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LECKWITH QUAY, CARDIFF

ECOLOGICAL ASSESSMENT

September 2021

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SUMMARY

This report refers to a large industrial and commercial site, with associated buildings and some surrounding land, known as Leckwith Yard. This is located on the bank of the River Ely on the south-western outskirt of the Leckwith district of Cardiff in South Wales. The site straddles two counties: Vale of Glamorgan County Borough and Cardiff County Borough, the unitary authority boundary being along the midline of the river. The site is located on the western edge of the city of Cardiff, being accessed directly off of the A4267 Leckwith Road at the Leckwith Roundabout. To the south and west the site is bounded by large areas of woodland, predominantly comprising Leckwith Wood and Factory Wood, both of which form part of the extensive Leckwith Woods complex which extends for over a kilometre in each direction to the north and south of the site. Beyond the woodlands the landscape opens out into an extensive farmland and woodland habitat mosaic lying to the south and west of the city. The River Ely runs along the north-eastern boundary of the site. On the opposite side of the river, and running parallel with it, lies the A4234 Ely-Grangetown Link Road, an elevated dual carriageway road.

The site itself mainly comprises cleared and levelled land containing a number of commercial and other buildings of various character, most of which are currently used for industrial or commercial purposes. There are also two residential properties on the site one of which was occupied at the time of survey. The site is crossed from north to south by an elevated section of Leckwith Road (the Leckwith Road Viaduct) which divides the site broadly into two halves lying to the north-west and the south-east respectively. The industrial land itself is fairly flat, and lies at about 10m AOD, but the site rises fairly sharply to the south-west where it meets the adjacent woodland, rising to about 30m AOD at the site boundary.

The great majority of the habitats within the site comprise either bare ground, hardstandings or cleared and levelled ground supporting secondary ruderal vegetation and some scrub. However, there is broadleaved semi-natural woodland along the south-western fringe of the site, and a very narrow belt of scrub and ruderal vegetation along the north-eastern fringe of the site where it abuts the adjacent river. There are also some neglected former garden areas associated with the residential buildings, one of which contains a large artificial pond.

The site is proposed for residential redevelopment, which would require the demolition of all of the existing buildings and redevelopment of the site to support a large residential scheme. The redevelopment would largely be confined to the industrial land alongside the river. Under these proposals, the present Leckwith Road Viaduct would also be realigned, which would result in the loss of an area of woodland.

The Cwm Cydfin, Leckwith Site of Special Scientific Interest (SSSI) lies just under 1km to the south-east of the site, downstream along the River Ely. There are no other statutory sites in the vicinity. Part of the non-statutory Factory Wood Site of Importance for Nature Conservation occurs within the site boundary, encompassing the woodland and sections of riparian habitat within the site, together with associated scrub and ephemeral/short perennial habitats. This SINC, which is designated by the Vale of Glamorgan Council (VGC), is very extensive, extending well outside the proposed development area to the south and south-west.

The River Ely, which runs immediately adjacent to the site boundary to the north-east, is also designated as a SINC due to its importance for migratory fish, otters, wildfowl and bankside vegetation etc. It is an example of a comparatively unmodified main riverbed and bank, the water is not grossly polluted by long-term sources. The SINC extends for many kilometres to the north-

west and south-east of the site, and forms a major wildlife corridor. Numerous important species have been recorded along its length, including various bats, otter, kingfisher and barn owl. Other SINCs occur within about 1km of the site.

Previous ecological survey work of the site was undertaken by DCE in 2013, including Extended Phase 1 and bat surveys. Ecological survey work of the site in 2019 has included surveys of buildings and viaduct for bats, otter surveys of the river, breeding bird surveys, badger surveys, dormouse surveys and Extended Phase 1 habitat surveys and great crested newt surveys. **Further surveys for otter and both ground level, aerial and dusk emergence surveys of trees for bats were carried out in 2020-21.**

Current surveys have found the following: Several of the buildings on the site are known to support roosting bats. At present, the roosts are believed to comprise comparatively low numbers of pipistrelle bats and brown long eared bats, and therefore the buildings are assessed as being of High Local value**. A number of trees within the woodland that are likely to be removed as part of the development have potential to support roosting bats, but no evidence of bats roosting in any of the trees has been found to date.** Bottle trapping surveys of the pond found smooth and palmate newts and have indicated the likely absence of great crested newt. Dormouse surveys of the woodlands immediately adjacent and on site found no evidence of dormouse on or within adjacent suitable habitats. Boat based otter surveys found evidence of otter use of the stretch of river. The river Ely, woodland and pond on site are also considered to be priority habitats and the woodland and river are classed as district level value owing to their designated status. The remaining semi-natural habitats of the site, including the scrub, ruderal vegetation and ephemeral/short perennial habitats, are all assessed as being of SINC quality owing to the presence of 27 indicator species present within a mosaic of habitats on the site qualifying this as a SINC for post industrial land as making this of District level value. The unvegetated hard standings of the site are considered to be of negligible value for wildlife, as are the main stands of Japanese knotweed and other non-native plant species of the site.

The site has been proposed for residential redevelopment. The development plans envisage the demolition of all of the existing buildings and redevelopment of the site primarily for a large number of new dwellings. The redevelopment is envisaged to occupy the flat industrial land adjacent to the river, but may impact the river edge and woodland edge. It is also envisaged that the present Leckwith Road Viaduct would be realigned to the north-west of its current alignment. The proposed new buildings are of varying scale, from single-story up to five-storey in height. Impacts within the site would primarily comprise the loss of the existing semi-natural habitats, potentially including some which are of High Local value or higher such as the pond and woodland and vegetated post-industrial habitats to the south. The loss of such habitats would necessitate the creation of compensatory habitats, or other equivalent conservation benefits elsewhere in order to satisfy current planning policy requirements. In practice, however, the great majority of the affected habitats are of relatively low conservation value and any adverse impacts would be confined to the local context only and should be fairly readily amenable to mitigation.

On the basis of the present survey, the proposed redevelopment of this site as currently proposed is considered to be constrained by wildlife and conservation issues. These range from the presence of statutorily protected species, and other species which are subject to statutory or policy regulation, and the presence of designated sites and habitats both within and adjacent to the site. The site also supports invasive non-native plant species which are subject to statutory controls. Notwithstanding these constraints, however, and provided that adequate resources are made available for the mitigation and compensation of any adverse impacts, it is not currently considered

that redevelopment of the site is unacceptably constrained by biodiversity and wildlife considerations.

Recommendations are made with respect to appropriate mitigation and compensation measures.

1.0 INTRODUCTION

1.1 This report has been prepared by David Clements Ecology Ltd. (DCE) on the instructions Gareth Davies on behalf of Phil Worthing. The report refers to a large industrial and commercial site, with associated buildings and some surrounding land, known as Leckwith Yard. This is located on the bank of the River Ely on the south-western outskirt of the Leckwith district of Cardiff in South Wales. The site straddles two counties: Cardiff County Borough and Vale of Glamorgan County Borough, the unitary authority boundary being along the midline of the river. The site location and context is shown at Plan 1.

1.2 The site is located on the western edge of the city of Cardiff, being accessed directly off of the A4267 Leckwith Road at the Leckwith Roundabout. To the south and west the site is bounded by large areas of woodland, predominantly comprising Leckwith Wood and Factory Wood, both of which form part of the extensive Leckwith Woods complex which extends for over a kilometre in each direction to the north and south of the site. Beyond the woodlands the landscape opens out into an extensive farmland and woodland habitat mosaic lying to the south and west of the city. The River Ely runs along the north-eastern boundary of the site. On the opposite side of the river, and running parallel with it, lies the A4234 Ely-Grangetown Link Road, an elevated dual carriageway road, beyond which lies an extensive area of industrial, commercial and retail land extending away to the north, east and south-east. Beyond the river to the north and north-west, however, the landscape is more open, comprising various playing fields and sports grounds.

1.3 The site itself mainly comprises cleared and levelled land containing a number of commercial and other buildings of various character, most of which are currently used for industrial or commercial purposes. There are also two residential properties on the site one of which appeared to be occupied at the time of survey. The site is crossed from north to south by an elevated section of the Leckwith Road (the Leckwith Road Viaduct) which divides the site broadly into two halves lying to the north-west and the south-east respectively. The industrial land itself is fairly flat, and lies at about 10m AOD, but the site rises fairly sharply to the south-west where it meets the adjacent woodland, rising to about 30m AOD at the site boundary.

1.4 The great majority of the habitats within the site comprise either bare ground, hardstandings or cleared and levelled ground supporting secondary ruderal vegetation and some scrub. However, there is broadleaved semi-natural woodland along the south-western fringe of the site, and a very narrow belt of scrub and ruderal vegetation along the north-eastern fringe of the site where it abuts the adjacent river. There are also some neglected former garden areas associated with the residential buildings, one of which contains a large artificial pond.

1.5 It is understood that the site is proposed for redevelopment, preliminary plans for which envisage the demolition of all of the existing buildings and redevelopment of the site primarily to support a large number of new residential dwellings. The redevelopment would largely be confined to the industrial land alongside the river. Under these proposals, the present Leckwith Road Viaduct would also be realigned.

1.6 The remainder of this report sets out the results of an ecological survey and assessment of the site. The report also assesses the ecological value of the site and the likely impacts of any redevelopment, and makes broad recommendations regarding the mitigation of any potentially adverse biodiversity impacts.

1.7 Designated Sites of Biodiversity Value

1.7.1 Plan 2 shows the location of designated statutory and non-statutory wildlife conservation sites within the site vicinity.

Statutory sites

1.7.2 The Cwm Cydfin, Leckwith Site of Special Scientific Interest (SSSI) lies just under 1km to the south-east of the site, downstream along the River Ely. This comprises an area of mixed deciduous woodland around a confluence with a tributary stream flowing from the west. The ground flora is varied, and is especially rich alongside the stream. The woodland is set in a small valley containing the stream and adjacent to a creek that was formerly tidal, prior to the construction of the Cardiff Barrage downstream. Triassic Marls and Rhaetic rocks are exposed locally in cliffs beside the creek. Cwm Cydfin SSSI is set within the larger Leckwith Woods complex which also contains the woodlands which extend past and around the proposed development site.

1.7.3 Approximately 2km downstream from the site the River Ely enters Cardiff Bay, which forms part of the Severn Estuary. The Severn Estuary itself is a very highly designated site, being both a 'Special Protection Area' (SPA), a 'Special Area of Conservation' (SAC), a Ramsar Site and a SSSI. SACs and SPAs are 'European sites' identified under the EU 'Habitats Directive' (the Council Directive on the Conservation of Natural Habitats & of Wild Flora and Fauna, 1992, EU Directive 92/43/EEC) and the EU 'Birds Directive' (Council Directive 2009/147/EC on the conservation of wild birds) respectively. Such sites are designated due to the presence of habitats and/or species which are restricted or threatened at the European scale. Both the EU directives are implemented in the UK via the Conservation of Habitats & Species Regulations, 2010 (the 'Habitats Regulation', SI 490). UK law requires that all such sites are also designated as SSSIs under domestic legislation. Ramsar sites are wetlands of international importance, designated under the Ramsar Convention of 1971 which provides for the conservation and good use of wetlands. This international agreement is also implemented in the UK via the Habitats Regulations, and sites are also required to be designated as SSSIs.

1.7.4 The upper reaches of the River Ely are also designated as a SSSI in the section which stretches from Miskin almost to St Fagans, but this is approximately 5km away from the site. In addition to supporting rare plants such as monkshood (*Aconitum napellus*) and various uncommon birds such as kingfisher, the River Ely is notable in supporting a flourishing population of otter and various migratory salmonids and other fish of conservation interest, and a wide range of uncommon aquatic plants and invertebrates.

Non-Statutory sites

1.7.5 Part of the Factory Wood Site of Importance for Nature Conservation (SINC No. 188) occurs within the site boundary. This SINC, which is designated by the Vale of Glamorgan Council (VGC), is very extensive extending well outside the proposed development area to the south and south-west and containing the Cwm Cydfin SSSI. The SINC is designated as an extensive area of broadleaved woodland, comprising a mixture of ancient semi-natural woodland, replanted ancient woodland and secondary broadleaf woodland.

1.7.6 The River Ely, which runs immediately adjacent to the site boundary to the north-east, is also designated as a SINC due to its importance for migratory fish, otters, wildfowl and bankside vegetation etc. It is an example of a comparatively unmodified main riverbed and bank and where the water is not grossly polluted by long-term sources. The SINC extends for many kilometres to the north-west and south-east of the site, and forms major wildlife corridor. Numerous important species have been recorded along its length, including various bats, otter, kingfisher and barn owl.

1.7.7 Other SINCs occur within about 1km of the site. These include the West Hill Wood SINC (VGC SINC No. 187) which lies about 0.75km to the south-west and the Canton Common Ditch SINC which lies across the River Ely, about 300m to the north-east. The Leckwith Woods Viaduct SINC lies about 250m to the north of the site, and is designated for supporting a roost of the rare and protected lesser horseshoe bat. The Leckwith Pond & Marsh SINC lies on the east side of the river, about 1.25km to the south-east of the site. The latter three sites are all designated by Cardiff Council.

1.7.8 SINCs are one of a class of sites which are referred to nationally as 'Wildlife Sites'. These are so-called 'third tier' sites, generally ranked below sites which are of international or national biodiversity significance, but which are considered to have substantive nature conservation value in the sub-national (i.e. regional or district) context. They are usually designated at the county or county borough level by the relevant local planning authority, and are recognised as a planning constraint in the relevant statutory development plan. The framework for the identification and designation of 'Wildlife Sites' is set out in various Government documents, and is referred to in Planning Policy Wales (Ed 5: 2012) and Technical Advice Note (Wales) 5: Nature Conservation & Planning (2009).

1.7.9 The great majority of the Leckwith Woods complex, including the sections of Leckwith Wood and Factory Wood which lie immediately adjacent to or fall within the site, are recorded as 'Ancient Semi-Natural Woodlands' (ASNW). These are broadleaved woodlands comprising mainly native tree and shrub species which are believed to have been in existence for at least 400 years. Any area of ASNW automatically qualifies as a SINC according to the Guidelines for the Selection of Wildlife Sites in South Wales (WBP 2008) and is therefore covered by any SINC related policy.

1.8 Survey Constraints

1.8.1 Dormouse surveys were impacted by vandalism of the tubes. A total of ninety-six tubes were originally deployed, approximately half of these were subject to vandalism therefore

reducing the number of tubes to around 50 throughout the survey period. The vandalism was prevalent in the habitats adjacent to the site. The tubes deployed in the on-site woodland to the south of the site were not subject to any vandalism and as a result the vandalism is not considered to have imposed a major constraint on the survey results.

1.8.2 The bat surveys were constrained to some extent by limited internal access, with access to some of the buildings being unavailable, others had health and safety concerns that limited extensive searching and/or entering of loft interiors. Therefore, it was not possible to carry out internal site inspections for a number of the buildings, however any such buildings were subject to two emergence/re entry surveys to accommodate this.

1.8.3 The tree surveys were constrained by the following factors: extensive ivy and/ or foliage obscuring the view of many trees on site and extensive dense scrub limiting close access to some groups of trees. **Ground based and dusk emergence surveys are always constrained by the physical ability to view the tree, therefore only potential features on the visible parts of the tree are recorded and any features present on the upward facing side of branches will not be recorded.** Some features were occupied by large numbers of slugs/competitors on the day of the aerial survey therefore internal measurements of the features could not be taken on this occasion**.**

1.8.4 The pond surveys for great crested newt were constrained in that it was not possible to complete an egg search of the vegetation. This was due to the steep sided nature of the pond making the pond vegetation not safely accessible for this survey type. Netting was used as an alternative method to the survey instead, and therefore it is not considered that this has imposed a serious constraint on the results.

