JBA consulting

Barnstaple Flood Defence Improvements

Preliminary Ecological Appraisal

Final Report August 2016

North Devon District Council Lynton House Commercial Road Barnstaple Devon EX31 1DG

JBA Project Manager

Phil Emonson JBA Consulting Bradley House Park Five Harrier Way Exeter EX2 7HU

Revision History

Revision Ref / Date Issued	Amendments	Issued to
Final Report v1.0 / 6 July 2016		Sally Nelson (NDDC) Andrew Austen (NDDC) John Galt (DCC) Simon Dart (EA)
Final Report v2.0 / 18 August 2016	Minor amendments as per DCC comments	Sally Nelson (NDDC) Andrew Austen (NDDC) John Galt (DCC) Simon Dart (EA)

Contract

This report describes work commissioned by North Devon District Council on behalf of Devon County Council. Catherine Shaw of JBA Consulting carried out this work.

Prepared by	Afran.	. Catherine Shaw BSc (Hons) MSc Grad CIEEM Assistant Ecologist
Reviewed by	NDU.	Nicola Darwin BSc ACIEEM

Senior Ecologist

Purpose

This document has been prepared as a Final Report for Devon County Council. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to North Devon County Council and Devon County Council.

JBA



Copyright

© Jeremy Benn Associates Limited 2016

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 223g if 100% postconsumer recycled paper is used and 283g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex.

JBA is aiming to reduce its per capita carbon emissions.

Executive Summary

JBA Consulting were commissioned by North Devon Council to undertake a Preliminary Ecological Appraisal (PEA) to identify any potential ecological constraints associated with the proposed realignment of the River Yeo, as a flood defence. The potential impacts associated with the proposed flood defence scheme such as habitat loss and the impact on UK protected species and habitats, and designated sites, was assessed and, where necessary, further surveys and / or appropriate mitigation and enhancement measures recommended.

This appraisal was conducted using the findings of a field survey, supplemented by a desk-based study and data search provided by Devon Biodiversity Records Centre (DBRC) and the Environment Agency (EA). The data search returned records of protected and notable species within 2 km of a central grid reference point, extended to 4 km for bats. A number of species records were provided including bats, birds, invertebrates, amphibians and reptiles. The EA provided numerous data about the river to include macrophytes, macroinvertebrates and fish.

The majority of the works will take place within Pilton Park itself. Pilton Park is largely dominated by amenity grassland with hardstanding. There is a children's play area within the centre of the park and a toilet block at the south east corner. The park is bordered on three sides by the River Yeo. The flood scheme proposals also incorporate a length of the River Yeo to the south of Pilton Park and further downstream to its outfall into the River Taw.

Several of the mature trees were identified as having bat roosting potential. The small area of scrub, coastal grassland and areas of less intensively managed amenity grassland have the potential to support reptiles and amphibians in their terrestrial phase. The mature trees provide roosting opportunities and foraging habitat for bats as well as nesting opportunities for birds. The river provides habitat for a variety of aquatic invertebrates as well as a foraging resource for bats. The toilet block was also found to have bat roosting potential.

The finalised details of the proposals are unknown at this time, but it is expected that the river around Pilton Park will be diverted. It is anticipated that the majority of habitats of ecological value will be retained and improved. As a result of the diversion of the river, a length of approximately 290 metres of riparian habitat will be lost. In addition, the toilet block building will be removed. Vegetation clearance is anticipated to be limited to small areas of scrub, shrub, a small number of mature trees and areas of amenity and coastal grassland. Construction and landscaping activities have the potential to impact upon nesting birds, wetland birds, roosting bats, reptiles and amphibians (if found to be present) and foraging and commuting bats.

Depending upon the nature of the final designs, further surveys are required to establish the presence of protected species and enable a full assessment of the impacts any future flood defence scheme may have. These include reptile presence / absence surveys, bat activity surveys, a bat emergence survey of the toilet block and an inspection of the potential roost features in the trees. A further river corridor survey is also required to assess the coastal grassland and riverine habitat. Depending on the findings of these surveys, specific mitigation and compensation recommendations may be required.

As part of the flood defence scheme, there is scope for ecological enhancements that would improve what is of relatively low ecological value into a mosaic of habitats with improved ecological value which could benefit a number of plant and animal species. Recommendations include the creation of wetland habitats such as ponds, areas of species-rich grassland to benefit invertebrates and the introduction of shelter for various species such as bat and bird boxes. There is also scope for Pilton Park to be used as an environmental educational resource for all users and consideration could be given to installing interpretation panels. These would benefit all users, but there is particularly value to local educational groups that could use the biodiversity features as a learning resource.

It is recommended that a Biodiversity Management Plan is produced to ensure successful and effective delivery of mitigation and enhancement measures.



Contents

Executiv	ve Summary	iii
1	Introduction	1
1.1 1.2	Site Description Proposed Development	1 2
2	Planning Policy and Legislation	3
2.1 2.2	Planning Policy Legislation	3 4
3	Methodology	6
3.1 3.2 3.3 3.4 3.5	Desk Study Extended Phase 1 Habitat Survey Dates of Survey and Personnel Approach to Evaluation Limitations	6 6 8 8 9
4	Results	10
4.1 4.2 4.3	Desk Study Phase 1 Habitat Survey Consideration of Species	10 14 24
5	Evaluation	33
5.1 5.2 5.3 5.4	Designated Sites Environment Agency River Data Habitats and Botanical Interest Protected and Notable Species	33 33 34 35
6	Conclusions and Recommendations	37
6.1 6.2 6.3 6.4	Mitigation Enhancement Measures Biodiversity Management Plan Further Survey	37 39 39 40
Referer	nces	42
Append	ices	I
А	Phase 1 Habitat Maps	I
В	Target Notes	IV

List of Figures

Figure 1-1: Site location	.1
Figure 1-2: Planned river Yeo re-alignment	.2
Figure 4-1: Dense scrub along the northern boundary of Pilton Park	. 15
Figure 4-2: Scattered broadleaved trees	. 16
Figure 4-3: Non-native Apple trees along the eastern boundary of the Pilton Park	. 16
Figure 4-4: Brackish running water circumventing the park, including intertidal mudflats	. 17
Figure 4-5: Intertidal mudflats	. 18
Figure 4-6: Coastal grassland adjacent to the river	. 19
Figure 4-7: Introduced shrub in the south eastern corner of the park	. 20
Figure 4-8: Introduced shrub in the north-eastern corner of the park	. 20
Figure 4-9: Amenity grassland showing the children's playground in the centre of the park	. 21
Figure 4-10: Toilet Block at south east corner of Pilton Park	. 22
Figure 4-11: Hard-standing path around Pilton Park	. 23
Figure 4-12: Banks of River Yeo that were not accessed. Habitats are considered to be coastal grassland with areas of intertidal mudflats.	. 24

JBA consulting

List of Tables

Table 3-1: Guidelines for assessing the potential suitability of proposed development sites for bats following BCT Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016)	7
Table 4-1: Nationally statutory designated sites within 2km of the site	10
Table 4-2: Non-statutory designated sites within 2km of the site	10
Table 4-3: Summary of protected and notable species relevant to site and/or proposals within 2km of the site	11
Table 4-4: Summary of non-native species identified within the study area	12
Table 4-5: River Yeo water body classification reproduced from the EA (EA, 2016)	13
Table 4-6: Macroinvertebrate data from the EA	14
Table 4-7: Trees with potential to support roosting bats.	25
Table 4-8: Bat roosting features within the toilet block	28

Abbreviations

BAP	Biodiversity Action Plan
BoCC	Birds of Conservation Concern
BSI	British Standards Institute
CIEEM	Chartered Institute of Ecology and Environmental Management
CRoW	Countryside Rights of Way Act
CWS	County Wildlife Site



DBAP	Devon Biodiversity Action Plan
DCC	Devon County Council
DN	Devon Notable Species
EA	Environment Agency
Habiats Regs	Conservation of Habitats & Species Regulations 2010
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
NERC	Natural Environment and Rural Communities Act
NPPF	National Planning Policy Framework
ODPM	Office of the Deputy Prime Minister
OSWI	Other Site of Wildlife Interest
PBA	Protection of Badgers Act
PEA	Preliminary Ecological Appraisal
PRF	Potential Roost Feature
SoCC	Species of Conservation Concern
SPI	Species of Principal Importance
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
UKBAP	UK Biodiversity Action Plan
UWS	Unconfirmed Wildlife Site
WCA	Wildlife and Countryside Act
WFD	Water Framework Directive



1 Introduction

This report has been prepared on behalf of North Devon Council (NDC) following an initial investigation by JBA Consulting to address future flood risk in Barnstaple (JBA Consulting, 2015). JBA Consulting has since been commissioned to undertake Phase 2 of the Flood Defence Improvements study, which includes a Preliminary Ecological Appraisal. This appraisal enables an assessment of the likely ecological effects of the proposed flood defence scheme, which involves re-routing the River Yeo along the A39 Pilton Causeway (Central Grid Reference: SS 55599 33486). The area considered by this assessment includes Pilton Park and the River Yeo which runs from Pilton Park to the south, where it reaches the River Taw as indicated by the red line boundary shown in Figure 1-1.



Figure 1-1: Site location

The aims of this appraisal were to assess the significance of any ecological effects that would result from the proposed flood defence scheme, present appropriate mitigation measures and make recommendations for enhancement measures.

This assessment follows the principles set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Assessment (CIEEM, 2013). This report has been produced following CIEEM Guidelines for Ecological Report Writing (CIEEM, 2015), with reference to BS 42020:2013 - Biodiversity: Code of Practice for Planning and Development (BSI, 2013).

1.1 Site Description

The site includes Pilton Park and a section of the River Yeo in the centre of Barnstaple, North Devon and extends to approximately 1.40 hectares. The site consists of a small public convenience building (hereafter referred to as the toilet block), amenity grassland, a playground and a number of scattered mature trees in the park, and a section of the tidal River Yeo.

The wider landscape is comprised of the broader urbanisation of Barnstaple on the River Taw Estuary that leads to the North Devon coast. Beyond Barnstaple is a mosaic of arable, pastoral



and mixed use fields with smaller areas of residential developments, pockets of woodland and rivers.

1.2 Proposed Development

Leading on from the Initial Flood Defence Improvements project (JBA Consulting, 2015), current plans are to re-direct the River Yeo to intersect Pilton Park rather than circumventing it, as shown in Figure 1-2 below.



Figure 1-2: Planned river Yeo re-alignment

The realignment of the river will almost certainly involve the demolition of the toilet block and the removal of vegetation, including mature trees.

2 Planning Policy and Legislation

2.1 Planning Policy

2.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied, with a presumption in favour of sustainable development, a core element of the framework. Twelve core planning principles are identified within the framework, with that relevant to biodiversity stating it will:

'Contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser environmental value, where consistent with other policies in this Framework'.

