

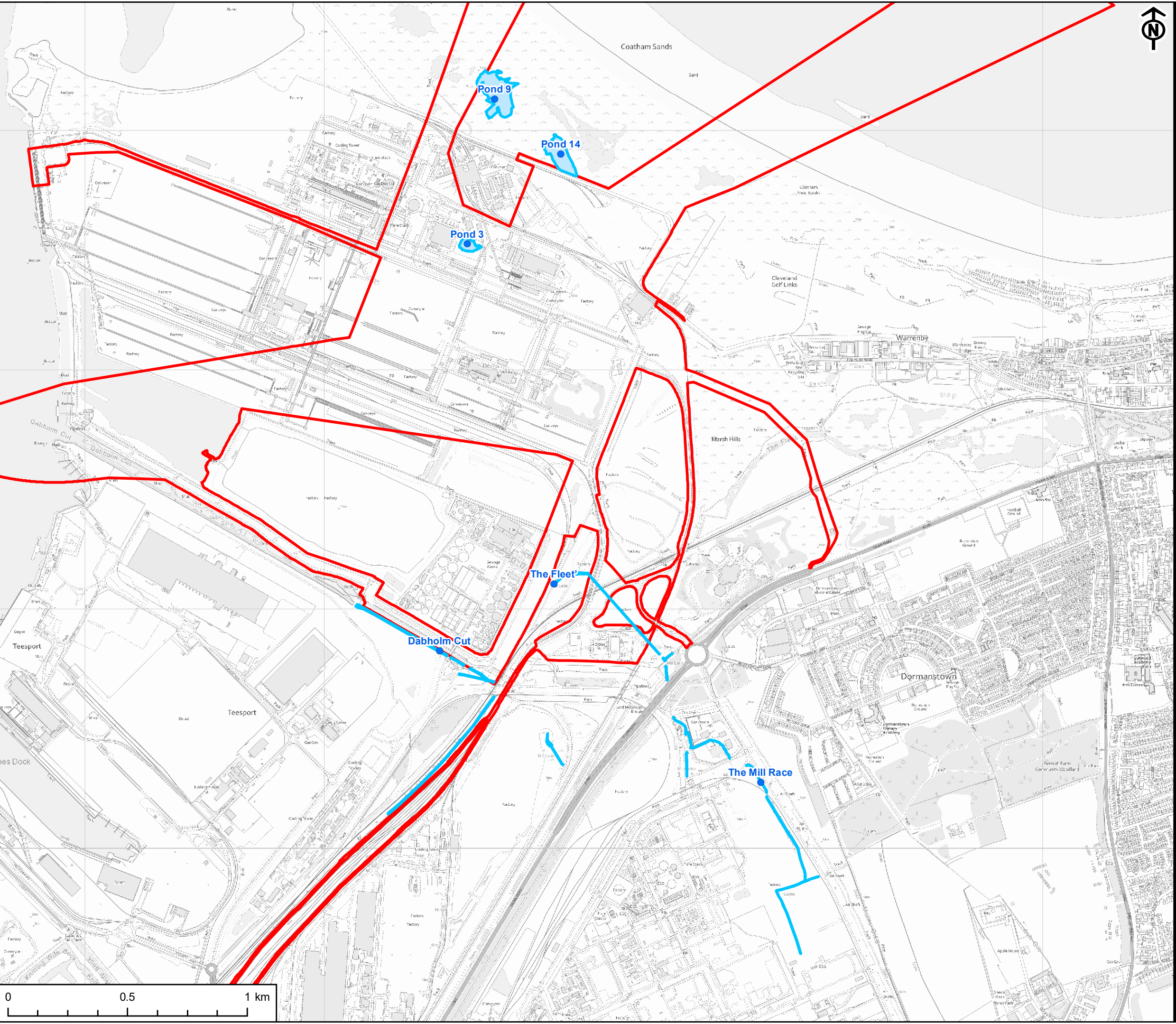
Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
88	Large square reservoir within Seal Sands complex	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
89	Waterbody with island in centre of Seal Sands site	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
90	Complex pool within Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
91	Square artificial reservoir in BP Exploration site	Out	Scoped out using Google Earth	Artificial
92	Complex pool within Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
93	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
94	Complex pool within Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
95	Belasis Beck – Holme Fleet	In	Proposed Development design details	Within the Site required for the CO2 Gathering Network
96	Complex pool within Seal Sands	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
97	Drains	In	Proposed Development design details	Within the Site required for the CO2 Gathering Network
98	Trib Holme Fleet	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
99	Pond	Out	Scoped out using Google Earth	Artificial
100	Complex pool within Seal Sands	Out	Scoping visit June 2020	No waterbody (dry)
101	Complex pool within Seal Sands	Out	Scoping visit June 2020	No waterbody (dry)
102	Pond	Out	Scoping visit June 2020	No waterbody (dry)
103	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
104	Complex pool within Seal Sands	Out	Scoping visit June 2020	No waterbody (dry)
105	Complex pool within Seal Sands	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
106	Complex pool within Seal Sands	Out	Scoping visit June 2020	No waterbody (dry)
107	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
108	Small pond immediately south of Seal Sands	Out	Scoped out using Google Earth	No waterbody (dry)
109	Small balancing pond adjacent to roundabout	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
110	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
111	Artificial circular water tank	Out	Scoped out using Google Earth	Artificial
112	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
113	Small pond immediately south of Seal Sands	In	Proposed Development design details	Within the Site required for the CO2 Gathering Network
114	Small pond immediately south of Seal Sands	In	Proposed Development design details	Within the Site required for the CO2 Gathering Network
115	Small pond immediately south of Seal Sands	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
116	Large drain which occasionally turns into pools between Seal Sands and the Brine Reservoirs	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
117	Semi-natural pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site

Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
118	Pool linked to Belassis beck	Out	Scoped out by desk study	No waterbody (dry)
119	Small pond near pond 70	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
120	Large pool in wetland near Saltholme	Out	Scoped out using Google Earth	No waterbody (dry)
121	Belasis Beck	In	Proposed Development design details	Within the Site for the construction of the CO ₂ Gathering Network
122	Very small pool in wetland near Saltholme	Out	Scoped out using Google Earth	No waterbody (dry)
123	Large pool in wetland near Saltholme	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
124	Large, complex waterbody making up majority of north area of RSPB Saltholme	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
125	Small pool in wetland near Saltholme	Out	Scoped out using Google Earth and third-party information	No waterbody (dry)
126	Small pool in wetland near Saltholme	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
127	Very large pool south-east of Seal Sands	Out	Scoped out using Google Earth	No waterbody (dry)
128	Small reservoir adjacent to larger pool 104	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
129	Medium-sized pool in wetland near Saltholme	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
130	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
131	Large pool in wetland near Saltholme	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure

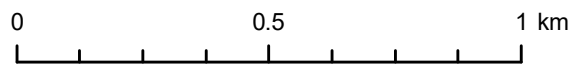
Waterbody_ID	Brief Description	Scoped in / out	Evidence	Reason
132	Large pool in wetland near Saltholme	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
133	Pond is part of network of waterbodies to east of RSPB Saltholme	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
134	Small pond with ditch in field with cattle west of Cowpen Bewley Road	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
135	Pond	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
136	Irregular shaped pool in wetland near Saltholme	Out	Scoped out due to changes in Proposed Development design and Site boundary.	> 200 m from Site
137	Very large pond east of RSPB Saltholme	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
138	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
139	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure
140	Pond	Out	Scoped out based on Proposed Development design details	Outside of the Site for construction of the Connection Corridors which will only involve above ground works using existing infrastructure

Annex B: Map of Sample Site Locations



KEY

- Site Boundary
- Aquatic Survey Location
- Surveyed Waterbody



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Annex C: Site Photographs



Plate C.1: The Mill Race looking upstream



Plate C.2: The Mill Race looking downstream



Plate C.3: Dabholm Gut looking upstream



Plate C.4: Dabholm Gut looking downstream



Plate C.5: The Fleet looking upstream



Plate C.6: The Fleet looking downstream



Plate C.7: Pond 3



Plate C.8: Pond 3



Plate C.9: Pond 9



Plate C.10: Pond 14



Plate C.11: Pond 14

Annex D: Whalley, Hawkes, Paisley & Trigg (WHPT) Metric

There are approximately 4,000 species of aquatic macroinvertebrates in the British Isles. To simplify the analysis of the samples and the data we do not identify individual species but only the major types (taxa), mostly at the family taxonomic level. A key piece of information is the number of different taxa at a site. A fall in the number of taxa indicates ecological damage, including pollution (organic, toxic and physical pollution such as siltation, and damage to habitats or the river channel).

The WHPT scoring system (WFD-UKTAG, 2014) is based upon the sensitivity of macroinvertebrate families to organic pollution. It replaces the Biological Monitoring Working Party (BMWP) system (Hawkes, 1997) previously used in the UK.

The WHPT system assigns a numerical value to about 100 different taxa (known as the WHPT-scoring taxa) according to their sensitivity to organic pollution. In addition to the presence of macroinvertebrate taxa at a sampling site, as in the BMWP scoring system, the WHPT system also uses another type of information, this being the abundances of different scoring taxa.