1.8.5 The bank based otter surveys were somewhat limited by the dense bankside vegetation, preventing access, particularly during the September 2020 survey.

1.8.6 The Extended Phase 1 Habitat survey along with the other protected species surveys undertaken, were undertaken during respective optimal periods for such surveys and are therefore not considered constrained.

1.8.7 The previous report (DCE 2013) recommended that reptile refugia surveys should be carried out on sections of the site with potential to support common reptiles. However, it was not possible to leave refugia mats out, due to the industrial nature of the site and constant use by vehicles.

2.0 APPROACH AND METHODS

2.1 Survey Methodology

Vegetation & Habitats

2.1.1 An Extended Phase 1 Habitat survey was undertaken on 19th June 2019 in good weather conditions by a suitably experienced ecologist. The site was subject to an Extended Phase 1 survey as recommended by the Institute of Environmental Assessment (IEA 1995). This was based on the Phase 1 vegetation classification methodology developed by the former Nature Conservancy Council (current version: JNCC 2007)), a nationally-accepted and standard method for the rapid survey and appraisal of ecological habitats which is based primarily on the recording of vegetation and its classification into defined habitat categories. Dominant and conspicuous flora species were recorded and 'target notes' were prepared for any features of particular interest.

2.1.2 The methodology also requires the recording of conspicuous fauna species such as birds, herptiles (ie amphibians and reptiles), mammals and invertebrates such as butterflies and dragonflies, paying particular attention to the presence (or possible presence) of any rare or protected species.

Surveys for Bats: Buildings & Viaduct

2.1.3 Surveys for bats were carried out in accordance with the guidance given by BCT (2016). The external features of the buildings and the viaduct were initially inspected in daylight by two appropriately licenced and experienced surveyors for evidence of bats. Long ladders were used to inspect potential crevices underneath the viaduct. The interiors of the buildings were also searched and any accessible loft voids or basements where access was permitted, and it was safe to do so. The buildings were searched for potential bat entry points and any evidence of usage by using close-focusing binoculars and high-powered torches. Any evidence of bats such as droppings or feeding remains, as well as sightings of actual bats and secondary signs such as scratch marks, fur-oil and urine stains, were recorded. The ground plan and construction of the buildings were recorded, and an estimate made of their potential suitability for bats.

2.1.4 In addition, a series of flight surveys were carried out between July and September 2019, in accordance with BCT good practise guidance. Groups of up to 15 experienced observers were stationed around the various buildings and viaduct of the site either at dawn or at dusk, to record any bats seen either entering or leaving the buildings. Observers were equipped with Anabat SD1, SD2 or Peersonic RPA3 full spectrum bat detectors, with bat calls being recorded to flashcard for subsequent review and analysis using the AnalookW software of Corben (2006) and/or Kaleidoscope.

Surveys for Bats: Trees

2.1.5 Large standard trees were subject to a preliminary ground based survey to assess their potential suitability for use by roosting bats during the site inspection. This survey was carried out from ground level, using close-focusing binoculars, with particular attention being given to the presence of 'potential roosting features' (PRFs) such as those described

by Andrews (2018). The trees were individually searched for features which are likely to be attractive to roosting bats such as cavities and rot-holes, splits and cracks, rugose or delaminating bark and dense ivy cover etc, and any such features recorded. The inspected trees were then categorised as follows:

Table 1: Categorisation of trees with respect to bat roosting potential

Occupied by bats	Bats are known to occupy features of the tree, or there is direct evidence of such occupation.	Further detailed survey by bat ecologist required. NRW licence required before any tree works.
High potential for bat use	Tree has features which appear to be of high suitability for use by bats. Usually large and/or mature trees with numerous and/or well-developed PRFs.	Further surveys by bat ecologist required per BCT (2016) 'high roost suitability'. NRW licence will be required if any bats are found.
Moderate potential for bat use	Tree has features which appear moderately suitable for use by bats. Usually large and/or mature trees with at least some well-developed PRFs.	Further surveys by bat ecologist required per BCT (2016) 'moderate roost suitability'. NRW licence will be required if any bats are found.
Low potential for bat use	Tree has overall low roosting suitability, although some features of low or marginal roosting potential may be present. Trees of suitable age/size to support PRF but no PRF visible from ground.	Inspection by arborist and/or bat ecologist immediately prior to and during tree works. 'Soft-felling' may be advised.
Negligible potential of bat use	Usually young and/or small trees, lacking any obvious features suitable for use by bats.	No further survey required. No constraint to tree works.

2.1.6 An initial ground based visual inspection of all trees on site was undertaken on the 15th January 2020 by two suitably experienced surveyors. The area of woodland likely to be affected by the development, including trees within 5m of the development boundary was marked out on the ground in August 2020. These trees were surveyed in detail from the ground by an experienced and bat licenced surveyor between 21st August and 8th September 2020.

2.1.7 A close inspection survey of identified potential roost features (PRF) was undertaken by two certified climbers and bat licenced ecologists in accordance with current best practice guidance provided by BCT (2016). The survey was carried out in cold weather conditions with some light snow during daylight hours on 31st January 2021. Four trees were climbed and all PRF inspected using high powered torches (LED Lenser) and a digital endoscope (Rigid See snake CA350) where required. Searches were made especially for direct evidence of bat occupation such as bats in situ and bat droppings, and secondary signs such interior PRF staining and smell etc.

2.1.8 The type, location and dimensions of the PRF were recorded in accordance with the bat tree habitat key (Andrews, 2018), with an estimate being made of the potential attractiveness and suitability for bats.

2.1.9 Following aerial survey, the trees potential to support roosting bats was reassessed in accordance with the BCT bat survey guidance (2016).

2.1.10 Two dusk emergence surveys were carried out on each of the four trees that required further survey on 24th August and 15th September 2021, in accordance with the BCT good practise guidance (2016). Two surveyors/ one surveyor + IR camera were stationed around each tree. All surveyors were equipped with Anabat SD1, SD 2 frequency-division bat detectors or Peersonic RPA3 full spectrum detectors, supplemented by a mixture of Petterson D200 and BatBox duet heterodyne detectors. Bat calls were logged and recorded to SD cards for subsequent analysis using the AnalookW software (Corben, 2006) and Kaleidoscope software. During the two surveys two infrared Panasonic hc-w850 camera supplemented by one IR lamp were used, so that each tree could be covered by a camera during one of the surveys. Infrared footage was recorded to SD card and later analysed using VLC player software.

Dormouse

2.1.11 The site and adjacent woodland habitats were subject to a nest-tube survey for dormouse in accordance with survey advice set out by Bright et al (2006). Ninety-six nest tubes were set out in suitable and accessible locations on 11th April 2019 throughout the on site woodland and in immediately adjacent woodland (See Plan 3). Six checks were made by a suitably experienced and licenced ecologist, with one check taking place per month between the months of April 2019 and September 2019. Any nests or animals present within the tubes were recorded.

2.1.12 Checks were also made of any hazel (*Corylus avellana)* nuts which were found for any evidence of handling by dormouse during each survey occasion.

Great Crested Newt

2.1.13 The pond was subject to a presence/likely absence survey for GCN based on the guidance provided by the GCN Mitigation Guidelines (English Nature, 2001). The pond was surveyed on four separate survey sessions using bottle traps, torching and netting methodologies.

2.1.14 The survey sessions were carried out at intervals of at least one week in the period between mid-April and June, with at least two of the sessions before mid-May. Up to 10 bottle traps were placed at 2-3m intervals around all accessible sections of the pond, and were left in situ for one night on each session.

2.1.15 The great crested newt (GCN) surveys were undertaken by at least one fully licenced ecologist during each survey session.

Breeding birds

2.1.16 Breeding bird surveys were carried out on 12th April, 24th April and 27th May 2019 by an experienced ornithological surveyor who walked a transect along the River Ely trail and through the woodland, starting 30-45 minutes after sunrise in suitable conditions i.e. not in heavy rain, strong winds or poor visibility. Surveys followed standard Breeding Bird Survey (BTO) methodology, Bibby *et. al.* (2000).

2.1.17 All birds present on the site were recorded together with any evidence which might indicate nesting behaviour, such as territorial singing, adults carrying food, adults attending nests, bird families etc.

Otter

2.1.18 A boat-based otter survey was carried out by a suitably experienced ecologist along the length of the river Ely running through the site, on 17th April 2019 in accordance with guidance set out by Strachan and Jeffries (1996). Both banks of the stream were inspected for signs of otters using the habitat, such as spraints and pathways through the vegetation. A bank-based survey was also conducted on 15th January 2020. An additional assessment of the suitability of the site habitats for natal use by otter was carried out on 14th September 2020.

2.2 Data Trawl

2.2.1 In addition to original survey, the Southeast Wales Biological Records Centre (SEWBReC) was contacted in order to obtain any existing records of species and/or habitats from the site and its vicinity. SEWBREC is the main repository for biodiversity and wildlife records in South Wales.

2.2.2 The National Biodiversity Network's (NBN) Gateway was also consulted for wider distributional data on certain species.

3.0 SURVEY RESULTS

3.1 Habitats & Vegetation

3.1.1 The results of the habitats and vegetation survey are shown on Plan 4 of this report and are described briefly below. Lists of the plant species recorded are given at Appendix 1. Representative photographs of the site are appended at the end of this report.

Notable Habitats

3.1.2 The site contains areas of native broadleaved woodland, almost all of which is recorded as ancient semi-natural woodland. Native broadleaved woodland is listed as 'Priority Habitat' for conservation in the UK Biodiversity Action Plan (UK BAP) and its Welsh equivalent. Some other habitat areas within the site are designated as SINCs indicates they have substantive nature conservation value in the regional or district context. The River Ely, which forms the site's north-eastern boundary, is also a 'Priority Habitat' and SINC. The site also contains one pond, ponds are listed as 'Priority Habitat' under the Environment (Wales) Act 2016.

Notable Plant Species

3.1.3 The only recent record for a notable plant species refers to bluebell (*Hyacinthoides non-scripta*) and relates to a record located approximately 280m away (SEWBReC Ref: 0189-683), however, this species was not recorded during the current survey.

3.1.4 Several historical records, for various notable plant species, retuned from the data trawl within 2km of the site, and include divided sedge (*Carex divisa*), frog orchid (*Coeloglossom viride*), least lettuce (*Lactuca saligna*), lesser butterfly orchid (*Platanthera bifolia*), rough marsh-mallow (*Malva setigera*), shepherd's needle (*Scandix pecten-veneris*), small fleabane (*Pulicaria vulgaris*), three-lobed crowfoot (*Ranunculus auricomus*) and tubular water drop-wort (*Oenanthe fistulosa*) (SEWBReC Ref: 0189-683). None of the above species were recorded during the current survey.

Invasive Non-Native Plant Species

3.1.5 There are some large stands of Japanese knotweed (*Fallopia japonica*) in various locations around the site (See Plan 4). This is a highly invasive species, the spread of which, either deliberately or recklessly, is subject to regulation under the amended Wildlife & Countryside Act 1981, being listed on Schedule 9. This species spreads through its crown, rhizome (underground stem) and stem segments rather than by seed, and can grow up to a metre in a month, causing heave below concrete and tarmac, and coming up through the resulting cracks, causing damage to buildings and roads etc. Studies have shown that just a 1cm section of rhizome can produce a new plant within 10 days. Rhizome segments can remain dormant in soil for up to 20 years before producing new plants (EA 2013).

3.1.6 There is also Himalayan balsam (*Impatiens glandulifera*) on the site (See Plan 4). This species is also listed on Schedule 9 of the amended Wildlife & Countryside Act 1981 as described above. It grows rapidly and spreads quickly in wetland and riparian habitats,

suppressing the growth of native British species and leaving ground bare of vegetation in the autumn and winter, and liable to erosion. When the seed pods are mature they open explosively when touched, scattering the abundant seed very widely.

3.1.7 Buddleia (*Buddleja davidii*) and Himalayan honeysuckle (*Leycesteria formosa*) are also present extensively on the site. Although not currently subject to any statutory regulation, these non-native species are highly invasive on disturbed ground and can spread into native habitats (eg scrub, woodland, grassland) at the expense of native species.

Riparian Woodland

3.1.8 To the north-west of the development boundary, alongside the Ely trail, lies an area of riparian woodland. Tree species within this area include field maple (*Acer campestre*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus monogyna*), birch *(Betula* sp.), hazel and elder (*Sambucus nigra*). Clambering woody species, such as ivy (*Hedera helix*), dog rose (*Rosa canina*) and wild clematis (*Clematis vitalba*) are frequent in this area. Species among the ground flora include cleavers (*Galium aparine*), herb-Robert (*Geranium robertianum*), dog's mercury (*Mercurialis perennis*), wood avens (*Geum urbanum*) and pendulous sedge (*Carex pendula*). The extremely invasive, non-native plant species, Himalayan balsam and Japanese knotweed are found within this area.

Broad-leaved Woodland

3.1.9 Constituting the south-west boundary of the site, lies an extensive area of deciduous broad-leaved woodland. Tree species dominating the canopy comprise sycamore and ash. The understory shrub layer consists of hazel, elder, hawthorn, blackthorn (*Prunus spinosa*), field maple and dogwood (*Cornus sanguinea*), while woody-climbing species such as bramble (*Rubus fruticosus* agg.), dog rose, honeysuckle (*Lonicera periclymenum*), black bryony (*Tamus communis*) wild clematis and ivy are found throughout the woodland area. Species among the ground flora include cuckoopint (*Arum maculatum*), dog violet (*Viola riviniana*), primrose (*Primula vulgaris*), hart's tongue fern (*Asplenium scolopendrium*), dog's mercury (*Mercurialis perennis*), enchanter's nightshade (*Circaea lutetiana*), lesser celandine (*Ficaria verna*), pendulous sedge (*Carex pendula*), herb Robert (*Geranium robertianum*), ground ivy (*Glechoma hederacea*), gooseberry (*Ribes uva-crispa*), raspberry (*Rubus idaeus*), ramsons (*Allium ursinum*), and yellow archangel (*Lamium galeobdolon*). Species found along the woodland margins include common spotted orchid (*Dactylorhiza fuchsii*), fleabane (*Pulicaria dysenterica*), comfrey (*Symphytum caucasicum*) and Himalayan honeysuckle.

Dense Scrub

3.1.10 Situated along the River Ely lies a narrow strip of vegetation dominated by dense scrub, with species such as buddleia, alder (*Alnus glutinosa*), grey willow (*Salix cinerea*), goat willow (*Salix caprea*) comprising the community. Prominent stands of Japanese knotweed are also present along this area of vegetation. A small section of dense scrub lies on the eastern side of the river adjacent to an area of hardstanding (part of the River Ely Trail), with a similar assemblage of species.

Ephemeral / Short Perennial Vegetation

3.1.11 Situated in a clearing, within the centre of the site, lies an area of short perennial / ephemeral vegetation. Vegetative ground cover within this area is very sparse, with grasses such as cock's foot (*Dactylis glomerata*), creeping bent (*Agrostis stolonifera*), soft brome (*Bromus hordeaceus*) and crested dog's tail (*Cynosurus cristatus*) only occasionally found. Forbs, such as common spotted orchid, purple toadflax (*Linaria purpurea*), yellow wort (*Blackstonia perfoliata*), perforate St. John's wort (*Hypericum perforatum*), black medick (*Medicago lupulina*), red valerian (*Centranthus ruber*), white clover (*Trifolium repens*), willowherb (*Epilobium* sp.), ribwort plantain (*Plantago lanceolata*), selfheal (*Prunella vulgaris*), ragwort (*Senecio jacobaea*), oxeye daisy (*Leucanthemum vulgare*), common knapweed (*Centaurea nigra*), glaucous sedge (*Carex flacca*), tufted vetch (*Viccia cracca*) and common bird's-foot trefoil (*Lotus corniculatus*), comprise the species present within this area.