The Framework recognises that, when determining planning applications, local planning authorities have an obligation to promote the conservation and enhancement of biodiversity by:

- Ensuring that adverse impacts are avoided, adequately mitigated or compensated for.
- Refusing developments that may adversely impact on Sites of Special Scientific Interest (SSSIs) or their interest features unless the benefits of the development clearly outweigh the impacts.
- Permitting developments where the primary objective is to conserve or enhance biodiversity.
- Encouraging proposals to incorporate biodiversity in and around developments.
- Refusing planning permission for developments that would result in the damage or deterioration of irreplaceable habitats (e.g. ancient woodland, veteran trees).

2.1.2 North Devon Council Development Plan

Several policies listed in Chapter 5: The Environment of the North Devon Local Plan adopted in July 2006 states that:

- Policy ENV8 (Biodiversity): "Development will not be permitted where it harms a substantive biodiversity habitat, species, network or landscape feature. If development is permitted, any consequent losses to biodiversity must be minimised, fully mitigated and compensated for by the creation or enhancement of habitat."
- Policy ENV9 (International Nature Conservation Sites): "Development will not be permitted where it would harm the integrity or conflict with the nature conservation objectives of a designated or candidate special area of conservation or UNESCO biosphere reserve."
- Policy ENV10 (Sites of Special Scientific Interest): "Development will not be permitted where it would harm the wildlife, geological or geomorphological interest features of a SSSI."
- Policy ENV11 (Protected Species): "Development will not be permitted where it would directly or indirectly harm a statutorily protected animal or plant species, or would damage, destroy or lead to the deterioration of a breeding site, foraging area or Resting place of a European protected species."
- Policy ENV12 (Locally Important Wildlife or Geological Sites): "Development will not be permitted where it would harm a county wildlife site, a county geological site, a local nature reserve, the Braunton Bat Sustenance Zone, the voluntary marine conservation area or sites of equivalent value unless:-
 - the economic or social benefits of the development outweigh the identified value of the site;
 - $\circ \quad$ any damage to the identified value of the site is minimised;
 - o there are no reasonable, less damaging alternatives; and
 - o appropriate compensatory measures are undertaken"

2.2 Legislation

2.2.1 Conservation of Habitats and Species Regulations 2010 (as amended)

The Conservation of Habitats and Species Regulations 2010 (as amended) are the means by which the EC Habitats Directive (92/43/EC) is transposed in England and Wales and update and consolidate previous legislation.

These Regulations provide protection for European Protected Species (animals and plants listed in Annexe IV Habitats Directive which are resident in the wild in Great Britain) including bats, Dormice *Muscardinus avellanarius*, Great Crested Newts *Tritatus cristatus* and Otters *Lutra lutra*. The Conservation of Habitats and Species (Amendment) Regulations 2012 placed new duties on public bodies to help "preserve, maintain and re-establish habitat for wild birds".

The designation and protection of European Sites including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) also falls within these Regulations.

Public bodies (including the Local Planning Authority) have a duty to have regard to the requirements of the Habitats Directive in carrying out their duties i.e. when determining a planning application.

2.2.2 The Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act (WCA) 1981 (as amended)¹ is the primary legislation for England and Wales for the protection of flora, fauna and the countryside. Part 1 of the Act deals with the protection of wildlife.

Most European Protected Species are now covered under the Conservation of Habitats and Species Regulations (as amended) (see above) but some activities are still covered by the WCA such as obstructing access to a bat roost.

All British birds, their nests and eggs are protected in law. It is an offence to deliberately take, kill or injure any wild bird or to take, damage, or destroy any nest or egg of any wild bird under Section 1 of the Act. In addition, certain species such as the Barn Owl *Tyto alba* are included in Schedule 1 of the Act and are protected against disturbance while nesting and when they have dependent young. Offences against birds listed on Schedule 1 are subject to special penalties.

All species of reptile and amphibian are protected by the WCA. Under Schedule 5, reptiles such as Adder *Vipera berus*, Common Lizard *Lacerta vivipara*, Slow Worm *Anguis fragilis* and Grass Snake *Natrix natrix* are protected against intentional killing, injuring or selling, and Smooth Newt *Lissotriton vulgaris*, Palmate Newt *Lissotriton helveticus*, Common Frog *Rana temporaria* and Common Toad *Bufo bufo* are protected only against sale. Species such as the Smooth Snake *Coronella austriaca*, Sand Lizard *Lacerta agilis* and Great Crested Newt are afforded additional protection by European legislation as described above.

The WCA also provides the mechanism for the designation and protection of SSSIs.

2.2.3 Natural Environment and Rural Communities Act 2006 (NERC)

The Natural Environment and Rural Communities Act (NERC) requires all public authorities, including planning authorities to have regard to the purpose of conserving biodiversity whilst carrying out their normal functions. The NERC Act includes lists of Habitats and Species of Principal Importance (HPIs and SPIs) to the conservation of biodiversity (Section 41) which should be considered in the implementation of duties under the NERC Act. In line with government circular 06/2005 (ODPM, 2005) which provides supplementary guidance, the presence of a Priority species may be a material consideration when a planning authority is considering a development proposal.

The HPI and SPI listed under the NERC Act are largely also UK Biodiversity Action Plan (BAP) Priority habitats and species. The UK Post-2010 Biodiversity Framework succeeds the UK BAP partnership; though its list of Priority species and habitats agreed under the UK BAP still form the basis of much biodiversity work in the UK. The current strategy for England is 'Biodiversity 2020: A Strategy for England's wildlife and ecosystem services'. Although the UK BAP has been succeeded, Species Action Plans (SAPs) developed under the UK BAP still remain important

¹ Amended by the Countryside and Rights of Way Act 2000



and valuable reference sources for background information on Priority species under the UK Post-2020 Biodiversity Framework.

2.2.4 Protection of Badgers Act (1992)

Badgers *Meles meles* are protected by the Protection of Badgers Act (1992) and the Wildlife and Countryside Act 1981 (as amended), Schedule 6. Under the Wildlife and Countryside Act it is illegal to intentionally kill, capture, injure or ill-treat any badger. Under the Protection of Badgers Act it is an offence to obstruct, destroy or damage a badger sett or disturb badgers within a sett. Disturbance is defined, for development purposes, as any activity that could damage a sett or be greater than what Badgers commonly tolerate.

2.2.5 Non-Native Invasive Species

Certain non-native invasive plant species are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to plant them, or otherwise cause them to grow, in the wild. The Wildlife and Countryside Act 1981 (Variation of Schedule 9) (England and Wales) Order 2010 added a number of plant species to the list including Himalayan Balsam *Impatiens glandulifera*, Montbretia *Crocosmia x crocosmiiflora*, Rhododendron *Rhododendron ponticum* and Three-cornered Garlic *Allium triquetrum*.

The Environmental Protection Act 1990 has limited provisions for non-native invasive species, but is included here due to the classification of soil and other waste containing viable propagules of invasive non-native plant species as controlled waste. This has been applied to Japanese Knotweed *Fallopia japonica* and Giant Hogweed *Heracleum mantegazzianum* with the result that waste containing these species must be disposed of in accordance with the duty of care set out in section 34 of the Act. The Environment Agency have issued guidance which will be of use in complying with the duty of care.

2.2.6 Devon Biodiversity Priority Species

Devon Biodiversity Partnership has identified hundreds of Priority species that are under threat or those of which are most notable in Devon. Planning decisions must take these into account. Twenty of these species (or species groups) have been identified as needing targeted action to secure their future in Devon, and these have their own Species Action Plans. All UK Priority species that have an established resident population in Devon have been adopted as Devon Priority species.

3 Methodology

This preliminary ecological appraisal comprises an Extended Phase 1 Habitat Survey following Joint Nature Conservation Committee (JNCC) survey methods (JNCC, 2010). This was extended to include consideration of notable / protected habitats and species following both CIEEM Guidelines for Preliminary Ecological Appraisal (PEA) (CIEEM, 2013) and the Bat Survey for Professional Ecologists: Good Practice Guidelines, (Collins, 2016).

3.1 Desk Study

A desk study was undertaken in March 2016 to review existing ecological baseline information available in the public domain and to obtain ecological records held by third parties.

Designated Sites and Protected / Notable Species

For the purposes of the desk study, the study area was defined to be the site and a 2km radius around the site, which was extended to 4km for bat species records (a highly mobile species). Information was requested from the Devon Biodiversity Records Centre (DBRC), including records of non-statutory designated nature conservation sites and legally protected species and species of conservation concern.

In addition, the MAGIC database was searched for statutory designated sites within 2 km of the site including SSSI, National Nature Reserves (NNR) and Local Nature Reserves (LNR). This was extended to 5km for European designated Natura 2000 sites (SACs, SPAs) and internationally designated Ramsar sites.

The UK Biodiversity Action Plan (UKBAP) and local Devon Biodiversity Action Plan (DBAP) were also reviewed to consider whether Priority habitats or species could be relevant to the site.

Environment Agency (EA) River Data

Due to the nature of re-directing the River Yeo, further environmental data was requested from the Environment Agency: to include records of water quality, invertebrates, fish and vegetation to enable an assessment of impacts to be made of the wildlife associated with the river habitats.

3.2 Extended Phase 1 Habitat Survey

The PEA field survey was based upon an extended Phase 1 habitat survey methodology, conducted following the JNCC survey method (JNCC, 2010) extended to include consideration of notable / protected habitats and species such as Bats, Badgers, Dormice, Reptiles, Great Crested Newts and Invertebrates (CIEEM, 2013). The Phase 1 habitat survey is a standard technique for classifying and mapping British habitats where the dominant plant species are recorded and habitats are classified according to their vegetation types.

All habitats within the site were mapped during the field survey (Appendix A) and a description of each habitat type collected. Areas of particular importance were recorded as target notes (Appendix B).

Habitats were assessed for their potential to support any legally protected or species of conservation concern and any incidental faunal sightings, or field signs discovered during the survey, were recorded.

3.2.1 Bats

The PEA was carried out in accordance with the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016). The PEA aims to identify any trees or structures that could be suitable for bats to roost in and any habitats that could be suitable for bats to commute, forage or swarm in / at. The suitability of the site is assessed in accordance with the criteria presented in Table 3-1 below.

Table 3-1: Guidelines for assessing the potential suitability of proposed development sites for bats following BCT Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, conditions, and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (unlikely to be suitable for maternity of hibernation). A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features observed have only very limited roosting potential.	Habitat that could be used by a small number of commuting bats such as gappy hedgerow or unvegetated stream, but not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat, but unlikely to support a roost of high conservation status.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
High	A structure or tree with one or more potential roost sites that are clearly suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions and surrounding habitat.	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

The PEA assessment informs the requirement for further survey and subsequent survey effort for bat roosts and commuting and foraging habitats.

Bat Roost Inspection - Buildings

A detailed inspection of the exterior and interior of the toilet block was carried out to look for evidence of bat use and features bats could use for entry / exit and roosting. This is because there is potential the toilet block may require demolition as part of the proposed flood alleviation scheme. The aim of this inspection is to determine the actual or potential presence of bats and the need for further survey and / or mitigation.