Taxa abundances are classified in four categories (Class 1: 1 to 10 individuals, Class 2: 11 to 100 individuals, Class 3: 101 to 1,000 individuals, and Class 4: > 1,000 individuals). A score (Pressure Sensitivity Scores (PSs)) is then assigned to each taxa, depending of the taxa sensitivity and abundances recorded.

The total WHPT score for a sample corresponds to the sum of PSs of scoring taxa recorded. The Average Score Per Taxon (ASPT) values are calculated as the Sum PSs divided by the number of scoring taxa (NTAXA). As such, three metrics are calculated:

- WHPT score.
- NTAXA.
- ASPT.

Some animals are more susceptible to organic pollution than others, and the presence of sensitive species indicates good water quality. This fact is taken into account by the WHPT metrics.

The most useful way of summarising the biological data was found to be one that combined the number of taxa and the ASPT. The best quality is indicated by a diverse variety of taxa, especially those that are sensitive to pollution. Poorer quality is indicated by a smaller than expected number of taxa, particularly those that are sensitive to pollution. Organic pollution sometimes encourages an increased abundance of the few taxa that can tolerate it. However, maximum achievable values will vary between geological regions. For example, pristine lowland streams in East Anglia will always score lower than pristine Welsh mountain streams because they are unable to support many of the high-scoring taxa associated with fast flowing habitat. WHPT scores and ASPT for different types watercourse are dependent on the quality and diversity of habitat, natural water chemistry (associated with geology, distance

from source etc.), altitude, gradient, time of year the sample was taken and other factors.

Annex E: Community Conservation Index (CCI)

The Community Conservation Index (Chadd & Extence, 2004) allows a classification of the nature conservation value associated with a macroinvertebrate community. The CCI score for one sample is derived from individual Conservation Scores (CS), assigned to some species of aquatic macroinvertebrates and relating closely to the available published Red Data Books (Bratton, 1991a, 1991b; Shirt, 1987). Conservation Scores assigned to individual species vary from 1 to 10, as detailed on the Table E1 below. The derived CCI scores generally vary from 0 to > 20, as detailed in the Table E2 below. The Table E2 below provides a guide to interpreting CCI scores.

Table E1. Conservation Scores from the Community Conservation Index (from Chadd & Extence, 2004).

Conservation Score	Relation to Red Data Books
10	RDB1 (Endangered)
9	RDB2 (Vulnerable)
8	RDB3 (Rare)
7	Notable (but not RDB status)
6	Regionally notable
5	Local
4	Occasional (species not in categories 10-5, which occur in up to 10% of all samples from similar habitats)
3	Frequent (species not in categories 10-5, which occur in up to >10-25% of all samples from similar habitats)
2	Common (species not in categories 10-5, which occur in up to >25-50% of all samples from similar habitats)
1	Very common (species not in categories 10-5, which occur in up to >50-100 % of all samples from similar habitats)

Table E2. General guide to CCI scores (from Chadd & Extence, 2004).

CCI Score	Description	Interpretation
0 to 5.0	Sites supporting only common species and/or community of low taxon richness	Low conservation value
> 5.0 to 10.0	Sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	Moderate conservation value
> 10.0 to 15.0	Sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	Fairly high conservation value

CCI Score	Description	Interpretation
> 15.0 to 20.0	Sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness	High conservation value
> 20.0	Sites supporting several rarities, including species of national importance and/or a community of very high taxon richness	Very high conservation value

Annex F: Lotic-Invertebrate Index for Flow Evaluation (LIFE)

The Lotic-Invertebrate Index for Flow Evaluation (LIFE) provides an assessment of the impact of variable flows on benthic macroinvertebrate communities. Under the assessment, individual species of aquatic macroinvertebrates are assigned to a flow group varying from I to VI, as detailed on the Table F1 below. The LIFE score for a macroinvertebrate sample is then derived (mean of individual scores) from individual species scores and abundances, as detailed on the Table F3 below. LIFE scores for a macroinvertebrate sample ranges from 1 to 12, where highest scores describe communities adapted to rapid flows.

Table F1. Flow groups used to derive LIFE scores (from Extence, Balbi and Chadd, 1999).

LIFE score Group	Description	Mean current velocity
I	Taxa primarily associated with rapid flows	Typically > 100 cm.s ⁻¹
II	Taxa primarily associated with moderate to fast flows	Typically 20 to 100 cm.s ⁻¹
III	Taxa primarily associated with slow or sluggish flows	Typically < 20 cm.s ⁻¹
IV	Taxa primarily associated with (usually slow) and standing waters	
V	Taxa primarily associated with standing waters	
VI	Taxa frequently associated with drying or drought impacted sites	

Table F2. Abundance categories used to derive LIFE scores (from Extence, Balbi and Chadd, 1999).