Tall Ruderal / Neutral Grassland Mosaic

3.1.12 Situated within the south of the site lies an area of mixed habitat, comprising a mosaic of damp neutral grassland and tall ruderal vegetation. Species within the damp regions include soft rush (*Juncus effusus*) and hard rush (*Juncus inflexus*); one portion, which appears to be subject to regular periods of water inundation, contains a small area of common reed (*Phragmites australis*) vegetation. Grassland dominates the vegetation in this area, with soft brome, crested dog's tail, common bent (*Agrostis capillaris*), creeping bent, Yorkshire fog (*Holcus lanatus*), glaucous sedge and grey sedge (*Carex divulsa*) are among the graminoids within the sward; sward length at the time of survey was 10-15cm. Forbs within the grassland include common vetch (*Vicia sativa*), white clover, meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), common knapweed, fleabane, selfheal, silverweed (*Potentilla anserina*), red clover (*Trifolium pratense*), common bird's-foot trefoil and germander speedwell. Interspersed throughout, and dominating in certain areas, lie areas of tall ruderal vegetation, with species such as greater willow herb (*Epilobium hirsutum*), creeping thistle (*Cirsium arvense*), teasel (*Dipsacus fullonum*), field horsetail (*Equisetum arvense*), comfrey and colt's foot (*Tussilago farfara*).

Standing Water Bodies

3.1.13 Within the northern portion of the site, within the premises of a residential dwelling (Building 3), lies a man-made pond (See Plan 4). Species present within the pond consist of ornamental cultivars, with extensive duckweed (*Lemna minor*) growth across the surface. The pond is situated within a concrete steep-sloped basin, with hardstanding surrounding the entire perimeter.

River Ely

3.1.14 The River Ely flows through the site from north-west to south-east. Dense common reed vegetation line regions of the watercourse, while the majority is bordered by dense scrub and riparian woodland. Japanese knotweed and Himalayan balsam are frequently found within the vicinity of the river.

Hardstanding & Buildings

3.1.15 Hardstanding areas occur across the majority of the northern section of the site; this area consists of industrial business units, office units, residential dwellings and associated infrastructure. Surface materials range from tarmac, paving, ballast, gravel and bare earth.

3.2 Fauna

Bats

3.2.1 All species of bat and their roosting sites are protected under the EU Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC; the 'Habitats Directive'), implemented in the UK via the Conservation of Habitats & Species Regulations 2017 (the 'Habitats Regulations')[1]. The roosting places used by bats are also protected against unauthorised disturbance or obstruction under the amended Wildlife & Countryside Act 1981. Several bat species, including common and soprano pipistrelle, are listed as priorities for conservation in Wales under Section 7 of the Environment (Wales) Act 2016.

Existing Records

3.2.2 Surveys by DCE in 2013 found 5-6 common pipistrelle bats roosting in Building 2. A single common pipistrelle roosting in Building 4 and a single brown long-eared roosting in building 8. Significant foraging and commuting activity was detected across the site by soprano pipistrelle and occasional common pipistrelle. Amongst the pipistrelle calls there were also several passes by *Myotis* species and Nathusius' pipistrelle. Brief foraging activity by Daubenton's bat, was detected on the river and some noctule activity was also recorded during these surveys.

3.2.3 The data trawl returned recent records of a couple of roosts within 1km. The closest record involved two pipistrelles seen foraging during the daytime over the Ely river within the site. In terms of roosts, a lesser horseshoe bat roost is recorded at the Leckwith Woods Viaduct SINC site, which lies immediately to the north of the site just beyond the northernmost site boundary. Additionally, records of maternity roosts of brown long eared bat, common and soprano pipistrelle are recorded less than 300m from the site. There are also foraging records in the general vicinity for both common and soprano pipistrelle, lesser horseshoe bat and several other unspecified bat species.

[1] The European legislation cited herewith is that which was applicable at the time of survey, but it should be noted that new arrangements have become applicable after 31 Jan 2020 as a result of 'Brexit'. At the time of writing these comprise a continuance of the current legal and protection arrangements by means of Statutory Instrument No. 579 (*The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations*, 2019) but the longer term arrangements which will apply after the end of the Brexit 'Transition Period' are still to be confirmed and may differ in detail from those which previously applied.

Site Inspection Results

3.2.4 Internal inspections were only possible for only some of the buildings on site, due to lack of access or health and safety considerations - these are shown on Plan 5. The other buildings of the site were therefore assessed from the exterior only.

3.2.5 The layout of the buildings are shown at Plans 6a, 6b, 6c and 6d, and representative photographs are given at the end of this report. The individual buildings are described in Table 13 below, and their potential for roosting bats is assessed as far as possible.

Flight Survey Results

3.2.6 The results of the flight surveys are shown at Plans 7a, 7b, 7c and 7d and are summarised briefly below.

Dusk Emergence Survey: 01st July 2019

3.2.7 A dusk emergence survey was carried on 1st July 2019 on the structures listed in Table 1. The weather during the survey was warm, dry and calm with a starting temperature of 18ºC at the beginning of the survey. Sunset was at 21:33.

Table 2: Bat Flight Survey Results

1st July 2019		
Building / structure	Number of surveyors	Results
Viaduct	7	Significant soprano pipistrelle activity over the river and a possible emergence under the viaduct. Foot bridge possible roosting place.
9	1	Foraging and commuting pipistrelles – no emergence

Dusk Emergence Survey: 03rd July 2019

3.2.8 A dusk emergence survey was carried out on 3rd July 2019. The weather during the survey was warm, dry and still with a starting temperature of 20ºC at the beginning of the survey. Sunset was at 21:32. The following buildings were surveyed:

Table 3: Bat Flight Survey Results

3rd July 2019		
Building	Number of surveyors	Results
9	1	Pipistrelles commuting – no emergence
10	2	Noctule and pipistrelles heard – no emergence
2	3	Noctule and pipistrelles flying over – no emergence
1	2	Foraging and commuting pipistrelles – no emergence
3	2	Pipistrelle and noctule heard – one emergence from gable end at 21:46 – unknown species (no echolocation)
4	3	Pipistrelle and noctule activity – one possible soprano pipistrelle emergence from north east elevation from under board above rolling door at 22:28.

Dawn Return Survey: 29th August 2019

3.2.9 A dawn return survey was carried out on the 29th August 2019 on the buildings listed in the below table. The weather during the survey was dry, calm with some cloud and temperatures at the beginning of the survey were 10ºC. Sunrise was at 06:20.

***Table 4**: Bat Flight Survey Results*

29th August 2019		
Building	Number of surveyors	Results
6	6	Soprano and noctule activity heard – no re entry
8	2	1 brown long eared bat using the building throughout the survey. Night roost and possible day roost.
13	2	Soprano pipistrelle activity and one soprano entered building at gable end apex (western elevation) at 05:46.
14	4	Pipistrelle activity heard. One soprano pipistrelle entered building under gap of corrugated metal roof at 06:04. Second soprano pipistrelle bat possibly entered under fascia.

Dawn Return Survey: 13th September 2019

3.2.10 A dawn return survey was carried out on 13th September 2019 on the structure listed in the below table. The weather during the survey was clear, dry and calm with a temperature of 15ºC at the start of the survey. Sunrise was at 06:44.

Table 5: Bat Flight Survey Results

13th September 2019		
Building/ structure	Number of surveyors	Results
Viaduct	7	A lot of soprano pipistrelle activity and some common pipistrelle and noctule activity – no re-entry.

Dusk Emergence Survey: 18th September 2019

3.2.11 A dusk emergence survey was carried out on 18th September 2019. The weather during the survey was 17ºC with moderate cloud, dry and calm conditions. Sunset was at 19:22. The following buildings were surveyed:

Table 6: Bat Flight Survey Results

18th September 2019		
Building	Number of surveyors	Results
6	6	Pipistrelles and noctule commuting – no emergence
4	3	Pipistrelles and noctule commuting – no emergence
3	2	Pipistrelles and noctule commuting – no emergence
5	1	Pipistrelles commuting – no emergence
8	2	One brown long eared bat emerged from doorway at 19:47 and two likely pipistrelles emerged from door

		lintel on southern elevation at 20:09 (no echolocation to confirm species ID).

Dusk Emergence Survey: 25th September 2019

3.2.12 A dusk emergence survey was carried out on 25th September 2019. The weather during was cloudy with drizzle and no wind and temperatures at the start of the survey were 17ºC. Sunset was at: 19:05. The following buildings were surveyed:

Table 7: Bat Flight Survey Results

25th September 2019		
Building	Number of surveyors	Results
2	3	Soprano pipistrelle activity – one possible soprano pipistrelle emergence from western elevation
1	2	Common and soprano pipistrelle activity heard – no emergence
10	2	Soprano pipistrelle commuting activity – no emergence
13	2	Soprano pipistrelle emerged from gable end (western elevation) at 18:58. Common pipistrelle and noctule detected.
14	4	Soprano pipistrelle emerged from open garage on northern elevation at 19:29. A soprano pipistrelle emerged from ridge at 19:26.

Ground Based Visual Inspection of Trees for Bats

3.2.13 A ground based visual inspection of all trees on site was undertaken between 21st August and 8th September 2020. The weather was clear and dry throughout the survey. Many of the trees in the woodland have extensive thick stemmed ivy that could be used as a feature by bats or could be obscuring other potential features. One hundred and eighty mature/ semi-mature woodland trees are likely to be affected by the proposed development. The approximate Diameter at Breast Height (DBH) in metres was estimated for each tree/ group of trees and the potential for the trees to be used by roosting bats was assessed using the categories shown in 2.1.5. These results are summarised in Table 8, below and Plans 9 and 10.

Table 8: Ground Level Tree Survey Results

No.	**Species**	**Approx. DBH (m)**	**Potential Roost Features (PRFs) for Bats**	**Bat roost Potential**
T1	*F. sylvatica*	0.7	Mature tree of age likely to have PRFs. Canopy obscured due to dense foliage.	Low
G2	*F. sylvatica* *C. avellana*	<0.5	Group of 9 trees. No visible features.	Negligible
T3	Unknown	0.5	Dead tree. Thick stemmed ivy – possible crevices.	Low
T4	*F. sylvatica*	0.8	Compression fork – possible crevice.	Moderate

T5	*F. sylvatica*	0.5	Compression fork – possible crevice.	Moderate
G6	*F. sylvatica*	<0.5	Group of 8 beech trees with no visible features.	Negligible
T7	*F. sylvatica*	0.8	Compression fork – possible crevice. Canopy obscured due to dense foliage.	Moderate
G8	*F. sylvatica*	<0.7	Group of 20 beech trees with no visible features.	Negligible
T9	*F. sylvatica*	0.7	Some scarring on limbs possible crevices Canopy obscured due to dense foliage.	Low
G10	*F. sylvatica*	<0.5	Group of 8 beech trees with dense ivy covering – obscuring stems.	Low
T11	*F. sylvatica*	0.4	Dense ivy covering – obscuring stem.	Low
G12	*C. monogyna*	<0.5	Group of 5 hawthorn with dense ivy covering – obscuring stems.	Low
G13	*F. excelsior* *U. glabra* *C. avellana*	<0.5	Group of 10 mainly semi-mature trees. No visible features.	Negligible
T14	*F. excelsior*	0.6 each	Canopy obscured due to dense foliage.	Low
T15	*A. campestre*	0.7	Canopy obscured due to dense foliage. Dense ivy covering – obscuring stem.	Low
T16	*F. excelsior*	0.7	Canopy obscured due to dense foliage. Dense ivy covering – obscuring stem.	Low
T17	*F. excelsior*	0.5 each	Twin-stemmed. Canopy obscured due to dense foliage.	Low
T18	*A. campestre*	0.4	Canopy obscured due to dense foliage. Thick stemmed ivy – Possible crevices.	Low
G19	*C. avellana*	<0.5	Group of 3 semi-mature, multi-stemmed hazel with no visible features.	Negligible
T20	*A. campestre*	0.5-0.8	Possible veteran tree. On edge of steep bank. Deadwood and knot holes. Canopy obscured due to dense foliage.	Moderate
T21	*F. excelsior*	0.5	Canopy obscured due to dense foliage. Dense ivy covering – obscuring stem.	Low
G22	*C. avellana*	<0.5	Group of 2 hazel with no visible features.	Negligible
G23	*F. excelsior*	0.5	Group of 2 ash with large cankers. Canopy obscured due to dense foliage. Dense ivy covering – obscuring stems.	Low
G24	*F. excelsior* *A. campestre*	<0.5	Group of 4 trees with no visible features.	Negligible
T25	*F. excelsior*	0.6	Some cankers. Canopy obscured due to dense foliage.	Low
T26	*F. excelsior*	0.5	Thick stemmed ivy – Possible crevices.	Low
T27	*C. avellana*	0.2	No visible features.	Negligible
G28	*C. avellana* *C. monogyna*	<0.5	Group of 6 trees with dense ivy covering – obscuring stems.	Low
T29	*F. excelsior*	0.3 each	4 stemmed tree. Dense ivy covering – obscuring stems.	Low

G30	*F. excelsior* *C. avellana*	<0.5	Group of 3 trees with dense ivy covering – obscuring stems.	Low
G31	*F. excelsior* *C. avellana*	<0.5	Group of 8 trees with no visible features.	Negligible
T32	*F. excelsior*	0.3-0.6	Three-stemmed tree. Dense ivy covering – obscuring stems. Canopy obscured due to dense foliage. Potential branch crevice (7m) Large cavity facing upwards (0.3m)	Moderate
G33	*F. excelsior*	<0.5	Group of 8 ash with no visible features.	Negligible
G34	*Cupressus* sp	0.3-0.6	Group of 7 conifers with no visible features.	Negligible
G35	*F. excelsior*	0.5	Group of 4 ash with rugose bark and very dense ivy covering.	Low
T36	*A. campestre*	0.8	Some deadwood present. Canopy and stem obscured by dense foliage.	Low
T37	*F. excelsior*	0.7	Very dense ivy covering – obscuring stem.	Low
T38	*F. excelsior*	0.6	On edge of woodland. Separated from other trees. In poor condition. 2 large knot holes on stems, facing upwards (5m and 8m). Small knot holes on upper branches. Potential cracks in stem.	Moderate
G39	*F. excelsior*	<0.5	Group of 4 ash with very dense ivy covering – obscuring stems. Potential cracks in stems.	Low
G40	*F. excelsior*	<0.4	Group of 15 mainly semi-mature ash. Dense ivy covering – obscuring stems.	Low
T41	*F. excelsior*	0.4	Stem wounds (5m).	Low
G42	*F. excelsior* *Salix* sp *A. pseudoplatanus*	<0.4	Group of 27 semi-mature trees. Ivy covering – obscuring stems. Some canker on ash.	Low
T43	*F. excelsior*	0.6	Large, mature tree. Deadwood present with potential cavities.	Moderate

3.2.14 An aerial inspection of four trees identified from the ground level survey as having PRFs with at least moderate potential to support roosting bats was carried out on 31st January 2021. The four trees surveyed were: T4, T5, T7, T20. Three further trees (T32, T38 and T43), listed above as having moderate potential were assessed as not being safe to climb, being ash trees with evidence of dieback/ substantial deadwood.

3.2.15 Following the aerial inspections, the four trees were reassessed as follows: T4 was found to have low potential for roosting bats. T5 was constrained by the presence of competitors on the day of the survey preventing full internal survey of the PRF. T7 and T20 supported features of moderate potential to support roosting bats. For detailed results refer to the Tables 9-12, below and Plans 9 and 10. Photos of the PRFs are at the end of this report.