The roost assessment was carried out in line with best practice guidelines (Collins, 2016) and involves a detailed external and internal inspection of the building to compile information on



potential and actual bat entry / exit points; potential and actual bat roosting locations and any evidence of bats found. See Table 3-1 above for the suitability assessment for roosting bats.

The surveyor conducted a visual inspection from ground level using a high powered torch and binoculars to search for bat evidence or features that could provide potential roosting opportunities for bats. Features searched for included gaps between roof structures and adjoining brick structures, holes, cracks and crevices in brickwork, lifted, slipped and missing roof tiles and areas where bat droppings might accumulate such as window sills, walls or ledges.

Where it was safe to do so, all accessible parts of the building were subject to an internal inspection to record suitability of internal features for roosting bats and search for evidence indicating current or historical use of the building's interior by roosting bats using a torch and an endoscope. Within internal spaces, particular attention was paid to beams (for free hanging bats), top of gable end walls, mortice joints, junctions of roof timbers, behind purlins and between tiles and roof lining.

Where suitable internal features were identified, a systematic search was completed to record any evidence of bats including live or dead bats, droppings, urine staining, scratch marks / characteristic staining (from fur oils) and feeding remains.

Bat Roost Inspection - Trees

A bat roost inspection is required where development proposals may require tree felling or lopping where bats and their roosts could be directly impacted if present. These surveys may also be required where bats roosting in a tree could be impacted by other activities such as artificial lighting used during construction.

The trees within the site were inspected for their bat roost potential in line with good practice guidelines, see Table 3-1 (Collins, 2016). Trees were inspected from the ground with the aid of binoculars for features of potential value to bats such as holes, cracks / splits, loose bark, hollows / cavities, dense epicormic growth and lvy *Hedera* spp. (bats may roost within it) and bird and bat boxes. Signs indicating possible use by bats were also recorded and can include scratches, staining, flies and smoothing of surfaces around entry points, bat droppings in, around or below entrance, distinctive smell of bats and audible squeaking in warm weather.

3.3 Dates of Survey and Personnel

The Preliminary Ecological Appraisal was undertaken on 3rd March 2016 by Nicola Darwin BSc (Hons) ACIEEM (Natural England Bat Class Licence - Level 2: 2015-15060-CLS-CLS) and Catherine Shaw BSc (Hons) MSc GradCIEEM (Barn Owl Class Survey Licence WML-CL29). The survey of the tidal area started at approximately one hour after a neap high tide, which was at 12:33.

All members of the Chartered Institute of Ecology and Environmental Management (CIEEM) are bound by its Professional Code of Conduct.

3.4 Approach to Evaluation

The approach to evaluation and assessment will follow CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom (CIEEM, 2016) and supplemented by CIEEM Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013).

Habitats and species will be valued where possible to allow ecological features that are important, to be subjected to a detailed assessment. For example, habitats with **high** value have been designated as such due to their exceptional habitat quality that would be worthy of designation under international and national site designation (e.g. Special Areas of Conservation) and / or contain European Protected Species, bat roosts or Schedule 1 species protected under the Wildlife and Countryside Act. **Moderate** value would be placed on locally designated sites (e.g. Local Nature Reserves), BAP priority habitats and nationally notable species. **Low** value would be placed on sites that are of local importance (Local Wildlife Sites), habitats that are of value locally, but not BAP habitats and species that are notable in the local area but not notable nationally. Features of negligible value are habitats / sites / species that are both widespread and common and habitats / sites that are easily replaceable.



3.5 Limitations

This PEA Report has been produced in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Code of Professional Conduct. The assessments, conclusions and advice in this report are based on the results of the survey, the limitations listed below and the data availability.

The conclusions and recommendations presented within this report are based on the most recent designs and current ecological features present. If any change in management occurs, or if there is a significant delay before proceeding with, this could result in the identified ecological features changing naturally over time. Therefore, if the proposed flood defence works do not commence within two years of the date of this report, a reappraisal of the ecological conditions within the site would be required. Furthermore, any subsequent changes to the design proposals may alter the recommendations and proposed mitigation / enhancement measures.

3.5.1 Field Survey Limitations

The PEA walkover survey was carried out in the winter months when some plants may not have been evident; although it is considered likely that the species evident at the time of survey allowed an accurate assessment of the Phase 1 habitat types present. Despite this, surveying at a sub-optimal time of year means that some species would not be visible and the species diversity of a habitat cannot be correctly assessed. Therefore, it is likely that a botanical survey will be required during the optimal survey season (see Section 6.3).

There were several areas of land, which could not be accessed during the survey, due to health and safety concerns, time constraints, physical inaccessibility and access issues. This includes the loft space of the toilet block. The loft space was observed from the top of a ladder, but further access into the loft was not possible as the floor could not be observed under insulation materials and it was not known if it was safe to walk on.

Weather conditions were changeable during the survey: ranging from light rain and sunny intervals to being overcast with high winds. Despite this, weather was not a limiting factor for the walkover survey, but the wind may have blown away evidence of bats in the loft of the public convenience building.

3.5.2 Data Limitations

Data from biological records centres or on-line databases is historical information, and datasets might be incomplete, inaccurate or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simply be under-recorded.

consultina

4 Results

4.1 Desk Study

4.1.1 Statutory Designated Sites

A search of the MAGIC database found there are no European designated sites within 5km of the site. There are two nationally statutory designated sites within 2km of the site, both of which are SSSIs.

Table 4-1: Nationally statutory designated sites within 2km of the site

Site Name	Status	Proximity to Site	Description
Taw-Torridge Estuary	SSSI	Adjacent to SE boundary of site	Regularly supports nationally important populations of overwintering and migratory wading birds such as curlew <i>Numenius arquata</i> , golden plover <i>Pluvialis</i> <i>apricaria</i> and lapwing <i>Vanellus vanellus</i> . The wide tidal range results in very large areas of salt marshes, mudflats and sandbanks. There is also a rich plant diversity zonation of estuarine plant communities displayed among the saltmarshes.
Bradiford Valley	SSSI	1.0km N	Ancient sessile oak woodland with a leat, stream, pond and meadows, supporting a rich biodiversity. 50 breeding birds on site including Lesser Spotted Woodpecker <i>Dendrocopos minor</i> , Spotted Flycatcher <i>Muscicapa striata</i> and Water Rail <i>Rallus</i> <i>aquaticus</i> .

4.1.2 Non-Statutory Designated Sites

There are nine non-statutory designated sites within 2km of the site. Six County Wildlife Sites (CWS), one Other Site of Wildlife Interest (OSWI) and two Unconfirmed Wildlife Site (UWS) summarised in Table 4-2 below.

Table 4-2: Non-statutory designated sites within 2km of the site

Site Name	Status ²	Proximity to Site	Description
Anchorwood Bank	CWS	0.3km S	Saltmarsh & semi-improved calcareous grassland, containing four Devon notable species.
Shearford Lane & Bradiford Scarp	CWS	0.9km NE	Broadleaved semi-natural woodland, scrub, species-rich hedgebank, ponds and watercourse.
Anchor Wood	CWS	1.1km SW	Semi-natural broadleaved woodland.
Frankmarsh Wood	CWS	1.3km NE	Broadleaved semi-natural woodland, water course and tall herbs.
Yeo Valley Woodland	LNR	1.4km E	Woodland planted in 2007 and pubic park within a sheltered valley
Tutshill	UWS	1.7km N	Broadleaved woodland
Bradiford	NR	1.7km W	Scrape and pond with rough grazing
Bishop's Tawton Saltmarsh	CWS	2.0km SE	Saltmarsh, semi-improved grassland, watercourse & species-rich hedgebank.
Upcott House	CWS	2.0km NW	Parkland with veteran and ancient trees.

² CWS = County Wildlife Site, OSWI = Other Wildlife Site, UWS = Unconfirmed Wildlife Site

Tarka Trail Fields (E)	OSWI	2.0km W	Developing grazing marsh.
Rumsam Marsh	UWS	2.0km SE	Possible floodplain grazing marsh.

Numerous North Devon Key Network Features and Biodiversity Network Sites were also identified, one of which is located within the site boundary and is associated with the River Yeo that runs around Pilton Park. These features are classified as areas of semi-natural habitat with the potential to aid the overall movement / dispersal of species within the local landscape as wildlife corridors or 'stepping stones.'

4.1.3 Protected Species and Species of Conservation Concern

Table 4-3 provides a summary of the abundance and closest proximity of protected and notable species records that are considered most relevant to the site and / or proposals. The 2km desk study survey area was extended to 4km for bats, with undefined species being excluded from the data set. For the purpose of the desk study historic records (those preceding 2000) have been excluded, however these records are available upon request.

Table 4-3: Summary of protected and notable species relevant to site and/or proposals within 2km of the site

Common Name	Scientific Name	No. Records	Proximity to Site	Status / Protection ³	
Amphibians					
Common Frog	Rana temporaria	10	0.15km E	WCA 5	
Common Toad	Bufo bufo	3	0.25km NW	NERC, UKBAP, WCA 5	
Smooth Newt	Lissotriton vulgaris	1	1.10km SW	WCA 9	
Bats	·		1		
Common Pipistrelle	Pipistrellus pipistrellus	6 (1 Roost)	0.50km NW	Habitats Regs, WCA 5,6	
Brown Long-eared Bat	Plecotus auritus	5	0.85km NW	Habitats Regs, WCA 5, 6, NERC, UKBAP	
Daubenton's Bat	Myotis daubentonii	2	0.90km NE	Habitats Regs, WCA 5,6	
Lesser Horseshoe Bat	Rhinolophus hipposideros	5 (1 Roost)	0.95km NE	Habitats Regs, WCA 5,6, NERC, UKBAP	
Soprano pipistrelle	Pipistrellus pipistrellus	1	0.95km NE	Habitats Regs, WCA 5,6, NERC, UK BAP	
Natterer's Bat	Myotis nattereri	1	1.10km SW	Habitats Regs, WCA 5,6, NERC, UKBAP	
Greater Horseshoe Bat	Rhinolophus ferrumequinum	3 (1 Roost)	2.60km SW	Habitats Regs, WCA 5,6, NERC, UKBAP, DBAP	
Noctule	Nyctalus noctula	1	2.60km SW	Habitats Regs, WCA 5,6, NERC, UKBAP	
Birds					
Greenshank	Tringa nebularia	3	0.05km SW	WCA 1, BoCC: Amber	
Common Kingfisher	Alcedo atthis	7	0.05km SW	WCA 1, BoCC: Amber	
Eurasian Spoonbill	Platalea leucorodia	6	0.25km SW	WCA 1, BoCC: Amber	