Abundance category	Description
A	1 to 9
B	10 to 99
C	100 to 999
D	1000 to 9999
E	> 10000

Table F3. A guide to interpreting LIFE scores (from Extence, Balbi and Chadd, 1999).

Flow groups	Abundance categories			
	A	B	C	D/E
I	9	10	11	12
II	8	9	10	11
III	7	7	7	7
IV	6	5	4	3
V	5	4	3	2
VI	4	3	2	1

Annex G: Proportion of sediment-sensitive invertebrates (PSI)

The Proportion of Sediment-sensitive Invertebrates (PSI) index (Extence et. Al, 2013) provides an assessment of the extent to which the riverbed is composed of, or covered by, fine sediments.

Under the assessment, individual species of aquatic macroinvertebrates are assigned a Fine Sediment Sensitivity Rating (FSSR) ranging from A to D, as detailed in the Table G1 below. The PSI score for a macroinvertebrate sample is then derived from individual species scores and abundances, as detailed on the Table G2 below. The PSI score corresponds to the percentage of fine sediment-sensitive taxa present in a sample. PSI score for a sample ranges from 0 to 100 where lowest scores correspond to watercourses with high fine sediment cover.

Table G1. Fine Sediment Sensitivity Rating (FSSR) groups used to derive PSI scores (from Extence et al., 2013).

FSSR group	Description
A	Highly sensitive
B	Moderately sensitive
C	Moderately insensitive
D	Highly insensitive

Table G2. Abundance categories used to derive PSI scores (from Extence, et al., 2013).

FSSR group	Abundance			
	1-9	10-99	100-999	>999
A	2	3	4	5
B	1	2	3	4
C	1	2	3	4
D	2	3	4	5

Table G3. Interpretation of PSI scores (from Extence et al., 2013)

PSI	Description
81-100	Minimally sedimented / Unsedimented
61-80	Slightly sedimented
41-60	Moderately sedimented
21-40	Sedimented
0-20	Heavily sedimented

Annex H: Results from the fish (eDNA and electric fishing) surveys undertaken

Table H.1: Fisheries eDNA results showing the proportion of sequencing output allocated to the different species at Pond 3, Pond 9 and Pond 14

Species	Pond 3	Pond 9	Pond 14
Eel	0.60	0.00	0.00
Common carp	78.57	0.00	0.00
Dace	0.06	0.00	0.00
Minnow	0.00	0.00	0.35
Roach	5.56	0.00	0.00
Rudd	6.42	0.00	0.00
Three-spined stickleback	0.00	0.00	99.65
Perch	8.78	0.00	0.00

* Care should be taken when interpreting the numbers in terms of relative abundance, these numbers represent the proportion of the total DNA detected from each species and do not represent the number or percentage abundance of each species present and should not be used to compare between sites. The higher proportion detected can be interpreted as lending a great confidence that the species is currently present.

Table H.2: Species composition and minimum density estimates (numbers of fish per 100 m² ± Standard Error) at survey sites on the proposed development, July 2020

Species	Mill Race (n/100m ² ± SE)	Dabholm Gut (n/100m ² ± SE)
Three-spined stickleback	3	62.67 ± 0
European Eel	0	5.33 ± 0
Total abundance	3	68
Species richness	1	2

Annex I: Results from the macroinvertebrate surveys undertaken

Table I.1: Macroinvertebrate data from the sample taken on Pond 3

Taxon	BMWP score	Conservation Score	Number of Specimens
<i>Dugesia lugubris/polychroa</i>	5	2	1
<i>Bithynia tentaculata</i>	3	1	2
Planorbidae	3		2
<i>Gyraulus albus</i>	3	1	2
<i>Pisidium</i> sp.	3		1
Oligochaeta	1		36
<i>Helobdella stagnalis</i>	3	1	4
Cladocera	-		1
<i>Crangonyx</i> sp. (<i>floridanus/pseudogracilis</i>)	6		9
<i>Caenis</i> sp.	7		1
<i>Caenis horaria</i>	7	1	1
<i>Caenis robusta</i>	7	5	2
<i>Ischnura elegans</i>	6	1	1
<i>Erythromma</i> sp.	6		1
<i>Gerris</i> sp.	5		
<i>Nepa cinerea</i>	5	3	1
Corixidae	5		7
<i>Micronecta</i> sp.	5		8
<i>Micronecta scholzi</i>	5	5	3
<i>Sigara falleni</i>	5	1	1
Dytiscidae	5		1
Hydrophilidae	5		4
<i>Agraylea multipunctata</i>	6	1	3
<i>Agraylea sexmaculata</i>	6	5	1
<i>Oxyethira</i> sp.	6		1
<i>Athripsodes aterrimus</i>	10	1	1
<i>Mystacides</i> sp.	10		3
<i>Mystacides longicornis</i>	10	1	1
Tanypodinae	2		10
Orthoclaadiinae	2		18
Chironomini	2		70
Tanytarsini	2		5
Ceratopogonidae	-		1
NTAXA(BMWP)			16
Number of non-scoring families (BMWP)			2
ASPT (BMWP)			4.7
BMWP Score			75.0
CCI score			10.4