Dusk Emergence Surveys of trees

3.2.16 Trees T5, T32, T38 and T43 could not be fully assessed through ground level or aerial inspections; therefore, two dusk emergence surveys were carried out on each of these four trees.

Dusk Emergence Survey: 24th August 2021

3.2.17 A dusk emergence survey was carried out on 24th August 2021. The temperature at the start of the survey was 19ºC. The weather was clear and dry with a light wind. Sunset was at 20:17.

Table 9: **Bat Flight Survey Results**

24th August 2021		
Tree	Number of surveyors	Results
T5	1 +IR	**No emergences. No bats recorded.**
T32	1 +IR	**No emergences. Only one bat recorded: Soprano pipistrelle at 20:55**
T38	2	**No emergences. Soprano and common pipistrelles foraged a little around trees. Noctules also flew over. First bat recorded was a soprano pipistrelle at 20:30.**
T43	2	**No emergences. Soprano and common pipistrelles foraged around trees. Noctules also flew over. First bat recorded was a soprano pipistrelle at 20:29.**

Dusk Emergence Survey: 15th September 2021

3.2.18 A second dusk emergence survey was carried out on 15th September 2021. The temperature at the start of the survey was 18ºC with clear, dry and calm conditions. Sunset was at 19:28.

Table 10: Bat Flight Survey Results

15th September 2021		
Tree	Number of surveyors	Results
T5	2	**No emergences. Only 2 bats recorded: Noctule at 19:45 overhead and soprano pipistrelle at 19:48.**
T32	2	**No emergences. Only 2 bats recorded: soprano pipistrelle at 19:28 and a noctule at 19:44.**
T38	1+IR	**No emergences. No emergences. Soprano and common pipistrelles foraged a little around trees. Noctules also flew over. First bat recorded was a soprano pipistrelle at 19:42.**
T43	1 +IR	**No emergences. Soprano and common pipistrelles foraged a little around trees. Noctules also flew over. A probable brown long-eared bat was recorded at 20:13. First bat seen did not echolocate but flew into woodland at 19:35.**

Table 11: Tree 4 PRF Close Inspection Results

Ground Assessors		Hs jd		Ground Assessment Date	31/01/2021	Ground Assessment Grade	Potential	Survey Type	Climb
Tree/Photo_ID	Tree Marked (Tag Number)	Species	Age	DBH (cm)	Habitat (Phase 1)	Tree Description & Location (e.g. dead/alive, tree height, locational reference points)	Semi mature beech. Southern most out of the 3 beaches surveyed		
T0001		Beech	Semi-Mature	33	Broad leaf woodland	Further comments (incl. survey recommendations, climbing, H&S info)			

Description			Entrance		Internal	Up	Down	Apex		Substrate		Substrate (General)	Humidity	Bats			
Type	Compression fork		Height (cm)	20	Height (cm)	0	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA
								Spire		Blackened							
Height (m)	7	Location	Width (cm)	2	Width (cm)	2	2	Peak	Yes	Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA
								Flat		Dusty		Yes	Yes	Droppings	No		
Aspect	South	Stem	DPH (cm)	40	Depth (cm)	5	5	Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA
								Chambered		Sludgy	Yes						
Type	Weld		Height (cm)	40	Height (cm)	0	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA
								Spire		Blackened							
Height (m)	5	Location	Width (cm)	10	Width (cm)	2	2	Peak	Yes	Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA
								Flat		Dusty		Yes		Droppings	No		
Aspect	North east	Stem	DPH (cm)	50	Depth (cm)	15	15	Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA
								Chambered		Sludgy			Yes				

Bat Potential Assessment: Compression fork feature contained many slugs. Both features considered to have low potential for roosting bats. Could be used by bats caught out in poor weather.

Table 12: Tree 5 PRF Close Inspection Results

Ground Assessors		Hs jd		Ground Assessment Date	31/01/2021	Ground Assessment Grade	Potential	Survey Type	Climb
Tree/Photo_ID	Tree Marked (Tag Number)	Species	Age	DBH (cm)	Habitat (Phase 1)	Tree Description & Location (e.g. dead/alive, tree height, locational reference points)	Middle semi mature beech tree in the 3 close to one another.		
T0002		Beech	Semi-Mature	28	Broad leaf woodland	Further comments (incl. survey recommendations, climbing, H&S info)			

PRF No.	Description			Entrance		Internal	Up	Down	Apex		Substrate		Substrate (General)	Humidity	Bats			
1	Type	Weld		Height (cm)	4	Height (cm)	?	?	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA
									Spire		Blackened							
	Height (m)	10	Location	Width (cm)	2	Width (cm)	?	?	Peak		Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA
									Flat		Dusty			Yes	Droppings	No		
	Aspect	West	Stem	DPH (cm)	40	Depth (cm)	?	?	Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA
									Chambered		Sludgy							

Bat Potential Assessment: Feature full of slugs so not possible to fully inspect. Low to moderate potential.

Table 13: Tree 7 PRF Close Inspection Results

Ground Assessors	Hs jd	Ground Assessment Date	31/01/2021	Ground Assessment Grade	Potential	Survey Type	Climb

Tree/Photo_ID	Tree Marked (Tag Number)	Species	Age	DBH (cm)	Habitat (Phase 1)	Tree Description & Location (e.g. dead/alive, tree height, locational reference points)	Northern most semi mature beech in the 3 close to one another.
T0003		Beech	Semi-Mature	25	Broad leaf woodland	Further comments (incl. survey recommendations, climbing, H&S info)	

PRF No.	Description			Entrance		Internal	Up	Down	Apex		Substrate		Substrate (General)	Humidity	Bats			
1	Type	Weld		Height (cm)	43	Height (cm)	0	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA
									Spire		Blackened	Yes						
	Height (m)	4	Location	Width (cm)	2.5	Width (cm)	2	2	Peak	Yes	Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA
									Flat		Dusty			Yes	Droppings	No		
	Aspect	North west	Stem	DPH (cm)	45	Depth (cm)	4	4	Tube		Debris	Yes	Rough	Wet	No. Collected	NA	Condition/State	NA
									Chambered		Sludgy	Yes		No				
2	Type	Weld		Height (cm)	25	Height (cm)	Slugs	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA
									Spire		Blackened							
	Height (m)	2	Location	Width (cm)	4	Width (cm)	2	2	Peak	Yes	Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA
									Flat		Dusty		Yes		Droppings	No		
	Aspect	North	Stem	DPH (cm)	40	Depth (cm)	10	10	Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA
									Chambered		Sludgy	Yes		Yes				

Bat Potential Assessment: Moderate potential for roosting bats. PRF 1 Slug present in weld and pocket created at the top of the weld suitable for bat roosting. PRF 2 has potential for solitary summer day roosting.

Table 14: Tree 20 PRF Close Inspection Results

Ground Assessors	Hs jd	Ground Assessment Date	31/01/2021	Ground Assessment Grade	Potential	Survey Type	Climb

Tree/Photo_ID	Tree Marked (Tag Number)	Species	Age	DBH (cm)	Habitat (Phase 1)	Tree Description & Location (e.g. dead/alive, tree height, locational reference points)	ST 15838 75152 Alive, multi stemmed veteran field maple close to woodland edge
T0004		Field maple	Ancient	75	Broad leaf woodland	Further comments (incl. survey recommendations, climbing, H&S info)	

Description			Entrance		Internal	Up	Down	Apex		Substrate		Substrate (General)	Humidity	Bats				PRF Status & Observations				
Type	Wound		Height (cm)		Height (cm)			Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA	Competators, smell & Other Observations	Upward facing. Doesn't extend anywhere. Negligible			
Height (m)	8	Location	Width (cm)		Width (cm)			Peak		Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA	PRF Suitability				
Aspect	North	Limb	DPH (cm)		Depth (cm)			Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA	Hibernation	No	Maternity	No	
								Chambered		Sludgy								Transitional	No	Mating	No	
																		Summer Solitary	No			
Type	Wound		Height (cm)	50	Height (cm)	15	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA	Competators, smell & Other Observations	considered not to be a large enough cavity for maternity or hibernation			
Height (m)	8	Location	Width (cm)	7	Width (cm)	5	0	Peak		Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA	PRF Suitability				
								Flat	Yes	Dusty		Yes	Yes	Droppings	No			Hibernation	No	Maternity	No	
Aspect	North	Stem	DPH (cm)	35	Depth (cm)	7	0	Tube		Debris	Yes	Rough	Wet	No. Collected	NA	Condition/State	NA	Transitional	Yes	Mating	Yes	
								Chambered		Sludgy								Summer Solitary	Yes			
Type	Fluting		Height (cm)	14	Height (cm)	0	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA	Competators, smell & Other Observations				
Height (m)	6	Location	Width (cm)	2	Width (cm)	3	3	Peak	Yes	Polished		Bumpy	Damp	No. Bats	NA	Orientation to entrance	NA	PRF Suitability				
								Flat		Dusty		Yes		Droppings	No			Hibernation	No	Maternity	No	
Aspect	North east	Stem	DPH (cm)	30	Depth (cm)	6	6	Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA	Transitional	Yes	Mating	No	
								Chambered		Sludgy	Yes		Yes					Summer Solitary	Yes			
Type	Knot hole		Height (cm)	6	Height (cm)	0	0	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA	Competators, smell & Other Observations	Maternity roosting considered unlikely due to the limited depth of the feature			
								Spire		Blackened												
Height (m)	1.5m	Location	Width (cm)	4	Width (cm)	0	0	Peak		Polished		Bumpy	Damp	No. Bats	0	Orientation to entrance	NA	PRF Suitability				
								Flat	Yes	Dusty			Yes	Droppings	No			Hibernation	Yes	Maternity	No	
Aspect	West	Limb	DPH (cm)	4	Depth (cm)	2	2	Tube		Debris		Rough	Wet	No. Collected	NA	Condition/State	NA	Transitional	Yes	Mating	Yes	
								Chambered		Sludgy								Summer Solitary	Yes			
Type	Butt rot		Height (cm)	Multiple entrances	Height (cm)	Extensive	Extensive	Dome		Waxy		Smooth	Dry	Species	NA	Distance from entrance (cm)	NA	Competators, smell & Other Observations	Very vacuous, difficult to check with endoscope			
								Spire		Blackened												
Height (m)	0m	Location	Width (cm)	Multiple entrances	Width (cm)	Extensive	Extensive	Peak		Polished		Bumpy	Damp	No. Bats	0	Orientation to entrance	NA	PRF Suitability				
								Flat		Dusty			Yes	Droppings	No			Hibernation	Yes	Maternity	No	
Aspect	North	Stem	DPH (cm)	Multiple entrances	Depth (cm)	Extensive	Extensive	Tube		Debris	Yes	Rough	Wet	No. Collected	NA	Condition/State	NA	Transitional	Yes	Mating	No	
								Chambered		Sludgy	Yes							Summer Solitary	No			

Bat Tree Assessment: Moderate potential. Multiple features with suitability to be used by roosting bats throughout the year on a regular basis.

Table 15: Building and Viaduct Inspection Results

Building/ Structure	Description	Evidence of Bats and Nesting Birds	Bat Roosting Potential
Building 1 & 2			
	Exterior: Buildings 1 and 2 form conjoined residential and commercial properties. Building 2 is a largely residential old farm cottage. Walls are white washed of stone and brick construction. The roof is double pitched with double roman concrete tile. Due to a number of extensions the building supports a number of gables ends with wooden barge boards and soffits. Building 1 forms a series of single story extensions of commercial use. Walls are rendered and the roof is double pitched with double roman concrete tiles.	No evidence of bats present on the exterior. No evidence of nesting birds observed on the exterior.	Building 2 is a confirmed bat roost (2013) Building 1 - Moderate to high summer roosting potential. Gaps present under soffits and barge boards on all elevations
	Interior: Voids only accessed in building 1 due to no loft void in parts of building 2 and health and safety issues due to active wasp nest in building 2. Voids accessed were warm, dark and stable lined with rock wool insulation and supported a timber queen post truss system. Not extensively searched owing to health and safety issues.	No evidence of bats or nesting birds observed.	See above
Building 3			
	Exterior: A two storey building with stone walls and some rendered elevations. Supporting a double pitched roof of double roman concrete roof tiles with wooden soffits and barge boards in moderate condition. Building appears to be part commercial and part residential use.	Evidence of bats: A single bat dropping was observed on the south east gable end elevation under the apex of the gable end. No evidence of nesting birds observed.	Confirmed bat roost – evidence of bat use found
	Interior: Not accessible	Unknown	Unknown
Building 4			
	Exterior: Breeze block double storey building. Breeze block walls are rendered on some exterior elevations. Contains large roller doors and double pitched roof of corrugated iron sheeting.	No evidence of bats. No evidence of nesting birds	Previously confirmed bat roost (2013)
	Interior: No interior access	Unknown	Unknown
Building 5			

	Exterior: A residential bungalow supporting breeze block walls, corrugated iron sheet double pitched roof and rock wool insulation.	No evidence of bats No evidence of nesting birds	Low potential for roosting bats One feature – damaged breeze block to rear of building.
	Interior: No access available	Same as above	Unknown
Building 6			
	Exterior: A single storey structure comprising largely corrugated metal sheeting. Some parts support interior brick and breeze block walls. To the west a shop front supporting a double pitched roof occurs with barge boards.	Evidence of bats: A single dropping noted on the shop front exterior. Reports from workers that they have seen a bat enter a feature in the breeze block early in the morning. No evidence of nesting birds.	Confirmed bat roost
	Interior: Active concrete works. Generally loud, disturbed well-lit with heavy footfall. Parts that are open are draughty and well-lit and parts contained within containers are subject to less draughts and disturbance. Interior supports mixture of brick and breeze block walls. Interior largely used as a workspace and/or material storage/shop.	See above	Confirmed bat roost
Building 7			
	Exterior: Corrugated iron sheet container used for storage.	No evidence of roosting bats or nesting birds	Negligible potential for roosting bats Building highly disturbed and lacking suitable access and/or crevices for bats to use.
	Interior: Used for storage of materials. Open to the roof, draughty and in constant use during the daytime.	No evidence of roosting bats or nesting birds	Negligible potential for roosting bats Building highly disturbed and lacking suitable access and/or crevices for bats to use.
Building 8			
	Exterior: A single storey outbuilding that appears to have previously held horses. Currently in a state of disrepair and abandoned. The building support single skin breeze block walls in good condition and a corrugated iron sheet double pitched roof.	No evidence of roosting bats or nesting birds on the exterior	Confirmed bat roost Confirmed nesting bird use

	The building has a number access points in the form of open doorways and missing windows.		
	Interior: Is not in use and contains dumped materials and items. There is no loft void and the interior is open to the ridge. The roof supports a timber A frame truss system and roughly half of the roof is lined with bitumen felt that is in moderate condition.	Evidence of bats: yellow underwing moth feeding remains, many bat droppings on walls and floor. Evidence of nesting birds: Bird nest on top of pillar	Confirmed bat roost Confirmed nesting bird use
Building 9			
	Exterior: Single story brick outbuilding with double pitched corrugated metal sheet roof. Abandoned and unused, grown over with ivy. Open doorway.	No evidence of roosting bats or nesting birds	Moderate potential for roosting bats Access to building interior and some crevice opportunity apparent.
	Interior: Unused, open to the ridge, timber sarking lines the roof.	No evidence of roosting bats or nesting birds	Moderate potential for roosting bats Access to building interior and some crevice opportunity apparent.
Building 10			
	Exterior: Building 10 is a commercial unit with painted brick walls and corrugated asbestos double pitched roof.	No evidence of bats or nesting birds	Moderate potential for roosting bats Access to interior, gaps under barge boards and under ridges of asbestos sheeting.
	Interior: No access available.	Unknown	Unknown
Building 13			
	Exterior: A single story building of breeze block construction and double pitched concrete tile roof. PVC soffits.	No evidence of bats or nesting birds observed.	Moderate potential for roosting bats. Gaps under soffits and tiles that could be used by bats.
	Interior: No access to the interior	Unknown	Unknown
Building 14			
	Exterior: Exterior is a mix of pebble dash render and wood cladding, wooden fascias on most elevations in moderate	No evidence of roosting bats or nesting birds observed.	Moderate potential for roosting bats.

	condition. Double pitched roof, part concrete tiles, part corrugated asbestos sheet roofing.		
	Interior: Accessed some of interior. Building is currently in use as a series of separate workshops.	No evidence of roosting bats or nesting birds observed.	Moderate potential for roosting bats.
Viaduct			
	Concrete structure spanning the River Ely with 10 arches. Some of the businesses currently on the site make use of the space underneath the arches that continue over the land. The structure appears to have few cavities present. Apparent crevices observed from ground level at the south end of the viaduct, were found on closer inspection to be closed off or very narrow and cobwebbed.	No evidence of roosting bats or nesting birds observed.	Low potential for roosting bats. There is some potential for crevices on inaccessible sections of the structure. A number of drainage pipes on the southern-most section of the structure, approximately 1.2m above the ground, 100mm diameter and >2m long have some potential for roosting bats.