³ Habitat Regs = Habitat Regulations (2010); WCA = Wildlife and Countryside Act (1981) with Schedules Listed; NERC = Natural Environment and Rural Communities Act (2006); UKBAP = UK Biodiversity Action Plan Priority Species; DBAP = Devon Biodiversity Action Plan; PBA = Protection of Badgers Act (1992); BoCC = Birds of Conservation Concern (Amber listed or Red listed); DN = Devon Notable Species (Lists 1 / 2)

consultina

Common Name	Scientific Name	No. Records	Proximity to Site	Status / Protection ³
Curlew	Numenius arquata	5	0.30km W	NERC, UKBAP, DBAP, BoCC: Red
House Sparrow	Passer domesticus	2	0.45km E	NERC, WCA 5,6, UKBAP, DBAP
Black Redstart	Phoenicurus ochruros	2	0.50km SE	WCA 1, BoCC: Red
Spotted Flycatcher	Muscicapa striata	1	1.10km SW	NERC, UKBAP, BoCC: Red
Firecrest	Regulus ignicapillus	2	1.10km SW	WCA 1, BoCC: Amber
Invertebrates				
Violet Oil-Beetle	Meloe violaceus	1	1.00km E	NERC, UKBAP
Wall Butterfly	Lasiommata megera	1	1.60km E	NERC, UKBAP
Other Mammals				
Eurasian Badger	Meles meles	5	0.50km NE	PBA, WCA 6
European Otter	Lutra lutra	3	0.60km SW	WCA 5, NERC, BAP, DBAP
Hazel Dormouse	Muscardinus avellanarius	2	0.90km NE	WCA 5,6, NERC, BAP, DBAP
West European Hedgehog	Erinaceus europaeus	5	1.40km E	WCA 5,6, NERC, BAP
Reptiles				
Slow-Worm	Anguis fragilis	5	0.65km NE	NERC, WCA 5, BAP
Grass Snake	Natrix natrix	1	1.10km SW	NERC, WCA 5, BAP
Common Lizard	Zootoca vivipara	1	1.10km SW	NERC, WCA 5, BAP
Flora				
Wild Mignonette	Reseda lutea	1	1.10km SW	DN1
Wild Service-Tree	Sorbus torminalis	1	1.10km SW	DN2
Witches' Whiskers Lichen	Usnea florida	1	1.10km SW	NERC, UKBAP

4.1.4 Non-Native Invasive Species

Three non-native invasive species were returned in the desk study, as shown in Table 4-4.

Table 4-4: Summary of non-native species identified within the study area

Common Name	Scientific Name	No. Records	Proximity to Site (m)	Status / Protection
Himalayan Balsam	Impatiens glandulifera	1	1.10km SW	WCA 9
Japanese Knotweed	Fallopia japonica	12	0.25km E	WCA 9
Three-Cornered Garlic	Allium triquetrum	1	1.10km SW	WCA 9

4.1.5 Environment Agency (EA) River Data

Numerous data was returned from the EA to include Water Framework Directive (WFD) status, fish, macroinvertebrate and macrophyte data. Complete data sets were too numerous to include in this report, however, these can be provided upon request. Only the most recent data from the closest monitoring station was assessed which is approximately 4.3km upstream from the north

JBA consulting



eastern edge of the site. The closest fish data was taken from approximately 4.5km away in the same direction.

Water Body Classification

The water quality of the River Yeo was assessed following a review of the EA's Catchment Data Explorer (EA, 2016). Information on its classification, status and objectives, as described in the Taw-Torridge Estuary Catchment of the Yeo, are summarised in Table 4-5 below. The Current Overall Status of the waterbody is identified as 'Moderate' under Cycle 2 of the WFD and the Overall Status Objective was to achieve 'Moderate Ecological Status' by 2015, which has been achieved, however, there is no future target beyond this date.

This section of the Taw-Torridge Estuary is a transitional (tidal) water body partially flows through Barnstaple, through Pilton Park (GB106039029900). The tidal river here has been highly physically modified as a result of urban development. See Table 4-5.

Table 4-5: River Yeo water body classification reproduced from the EA (EA, 2016)

Waterbody ID No.	Name of Waterbody	Hydromorphological designation	Current Overall Status / Potential	Overall Status Objective
GB106039029900	Taw-Torridge Estuary	Heavily modified	Moderate	Moderate by 2015

The current Ecological Status of the water body is classified as 'Moderate', and the objective is to achieve 'Moderate' status by 2015. There are some elements within the overall classification that have been targeted to a later date. The Catchment Data has identified five biological Quality Elements for the water body, which includes angiosperms, fish, invertebrates, macroalgae and phytoplankton. The current status for angiosperms, fish and invertebrates is 'Good' and the objective was to achieve this by the end of Cycle 2 in 2015. The current status for macroalgae and phytoplankton are 'High' and 'Moderate', respectively. The objective for macroalgae was to achieve 'Good' by 2015, with this same target for phytoplankton to be achieved by 2027 under 2015 Cycle 2 assessment criteria.

The Taw-Torridge Estuary has identified a hydromorphological Quality Elements, which is the 'Hydrological Regime' for the waterbody. The current status for this is classified as 'Supports Good' under Cycle 2 of the WFD and met the target of 'Supports Good' by 2015. No further targets beyond 2015 have been set.

The WFD also includes several Physico-Chemical Quality Elements for the waterbody. These are dissolved organic nitrogen and dissolved oxygen. The dissolved organic nitrogen is classified as being 'Moderate' at the end Cycle 2 and has therefore met the target of being 'Moderate' by 2015. Dissolved oxygen is currently 'High', with a target of lowering to good by 2015, so this has not met the objective. No further targets beyond 2015 have been set.

Specific pollutants are all classified as 'High', to include Arsenic, Copper, Iron, Un-Ionised Ammonia and Zinc; these objectives were all achieved by remaining as 'High' by 2015. Again, no further targets beyond this date have been set.

The Chemical Status of the waterbody classification returned that all other pollutants, priority hazardous substances and priority substances met the objective set in 2015 and are all classed as "Good". No further objective beyond 2015 have been established.

Fish

The most recent EA data returned from the Barnstaple Yeo New Mills site (NGR: SS 6035 3574) and Barnstaple Yeo Shirwell Mill site (NGR: SS 6084 3745) in 2012 compiled a small list of fish species including Salmon *Salmo salar*, Brown Trout *Salmo trutta*, Rainbow Trout *Onchorynchus mykiss*, Bullhead *Cottus gobio*, European Eel *Anguilla anguilla* and Lamprey *Lampetra sp*. All of these species are likely to be present within the River Yeo that is located within the site.



Macroinvertebrates

The closest EA monitoring station for macroinvertebrates is also at Yeo (Barnstaple) 50m Upstream of Collard Bridge, (Riversmead) (NGR: SS 59580 35700). Data from this monitoring station has been assessed for the most recent sampling taken in spring and autumn 2015 (see the Biological Metrics data in Table 4-6 below). Within both seasons surveys, the BMWP (Biological Monitoring Working Party) and ASPT (Average Score Per Taxon) scores are considered as being high, which is representative of low anthropogenic impact. The LIFE scores (Lotic-Invertebrate Index for Flow Evaluation) are also high and this shows species present are tolerant of faster flow types.

Yeo (Barnstaple) 50m Upstream Collard Bridge, (Riversmead) (NGR: SS 59580 35700)					
	April-2015	Sept-2015			
BMWP	208	144			
ASPT	6.93	6.55			
Number of Taxa	30	22			
Family LIFE	7.83	8.19			

Table 4-6: Macroinvertebrate data from the EA⁴

Within the taxa recorded the species of note include the presence of a non-native shrimp *Crangonyx pseudogracilis*. No protected or otherwise designated taxa were recorded. The species assemblage contains a wide range of taxa from all taxonomic groups as would be expected for this type of river. Of note is the presence of some salt tolerant species such as the mollusc *Peringea ulvae*. Overall the species assemblages for this monitoring station can be regarded as 'good', supporting a healthy spread of species across all expected taxonomic groups.

Macrophytes

The closest EA monitoring station on the River Yeo to the site is at Yeo (Barnstaple) 50 m Upstream of Collard Bridge (Riversmead) (NGR: SS 59580 35700). The most recent macrophyte surveys undertaken in 2014 show a relatively diverse assemblage of macrophytes.

All species present are common and widespread both locally and within the wider area within riverine habitats and there are no species of special or conservation significance (e.g. protected species) other than the presence of the invasive non-native species Himalayan Balsam. However, there is a diverse range of bryophytes including the crustose lichen *Hildenbrandia rivularis*. The species assemblage also contained low cover scores of Water Crowfoot *Ranunculus spp.* Several algae were noted within the data set including *Cladophora*, *Vaucheria* and *Lemanea*. Another macrophyte assemblage recorded with low cover scores was *Cladophora* and *Vauchera*.

Overall the macrophyte assemblage is considered as being 'good' and is likely to support a range of faunal species adding to the health of the river system in this location.

4.2 Phase 1 Habitat Survey

Dense Scrub

One area of dense scrub was present situated on the southern bank of the river towards the northern part of the site. This was locally dominated by Elm *Ulmus sp.* that were up to approximately 5m tall in places. Other species present included locally dominant bramble *Rubus fruticosus* agg., locally abundant lvy and rarely occurring Lesser Celandine *Ficaria verna*. See Figure 4-1 below.

⁴ NGR = National Grid Reference; BMWP = British Monitoring Working Party; ASPT = Average Score Per Taxon; Family LIFE = Family level Lotic-Invertebrate Index for Flow Evaluation; Species LIFE = Species level Lotic-Invertebrate Index for Flow Evaluation.



Figure 4-1: Dense scrub along the northern boundary of Pilton Park

Scattered Broadleaved Trees

There are a large number of mature and semi-mature broadleaved trees around the site (see Figure 4-2 and Figure 4-3), which have been planted as part of the formal landscaping in Pilton Park. These trees are of both ornamental and native species including:

- Apple Malus sp.
- Birch sp. *Betula* sp.
- Common Lime *Tilia europaea*
- Copper Beech Fagus sylvatica purpurea
- Cypress sp.
- Elm
- Horse Chestnut Aesculus hippocasatanum
- Pendunculate Oak Quercus robur
- Scots Pine Pinus sylvestris
- Weeping Ash Fraxinus excelsior 'Pendula'
- Willow sp. Salix sp.

Note: some of these trees have been target noted for their potential to support roosting bats.





Figure 4-2: Scattered broadleaved trees



Figure 4-3: Non-native Apple trees along the eastern boundary of the Pilton Park

Running Water - Brackish

The River Yeo has been canalised and circumvents Pilton Park through the centre of Barnstaple to the mouth of the River Taw as shown in Figure 4-4. The River Yeo is a tidal estuary that



contains a mixture of saltwater and freshwater. At the time of survey, no in-channel vegetation was present.



Figure 4-4: Brackish running water circumventing the park, including intertidal mudflats

Intertidal Mudflats

During the survey, the tide receded and revealed several areas of intertidal mudflats that flank the River Yeo (see Figure 4-4 and Figure 4-5). This habitat is considered to be UK BAP Habitat of Principal Importance (HPI).