Table I.2: Macroinvertebrate data from the sample taken on Pond 9

Taxon	BMWP score	Conservation Score	Number of Specimens
<i>Radix balthica</i>	3	1	354
<i>Haemopsis sanguisuga</i>	3	4	1
<i>Ostracoda</i>		-	1
<i>Cloeon sp.</i>	4		1
<i>Cloeon dipterum</i>	4	1	3
<i>Dragonflies</i>	-		10
<i>Aeshna mixta</i>	8	3	2
<i>Sympetrum striolatum</i>	8	1	3
<i>Gerris sp.</i>	5		1
<i>Corixidae</i>	5		13
<i>Notonectidae</i>	5		2
<i>Dytiscidae</i>	5		4
<i>Agabus nebulosus</i>	5	1	1
<i>Chironomidae</i>	2		3
<i>Tanypodinae</i>	2		2
<i>Orthocladiinae</i>	2		2
<i>Dixella sp.</i>	-		2
<i>Psychodidae</i>		-	1
NTAXA (BMWP)			10
Number of non-scoring families (BMWP)			3
BMWP score			48.0
ASPT (BMWP)			4.8
CCI score			5.5

Table I.3: Macroinvertebrate data from the sample taken on Pond 14

Taxon	BMWP score	Conservation Score	Number of Specimens
<i>Galba truncatula</i>	3	3	3
<i>Radix balthica</i>	3	1	230
<i>Potamopyrgus antipodarum</i>	3	1	470
<i>Physidae</i>	3		3
<i>Physella sp.</i>	3		29
<i>Pisidium sp.</i>	3		1
<i>Oligochaeta</i>	1		1
<i>Hydracarina</i>	-		1
<i>Asellus aquaticus</i>	3	1	1
<i>Cloeon sp.</i>	4		1
<i>Cloeon simile</i>	4	2	2
<i>Sympetrum striolatum</i>	8	1	1
<i>Corixidae</i>	5		3

Taxon	BMWP score	Conservation Score	Number of Specimens
<i>Sigara dorsalis/striata</i>	5		1
<i>Haliphus sp.</i>	5		1
Dytiscidae	5		1
<i>Hydroglyphus geminus</i>	5	5	1
<i>Hygrotus inaequalis</i>	5	2	3
<i>Laccobius minutus</i>	5	2	1
<i>Limnephilus lunatus</i>	7	1	1
<i>Oecetis ochracea</i>	10	2	18
Tanypodinae	2		10
Orthocladinae	2		2
Chironomini	2		4
Tanytarsini	2		8
Psychodidae	-		1
Stratiomyidae	-		1
NTAXA (BMWP)			15
Number of non-scoring families (BMWP)			3
ASPT score			4.5
BMWP score			67.0
CCI score			9.5

Table I.4: Macroinvertebrate data from the sample taken on The Mill Race

Taxon	WHPT score (presence only)	Conservation Score	Number of Specimens
Lymnaeidae	3.3		8
<i>Radix balthica</i>	3.3	1	5
<i>Potamopyrgus antipodarum</i>	4.2	1	58
<i>Pisidium sp.</i>	3.9		48
Gammaridae	4.4		2
<i>Gammarus pulex</i>	4.4	1	2
<i>Asellus aquaticus</i>	2.8	1	23
Coenagrionidae	3.5		3
<i>Plea minutissima</i>	3.3	4	1
<i>Sigara sp.</i>	3.8		1
<i>Sigara dorsalis</i>	3.8	1	1
<i>Haliphus sp.</i>	3.6		1
<i>Haliphus flavicollis</i>	3.6	3	1
<i>Haliphus lineaticollis</i>	3.6	1	5
<i>Haliphus obliquus</i>	3.6	4	1
Dytiscidae	4.5		1
<i>Helophorus brevipalpis</i>	6.2	1	1
<i>Elmis aena</i>	6.6	1	1
<i>Limnephilus lunatus</i>	6.9	1	8