Dormouse

3.2.19 Dormouse is a 'European Protected Species' afforded the highest level of statutory protection available in the UK under both British domestic and European legislation, and therefore of similar status to bats (see above). Protection also extends to the habitats which support it. It is a 'Priority Species' of the UK BAP and its Welsh equivalent.

3.2.20 The SEWBReC data (Ref: 0189-683) search returned no records for this species within 1km of the site, although the NBN Gateway shows that there are some records in the wider vicinity. The closest record to the site appears to be for the Roath area of Cardiff, but perhaps more relevant for this site is a record from Welsh St Donats which, whilst further away (14 km), is better connected, via woodlands and hedgerows in an open farmland mosaic, to the woodlands that occur around the site. There have been anecdotal records of dormouse from the Plymouth Woods, which lie a few kilometres to the north of the Leckwith Woods, in the past but these have not been confirmed to date.

3.2.21 Owing to the presence of habitats suitable to support dormouse both within the site and immediately adjacent, nest tubes surveys were undertaken to determine presence/likely absence of the species using the site. See Table 14, below for survey results. No dormouse or field signs of dormouse (Nests or chewed nuts) were encountered on any survey visit, therefore it is considered likely that dormouse is absent from the site.

Table 16: Dormouse Survey Results

Date	Conditions	Survey Type	Results
11/04/2019	Warm, dry and cloudy	Nest tube deployment and nut search	Nil
29/04/2019	Dry, clear	Nest tube and nut search	Nil
29/05/2019	Clear, dry	Nest tube and nut search	Nil
18/06/2019	Clear, dry	Nest tube and nut search	Nil
18/07/2019	Clear, dry and warm	Nest tube and nut search	Nil
28/08/2019	Clear and dry	Nest tube and nut search	Nil
24/09/2019	Drizzle and cloudy	Nest tube and nut search	Nil

Otter

3.2.22 Otter is a 'European Protected Species' afforded the highest level of statutory protection available in the UK under both British domestic and European legislation, and therefore of similar status to bats and dormouse (see above). Protection also extends to its resting places, such as holts and couches. It is a 'Priority Species' of the UK BAP and its Welsh equivalent.

3.2.23 Otter in present on many of the main river systems in the Wales, having now recovered much of its former range following its sharp decline in the 1970s and 1980s, although

numbers remain at lower levels than was previously the case. The SEWBReC data search yielded records of this species in the immediate vicinity of the site, including a record of spraint under 'Leckwith Bridge' (ie near the site entrance) in 2002. Otter is known to range along the River Ely, having been recorded on numerous occasions in the last decade or so, and presumably passes through the section of the river which runs alongside the site with some frequency. Evidence of otter was found during the boat-based survey, this included anal jelly and an otter spraint close to the overpass. Some footprints were found in silty mud bank habitats, as well as an otter slide outside the site boundary, 400m north of the overpass (see Plan 11).

3.2.24 No evidence of otter was found during the two surveys of the riverbank, either within or immediately beyond the site. Both, the south bank of the river (within the site boundary) and the north bank (outside the site boundary) are on very steep inclines; The site is 4-5m above the river. The riverbanks are densely vegetated with buddleia, Japanese knotweed, Himalayan balsam, traveller's joy (*Clematis vitalba*) and bramble. There are a small number of scattered semi-mature trees close to the riverbanks, including ash and sycamore. These trees do not appear to have substantial root systems that could provide a suitable cavity for an otter den. There is also dense scrub up to 20m metres wide at the south end of the stretch of riverbank within the site (see Plan 4).

3.2.25 It should be assumed that otter commutes and forages along the River Ely adjacent to the site, and could possibly have holts on the riverbank in the vicinity of the site. It is possible that otter could even occur on the site itself on occasion, although this is not considered likely to be a frequent occurrence. Adventitious visits could potentially occur during commuting and foraging, however, and there are some suitable scrub and woodland habitats in less disturbed parts of the site (for example at the southernmost end) which could conceivably be used for temporary 'holing up' or even nesting in on occasion, although there is no evidence of this to date. There are some areas of the site which do not suffer from regular disturbance, particularly at night when the site is less active. The possibility of the site containing a natal holt cannot be entirely excluded. However, it is considered unlikely due to the poor access to the riverbank from the river and high level of disturbance apparent at the majority of the site.

Other protected species

3.2.26 Further sensitive information on protected species is included in Appendix 5, within a separate confidential report.

Other mammals

3.2.27 Harvest mouse and polecat, both Priority Species of the UK BAP and its Welsh equivalent, have been recorded in the vicinity. The habitats of the site, including the remaining semi-natural habitats, are not considered suitable for the former but the latter could possibly occur. European hedgehog, also a Priority Species, has also been recorded in the vicinity and a dead individual of this species was seen on the site in the2013 survey inside one of the buildings. The site provides suitable foraging and nesting habitats for hedgehog.

3.2.28 Other mammals which are likely to occur in the site include resident synanthropic species such as house mouse and brown rat, as well as other common species which occur in the

open countryside such as voles, shrews, fox, rabbit and mole etc. Evidence of rabbits was found on the site in the form of droppings along the north east facing bank in the southern half of the site, and a fox spraint was also seen in this area in 2013.

Birds

3.2.29 Nearly all species of bird are protected against killing or injury as individuals under UK legislation and this protection extends to their nests, eggs and young. A number of especially rare species are subject to enhanced protection under UK law by virtue of their listing on Schedule 1 of the Wildlife & Countryside Act 1981, and may not be disturbed whilst nesting.

3.2.30 There are nearby records for pied wagtail, black headed gull, dunnock and song thrush and many records of a number of species which are primarily associated with the River Ely and its tidal nature. These include redshank, cormorant, oystercatcher, teal and shelduck. The wader and waterbird species referred to above are less likely to nest on the site, however, but may visit occasionally whilst in transit (for example, while on passage) or to forage, particularly in the less disturbed ruderal marshy areas of the site. There are also records of warbler species which are mainly likely to make use of bankside vegetation along the river, such as Cetti's warbler, grasshopper warbler, whitethroat and willow warbler (SEWBReC data, Ref: 0189-683). It is quite likely that some of these species nest in the vicinity of the site, at least on occasion. There are suitable habitats for the warblers to forage and nest in both the riverbank vegetation and scrub areas within the site.

3.2.31 There are numerous records for barn owl, a Schedule 1 species in the vicinity. However, there are no suitable nesting sites on the site itself for this species and foraging activity is more likely to occur in the open countryside to the south and west than on this site.

3.2.32 During surveys undertaken in 2013 common bird species were heard calling on the site. These included long-tailed tit, blackbird, robin and goldfinch in the adjacent woodland canopy. Kingfisher, a Schedule 1 species, was seen flying along the River Ely during one site visit and was assumed to be nesting nearby – steep sections of riverbank alongside the site could potentially be suitable for this species.

3.2.33 Breeding bird surveys undertaken in 2019 found evidence of a range of common, as well as less common species that may be nesting on the site including a number of priority species / species of conservation concern, including dunnock, mistle thrush, song thrush, bullfinch, greenfinch, goldcrest and willow warbler. During additional surveys of the site species of conservation concern including kingfisher (a schedule 1 species), house sparrow and starling were recorded. All these species may nest on the site (see Table 15 below). A total of 36 bird species were recorded on the site in 2019.

3.2.34 There are suitable habitats for a range of nesting bird species within the site. These include the broadleaved woodlands and scrub habitats, as well as the buildings and other built structures on the site. A likely wren nest was found inside building 8. Old nesting material was found in a cavity of Tree (T20).

Table 17: Breeding Bird Survey Results 2019

BTO Code	Species	12th April	24th April	27th May	Breeding Status	Conservation Status (See key below)
B	Blackbird	x	x	x	Probable breeding	
BC	Blackcap	x	x	x	Probable breeding	
BT	Blue tit	x	x	x	Probable breeding	
BF	Bullfinch		x		Possible breeding	S7; Red
BZ	Buzzard[1]				Possible breeding	
C	Carrion crow	x			Possible breeding	
CH	Chaffinch	x		x	Possible breeding	
CC	Chiffchaff	x	x	x	Probable breeding	
D	Dunnock	x	x	x	Probable breeding	S7
FP	Feral pigeon			x	Possible breeding	
GW	Garden warbler	x			Possible breeding	
GC	Goldcrest	x			Possible breeding	Amb
GF	Goldfinch			x	Possible breeding	
GT	Great tit	x	x	x	Probable breeding	
GR	Greenfinch	x	x	x	Probable breeding	Amb
H.	Grey heron			x	Non-breeding	Amb
GL	Grey wagtail[1]				Possible breeding	Amb
HM	House martin[2]				Possible breeding	
HS	House sparrow[2]				Probable breeding	S7; Amb
JD	Jackdaw[2]				Probable breeding	
J.	Jay	x		x	Possible breeding	
KF	Kingfisher[1]				Possible breeding	Sch 1; Amb
LB	Lesser black-backed gull	x		x	Non-breeding	Amb
LT	Long-tailed tit	x		x	Probable breeding	
MG	Magpie	x	x		Probable breeding	
MA	Mallard			x	Possible breeding	Amb
M.	Mistle thrush		x		Possible breeding	Amb
MS	Mute swan		x		Non-breeding	
PW	Pied wagtail[2]				Possible breeding	
RW	Reed warbler			x	Possible breeding	
R	Robin	x	x	x	Probable breeding	
ST	Song thrush	x	x	x	Possible breeding	S7; Amb
SG	Starling[2]				Probable breeding	S7; Red
WW	Willow warbler[1]				Possible breeding	Red

WP	Wood pigeon	x	x	x	Probable breeding	
WR	Wren	x	x	x	Probable breeding	

Notes: 1 – Recorded during badger survey (11/04/2019); 2 – Recorded during various bat surveys (summer 2019)

	Conservation Status
Sch1	Wildlife & Countryside Act 1981 Schedule 1 species afforded the highest level of statutory protection
S7	'Section 7 List' – list of the living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.
Red	'Red List' Birds of Conservation Concern in Wales 3, BoCCW3 (2017)
Amb	'Amber List' Birds of Conservation Concern in Wales 3, BoCCW3 (2017)

Reptiles

3.2.35 Four native reptile species occur in South Wales, comprising common lizard, slow-worm, adder and grass snake. These four species are all afforded so-called 'partial protection' under the amended Wildlife & Countryside Act 1981, which prohibits the deliberate killing or injury of individuals, but which gives no direct protection to the habitats which support these species. Whilst not rare nationally, they are all declining and are therefore listed as 'Priority Species' of the UK BAP and its Welsh equivalent.

3.2.36 Common reptile species are difficult to detect in the field without recourse to targeted Phase 2 survey methods. Due to the nature of the site being a highly disturbed working industrial estate, surveys would be difficult to carry out for reptiles. Reliance was therefore placed on the subjective assessment of the habitats of the site with respect to their potential as dispersal, foraging and hibernating grounds for common reptiles, based on previous experience and on published information.

3.2.37 Records of reptiles are fairly limited in the area, with only a few records of slow-worm and grass snake occurring within 1km of the site and many of these records are historic (SEWBReC data, Ref: 0189-683). The grass snake records are quite old, but include some for the Leckwith Woods which border the site and extend within it. This species is primarily associated with freshwater habitats, so might be expected to occur on the site in the riverside and pond habitats, for example. Slow-worm commonly occurs in rough grassland habitats, and so might also be expected to occur. No reptiles were recorded during the present surveys, but the site is considered to provide suitable habitat for common species such as slow-worm, grass snake and common lizard, due to the mosaic of habitats and connectivity to other suitable reptile habitats in the surrounding area.

Amphibians

3.2.38 Five native amphibian species occur in South Wales, comprising common frog, common toad, smooth newt, palmate newt and great crested newt. The latter species is nationally rare and declining, and is afforded full protection under both UK and European legislation (see under 'Bats', above) which also extends to the habitats which support it. The other four species are not afforded any direct statutory protection, other than with respect to trade. Common toad is, however, a Priority Species of the UK BAP and its Welsh equivalent.

3.2.39 Common frog and smooth newt are both recorded from the Canton Common Ditch SINC, which lies approximately 250m to the north-west of the site. These species, together with common toad, are also recorded from other locations near the site. There do not, however, appear to be any records for the rare and specially protected great crested newt from anywhere within 1km of the site.

3.2.40 The site supports at one pond which would potentially be suitable for breeding by common amphibians. Bottle trapping, torching and netting of this pond found both smooth and palmate newts present during the breeding season. See Table 9 below. It is therefore considered that great crested newts are likely absent.

Table 18: Amphibian survey results

Date	Weather	Bottle trapping	Torching	Netting	Total
12/04/2019	10C calm dry cloud	Nil	3 x palmate male 2 x palmate/smooth females	Nil	5 x palmate/smooth newts
25/04/2019	10C dry, light wind, some cloud	13 x palmate males	2 x palmate/smooth females	Nil	15 x palmate/smooth newts
30/04/2019	11C dry, clear, calm	20 x palmate males 1 x smooth male 2 x palmate females	1 x palmate male 3 x palmate/smooth females	Nil	27 x palmate/smooth newts
06/06/2019	10C cloudy, drizzle, calm	3 x palmate males	3 x palmate males 1 x palmate/smooth female	1 x palmate male	8 x palmate/smooth newts

3.2.41 Given the results above it is considered unlikely that the pond supports GCN. However, the pond does support a good breeding population of palmate newts and small numbers of smooth newt. The probability that the rare and protected great crested newt could occur on the site is currently considered to be low, although it is known to occur in the area surrounding the site, being known from numerous ponds in the Llandough and Dinas Powys area, for example, some 2-3km away to the south-west.

Fish

3.2.42 The Severn Estuary SAC includes three Annex II migratory fish features listed as primary reasons for the site's designation: Twaite shad (*Alosa fallax*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*). No records for these species were available at the time of writing, but Natural Resources Wales (NRW) have stated that the two species lamprey species have been recorded on the River Ely.

3.2.43 The stretch of the River Ely adjacent to the site boundary is not a suitable spawning ground for these three species, due to the sand and silt nature of the riverbed at this point

and lack of a gravel substrate. However, it is likely that suitable spawning area exist further upstream.

Invertebrates

3.2.44 Upwards of about 40,000 species of invertebrate are recorded in Britain, including about 27,000 insects, occurring in every available habitat. About 40 species are afforded full statutory protection in the UK under either European or British legislation.