Figure 4-5: Intertidal mudflats

Coastal Grassland

There are six areas of coastal grassland within the site. These generally had a sward depth at up to approximately 15cm with a limited to negligible thatch and a tussocky structure in places. Two areas of grassland that are adjacent to Pilton Park were accessed, however the other areas were observed from a distance and identified as being generally homogeneic. See Figure 4-6.

The coastal grasslands situated on the river embankments have arisen as a combination of under-management and periodic fluvial / tidal flooding resulting in a number of salt-tolerant species being present. They are dominated by Common Bent *Agrostis capillaris* with rare amounts of Red Fescue *Festuca rubra* and Perennial Rye Grass *Lolium perenne*. Frequent amounts of Cleavers *Galium aparine* are present along with other occasional species including Curled Dock *Rumex crispus*, Sea Beet *Beta vulgaris*, Lesser Celandine and Hemlock Water Dropwort *Oenanthe crocata*. Rarely occurring species include Common Nettle *Urtica dioica* and Chive *Allium schoenoprasum*.

The highly invasive non-native WAC Schedule 9 Three-Cornered Garlic *Allium triquetrum* (**TN1**) is locally dominant in several areas (see Appendix B).

The southern-most compartment of coastal grassland also contains shrubs and trees, however, these were not physically accessed due to access and health and safety issues. If this area is to be affected by development, further surveys will need to be conducted.





Figure 4-6: Coastal grassland adjacent to the river

Introduced Shrub

There are four areas of non-native and ornamental shrub planting towards the western extent of the park (see Figure 4-7 and Figure 4-8 below). A variety of horticultural variants were present including Cherry Laurel *Prunus laurocerasus* and a potentially invasive Bamboo variant *Bambuseae sp* (Figure 4-8).





Figure 4-7: Introduced shrub in the south eastern corner of the park



Figure 4-8: Introduced shrub in the north-eastern corner of the park

Amenity Grassland

The vast majority of Pilton Park is comprised of well-managed amenity grassland with a children's playground in the centre (see Figure 4-9). The sward is short, at less than 5cm, and



of a poor structure, lacking in a thatch. There are occasional small areas of bare ground and standing water (due to the poor drainage in the park) however these have not been listed separately due to their limited size.

The sward is dominated by Perennial Rye Grass with frequently occurring Cock's-Foot *Dactylis glomerata* and Common Bent. Herb species present included occasional: Common Daisy *Bellis perennis*; Greater Plantain *Plantago major*; White Clover *Trifolium repens* and Creeping Buttercup *Ranunculus repens*. Common Dandelion *Taraxacum officianale* agg. occurs rarely. There are rows of non-native Daffodil *Narcissus sp.* (**TN2**) at the northern extent of the amenity grassland.



Figure 4-9: Amenity grassland showing the children's playground in the centre of the park

Buildings

There is a small toilet block (public conveniences block) located in the south-eastern corner of Pilton Park (Figure 4-10). This building has been identified as having potential to support nesting birds and roosting bats. There is also a small electricity substation located in the north east corner close to the Pilton Causeway road.





Figure 4-10: Toilet Block at south east corner of Pilton Park

Hardstanding

There is a tarmaced path that runs through Pilton Park with a footbridge over the River Yeo to nearby residential properties (see Figure 4-11).



Figure 4-11: Hard-standing path around Pilton Park

Non-Accessible Land

The banks of the River Yeo towards its southern extent were not physically accessed for health and safety reasons. The riverbanks were assessed from a distance of approximately 20m using binoculars. The habitats appeared to be either coastal grassland or intertidal mudflats (see Figure 4-12).



Figure 4-12: Banks of River Yeo that were not accessed. Habitats are considered to be coastal grassland with areas of intertidal mudflats.

4.3 Consideration of Species

Amphibians

A total of ten Common Frogs, three Common Toads and one Smooth Newt were recorded within 2km of the site, with the closest Common Frog being recorded 150m to the east and the closest toad located 250m to the north west. The Smooth Newt recorded is 1.1km to the south west of the site on the opposite side of the estuary, with no other species of newt, such as the Great Crested Newt, being recorded within the desk study area.

There is **low potential** for amphibians to be present within the site, in the more structurally diverse coastal grassland. However, due to the salinity of the water that periodically inundates and sprays onto the coastal grassland habitats, it is expected that their prey resources will be limited. The area of dense scrub and introduced shrub in Pilton Park provides suitable terrestrial habitat for amphibians, although the potential for amphibians to be present is considered to be low due to the generally disturbed nature of the habitats within the Park and lack of fresh water breeding habitat in close proximity. There is no suitable breeding habitat for amphibians (such as ponds) within, or in close proximity to the site. Great Crested Newt are considered highly likely to be absent from the site, due to the lack of records, highly limited distribution across Devon and limited amount of suitable habitat within and in close proximity to the site.

Badgers

Five records of Eurasian Badgers were returned in the desk study, with the closest located approximately 500m to the north east of the site.

There was no evidence of Badgers found within the site such as setts or other evidence of use such foraging activity, latrines or footprints. The site could form part of the wider territory of any local Badger population present but is considered to be of **negligible importance** for badgers.



Bats

The desk study identified twenty-four records of bats within the study area, including one Lesser Horseshoe Bat roost located approximately 1.4km to the north-east of the site on the River Yeo. Lesser Horseshoe Bats are known to commute long distances from their roosts travelling via commuting features such as the rivers. Five records of Brown Long-Eared Bat were found, with the closest being recorded 850m to the north east of the site.

Light tolerant species could use the site for foraging and / or commuting such as Common Pipistrelle. However, there is also potential for light-averse species, such as Daubenton's Bat, to commute along the River Yeo as the River is not directly lit and connected to further bat foraging and roosting habitat in the wider area. The mature trees provide foraging habitat and could be used by species such as Brown Long-Eared Bats in darker areas of the site. However, there is limited potential for more light-averse species, due to the central, urban location of the site.

This river provides both commuting and foraging opportunities for many bat species including the Daubenton's Bat found within 900m of the site that are known to roost in mature trees next to water sources. Plans for the site will certainly involve the redirection of the water course, potentially impacting upon the use of the site by bats, and the possible removal of **T1** (see Table 4-7 below).

The habitats on site offer **moderate** suitability for commuting, foraging and roosting bats. The river has moderate potential to support both commuting and foraging bats and the trees, scrub and introduced shrub provide moderate potential for foraging bats. The species-poor grassland provides negligible to low suitability foraging habitats. Overall, the site has **moderate** potential to support commuting and foraging bats.

The potential for trees and buildings to support roosting bats are discussed below.

Trees

There are several mature broadleaved trees within Pilton Park, of which three have been found to have bat roosting potential and are summarised in Table 4-7.

Table 4-7: Trees with potential to support roosting bats.



Tree 1 (T1)

Mature Horse Chestnut with small entrance hole that has the potential to extend further up into the upper parts of the trunk. (The larger hole pictured on the RHS of the photo is only superficial and blocked off by rotting wood) This hole could be the result of improper tree pruning.

Low bat roost potential.







Tree 2 (T2)

Mature Maple *Acer sp.* with large cylindrical tear-out, providing a potential roost feature in the central trunk that extends up into the upper part of the trunk (Tree tag number: 803).

Medium bat roost potential.





Tree 3 (T3)

Semi-mature Horse Chestnut (to the right of the picture) with a further flush-cut small hole that seems to go further up the trunk.

Low bat roost potential.



Buildings

The substation is sealed, constructed of steel, positioned next to the road and exposed to artificial lighting, and does not provide access inside the building for bats. The substation is considered highly unlikely to support roosting bats.

The toilet block (Figure 4-10) was renovated in 2007 and consists of seven enclosed toilet cubicles and a separate maintenance area with access to the roof void through a loft hatch. The toilet block is a single storey structure and has a pitched roof with clay tiles. It is rendered on three sides and has pebble-dashing on the western aspect. There are light wells on each side of the roof with large wooden slat vents on the northern and southern gable ends.



Externally, the roof is in moderate repair with numerous gaps between lifted tiles and a small number of broken tiles (Table 4-8: Photos 3, 5, 6 and 11). The roof is lined internally with wooden cladding (Table 4-8: Photo 17). These gaps provide roosting opportunities for crevice dwelling bats between the wooden cladding and tiles. The wooden cladding would conceal any evidence of bat roosting, as it would prevent droppings falling into the loft space. See Table 4-8 for full details of the potential bat roosting features.

There are a number of gaps between the lead flashing, light wells and the extractor vent (Table 4-8: Photos 2, 4, 6, 8, 10 and 11). Additionally, the wire mesh covering the wooden slat ventilation on the northern and southern gable ends is damaged providing access into the roof space (Table 4-8: Photos 1 and 16). This would provide potential roosting opportunities for bat species that require an internal flying area such as the Brown Long-Eared Bat.

The internal inspection revealed the loft floor to have a large amount of debris disturbed by strong winds flowing through the building at the time of the survey. This could have resulted in the removal of any bat dropping and insect remains as a result of the draught entering via the vents. Although two highly degraded unidentified bat droppings were found close to the loft hatch (Table 4-8: Photo 15).

The toilet block has been identified as having moderate bat roost potential.

Table 4-8: Bat roosting features within the toilet block.









Birds

No evidence of nesting birds was observed during the survey, although the survey was conducted early in the bird nesting season and it is likely that many species had not begun to display breeding behaviour or begun to construct their nests. There are bird nesting opportunities, for species such as Pigeon *Columbidae spp.*, in the roof of the toilet block where there is access into the roof space through damaged vent covers. Therefore, there is **moderate potential** that the toilet block, trees, scrub and shrub could be used by nesting birds.

Trees shrubs and scrub habitats within the site provide foraging and nesting habitat for breeding birds. Incidental observations during the survey included passerines such as European Robin *Erithacus rubecula*, House Sparrow, Long-Tailed Tit *Aegithalos caudatus*, Starling *Sturnus vulgaris* and Blackbird *Turdus merula*, as well as Jackdaw *Corvus monedula*.

There is the potential that Black Redstart could use the site as there are records of this species approximately 500m to the south east of the site. Black Redstart are listed on Schedule 1 of the Wildlife and Countryside Act (WCA). Black Redstarts are known to inhabit urbanised areas including railways, warehouses, large public buildings and maritime areas. Therefore, there is low potential that this species may be found on the site or on nearby buildings and warehouses. Therefore, if present in the vicinity of the site, there is the potential the proposals could have an impact upon this species.

Due to the highly disturbed nature of the Park as a whole and its limited short and poorly structured grassland, there is **negligible potential** for ground-nesting birds to be using the site.

Numerous records of birds associated with wetlands / water were returned in the desk study, to include Greenshank located 50m to the south west of the site. Eurasian Spoonbill were also recorded within 250m to the south west of the site. All of these birds are also listed under Schedule 1 of the WCA and are associate with the Taw Torridge Estuary, close to the southern extent of the River Yeo. However, there is potential that the occasional individual wetland bird could forage along the mudflats along the lower reaches of the Yeo, but they are highly unlikely to be within the majority of the site and are considered likely to be absent from Pilton park. Therefore, the site has **low potential** for wetland birds.