Taxon	WHPT score (presence only)	Conservation Score	Number of Specimens
<i>Athripsodes aterrimus</i>	6.7	1	5
<i>Orthoclaadiinae</i>	1.1		23
<i>Chironomini</i>	1.1		33
<i>Tanytarsini</i>	1.1		180
<i>Empididae</i>	7.1		3
NTAXA (WHPT)			16
Number of non-scoring families (WHPT)			0
WHPT score			65.0
ASPT (WHPT)			4.1
PSI score (species)			8.0
LIFE score (species)			6.4
CCI score			4.8

Table I.5: Macroinvertebrate data from the sample taken on Dabholm Gut

Species	WHPT score (presence only)	Conservation Score	Number of Specimens
Flatworms			1
<i>Lymnaeidae</i>	3.3		110
<i>Lymnaea stagnalis</i>	3.3	1	2
<i>Radix balthica</i>	3.3	1	2
<i>Potamopyrgus antipodarum</i>	4.2	1	45
<i>Physella sp.</i>	2.4		5
<i>Planorbis sp.</i>	3.1		1
<i>Armiger crista</i>	3.1	2	2
<i>Pisidium sp.</i>	3.9		48
<i>Musculium lacustre</i>	3.9	3	54
<i>Oligochaeta</i>	2.7		40
<i>Gammaridae</i>	4.4		1
<i>Gammarus zaddachi</i>	4.4	1	18
<i>Asellus aquaticus</i>	2.8	1	106
<i>Coenagrionidae</i>	3.5		3
<i>Ischnura elegans</i>	3.5	1	2
<i>Sigara sp.</i>	3.8		1
<i>Gyrinidae</i>	8.2		3
<i>Dytiscidae</i>	4.5		10
<i>Elmis aena</i>	6.6	1	1
<i>Oulimnius sp.</i>	6.6		1
<i>Lype phaeopa</i>	5.8	2	1
<i>Limnephilus lunatus</i>	6.9	1	4
<i>Tanypodinae</i>	1.1		46
<i>Orthoclaadiinae</i>	1.1		160

Species	WHPT score (presence only)	Conservation Score	Number of Specimens
<i>Chironomini</i>	1.1		182
<i>Tanytarsini</i>	1.1		730
<i>Prodiamesinae</i>	1.1		22
<i>Empididae</i>	7.1		20
<i>Ceratopogonidae</i>	5.5		1
<i>Ephydridae</i>	4.4		1
<i>Microturbellaria</i>	-		2
NTAXA (WHPT)			19
Number of non-scoring families (WHPT)			1
WHPT score			75.8
ASPT (WHPT)			4.0
PSI score (species)			3.8
LIFE score (species)			6.1
CCI score			4.1

Table I.6: Macroinvertebrate data from the sample taken on The Fleet

Species	WHPT score (presence only)	Conservation Score	Number of Specimens
<i>Lymnaeidae</i>	3.3		30
<i>Radix balthica</i>	3.3	1	1
<i>Potamopyrgus antipodarum</i>	4.2	1	2
<i>Physidae</i>	2.4		1
<i>Physella sp.</i>	2.4		1
<i>Oligochaeta</i>	2.7		20
<i>Gammaridae</i>	4.4		2
<i>Asellidae</i>	2.8		5
<i>Asellus aquaticus</i>	2.8	1	6
<i>Ischnura elegans</i>	3.5	1	1
<i>Plea minutissima</i>	3.3	4	1
<i>Notonectidae</i>	3.4		2
<i>Gyrinus substriatus</i>	8.2	1	1
<i>Nebrioporus sp.</i>	4.5		4
<i>Nebrioporus elegans</i>	4.5	1	2
<i>Agabus didymus</i>	4.5	1	3
<i>Helophorus brevipalpis</i>	6.2	1	2
<i>Chironomidae</i>	1.1		4
<i>Tanypodinae</i>	1.1		1
<i>Orthoclaadiinae</i>	1.1		25
<i>Chironomini</i>	1.1		7
<i>Tanytarsini</i>	1.1		50
<i>Empididae</i>	7.1		6

Species	WHPT score (presence only)	Conservation Score	Number of Specimens
<i>Dolichopodidae</i>	4.9		2
<i>Ephydriidae</i>	4.4		4
NTAXA (WHPT)			16
Number of non-scoring families (WHPT)			0
WHPT score			64.2
ASPT (WHPT)			4.0
PSI score (species)			0
LIFE score (species)			6.3
CCI score			4.0