3.2.45 Comparatively few notable invertebrate species have been recorded in the vicinity of the site (SEWBReC data, Ref: 0189-683) although the River Ely and its catchment are known to provide habitats for a wide range of aquatic and riparian species, including dragonflies and damselflies, some of which are of rare or restricted occurrence. The adjacent ancient semi-natural woodlands also have records of a wide range of characteristic species, including some rare and notable species. The probability that any protected, rare or especially notable species occur or are particularly dependant on the site itself is currently considered to be low, however, although not impossible. There are old records (<1916) of the Red Data Book horsetail weevil (*Grypus equiseti*) from the Leckwith Woods, for example, and it is not inconceivable that this poorly-studied species could still occur in the stands of great horsetail which occur in the south of the site, for example, but if so this species would almost certainly not be confined to the site. A small number of records for marsh fritillary were returned from over 1km from the site, all these records are historic, and the site does not support habitats suitable to support this species. Therefore, it is considered highly unlikely that marsh fritillary occurs on the site.

3.2.46 During the Phase 1 and Phase 2 surveys the following butterfly species were recorded on the site: brimstone, speckled wood, orange tip, peacock and small tortoiseshell. The site is likely to support a range of common and ubiquitous species of invertebrate, as well as potentially some less common species.

4.0 ECOLOGICAL EVALUATION

4.1 There is currently no nationally accepted system for the categorising of sites or features of biodiversity significance below the level of national value, criteria for which are set out by the former Nature Conservancy Council (1989, as amended). However, guidance for the identification of non-statutory sites of county significance (ie SINCs) is available in this instance (WBP 2008).

4.2 For the purposes of this study the habitats and features of the site have therefore been provisionally evaluated and graded in accordance with the categories set out in Appendix 2. The evaluation is shown at Plan 8.

International, National, County Value

4.3 No parts of the site are considered to fall into any of these categories.

District Value

4.4 Factory Wood, which lies to the south-west of the southern part of the site, is designated a SINC for its semi natural ancient woodland and is therefore of District Value.

4.5 The River Ely runs through the site and is a designated SINC, that forms part of a major river system which supports many notable species, including some which are protected, such as otter. Other species of conservation interest include migratory salmonids, rare aquatic invertebrates and plants, nesting Schedule 1 birds such as kingfisher, migratory birds and many others. Therefore, the river, including the bankside scrub, ruderal vegetation and all other riparian habitats to the top of the bank, are considered to be of at least District Value for wildlife.

4.6 The vegetated habitats of the site including the scrub, ephemeral / short perennial grassland and ruderal habitats particularly to the south of the site, exceed SINC guidance for qualifying as a post-industrial site. The site supports 27 indicator species for post-industrial land. Therefore, these areas of the site are also considered to be of District Value.

High Local

4.7 Several of the buildings on the site are known to support roosting bats. The roosts comprise low numbers of pipistrelle and brown long eared bat species, and therefore the buildings are assessed as being of High Local Value.

4.8 Although the pond on the site does not support great crested newts it is considered to be of high local value owing it its status as a ‘Priority habitat’ and supports breeding populations of smooth and palmate newts.

Local Value

4.9 The former garden area and grassed section adjacent to the large roundabout across the overpass are both assessed as being of no greater than Local Value for wildlife.

Negligible Value

4.10 The unvegetated hard-standings of the site are considered to be of Negligible Value for wildlife, as are the main stands of Japanese knotweed and Himalayan balsam.

5.0 ASSESSMENT OF DEVELOPMENT IMPACTS

5.1 The current development plans (Loyn & co plans 1844/S.102B), include the demolition of all the existing buildings and redevelopment of the site primarily for up to 250 new dwellings. The redevelopment would occupy the flat industrial land adjacent to the river but would extend westwards to the edge of the woodlands, and eastwards up towards the river edge. The present Leckwith Road viaduct would also be demolished, with a new single-span bridge constructed to the north-west of the current viaduct. The proposed new buildings are of varying scale, from single-story up to five-storey in height.

5.2 Impacts within the site would primarily comprise the loss of the existing semi-natural habitats, including some which are of High Local Value or higher. The majority of the SINC woodland to the south of the site will be retained within the new development. However, 180 trees within woodland close to the development boundary and where the new bridge will be constructed would be lost. Plan 9, Plan 10 and Table 8 show the area of woodland that will be lost to the development. The loss of the portion of SINC woodland will be compensated by the planting of new woodland habitats within the site and on adjacent land.

5.3 The mosaic of scrub/perennial/short ephemeral/ ruderal vegetation that supports indicator species qualifying as a SINC for post-industrial land will also be largely lost to the development, which is likely to impact on reptiles, invertebrates, and other fauna. The existing pond will be lost; a replacement pond will be created as part of the SUDS for the site at a minimum 1:1.5 ratio, as per the Vale of Glamorgan SPG.

5.4 Some adverse impacts are likely to be suffered by the adjacent woodland to the west and south. The development proposals include a new footpath through an area of woodland on the west side of the site, therefore increasing disturbance. There will also be potential for 'edge effects' caused by the proximity of a new residential area to the woodland and increased access. These include habitat degradation through factors such as altered drainage, increased light levels, increased noise, predatory ingress by pets, shading etc. Fauna species in the woodland adjacent to the development, such as nesting birds, roosting and foraging bats, etc, are likely to alter their patterns of use in the areas next to the new development, possibly resulting in declining numbers or more limited distribution. Boundary treatments for the new development will therefore need to be carefully considered in order to minimise these impacts. Additionally, any trees, that are to be lost/affected to/by the development, supporting features that could be used by roosting bats will require suitable mitigation provision.

5.5 The construction of a new single-span bridge and road through the adjacent woodlands will result in the loss of some ancient woodland habitat and the creation of a new corridor of disturbance through sections of the woodland which are currently undisturbed. This is likely to have significant impacts to a wide range of flora and fauna of high conservation value, including protected species such as bats and nesting birds. These impacts will require a high level of mitigation including the restoration of the existing road corridor to woodland habitat of high conservation value, the provision of additional compensatory habitat and the maintenance of habitat continuity.

5.6 Without an adequate Pollution Control Plan there are likely to be impacts to the River Ely SINC. Other significant adverse impacts are also likely to occur along the section of the river which abuts the new development, and potentially also downstream. These impacts include increased disturbance levels, increased access by residents, light pollution at night and increased noise. Some riparian bankside vegetation will be removed to create two new access points to the river from the development. This could potentially impact otter and bats, which are European Protected Species, and other protected species such as kingfisher, so appropriate mitigation measures are needed. There will be significant new planting of native bankside trees, shrubs and emergent vegetation, as well as the removal of invasive species such as Himalayan balsam and Japanese knotweed, which will benefit the biodiversity value of the riparian habitats.

5.7 Demolition of the existing buildings would result in the destruction of bat roosts, a matter which is subject to statutory regulation. It will be necessary to obtain a licence giving derogation under the Habitats Regulations, issued by Natural Resources Wales (NRW), in order to carry out the demolitions and this will require the agreement of a detailed method statement, outlining the mitigation measures which will be implemented to ensure that the 'Favourable Conservation Status' of the bats will not be significantly reduced. This will require the provision of new roosting opportunities within the buildings and other structures within the redeveloped site. Roof nesting birds will also be affected by the loss of the buildings; therefore, appropriate mitigation is required, including the provision of bird boxes on the new buildings.

5.8 Adverse impacts which could occur during construction include pollution events in the river; vibration from excavation of any under-crofts, foundations and pile-driving activities etc; construction site lighting; noise; and physical disturbance in adjacent habitats and other related impacts. There is also scope for invasive non-native plant species (ie Japanese knotweed and Himalayan balsam) to be spread off-site as a result of clearance and construction activities. These impacts should all be amenable to mitigation, provided adequate resources are made available.

5.9 In addition to potential impacts on bats, otter, kingfisher, there is a range of species which whilst not afforded statutory protection are nevertheless accorded high conservation status in the planning system, for example 'Priority Species', which could also be subject to adverse impacts. These could include hedgehog and common amphibians, amongst others. It is, however, considered likely that adequate mitigation could be provided in all these cases**.**

5.10 On the basis of the recent surveys, the proposed redevelopment of this site as currently proposed is assessed as being constrained by a number of wildlife and conservation issues. These range from the presence of statutorily protected species, and other species which are subject to statutory or policy regulation, and the presence of designated sites and habitats both within and adjacent to the site. The site also supports invasive non-native plant species which are subject to statutory controls.

5.11 Notwithstanding these constraints, provided that the recommendations in Section 6.0 are followed and adequate resources are made available for the mitigation and compensation

of any adverse impacts, it is not currently considered that redevelopment of the site is unacceptably constrained by biodiversity and wildlife considerations.

6.0 RECOMMENDATIONS

6.1 Bats

6.1.1 At least six of the buildings on site contain roosting bats, and therefore no action should be undertaken which would disturb or adversely affect either the bats or their roosting places until a licence has been obtained from Natural Resources Wales (NRW). This is a statutory requirement.

6.1.2 Following the various tree surveys, six trees within the development site are assessed as having moderate potential to support roosting bats, but no evidence of bat roosting in these trees has been found to date. Further aerial inspections by a bat licensed ecologist (using a Mobile Elevating Work Platform (MEWP) if necessary) will be required for trees with moderate potential, prior to any tree works. If evidence of roosting bats is found in any of the trees on the site, then a licence will be required from NRW, before any works proceed within a 5 metre radius of the roost.

6.1.3 A large proportion of the other woodland trees that will need to be removed for the development have low potential to support roosting bats, mainly due to dense ivy covering or due to foliage constraining the ground level survey. These trees will need to be checked by an arborist and/ or bat ecologist, immediately prior to felling. It is recommended that soft felling techniques are employed.

6.1.4 Although there is no conclusive evidence to date, it is considered highly likely that roosting bats use at least some of the trees within the woodland, that will be affected by the proposed development; therefore, substantial compensation measures will need to be put in place, as described in 6.1.5 below.

6.1.5 A Bat Conservation Plan will need to be in place, prior to the commencement of any development. This would need to include the following:

1. Updated ground level surveys of all trees that require removal before the commencement of any development, followed by aerial surveys if necessary.
2. Demolition of the buildings during the winter months (ie November to February inclusive) when there is least probability that any bats would be present;
3. Provision of a specially designed bat house within the wider site boundary, to provide suitable roosting opportunities for a range of bat species;
4. Additional provision of new roosting opportunities within the new buildings on the site, both in attic voids and in bat boxes, the latter preferably integrated into the wall structures;
5. Preservation of landscaped ‘dark corridors’ of scrub or woodland vegetation through the site, both laterally and longitudinally, which will allow bats to traverse the site without crossing well-illuminated or disturbed areas;
6. Implementation of a scheme of bat-boxes on large trees in the woodlands to the west of the site. Bat-boxes should be of ‘woodcrete’ construction (eg Schwegler boxes) installed in accordance with a detailed design specification in respect of location, height and aspect etc;

7. Wildlife sensitive lighting will be required within the newly refurbished site. The most recent information available which is relevant to bats has been produced by Bat Conservation Trust (2018). This is likely to be a requirement of the NRW derogation licence.
8. No breathable roofing membranes (BRMs) should be installed in any new buildings on the site. In all situations the roof lining should be Type 1F Bitumen felt with hessian matrix to BS8747 (2007), which is an acceptable alternative under current Buildings Regulations (Parts L1B, L2B and C). Research has shown that roosting bats can become entangled with the fibres of BRMs resulting both in the death of bats and damage to the BRM which is sufficient to seriously impair its waterproofing function. None of the BRMs which are currently available are approved for use in bat roosts and the use of these in developments on sites which harbour bat-roosts will only be permitted by NRW in exceptional circumstances where the total exclusion of bats can be guaranteed in the future.

6.2 **Otter**

6.2.1 The River Ely adjacent to the site is known to support foraging and commuting otter. Any action that would disturb or adversely affect either otter or their holts would need to be carried out under a European Protected Species licence, obtained from Natural Resources Wales (NRW). This is a statutory requirement.

6.2.2 Although there is evidence that otter is likely to use the site, at least on occasion. There is no evidence to suggest that there is an otter resting place or natal holt within the site boundary. However, the present of an otter holt within the dense scrub at the south of the site cannot be completely ruled out.

6.2.3 An Otter Conservation Plan will need to be in place, prior to the commencement of any development. This would need to include the following:

1. Maintenance of an undisturbed bankside corridor of vegetation which provides adequate cover by otter whilst commuting past the site. Habitat continuity for otter (eg underpasses, otter ledges) would need to be maintained under the new bridge crossings and across the new pontoons which are proposed for the riverbanks;
2. Careful consideration, design and control of bankside access and recreational use by residents of the developed site, including access by their pets such as dogs etc;
3. Careful consideration, design and control of night-time illumination in the developed site to prevent light-spillage into the adjacent riverside habitats. Light levels in adjacent habitats should seek to reach zero lux within 5m of any illuminated features in the developed site;
4. The provision of one or more artificial holting sites.

6.3 **Nesting Birds**

6.3.1 Nesting birds of common and less common species, including birds of conservation concern, such as greenfinch, song thrush, starling and house sparrow are likely to occur within the site. Kingfisher, a Schedule 1 species, has been recorded commuting along the River Ely, adjacent to the site. However, there is no evidence that this species is currently nesting within the site boundary.

6.3.2 General mitigation measures for nesting birds should include the following:

1. Any felling of trees, clearance of scrub or any other vegetation used by nesting birds, or demolition of buildings occupied by nesting birds to be completed outside of the bird-nesting season, ie between September to February, so as to minimise or avoid the risk of causing harm to any nesting birds, their occupied nests and eggs etc;
2. Where this is not possible, any features at risk of supporting nesting birds must be inspected immediately prior to the works (ie no more than 48 hours ahead) by an appropriately qualified person to make sure that no nesting birds are present. Approval for the commencement of works must be gained from the Local Planning Ecologist in writing. Where nesting birds are found to be present, the works will have to be delayed until the present nesting cycle is completed, and the nest abandoned;
3. Implementation of a scheme of bird-boxes both on the new buildings and on large trees in the woodlands to the south of the site. Boxes on buildings should be targeted to declining synanthropic species such as house sparrow, swift, house martin, swallow and starling. Boxes in woodland areas should be targeted to a range of key species including owls and song thrush (ie open-fronted boxes) as well as typical small birds such as tits etc. Bird-boxes should be of 'woodcrete' construction (eg Schwegler boxes) installed in accordance with a detailed design specification in respect of location, height and aspect etc.
4. The installation of an artificial kingfisher nest site will also be included.

6.4 **Common Reptile**s

6.4.1 Common reptiles are considered likely to occur on the site due to suitable habitats present. Owing to the difficulty in surveying the site, it is assumed that common reptiles are present on the site. A Reptile Mitigation Strategy will be drawn up and agreed with the Planning Authority Ecologists and implemented ahead of the development. This will be in accordance with current NRW guidelines (see Appendix 3). A precautionary approach will be required, using a combination of 'species deterrence' and 'destructive searching' methods to exclude or remove reptiles ahead of development of the site. An appropriate receptor site for any reptiles captured on the site will be identified and agreed with the Local Planning Ecologists.

6.4.2 Site clearance under a reptile method statement is seasonally constrained and cannot be carried out during the hibernating period which runs approximately from the middle/end of October to about February/March, depending on seasonal and climatic conditions at the time.

6.4.3 Two reptile hibernacula will be created in suitable locations on the site. Habitat piles of logs and brash will also be left in place, to create suitable habitat for reptiles and other species.

6.5 Other Species

6.5.1 Given the current survey results, both dormouse and great crested newt are considered likely absent from the site despite suitable habitat availability. Should GCN or dormouse be discovered at any time all works must cease and appropriate expert advice sought. As there are suitable habitats available and the presence these species cannot be entirely ruled out, a precautionary approach is recommended. This will need to be detailed in a Wildlife Protection Plan. The precautionary approach will also benefit other species known to be present on the site, including the breeding population of palmate newts.