Common Kingfisher (a Schedule 1 species) has been recorded 50m to the south west of the site. However, they are considered highly unlikely to be nesting along the reaches of the River Yeo that falls within the boundary of the site as there is no suitable nesting habitat and the river is highly disturbed in this location. The site is considered to have **negligible potential** for this species to be present.

Dormice

Two records of Dormice were returned from DBRC and a review of the online MAGIC database revealed four license applications to disturb Dormice within 2.5 km of the site; the closest of which being approximately 1.5 km to the east of the site.

The site is not considered likely to support dormice as it does not provide suitable dormouse habitat. In addition, it is isolated by urbanisation from other suitable dormouse habitat in the wider landscape. The site is considered to be of **negligible importance** to dormice. Therefore, no further consideration is given to this species.

Invertebrates

Invertebrate species identified during the data search include the Wall butterfly and Violet Oil Beetle both of which are NERC Species of Principal Importance, with the Violet-Oil Beetle being the closest recorded at 1km to the east of the site. These species are highly unlikely to be present within the site due to the lack of suitable habitat present. Wall butterflies are associated with short open grassland, dunes, field edges and farm tracks and require specific grass species for their larval foodplant. Violet Oil Beetle is found in woodland edge, upland moorland and flower-rich grasslands. The habitats within the park are likely to support common and widespread invertebrate assemblages. There is the potential that invertebrates and macroinvertebrates associated with the river have potential to be impacted upon.



Otter and Water Vole

Three records of Otter were returned in the desk study, with the closest being located approximately 600m to the south west of the site. The habitats within and in close proximity to the site are highly urbanised, highly disturbed and present little opportunity for Otter to rear its young. However, there is potential that the site could form part of the wider territory of an individual Otter. Habitats within the site are considered unsuitable for Otters to use as a holt or lying up area, but there is low potential that individual Otters occasionally commute through the site, and therefore, could be impacted upon as a consequence of construction works.

Water Vole are considered highly unlikely to be present within the site or the surrounding areas due their limited distribution in Devon. There are no records of Water Vole within 2km of the site and there is no suitable habitat along the banks of the River within the site. The site is of negligible importance to Water Vole and therefore no impact as a result of the flood alleviation scheme is expected upon this species. Water Vole are therefore, not considered further.

Reptiles

Three species of reptiles have been recorded within 2km of the site including five records of Slow Worm, one Common Lizard and one Grass Snake. The closest of these was Slow Worm located 650m to the north east of the site on the outskirts of Barnstaple.

The rarer reptile species such as Smooth Snake and Sand Lizard are highly unlikely to be using the site as none were recorded in the desk study area, nor is there suitable habitat on site.

The amenity grassland does not provide suitable reptile habitat as it is heavily managed, has a very short sward (approximately 5cm), lacks structure and does not provide the cover required by reptiles for safe refuge. It is also regularly disturbed by park users, particularly dog walkers.

Although much of the site is comprised of unsuitable habitats (being a short and structurally poor grass sward), there are limited pockets of suitable habitat for Slow Worms, Common Lizard and Grass Snake where vegetation is managed less frequently, including the scrub and taller grassland adjacent to the river to the north of the park. Additionally, the scrub and introduced shrub vegetation provides refugia for Slow Worms and Grass Snake.

To the north of Pilton Park, there is a small area of coastal grassland, with two stands of Three-Cornered Garlic (TN1) which has limited access and therefore is subject to less frequent management and disturbance by park users. However, the basking opportunities are limited due to heavy shading as it is on a north-facing slope, with tall scrub and tree saplings growing on the crest of the bank. This area of grassland is therefore considered to be of negligible importance to reptiles. The small area of dense scrub and shrubs within Pilton Park have the potential to provide refugia for reptiles. Overall, the site is considered to have **low potential** to support reptiles.

Species of Principal Importance and Species of Conservation Concern

The scrub and introduced shrub on site are likely to provide habitat for SPI such as hibernating and foraging opportunities for West European Hedgehog. Five records of Hedgehog were returned in the desk study, with the closest situated approximately 1.4km to the east of the site. The site is considered to have **low potential** to support Hedgehog.

Invasive Non-Native Species

There are fourteen records of WCA Schedule 9 non-native invasive species, with the closest of twelve records of Japanese Knotweed being located approximately 250m to the east of the site and a record of Himalayan Balsam approximately 1.1km to the south west.

Three-Cornered Garlic was observed in three locations within the site (TN1). No other nonnative invasive species were observed during the survey, but there is the potential that some species (such as Himalayan Balsam) would not have been visible at the time of the survey. Himalayan Balsam is associated with watercourses, so there is potential that the site could become colonised by this species from further upstream. The removal of these non-native invasive species needs to be carefully controlled to ensure they are not transferred to other locations.

5 Evaluation

This evaluation of the impacts of the flood defence proposals aims to highlight and discuss the ecological features within the site and in close proximity to the site. It also aims to identify what the likely potential impacts of the proposals will be on those ecological features.

5.1 Designated Sites

The only statutory designated site considered likely to be impacted upon is the Taw Torridge Estuary SSSI. There will be a temporary change in the in-channel velocities of the River Yeo (JBA Consulting UK, 2016), which could have a low impact on the Taw-Torridge Estuary. The corner of the Taw-Torridge Estuary SSSI is adjacent to the south western corner of the site where the River Yeo meets the Estuary. Changes to the flow rate of the River Yeo are not predicted to have a significant impact upon the River Taw due to its tidal periodic change in flow rate. There are also not likely to be any changes to the nutrient levels as there is no nutrient discharge under current proposals.

However, the proposals have the potential to result in changes to the in-channel velocities of the River Yeo (JBA Consulting UK, 2016). This could lead to increased erosion in the vicinity of the realignment in the short term as the channel bed adjusts to the new river alignment as detailed in the Hydromorphology Assessment (JBA Consulting UK, 2016). The report recommends that further modelling of the final design for the re-alignment will need to be carried out to establish the wider impacts.

Due to the proximity of the Taw-Torridge Estuary SSSI, a Countryside Rights of Way Assessment may need to be carried out to ensure that there will be no direct impact on the SSSI. Consultation with Natural England will be required.

There is a North Devon Biodiversity Network site located within the park, therefore this is presumed to be impacted upon. However, there is potential to reinstate the site as a more valuable network feature for biodiversity through enhancement recommendations post-construction. Furthermore, there are other North Devon Biodiversity Network sites and key network features surrounding the site, so wildlife could temporarily recede to these other areas during construction, and return during the operational phase.

There are not predicted to be any impacts upon all other non-statutory designated sites due to their proximity to the site and the nature of the proposals.

5.2 Environment Agency River Data

Conclusions that can be drawn from the EA data are somewhat limited due to the proximity of the closest monitoring station to the site. As previously described in Section 4.1.5, the river is fresh water at the monitoring station would therefore have a different and potentially greater species assemblage than the brackish river habitats within the site.

Water Body Classification

Due to the high anthropogenic impact on the River Yeo, the re-alignment is not anticipated to impact upon any of the chemical or ecological parameters. Neither the flow or nutrient levels are expected to impact upon the current overall classification of the river.

Fish

All of the species recorded at the monitoring stations are likely to be present in the section of River Yeo that falls within the site but most of the species are common and widespread. European Eel, Lamprey, Salmon and Brown Trout are, however, all UK Species of Principal Importance. Despite this, there is expected to be a negligible impact on these species due to the minimal change in both flow and nutrient level as a consequence of the flood scheme.

Macroinvertebrates

The upstream data has revealed scores associated with minimal anthropogenic impact that are tolerant of faster water flow types, indicating that the river has good hydro-geomorphology and is not significantly impacted by impoundments. A non-native species of shrimp was also identified, with no further notable species being recorded. Some salt tolerant species were recorded, such as the mollusc which is representative of the tidal nature of the river.

There is anticipated to either be no or negligible impact on macroinvertebrates due to the tidal nature of the River Yeo within the site, both due to the flow and salt levels. However, the potential for macroinvertebrates on site will be assessed during the River Corridor Survey (see Section 6.3).

Macrophytes

The data collected from the upstream monitoring station showed a relatively diverse assemblage upstream of the site of species that are both common and widespread, with the non-native invasive Himalayan Balsam also present. Due to the location of this station being upstream of the works area it will have slightly less tidal influence and therefore will contain a different species assemblage to the riparian habitats within the site. Despite this, a diverse range of Bryophytes was recorded and the presence of the lichen found here also suggest that there is a good water quality at the monitoring station, due to its intolerance to high levels of sedimentation. Water Crowfoot was observed in low numbers that where present, would provide important habitat structure for fish and macroinvertebrates.

Overall, there is not predicted to be an impact on macrophyte assemblages as a result of the re-alignment of the River Yeo, due to the negligible change in nutrient level and change in flow due to its tidal nature. However, to ensure that any macrophytes are not going to be impacted along the specific site reaches, a further river corridor botanical survey is recommended (see Section 6.3).

5.3 Habitats and Botanical Interest

Habitats within Pilton Park are widespread and common, and typical of amenity space and formal parks. No rare botanical species were observed during the field survey and the habitat types present did not suggest their presence to be likely. There were several areas of the non-native invasive Three-Cornered Garlic found growing on site, therefore its removal should be carefully considered. There is also an area of Bamboo growing in the north-eastern corner of the park, which would need further investigation to identify if this is an invasive species and if there needs to be any specific protocol adopted for its removal.

Further downstream of the park the UK BAP Priority Habitat (HPI) of intertidal mudflats has been identified flanking both sides of the river. This is an important resource for many species, particularly wetland birds such as Curlew and Greenshank that have been recorded on the Taw-Torridge Estuary SSSI adjacent to the site. Therefore, there could be a limited and variable impact on this habitat (and its associated species), which would need to be mitigated. Under current proposals, a combination of flood glass and re-enforced concrete will be used to raise the flood defences downstream of Pilton Park, which will have a temporary impact on the habitats and species associated with the river during construction.

The coastal grassland and mudflats that flank the River Yeo may be temporarily impacted upon during the construction phase, therefore further avoidance measures may be required.

The River Yeo is classed as a UK Broad BAP Priority Habitat as "River and Streams.". In general, the other habitats associated with Pilton Park itself are considered to be of low to moderate value ecological value. However, there is the potential that they may support protected or priority species for example the toilet block and mature trees may support roosting bats.

5.4 Protected and Notable Species

Amphibians

All native amphibians are protected under the WCA to varying degrees, with extra protection placed on the Great Crested Newt, which is also a European Protected Species under the EC Habitats Directive.

It is not anticipated that the proposals will have a significant negative impact on amphibians due to limited records for these species in the wider area and limited suitable aquatic and terrestrial habitat on site. However, depending on the final proposals, further consideration for amphibians such as the Common Toad (an SPI) may be required, such as avoidance measures during construction works.