Annex J: Results from the macrophyte surveys undertaken

Table J.1: Macrophyte species recorded from Pond 3

Type	Common Name	Nature Conservation Status (England)	Scientific Name
Emergent/ Marginal	Sneezewort	Least Concern ¹	<i>Achillea ptarmica</i>
	Creeping bent	Least Concern ¹	<i>Agrostis stolonifera</i>
	Sea club-rush	Least Concern ¹	<i>Bolboschoenus maritimus</i>
	False fox-sedge	Least Concern ¹	<i>Carex otrubae</i>
	Pendulous sedge	Least Concern ¹	<i>Carex pendula</i>
	Tufted hair-grass	Least Concern ¹	<i>Deschampsia cespitosa</i>
	Great willowherb	Least Concern ¹	<i>Epilobium hirsutum</i>
	Hoary willowherb	Least Concern ¹	<i>Epilobium parviflorum</i>
	Meadowsweet	Least Concern ¹	<i>Filipendula ulmaria</i>
	Reed sweet-grass	Least Concern ¹	<i>Glyceria maxima</i>
	Square-stalked St. John's-wort	Least Concern ¹	<i>Hypericum tetrapterum</i>
	Yellow Iris	Least Concern ¹	<i>Iris pseudacorus</i>
	Greater bird's-foot-trefoil	Least Concern ¹	<i>Lotus pedunculatus</i>
	Ragged robin	Near Threatened ²	<i>Lychnis flos-cuculi</i>
	Purple loosestrife	Least Concern ¹	<i>Lythrum salicaria</i>
	Water forget-me-not	Least Concern ¹	<i>Myosotis scorpioides</i>
	Common reed	Least Concern ¹	<i>Phragmites australis</i>
	Common fleabane	Least Concern ¹	<i>Pulicaria dysenterica</i>
	Common club-rush	Least Concern ¹	<i>Schoenoplectus lacustris</i>
	Water figwort	Least Concern ¹	<i>Scrophularia auriculata</i>
Branched bur-reed	Least Concern ¹	<i>Sparganium erectum</i>	
Lesser bulrush	Least Concern ¹	<i>Typha angustifolia</i>	
Submerged	Hornwort	Least Concern ¹	<i>Ceratophyllum demersum</i>
	Spiked water milfoil	Least Concern ¹	<i>Myriophyllum spicatum</i>

¹Leach (2019)

²Stroh et al. (2014)

Table J.2: Macrophyte species recorded from Pond 9

Type	Common Name	Nature Conservation Status (England)	Scientific Name
Emergent	Creeping bent	Least Concern ¹	<i>Agrostis stolonifera</i>
	Sea club-rush	Least Concern ¹	<i>Bolboschoenus maritimus</i>
	Common spike-rush	Least Concern ¹	<i>Eleocharis palustris</i>
	Great willowherb	Least Concern ¹	<i>Epilobium hirsutum</i>
	Hemp agrimony	Least Concern ¹	<i>Eupatorium cannabinum</i>
	Jointed rush	Least Concern ¹	<i>Juncus articulatus</i>

Type	Common Name	Nature Conservation Status (England)	Scientific Name
	Soft rush	Least Concern ¹	<i>Juncus effusus</i>
	Common reed	Least Concern ¹	<i>Phragmites australis</i>
	Celery-leaved buttercup	Least Concern ¹	<i>Ranunculus sceleratus</i>
	Grey club-rush	Least Concern ¹	<i>Schoenoplectus tabernaemontani</i>
	Bittersweet	Least Concern ¹	<i>Solanum dulcamara</i>
	Branched bur-reed	Least Concern ¹	<i>Sparganium erectum</i>
	Common bulrush	Least Concern ¹	<i>Typha latifolia</i>
Submerged	Common stonewort	Least Concern ²	<i>Chara vulgaris</i>
	Spiked water-milfoil	Least Concern ¹	<i>Myriophyllum spicatum</i>
	Small pondweed	Least Concern ¹	<i>Potamogeton berchtoldii</i>
	Water crowfoot	Least Concern ¹	<i>Ranunculus aquatilis</i>
	Horned pondweed	Least Concern ¹	<i>Zannichellia palustris</i>

¹Leach (2019)

²Stewart et. al (1992)