6.5.2 Other priority species such as hedgehog and polecat are likely to occur on the site. 13mm gaps should be incorporated into any new boundary fencing or walls within the site, to allow the passage of wildlife through the site. Wildlife corridors including bramble scrub, nettles and ruderal vegetation will be maintained around the edges of the site, between properties, etc to provide suitable habits for hedgehog and other species.

6.5.3 Additional biodiversity enhancement measures will be incorporated into the footprint of the development, including bee walls, artificial bumblebee nests and beetle banks.

6.6 Habitats

6.6.1 A water retention basin will be created close to the northern edge of the site, as part of the SUDS. This will be designed so that one section will hold water permanently, creating a pond of at least 5m x 5m in area, more than 1.5 x larger than the ornamental pond currently on the site. The pond will be designed with shallow shelving margins, to provide suitable breeding habitat for smooth and palmate newts, common frogs and common toads, as well as aquatic insects and other wildlife.

6.6.2 There will be a total of three access point to the river for recreational use, at the site of an existing pontoon used for launching boats, as well as two new pontoons/ platforms. Space will be provided underneath the new pontoons, to allow species such as otter to continue to access these sections of the riverbank. Other than at these access points, a buffer of dense vegetation at least 5 metres wide will be maintained between the top of the riverbank and any development (including the proposed foot/cycle path).

6.6.3 Following the removal of invasive plant species, particularly Himalayan balsam and Japanese knotweed from the riverbank, replacement planting of native marginal vegetation such as meadowsweet (*Filipendula ulmaria*), yellow flag iris and ragged robin (*Lychnis flos-cuculi*) will be carried out. The existing woody vegetation will be preserved, as far as possible, to maintain continuity between this cover and the remainder of the riparian corridor and the woodlands to the west. Any existing conifer trees along the riverbank will be felled and restored to native cover.

6.6.4 To compensate for the loss of broad-leaved woodland habitat to the development, a large area of new native broadleaved woodland will be planted. The total area of new woodland will need to be at least 1.5x the size of the woodland lost. As well as restoring the existing road corridor to woodland, an area to the north of the site has been suggested as a potential compensation site. This plot of land was formerly woodland that has been cleared relatively recently, as part of an industrial development. The restoration of this area would increase the connectivity between existing woodland habitats. The new woodland will be exclusively of native species which are indigenous to the region, planted in a naturalistic pattern (see for example the advice provided by Rodwell & Patterson 1994). An appropriate mitigation plan needs to be implemented to compensate for the proposed loss of the possible veteran field maple (see Plan 9: T20).

6.6.5 Specially designed 'green fingers' have been incorporated into the landscape strategy for the site to provide connectivity between the woodland habitats to the south and west of the site and the River Ely to the north. The use of native tree canopy cover and minimal directional lighting will provide dark corridors, suitable for commuting bats and other wildlife, across the access road within the site at three locations.

6.6.6 The landscaping of the redeveloped site will include new areas of semi-natural habitat within the managed landscape framework. These will include new planting of native trees, shrubs and wild-flower rich grassland habitats. These will be created using native species which are indigenous to the locality, using planting stock which is of local or at least UK provenance. Flora Locale guidance should be adhered to. Some suitable species are listed at Appendix 4. Any ornamental landscaping within the site will use plant species that are beneficial to wildlife, particularly pollinator-friendly plants.

6.6.7 Retained woodland and other trees and scrub should be treated in accordance with the British Standard BS 5837 (2012) *Guidance on the Treatment of Trees in Relation to Design, Demolition & Construction*. These habitats should not form part of the gardens of the new residents of the site but should be retained within the managed public landscape framework of the site.

6.6.8 During the site clearance and construction stages, all retained peripheral habitats and other adjacent habitats must be protected from adverse impacts. It is particularly important that the habitats associated with the River Ely SINC are appropriately protected. Materials storage, mixing areas, refuelling areas, haul routes, waste disposal and site compounds etc should not be located adjacent to any such habitats. Particular care should be taken to avoid the accidental release of pollutants and sediments etc into the River Ely, where they could have a detrimental effect on habitats downstream as well as adjacent to the site. Current NRW best practice guidelines and requirements should be adhered to.

6.6.9 As noted previously, careful consideration and design should be applied to the use of lighting within the redeveloped site. Light spillage into adjacent habitats such as the river corridor and woodlands should be avoided, as should the use of lighting fixtures and sources which have been shown to cause greatest impacts to nocturnal species such as foraging bats. A detailed lighting design strategy should be drawn up in consultation

with a suitably qualified ecologist. Lighting of the realigned Leckwith Road Viaduct will be particularly critical in this regard, and should be carefully designed to minimise light-spillage into the adjacent woodlands and river corridor.

6.7 *Invasive Plant Species*

6.7.1 Japanese knotweed and other invasive non-native plants which are listed on Schedule 9 of the Wildlife & Countryside Act 1981 should be treated in accordance with current NRW requirements in order to prevent their inadvertent spread from the site.

6.7.2 Himalayan balsam can all be dealt with relatively easily by means of cutting and/or treatment with herbicide. Japanese knotweed is a more intransigent species, however, and will require concerted efforts to eliminate it from the site and ensure that it does not accidentally spread as a result of site clearance and construction operations. A strategy for the clearance of Schedule 9 plants on the site should be drawn up and agreed with the Planning Authority Ecologist. On-line guidance on the treatment of Japanese knotweed is provided by the EA (2013), whilst on-line information about the treatment and management of Himalayan balsam is provided by CEH (2004).

6.7.3 Although it is not currently a legal requirement to control the spread of buddleia and Himalayan honeysuckle in the same way as the species described above, it is becoming increasingly recognised that these species can cause problems in native habitats if left to spread unchecked. Due to their encroachment into areas of ancient semi-natural woodland and along the River Ely, they are beginning to degrade these designated and high value sites. It is therefore recommended that buddleia and Himalayan honeysuckle are included in the clearance strategy described above. They should be controlled by cutting and/or spraying. They are relatively easy plants to control by cutting and spraying with herbicide. However, seedlings may continue to become established and may need repeated treatment at regular subsequent intervals.

6.8 *Other Measures*

6.8.1 The Water Framework Directive assessment (WFDa) carried out for the proposed development (WSP 2021) states that there is minimum risk to the current structure and substrate of the riverbed. The WFDa also describes the proposed new bridge as being a clear span structure that would not alter the River Ely water quality or affect the flow of water through the river channel. There is the potential for some increased shading by the bridge, but this would be offset by additional riparian planting to increase potential fish habitats. A range of mitigation measures to be implemented during the construction phase are outlined in the WFDa to prevent any negative effects on the river habitats and species, including migratory fish.

6.8.2 A Wildlife Protection Plan (WPP) will be drawn up for the site clearance and construction stages, setting out detailed measures to ensure that the identified interests, potential interests and statutory obligations etc are appropriately treated. This should include the

agreed bat mitigation, nesting bird, reptile clearance, and vegetation clearance strategies etc, and identify the individuals who will be responsible for ensuring that the ecological mitigation requirements are met. Responsibility for WPP implementation should be assigned to an appropriately qualified and/or experienced member of the development team who would act as an 'Ecological Clerk of Works'.

6.8.3 The mitigation and compensation plan for the site will follow a phased approach, to complement the various phases of the development. Detailed information on how the development will be divided into different phases is not currently available; however, appropriate mitigation targets will need to be achieved before each phase of development begins. For example, it will be necessary to complete the construction of the bat house before any of the existing buildings are demolished and the planting of compensatory woodland will need to be carried out before trees are removed to accommodate the realigned road.

6.8.4 A long term Biodiversity Management Plan (BMP) will be drawn up to guide the management and maintenance of the biodiversity enhancement measures, semi-natural habitats and other ecological features of the site, and its implementation should be funded by the developer. For example, in the woodland areas the understorey and ground flora will benefit from some cutting and possible resumption of hazel coppicing.

6.8.5 Contractors should be provided with a 'toolbox talk' at the outset of site works setting out the known and possible habitat and species constraints, and the mitigation measures which are required. The toolbox talk should also set out procedures to be followed in the event that there are unexpected encounters with protected species etc.

6.8.6 The services of an appropriately qualified and licensed ecologist should be available on an 'on-call' basis throughout the development in order to deal promptly with any protected species or other ecological matters which may arise during the clearance and construction works.

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APPENDIX 1: PLANT SPECIES RECORDED

All species recorded by DCE 2013 & 2019, unless otherwise indicated:

		South Wales Criteria						
Latin Name	Common Name	CS	W	NG	CG	AG	MG	PIL
Trees & Scrub								
Acer campestre	field maple		W					
Acer pseudoplatanus	sycamore							
Alnus glutinosa	alder							
Betula pendula	silver birch							
Buddleja davidii	buddleia							
Clematis vitalba	traveller's joy							
Cornus sanguinea	dogwood							
Corylus avellana	hazel							
Crataegus monogyna	hawthorn							
Fraxinus excelsior	ash							
Lonicera periclymenum	honeysuckle							
Malus sylvestris	crab apple		W					
Prunus spinosa	blackthorn							
Quercus robur	pedunculate oak							
Ribes uva-crispa	gooseberry							
Rubus fruticosus agg	bramble							
Rubus idaeus	raspberry							
Salix caprea	goat willow							
Salix cinerea	grey willow							
Salix viminalis	osier willow							
Sambucus nigra	elder							
Tilia x europaea	common lime							
Ulmus glabra	wych elm		W					
Herbaceous Plants								
Achillea millefolium	yarrow							
Agrostis capillaris	common bent							
Agrostis stolonifera	creeping bent							
Alliaria petiolata	garlic mustard							
Allium ursinum	wild garlic (ramsons)		W					
Arrhenatherum elatius	false oat-grass							
Artemisia vulgaris	mugwort							
Arum maculatum	cuckoopint							
Asplenium scolopendrium	hart's-tongue fern							
Athyrium filix-femina	lady-fern							
Blackstonia perfoliata	yellow wort	CS			CG			
Brachypodium sylvaticum	wood false-brome							
Bromus hordeaceus	soft brome							
Calystegia silvatica	large bindweed							
Carex flacca	glaucous sedge			NG	CG		MG	
Carex nigra	common sedge			NG			MG	

Carex pendula	pendulous sedge		W				MG	
Carex remota	remote sedge		W					
Centaurea nigra	common knapweed			NG	CG			
Centranthus ruber	red valerian							
Circaea lutetiana	enchanter's nightshade							
Cirsium arvense	creeping thistle							
Cirsium palustre	marsh thistle							
Cirsium vulgare	spear thistle							
Clematis vitalba	traveller's -joy							
Conyza canadensis	Canadian fleabane							
Cymbalaria muralis	ivy-leaved toadflax							
Cynosurus cristatus	crested dog's-tail							
Dactylis glomerata	cock's-foot							
Dactylorhiza fuchsii	common spotted orchid			NG			MG	
Deschampsia cespitosa	tufted hair-grass							
Dipsacus fullonum	teasel							PIL
Dryopteris filix-mas	male fern							
Dryopteris sp	buckler fern							
Elodea canadensis	Canadian pondweed							
Epilobium hirsutum	great willowherb							
Epilobium sp	willowherb species							
Equisetum arvense	field horsetail							
Eupatorium cannabinum	hemp agrimony						MG	
Fallopia japonica	Japanese knotweed							
Festuca rubra	red fescue							
Ficaria verna	lesser celandine							
Foeniculum vulgare	fennel							
Galium aparine	cleavers							
Galium odoratum	sweet woodruff		W					
Geranium molle	dove's-foot crane's-bill							
Geranium robertianum	herb Robert							
Geum urbanum	wood avens							
Glechoma hederacea	ground ivy							
Glyceria fluitans	floating sweet-grass						MG	
Hedera helix	ivy							
Helminthotheca echioides	bristly oxtongue							
Heracleum sphondylium	hogweed							
Holcus lanatus	yorkshire fog							
Hypericum maculatum	imperforate St John's-wort			NG				
Hypericum perforatum	perforate St john's-wort			NG	CG			
Impatiens glandulifera	Himalayan balsam							
Iris pseudacorus	yellow flag-iris						MG	
Jacobaea vulgaris	common ragwort							

Juncus effusus	soft rush							
Juncus inflexus	hard rush							
Lamiastrum galeobdolon	yellow archangel		W					
Lamium album	white dead-nettle							
Lemna sp.	duckweed species							
Leucanthemum vulgare	oxeye daisy			NG				
Leycesteria formosa	Himalayan honeysuckle							
Linaria vulgaris	common toadflax							PIL
Lolium perenne	perennial rye-grass							
Lotus corniculatus	common bird's-foot trefoil			NG	CG			PIL
Lysimachia nummularia	creeping jenny						MG	
Medicago lupulina	black medick				CG			
Melilotus officinalis	ribbed meliliot							
Mercurialis perennis	dog's mercury		W					
Oenanthe crocata	hemlock water dropwort						MG	
Oenothera sp	evening primrose sp.							
Phragmites australis	common reed						MG	
Plantago lanceolata	ribwort plantain							
Plantago major	greater plantain							
Potentilla anserina	silverweed							
Potentilla reptans	creeping cinquefoil							
Potentilla sterilis	barren strawberry		W		CG			
Primula vulgaris	primrose		W					
Prunella vulgaris	self heal							
Pulicaria dysenterica	common fleabane						MG	
Ranunculus acris	meadow buttercup							
Ranunculus repens	creeping buttercup							
Rosa canina agg.	dog rose sp.							
Rumex acetosa	common sorrel							PIL
Rumex crispus	curled dock							
Rumex obtusifolius	broad-leaved dock							
Scorzoneroides autumnalis	autumn hawkbit							
Scrophularia nodosa	common figwort		W					PIL
Senecio vulgaris	groundsel							
Sisymbrium officinale	hedge mustard							
Stachys sylvatica	hedge woundwort							
Symphytum officinale	common comfrey							
Tamus communis	black bryony							
Taraxacum officinalis agg	dandelion							
Trifolium pratense	red clover			NG				
Trifolium repens	white clover							
Tripleurospermum inodorum	scentless mayweed							
Tussilago farfara	colt's-foot							PIL
Typha latifolia	bulrush							
Urtica dioica	common nettle							

Veronica beccabunga	brooklime						MG	
Veronica chamaedrys	germander speedwell							
Veronica montana	wood speedwell		W					
Veronica persica	common field speedwell							
Vicia cracca	tufted vetch			NG				
Vicia sativa	common vetch							
Viola riviniana	common dog-violet			NG	CG			
	Total	1	13	11	8	0	12	6

NB. 27 species collectively pooled from combined grassland and PIL lists as per post-industrial land SINC guidance - 20 required for consideration.

Key
PS - Regionally Scarce - Primary Species in SWWSP (2004)
CS - Regionally Uncommon - Contributory Species in SWWSP (2004)
IA - Invasive Alien

Indicator Species (SWWSP 2004)
W - Woodland, NG - Neutral Grassland, CG - Calcareous Grassland, AG – Acid Grassland, MG - Purple Moor Grass and Rush Pasture, PIL – Post Industrial Land.

SINC Selection
Sites which support 1 primary species or 5 contributory species or habitats which support 8 neutral grassland, 8 calcareous grassland, 7 acid grassland, 12 Purple Moor Grass and Rush Pasture or 8 tillage field and margins indicator species should be considered for selection as a SINC. Post Industrial sites which support 20 or more indicator species from the combined post-industrial land, acid, neutral, calcareous and marshy grassland lists should also be considered for selection.