Badgers

Badgers and their setts are protected under the Protection of Badgers Act and the WCA. There is potential that this site could act as a biodiversity stepping stone for the Badger, so despite no evidence of Badger being found, its presence within the site cannot be ruled out. As a result, there is potential that there could be a temporary low impact on individual transient badgers during the construction phase, so avoidance and mitigation recommendations must be followed to minimise impacts to Badgers that may be present (see Section 6).

Bats

Overall the site is considered to provide moderate suitable foraging, commuting and roosting habitat for bats, due to the presence of mature trees, river, scrub and a building.

Removal of trees, alteration of the water course and works to the building have the potential to have a negative impact on bats. Additionally, the introduction of artificial lighting into currently dark areas during the construction phase, has the potential to impact upon foraging bat species, including rare bat species. All native bat species and their roost sites are fully protected as described in Section 2.2. At present there are no firm proposals, but the presence of bats should be considered highly likely and will require further bat activity and emergence surveys. Any feature of the site that has the potential to be directly affected by the proposals should be assessed to ascertain its suitability to support bat roosts. Once these surveys have been completed, specific mitigation and compensation recommendations can be suggested.

Birds

Numerous songbird and wetland bird records were returned within the study area, with several common bird species and the red-listed House Sparrow observed during the survey. No wetland birds were recorded on site, with the wetland bird records being predominantly associated with the Taw-Torridge Estuary SSSI.

Trees, scrub and features associated with the building provide nesting opportunities for a variety of birds. As described in Section 2.2, all bird species and their nests are protected from damage and or destruction. In the event that the development proposals require the removal of vegetation or other nesting features, avoidance measures should be implemented (see Section 6).

There is potential to temporarily impact upon intertidal mud foraging habitat and reduce the availability of this resource for wetland birds towards the southern end of the site, where the River Yeo and River Taw meet. This is especially important due to the proximity of the SSSI, which has been designated for its habitat for wading bird species. Therefore, depending on the works, further wetland bird surveys may be required (Section 6.3).

The estuary provides potential for wetland birds to forage on the turn of the tide, when areas of mud are exposed, therefore, there is potential that wetland birds could be impacted upon during the construction phase and as a consequence of habitat loss.



Invertebrates

The habitats within the site are considered likely to support a range of common and widespread invertebrate species, particularly amongst the mature trees, scrub and non-native apple trees. The river provides habitat for aquatic invertebrates and increases the overall invertebrate interest of the site.

The river will be retained, but the length of riparian habitat within the site will be reduced overall, relocated, and the banks of the river potentially of a different construction to that which will be lost. The aquatic invertebrate interest will continue into the future, although to a lesser degree, once the construction is complete. The reduced area of riverine habitat available as a result of the scheme should be compensated for by the creation of alternative wetland habitat. The scheme should seek to retain the existing biodiversity value within the site and incorporate enhancements where possible.

There will be a loss of small areas of grassland, scrub and introduced shrub during the construction phase. Compensatory planting should be incorporated into the design to ensure there is no net loss of habitat. The temporary loss of these habitats is unlikely to have a significant effect on invertebrates due to the presence of similar habitats in the wider area.

Although there will be a reduction in riparian habitat availability as a result of the diversion of the river, there is expected to be an increase in the terrestrial habitats post construction. Incorporating species-rich habitats into the landscaping proposals will benefit invertebrates.

Insects associated with the river potentially provide a food resource to other species such as bats and fish. Therefore, there is potential to impact upon species assemblages within the site by reducing the habitat available. The results of the river corridor survey (that encompasses the macrophyte and botanical survey) will enable specific mitigation recommendations to be made.

Otter

Otters are protected under the WCA and under the EC Habitats Directive. The low potential for Otters to be present within the site cannot be ruled out, although it is considered highly unlikely that Otter holts or lying up areas would be present in the vicinity of the works area. Impacts are considered to be limited to the construction process, for example if works are conducted at night when Otters are active. Avoidance measures will be adopted during construction to ensure there are no impacts on Otters that may pass through the site.

Reptiles

It is considered unlikely that Common Lizard or Adder would be present within the site due to the amenity use, regular management and disturbance. As described in Section 2.2, all native reptiles are protected from killing and injuring. If reptile habitat is likely to be affected, further surveys should be carried out to confirm the presence or likely absence of reptiles within the site. This will enable an assessment of the likely impacts on reptiles to be made and inform avoidance and mitigation measures that are required.

Other Protected and / or Notable Species

Habitats within the site have the potential to support Hedgehog. Avoidance and mitigation measures should be adopted during the construction phase to avoid adverse effects upon Hedgehogs. It is recommended that enhancements are incorporated into the development to benefit Hedgehog as this species is currently thought to be in decline within parks and gardens nationally.



6 Conclusions and Recommendations

The majority of the site is species-poor amenity grassland lacking in structure and is of low ecological value. A small area of unmanaged coastal grassland to the northern edge of Pilton Park is of low ecological value, having the potential to support reptiles, but with limited basking opportunities. The scrub and shrub within the park provides potential refugia for hibernating reptiles and cover during the active season between April and September.

The mature trees are of moderate ecological value and have the potential to support nesting birds and bat roosts. Furthermore, the trees provide foraging habitat for bats and birds. In addition to semi-natural habitats, the toilet block has the potential to be used as bat roost and by nesting birds.

Wherever possible habitats of value should be retained, such as the mature trees. In addition, where possible, the coastal grassland should be retained to ensure habitat provision is retained for insects, occasional small mammal use, reptiles and amphibians. The loss of any habitats or features of value should be suitably mitigated, and if possible the flood scheme should aim to achieve an overall net gain in biodiversity in line with the National Planning Policy Framework).

There is considerable potential to integrate wildlife habitats into the proposed redevelopment of the site by retaining important features (e.g. mature trees and scrub habitat), enhancing retained features (grassland) and creating new habitats complementary to the existing features of value.

6.1 Mitigation

All recommendations are subject to change once the results of the further surveys as described in Section 6.4 have been completed, analysed and further mitigation recommendations have been made.

6.1.1 Avoidance

- The building, trees and scrub should be removed outside of the bird nesting season (March to September inclusive). If this is not possible, a suitably qualified ecologist should search for active nests immediately prior to works being undertaken, to confirm their absence. In the event that an active nest is found, no works may proceed until the nest is no longer active (i.e. the chicks have fledged). Furthermore, House Sparrows are known to nest in buildings in all months of the year particularly in the south where winters can be milder.
- Out-of-channel vegetation removal should be removed by hand (if practicable) in September and October, followed by in-channel vegetation clearance in late summer due to the presence of salmonids in the river.
- Retained trees should be protected during construction by using weld-mesh fencing. To prevent degradation due to heavy machinery, a root protection zone should be established, following British Standard 5837:2012.
- Limit the hours of working to daylight hours during the construction phase to limit disturbance to nocturnal and crepuscular animals.
- Trenches or large excavations should be covered overnight to prevent wildlife such as Hedgehogs from falling in and getting trapped. If this is not possible, a strategicallyplaced plank should be used to help any animals escape. Any pipes should be capped when not in use (especially at night) to prevent animals becoming trapped.
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which is not to be used, such as wire in which animals can become entangled.
- If the results of the bat emergence surveys of the buildings and / or trees that are to be removed yield no roosting bats, a precautionary approach must still be adopted when dismantling features with bat roost potential. These features (and a 2 m radius) must be dismantled by hand. This would ensure that if a bat is encountered it can be safely retrieved and released or placed into a preinstalled bat box on site. Should any additional features be found during demolition, then care should also be taken when dismantling these. If a bat is found during demolition, JBA Consulting should be called



immediately on 01392 904940 to move the bat to a preinstalled bat box on an appropriate mature tree within Pilton Park by a licensed bat ecologist.

6.1.2 Minimisation

Pollution Prevention Guidelines

Due to construction taking place near water, appropriate mitigation measures should be implemented throughout the construction phase to ensure that habitats within proximity of the works are not degraded as a result of pollution events. This mitigation should include:

- Abiding by relevant Pollution Prevention Guidelines (PPG) produced jointly by the Scottish Environment Protection Agency (SEPA), Environment Agency and the Environment and Heritage Service of Northern Ireland.
- Any chemical, fuel and oil stores should be located on impervious bases within a secured bund with a storage capacity 110% of the stored volume.
- Biodegradable oils and fuels should be used where possible.
- Drip trays should be placed underneath any standing machinery to prevent pollution by oil/fuel leaks. Where practicable, refuelling of vehicles and machinery should be carried out on an impermeable surface in one designated area well away from any watercourse or drainage (at least 10m).
- Emergency spill kits should be available on site and staff trained in their use.
- Operators should check their vehicles on a daily basis before starting work to confirm the absence of leakages. Any leakages should be reported immediately.
- Daily checks should be carried out and records kept on a weekly basis and any items that have been repaired/ replaced/ rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed.

6.1.3 Compensation

Birds

To compensate for the loss of a number of scattered mature trees, introduced shrub and dense scrub on site, new habitats must be created to provide foraging and nesting opportunities for birds. This should be in the form of new native tree planting (including fruit trees) and dense blocks of native shrub planting that will result in a higher number invertebrate species on site and provide an increased food resource for a variety of bird species.

Bats

To ensure there is no net loss in bat roosting potential across the site as a result of loss of the toilet block or trees, similar roosting features should be incorporated into any new building and by including access points into roof voids if possible, or by the installation of bat boxes.

Wetland Habitats

A significant amount of riparian (including intertidal mudflats) habitat will be lost and the volume of new river habitat that will be created will be significantly less than currently existing, resulting in an overall reduction in the amount of wetland habitat within Pilton Park. The present watercourse is brackish and it is not possible to recreate a saltwater feature within Pilton Park by way of compensation, therefore a freshwater wetland habitat should be created within the park to ensure continued provision of aquatic habitat within the site.

The creation of a new freshwater wetland area could consist of a series of small ponds of varying depths, such as shallow bog patches around the edges of larger ponds, which then shelve off to deeper sections. These should be planted with species that can sustain waterlogged soils with changing water levels during prolonged rainfall. The design of any wetland features should be included in a Biodiversity Management Plan (BMP). The BMP would provide recommendations as to appropriate planting to provide greatest biodiversity benefit, timings of planting and ongoing management to secure the wildlife benefit of the habitat feature.

Where possible, the banks of the new river channel should incorporate coastal grassland species, as well as encouraging other suitable coastal plants, including Scarlet Pimpernel *Anagallis arvensis*, Lady's Bedstraw *Galium vernum*, Thyme *Thymus praecox*, Selfheal *Prunella vulgaris*, Storksbill *Erodium cicutarium*, Sea Beet and Frog Orchid *Coeleglossum viride*.