Table J.3: Macrophyte species recorded from Pond 14

Type	Common Name	Nature Conservation Status (England)	Scientific Name
Emergent	Creeping bentgrass	Least Concern ¹	<i>Agrostis stolonifera</i>
	Sea club-rush	Least Concern ¹	<i>Bolboschoenus maritimus</i>
	Unknown Sedge	Least Concern ¹	<i>Carex</i> sp.
	False Fox-sedge	Least Concern ¹	<i>Carex otrubae</i>
	Common spike-rush	Least Concern ¹	<i>Eleocharis palustris</i>
	Great willowherb	Least Concern ¹	<i>Epilobium hirsutum</i>
	Hoary willowherb	Least Concern ¹	<i>Epilobium parviflorum</i>
	Hemp agrimony	Least Concern ¹	<i>Eupatorium cannabinum</i>
	Marsh pennywort	Least Concern ¹	<i>Hydrocotyle vulgaris</i>
	Jointed rush	Least Concern ¹	<i>Juncus articulatus</i>
	Redshank	Least Concern ¹	<i>Pericaria maculosa</i>
	Common reed	Least Concern ¹	<i>Phragmites australis</i>
	Common fleabane	Least Concern ¹	<i>Pulicaria dysenterica</i>
	Grey club-rush	Least Concern ¹	<i>Schoenoplectus tabernaemontani</i>
	Bittersweet	Least Concern ¹	<i>Solanum dulcamara</i>
Common bulrush	Least Concern ¹	<i>Typha latifolia</i>	
Submerged	Common stonewort	Least Concern ²	<i>Chara vulgaris</i>
	Spiked water milfoil	Least Concern ¹	<i>Myriophyllum spicatum</i>
	Fennel-leaved pondweed	Least Concern ¹	<i>Potamogeton pectinatus</i>
	Horned pondweed	Least Concern ¹	<i>Zannichellia palustris</i>

Type	Common Name	Nature Conservation Status (England)	Scientific Name
¹ Leach (2019)			
² Stewart et. al (1992)			

Annex K: Results of the PSYM analyses and classification

Table K.1: Results of the PSYM analyses and classification for Pond 3, Pond 9 and Pond 14

Site name	Pond 3	Pond 9	Pond 14
Survey date	08-Jul-20	08-Jul-20	08-Jul-20
Grid reference (e.g. SP123456 or higher precision)	NZ 56598 25528	NZ 56763 26012	NZ 57003 25879
Plant metrics			
No. of submerged + marginal plant species (not including floating leaved)	24	18	20
Number of uncommon plant species	5	7	6
Trophic Ranking Score (TRS)	8.9375	8.79	8.871
Invertebrates metrics			
ASPT	4.6	4.8	4.466666
Odonata + Megaloptera (OM) families	1	2	1
Coleoptera families	2	1	3
Environmental variables			
Altitude (m)	10	4	4
Easting	4565	4567	4570
Northing	5255	5260	5258
Shade (%)	0	0	0
Inflow (0/1)	0	0	0
Grazing (%)	0	0	0
pH	6.15	6.75	6.8
Emergent plant cover (%)	10	80	10
Base clay (1-3)	3	3	3
Base sand, gravel, cobbles (1-3)	1	1	1
Base peat (1-3)	1	1	1
Base rock (1-3)	1	1	1
Area (m ²)	3000	20,000	10000
Results			
Submerged + marginal plant species			
Predicted (SM)	17.4	18.7	18.7
Actual (SM)	24.0	18.0	20.0
EQI (SM)	1.4	1.0	1.1

Site name	Pond 3	Pond 9	Pond 14
IBI (SM)	3	3	3
Uncommon plant species			
Predicted (U)	3.8	3.9	3.9
Actual (U)	5.0	7.0	6.0
EQI (U)	1.3	1.8	1.5
IBI (U)	3	3	3
Trophic Ranking Score (TRS)			
Predicted (TRS)	5.79	6.46	6.44
Actual (TRS)	8.94	8.79	8.87
EQI (TRS)	1.54	1.36	1.38
IBI (TRS)	0	0	0
ASPT			
Predicted (ASPT)	5.17	5.18	5.18
Actual (ASPT)	4.60	4.80	4.47
EQI (ASPT)	0.89	0.93	0.86
IBI (ASPT)	3	3	3
Odonata + Megaloptera (OM) families			
Predicted (OM)	3.30	3.29	3.28
Actual (OM)	1.00	2.00	1.00
EQI (OM)	0.30	0.61	0.30
IBI (OM)	1	2	1
Coleoptera families			
Predicted (CO)	3.81	3.84	3.83
Actual (CO)	2.00	1.00	3.00
EQI (CO)	0.52	0.26	0.78
IBI (CO)	2	1	3
Sum of Individual Metrics	12	12	13
Index of Biotic Integrity (%)	67%	67%	72%
PSYM quality category (IBI >75%=Good, 51-75%= Moderate, 25-50%=Poor, <25%=V Poor)	Moderate	Moderate	Moderate
Is this a Priority Pond? (Good quality category)	No	No	No