6.2 Enhancement Measures

Through implementation of measures to create and enhance habitat on the Site, there is scope to provide overall ecological enhancement in line with National Planning Policy Framework (NPPF, 2012) which states that 'opportunities to incorporate biodiversity in and around developments should be encouraged'. The following recommendations are designed to enhance the biodiversity of the site post-development:

- Any planting should seek to incorporate a high percentage of native species, particularly those of a local providence, as this will ensure the site provides opportunities for a range of invertebrate species, which in turn attract bats, birds and amphibians.
- Mowable grass and wildflower seed mixes can be used in amenity grassland areas to add diversity to an otherwise low value habitat.
- Creation of wildflower meadow or wildflower planting on the embankments and outside of the main park, away from areas of greatest disturbance.
- An area of rough grassland could be created on the north-facing embankment close to the dense scrub in the northern area of the park, encouraging its use by invertebrates and amphibians, reptiles and birds as a result.
- Areas of wildlife friendly shrub planting around the edges of the park, as much of the existing shrub planting within Pilton Park is of non-native horticultural varieties.
- Install bat boxes on mature trees to enhance the Site for bats. These can be general purpose wooden bat boxes or harder wearing woodcrete bat boxes. Groups of three boxes should be positioned on a mature tree on the eastern, southern and western aspects of the tree at slightly different heights but at a minimum height of 3 m from ground level. This will create a variety of roosting climates which bats can exploit.
- Installation of bird nest boxes for species likely to use the site post-development should be considered. For example, a House Sparrow terrace or swift box could be incorporated into the new toilet block and general purpose bird nest boxes could be installed on the trees or footbridge.
- Creation of reptile refugia and hibernacula in areas of suitable habitat should be considered. These can be in the form of dead wood piles or rubble piles amongst long vegetation or scrub.
- Consideration should be given to the creation of sheltering opportunities for a variety of other wildlife such as Hedgehog houses and insect hotels.
- Installation of a Sustainable Drainage System (SuDS) to assist with the drainage issues which could be impacting upon tree survival.
- Incorporate a sensory garden to benefit the users of the park. Nectar-rich plants would be selected to provide a variety of scents, textures and colours. These could be planted in close proximity to paths and in raised beds so less physically-able visitors can freely access the planting.

There is opportunity for the scheme to benefit the users of Pilton Park. For example, the pond has the potential to be used as an educational resource for local school groups. A series of outdoor educational activities could be programmed around the biodiversity features such as pond dipping or mini-beast hunts. Other environmental educational activities could include nature walks around the park using the newly created ecological enhancements as a resource to observe wildlife such as butterflies and birds. These could potentially be combined with environmental education boards.

6.3 Biodiversity Management Plan

It is recommended that a Biodiversity Management Plan is produced to include detailed mitigation method statements and details of agreed enhancements, to include species to be used for landscaping, locations of bat boxes and bird boxes and locations of any new tree and



6.4 Further Survey

Given the presence of suitable habitat on site, and potential for legally protected species to be present, under current development proposals it will be necessary to conduct further surveys on the following species:

- Bats
- Birds
- Botanical survey (including a River Corridor Survey)
- Reptiles

As mentioned in Section 5.1, the need for a Countryside Rights of Way (CRoW) Act Assessment will be discussed with Natural England.

Once these surveys have been completed, a full assessment of the impacts associated with the flood scheme can be made. Mitigation requirements will be appropriately designed into the scheme.

Bats

Bat surveys should be carried out in accordance with best practice to establish the current use of the site by bat species; the findings of which should be detailed within a bat survey report.

A bat activity survey will be necessary to establish the use of the site by commuting and foraging bats. In accordance with Bat Conservation Trust guidance (Collins, 2016), the site is considered to be of medium quality habitat. Therefore, **seven activity surveys** (one survey per month) in the bat season (April to October) in suitable weather conditions should be completed. At least one of the surveys should be comprised of a dusk and dawn survey within one 24-hour period. If practicable, automated static surveys must also supplement this data. Two suitable locations per transect must be chosen to record bat activity data on five consecutive nights in conjunction with the bat activity surveys during appropriate weather conditions. Activity surveys involve walking a predetermined transect route around the site stopping at listening points at features of value to bats such as trees and hedges.

Presence and absence surveys should be carried out on the toilet block to establish whether bats are using the building for roosting. **Two emergence surveys** should be conducted on this building including a dusk and a separate dawn re-entry survey, one of which must occur during the optimum survey period between May and August. Due to the number of features present on the building, four vantage points must be covered by at least two bat surveyors and two sets of night vision cameras and infra-red lights, are recommended to cover all of the potential access points.

Depending upon the proposals, a number of trees may require further presence / absence surveys. Trees can be inspected aerially (such as from a mobile elevating work platform) by a licensed ecologist to inspect features for suitability to support bat roosts, and evidence of bats. This can rule out features that appear to have potential from the ground and eliminate the need for emergence surveys if the features are deemed unsuitable. The results of the aerial inspection will determine whether further emergence surveys are required.

Birds

Nesting Birds

As described in Section 4.3, the toilet block may be used by nesting birds such as House Sparrow which are known to nest all year round. Therefore, the building should be inspected prior to demolition to ensure nesting birds are absent, even if demolition is to be conducted outside of the bird nesting season. If birds are found to be nesting the nest should be left until the young have fledged. Holes can be blocked up once birds have fledged to prevent birds nesting again prior to the commencement of building demolition.

Wintering Bird Survey



A winter bird survey should be conducted to ensure that the bird species associated with the Taw Torridge Estuary SSSI are not impacted upon. This would involve vantage point / 'look-see' surveying for two hours prior to high tide once a month between November and February, which is a total of four surveys.

Botanical

As outlined in the Limitations in Section 3.5, the PEA walkover survey was conducted in early March when certain grassland species may not have been evident, therefore there is potential for some species to have been missed. Therefore, a further botanical survey, particularly of the coastal grasslands, is recommended. This could be achieved by a suitably experienced ecologist completing a River Corridor Survey to capture and record the whole reach of the river that is to be diverted. This will also include records of macrophytes and incidental records of invertebrates.

Reptiles

Should the works involve the removal of scrub vegetation to the north of the site, it is recommended that a reptile presence and absence survey is conducted. This involves deploying artificial refugia which are checked a minimum of **seven times** during suitable weather conditions. Reptiles such as Slow Worms use the artificial refugia to warm up to enable them to hunt for food enabling easier detection of reptiles. The survey should be conducted during the main reptile activity period, generally between March and September inclusive, avoiding July and August if possible due to generally higher ambient air temperatures, which reduces the likelihood of refugia being used.



References

BSI (2013), *Biodiversity - Code of Practice for Planning and Development*. The British Standards Institution, London

CIEEM (2013), Guidelines for Preliminary Ecological Appraisal. CIEEM. Winchester

CIEEM (2015), Guidelines for Ecological Report Writing. CIEEM, Winchester

Collins, J. (ed.) (2016), *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London.

Department for Communities and Local Government, (2012), *National Planning Policy Framework*. London ISBN: 978-1-4098-3413-7

DEFRA (2011), *Biodiversity 2020, A Strategy for England's Wildlife and Ecosystem Services.* DEFRA, London. [online] Available at:

> [Accessed March 2016]

<

EA (Environment Agency) (2016). *River Catchment Data Explorer*. [online]. Available at: < http://environment.data.gov.uk/catchment-planning/WaterBody/GB540805015500> [Accessed May 2016]

European Commission (2015), *The Habitats Directive*. [online] Available at:<http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm> [Accessed March 2016]

Joint Nature Conservation Committee (JNCC) (2010), Handbook for Phase 1 Habitat Survey. JNCC, Peterborough

JBA Consulting UK (2015), Barnstaple Flood Defence Improvements - Final v3.0

JBA Consulting UK (2016), Barnstaple Hydromorphology Assessment v2.2

JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). (2012), *UK Post-2010 Biodiversity Framework.* [online] Available at: https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/ [Accessed March 2016]

HMSO (Her Majesty's Stationery Office) (1981), *Wildlife and Countryside Act* (as amended by the Countryside and Rights of Way Act 2000). [online] Available at: [Accessed March 2016]

HMSO (1992), *The Protection of Badgers Act 1992*. [online] Available at: ">https://www.legislation.gov.uk/ukpga/1992/51/contents>">https://www.legislation.gov.uk/ukpga/1992/51/contents>

HMSO (2006), *Natural Environment and Rural Communities Act.* [online] Available at: ">https://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed March 2016]

HMSO (2012), *Conservation of Habitat and Species Regulations* [online] Available at: https://www.legislation.gov.uk/uksi/2010/490/contents/made [Accessed March 2016]

North Devon District Council (2006), *North Devon Local Plan Adopted July 2006*: Chapter 5 - The Environment [online] Available at: < http://northdevon.gov.uk/media/249405/ndlp-chapter-5.pdf> [Accessed March 2016]

Office of the Deputy Prime Minister (ODPM) (2005), *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System.* The Stationery Office Ltd. London



Appendices

A Phase 1 Habitat Maps



·	Site boundary Target note		Fence Wall	C	Commerci Barnst Devo EX31 1	al Road aple on 1DG		Pavillion 7 Park Five Harrier Way Sowton
	Dense scrub		Introduced shrub	Scale:	Drawn:	CRS	13/04/2016	Exeter FX2 7HU
•	Scattered broadleaved trees	A	Amenity grassland	Original @ A3	Checked: Approved:	ND ND 92 Barnets	13/04/2016 13/04/2016	info@jbaconsulting.co.uk
T 1	Trees with bat roost potential		Building	Drawing Numb	er: Sheet N	lumber:	Revision:	Other offices at: Coleshill Doncaster Dublin Edinburgh Exeter Haywards Heath Limerick Newcastle upon
BB	Running water - brackish		Hardstanding	2016s3792_00 This document	1 2 of 2	opertv of	Jeremy Benn	Tyne Newport Saltaire Skipton Tadcaster Thirsk Wallingford
	Intertidal - mud		Not accessible	Associates Ltd. or in part, nor o permission of J	It shall not disclosed to erem y Benn	be reprod a third par Associates	duced in whole rty, without the sLtd.	www.jbaconsulting.co.uk



Coastal grassland сC

North Devon District Council Lynton House

Bradley House



B Target Notes and Trees

Target Note No.	Description
TN1	Stand of the invasive non-native Three-Cornered Garlic
TN2	Large area of planted non-native Daffodils

Trees	Description
T1	Tree 1 - Mature Horse Chestnut tree with low bat roost potential
T2	Tree 2 - Mature Maple tree with medium bat roost potential
Т3	Tree 3 - Semi-mature Horse Chestnut with low bat roost potential

JBA consulting

JBA consulting

Offices at

Coleshill Doncaster Dublin Edinburgh Exeter Glasgow Haywards Heath Isle of Man Limerick Newcastle upon Tyne Newport Peterborough Saltaire Skipton Tadcaster Thirsk Wallingford Warrington

Registered Office

South Barn Broughton Hall SKIPTON North Yorkshire BD23 3AE United Kingdom

t:+44(0)1756 799919 e:info@jbaconsulting.com

Jeremy Benn Associates Ltd

Registered in England 3246693

Visit our website www.jbaconsulting.com