APPENDIX 2: DEFINITIONS OF SITE VALUE

International Value

Site carrying an internationally recognised designation such as Ramsar Site, World Heritage Site, Special Protection Area, Special Area of Conservation, Biosphere Reserve or Biogenetic Reserve, or:

Habitats: site supporting nationally significant areas of habitats of defined international community interest.
Species: site supporting nationally significant populations of species of defined international community interest.

National Value

Site meeting published Site of Special Scientific Interest (SSSI) designation criteria (NCC 1989), whether so designated or not.

Habitats: site supporting nationally significant areas of habitats of defined national rarity or interest.
Species: site supporting nationally significant populations or communities of UK Red Data Book, Nationally Notable or protected species (other than badger).

County Value

Site identified as a County Wildlife Site (CWS), Site of Importance to Nature Conservation (SINC) or similar at the county level (ie greater than district, borough or city level); meeting published CWS designation criteria (where these exist), but falling short of SSSI designation criteria, whether designated as a CWS or not.

Habitats: site supporting good examples of nationally threatened habitats, or extensive areas of habitats which are rare or unique in the county.
Species: site supporting large or strong populations or communities of nationally rare or protected species (other than badger), or of species which are rare in the county and uncommon nationally.

District Value

Sites failing to meet County Value criteria, but nevertheless supporting habitats, species or communities which appreciably enrich the ecological resource of the county, especially by virtue of their size or extent.

Habitats: sites supporting habitats uncommon in the county, small but unmodified fragments of nationally threatened habitats, or comprising extensive areas or systems of semi-natural habitats.
Species: sites supporting nationally rare species, or strong populations or communities of regionally uncommon species, which would not otherwise be present (ie they are critically dependant on the site characteristics).

Local Value

Habitats which fail to meet District Value criteria, but which appreciably enrich the ecological resource of the locality. This category can be further divided into:

- **High Local Value**: just failing to meet District Value Criteria; supporting species which are notable or uncommon in the county; or species which are uncommon, local or habitat-restricted nationally, and which might not otherwise be present in the area.

- **Local Value**: sites which are of ecological value only in the context of their immediate surroundings. Rare or uncommon species may occur but are not restricted to the site or critically dependent upon it for their survival in the area.

Sites failing to meet any of the above can be considered as being of '**Negligible**' ecological value.

APPENDIX 3: REPTILE MITIGATION MEASURES – NRW GUIDANCE (Draft Feb 2005)

For any development site which supports reptiles, or which contains habitats with the potential to support reptiles, CCW recommends detailed survey at an early stage. Where suitable survey information is unavailable, however, or where there is insufficient time to carry out the necessary surveys, it should be assumed that any habitats on the site which are suitable for reptiles do indeed support reptiles, and mitigate accordingly.

Legislation

The four most common British reptiles (comprising grass snake, adder, slow-worm and common lizard) are afforded so-called 'partial protection' under the Wildlife and Countryside Act 1981 (as amended). This protects individuals of all species from 'intentional' or 'reckless' killing and injury, but does not confer any direct protection to the habitats which support them.

Where it can reasonably be predicted that reptiles could potentially be killed or injured by activities such as site clearance, earthworks or construction operations etc, to carry out such activities in the absence of appropriate mitigation could legally constitute intentional or reckless killing or injuring, and could result in prosecution.

Where reptiles (other than sand lizard, smooth snake and turtles, all of which are subject to additional restrictions under the law) are present, or potentially present, on a development site, the developer should consider the need for mitigation at an early stage in the development programme. The presence of reptiles on a development site will not necessarily prevent the development from taking place, but it means that 'reasonable' mitigation measures must be put in place to prevent, as far as possible, the killing or injuring of any reptiles.

It is not necessary to obtain a licence to carry out works which affect reptiles, but it is always advisable to seek guidance in any case where a development could potentially cause impacts to reptiles, and to obtain advice regarding what would constitute 'reasonable' mitigation, although it is ultimately up to the developer to decide what is 'reasonable' (and to accept any consequences which may ensue). In most cases, the services of an appropriately qualified and experienced reptile consultant will be required.

The remainder of this document sets out the main elements of a typical reptile clearance strategy. It is recognised, however, that not all of the elements listed below will be necessary or appropriate in all cases, and that individual strategies will vary from site to site.

Reptile Clearance Methodology

If reptiles are confirmed as being present (or are assumed to be present, for example from habitat assessment) then measures should be put in place to avoid or minimise the killing and injuring of reptiles as a result of development operations. Ideally, a 'Reptile Mitigation Strategy' should be drawn up for the site by a suitably qualified person, and agreed in advance with either the NRW or the relevant Local Authority Ecologist.

Wherever possible, reptiles should be accommodated within the site, or on one or more adjacent or nearby site. The translocation of reptiles to a different site which lies at a distance from the development site should only be undertaken as a last resort. Where reptiles cannot be accommodated within the site, a suitable receptor site should be identified in advance and surveyed for suitability. If a reptile population already exists on the receptor site, then advance enhancement works to increase the 'carrying capacity' of the receptor site may be necessary Adequate time should be allowed in the development programme for the safe clearance of reptiles ahead of any potentially harmful works using suitable means, which may vary from site to site.

It should be noted that the clearance of reptiles from a site can only be undertaken when the reptiles are active (ie, during the spring, summer and autumn months) and should never be attempted during the winter hibernation period (which runs approximately from November to March inclusive). This constraint may lead to conflict with other issues – the presence of nesting birds, for example, all species of which are protected against disturbance – which will also need to be taken into account and mitigated for accordingly[2].

[2] Hedgerow translocations or clearance of habitats such as trees, scrub, bramble or reedbed etc can lead to direct conflicts, which may require phased clearance or other mitigation measures to overcome.

Mitigation measures should apply to all areas of the site which will be subject to potentially harmful impacts, including the laying of haul routes, siting of contractors' compounds and the bulk storage of materials and soils etc. It should be remembered that reptiles may be present beneath the soil at depths of up to 250mm or more, as well as in locations such as amongst tree roots or buried rubble and brick waste etc.

Typical Mitigation Procedure

1. Where there are suitable receptor sites adjacent to the development site, mitigation should commence with the removal of tall vegetation from all areas affected by development to make them less attractive to reptiles, and to encourage them to move away voluntarily into adjacent habitats. Vegetation should initially be cut to a height of about 200mm, starting furthest away from the adjacent habitats and working towards them, so as to drive any reptiles which may be present towards the receptor habitats. All cutting must be done by hand (eg by strimmer or brush-cutter), rather than by tractor-drawn mowers, so as to minimise the risk of causing reptile casualties. All arisings should be removed immediately from the site following cutting.

   After a maximum of two days, the vegetation of the site should be cut again in a similar pattern to a height of about 50mm, taking great care to avoid injuring any reptiles which may be present and with all arisings again being removed from the site. The vegetation of the site should then be maintained in this short condition for a minimum of two further days before proceeding to Step 2.

In some rare situations this staged cutting, coupled with the careful removal of any structures which may be used by sheltering reptiles (eg rubble piles, timber piles, drystone walls etc – see Step 3 below) may be sufficient to achieve 'clearance' of the site by rendering it so unsuitable for reptiles that no further measures are required. In these circumstances, the site should then be maintained in this unsuitable condition until the commencement of development works, which should then be preceded by 'destructive searching' (see Step 8 below). These situations are likely to be very unusual, however, and will require careful assessment in advance by an appropriately qualified person.

Where there are no suitable habitats in the surrounding area for reptiles to relocate to (for example if the site is surrounded by roads or hard standings, or is hemmed in by other developments) then this step should be ignored.

2. Reptile-proof fencing should be erected around the perimeter of the affected areas of the site. These should be erected in accordance with published specifications such as that contained in the Highways Agency's *Design Manual for Road & Bridges* (Vol 10(4) (7) HA116/05 *Nature Conservation Advice in Relation to Reptiles and Roads* or the forthcoming *Reptile Mitigation Guidelines* (English Nature). The fencing will normally be required to extend below ground level for a depth of about 250mm, and both the installation and fabrication process may require careful supervision by a suitably qualified reptile handler to ensure that no reptiles are accidentally injured in the process. On large sites it may be useful, and will probably speed up the process, if the site is subdivided into smaller parcels.

   Reptile-proof fences may be either vertical 'no-pass' fences or sloping 'one-way' fences. The former will prevent the movement of reptiles in either direction, whilst the latter can be erected in areas where the site lies immediately adjacent to a suitable receptor sites, and will allow reptiles to leave the development area voluntarily.

3. Within the enclosed parcels, any rubble piles, drystone walls, tree roots, buried rubble and timber piles etc should be dismantled by hand to prevent reptiles from using them to shelter in. All arisings should be removed from the site. As far as possible, these operations should be carried out by hand, with the minimum tracking by any vehicles or machinery across the site. Complex or large structures may need to be carefully dismantled under the supervision of a reptile handler who can halt the works and rescue any reptiles which may be found sheltering in them.

4. Following the clearance of sheltering places, the vegetation of the enclosed parcel should be cut, if it has not already been so. Cutting should initially be to a height of about 200mm, starting at the centre of the parcel and working outwards towards the edges. All cutting must be done by hand (eg by strimmer or brush-cutter), rather than by tractor-drawn mower, so as to minimise the risk of causing reptile casualties. All arisings should be removed immediately from the site following cutting.

   Note that for a linear site, such as a cycle-path or verge, strimming should be undertaken from the path working ahead and outwards at the same time, effectively cutting a 'V'-shape.

5. After cutting, the site should be strewn with 'refugia'. These should comprise a combination of suitable materials such as sheet metal, timber (eg chipboard), roofing felt and carpet tiles. These will be used by reptiles for sheltering beneath, or for basking on, where they can be found and caught more easily. If the vegetation is already shorter than 200mm, refugia may be laid out straight away without cutting the vegetation. Refugia should be spread evenly around the site at a high density (ie about 100 per hectare).

6. Depending on the site, visits should be made to the site by a reptile handler over at least the next two days to check beneath the refugia, collect any reptiles which may be beneath them and remove them to the receptor habitats. In practice, it will usually take at least a week for the refugia to 'bed in', and daily reptile collection visits may need to take place over a period of several weeks. Reptile collecting visits must be undertaken in suitable weather conditions, ie in dry, still conditions with air temperatures in excess of 10ºC.

7. Daily or near-daily reptile collection and removal visits should continue until reptile numbers under the refugia begin to decline noticeably, at which point the vegetation of the site can be cut again, using the same methodology as at Step 4, but this time to a height of 100mm. Daily reptile collection and removal visits should continue for a further minimum of three days, in suitable weather conditions.

8. When reptile numbers are again detected to be declining, a final cut can be made to achieve very short, close-cropped vegetation of about 40-50mm height, again using the same methodology as at Step 4. This staged removal of the vegetation is likely to drive reptiles to make greater and greater use of the refugia, by removing alternative sheltering places and rendering the rest of the site unattractive to reptiles.

Depending on the individual circumstances of the site, it may be advisable to review the spread and location of refugia, and to begin to cluster these towards the edges of the site or in selected locations, although if this is done then the areas where refugia are no longer present must be kept in a highly unattractive state for reptiles. The manipulation of refugia numbers and locations may be used to reduce the amount of time needed for a reptile handler to check for reptiles. On a small site, however, there is probably no point in moving the refugia, and moving refugia may reduce capture efficiency[3]. This is a matter which will require expert assessment.

It is essential that the integrity of the reptile-proof fences is maintained throughout the trapping period. These should be checked on every visit, and any breaks repaired within 24 hours, otherwise reptiles could re-enter the trapping area from outside. An advantage of subdividing the trapping areas into compartments is that any breaks in the perimeter fence which do occur, and which go undetected for any length of time, will only affect the compartment it lies alongside, and not the whole trapping area.

On sites where vandalism is a significant problem, it may be necessary to institute security measures to ensure that the reptile-proof fences remain intact throughout the trapping period. The measures necessary will vary from site to site, but could include the use of 'Heras' fencing and/or the presence of site security personnel in extreme cases.

9. Daily or near-daily reptile collection visits should carry on until 10 successive nil-returns have been achieved, in suitable weather conditions, following the last vegetation cut. Following a final inspection by a suitably qualified person (the final inspection can be done at the same time as the last check of the refugia). At this point, the trapping records should be summarised and sent to the relevant Species Officer at the NRW. Although there is no obligation to do this, it will assist in maintaining a clear position with the statutory body and will encourage a cooperative dialogue. This may be useful in establishing that there has been full and reasonable compliance with the legal requirements in the event of a challenge arising.

   Note that there is no need to have 10 successive nil-returns between the vegetation cuts, but that these cuts should be at least 2 days apart and the numbers should be showing a decline (the exact time taken should be determined by the reptile handler in charge, and will vary from site to site).

10. CCW will then write to the developer to "release" the site to the developer or site engineers. Again, there is no obligation to obtain written consent from the NRW, but it will further demonstrate that there has been best-practice compliance to the satisfaction of the statutory body.

[3] Reptiles usually take a while to find refugia (hence the 'bedding in'), and once they do they tend to use them habitually. Moving refugia may simply confuse the animals and be counterproductive.

11. The area cleared of reptiles should then ideally be immediately stripped of all vegetation and the topsoil removed, leaving bare subsoil. This final stripping may be done with machinery (ideally using a bucket with tines)[4]. In some cases it may be desirable that the site is 'destructively searched' prior to development, especially if the trapping out has not gone absolutely to plan (eg vandalism problems etc). This means that the topsoil layer to a depth of about 250mm is removed from the site in strips or sections, working sequentially across the site, using a digger with a tined bucket, under the supervision of a reptile handler who is able to check for the presence of any reptiles remaining in the soil. Where such reptiles are found, the reptile handler will stop the works, rescue the animal and release it to the receptor area.

12. The edges of the cleared area should be marked with high-visibility temporary fencing to prevent accidental trafficking of vehicles on the uncleared parts of the site (if any).

13. If there is any delay between the end of the reptile clearance operation and the commencement of development, measures must be taken to prevent the recolonisation of the site by reptiles from adjacent habitats, unless there is no such habitat adjacent to the site. To prevent reptiles re-entering the cleared area, the developer must therefore either:
    a) Keep the area in the cleared condition obtained at Step 9 - bare earth with no vegetation. To keep the area bare, the developer could consider using an approved herbicide. Or:
    b) Retain the reptile-proof fencing until development works are underway in the area concerned. If this option is chosen, the integrity of the reptile-proof fences will need to be checked regularly throughout the intervening period (ie daily or near-daily), and any breaks repaired within 24 hours. If undetected breaks occur for any length of time, the affected area (or compartment) will need to be trapped out again by repeating Steps 5-9 above.

    Maintenance of the site in a cleared and reptile-proof condition is really only critical during the reptiles' active period, since recolonisation is not likely to occur during the winter months. Therefore if a site has been cleared of reptiles in summer prior to development in winter, the reptile-proof fences can be removed (or allowed to deteriorate) once the hibernation period has begun (ie after about the end of October). If the start of development is subsequently delayed beyond the end of the hibernation period, however, (ie after about the end of March) it may be necessary to reinstall the fences, or even re-trap the site.

    The site can be re-opened to reptiles by removing the fencing after all construction works are complete.

Catching Methods

The use of refugia at high densities (100/ha) can be very effective for collecting slow-worms. However, other species are less readily found under refugia, and can be much more difficult to catch. 'Noosing' of common lizards whilst sunning on refugia can be effective, but requires skill and is very time-consuming. Snake catching is also a specialised skill, and carries health and safety implications. However, both snakes and common lizards tend to be more mobile than slow-worms, and are therefore more likely to respond to the vegetation clearance and remove themselves from the trapping area where one-way fences make this possible.

Keeping Records

For trapping records, we recommend logging the date, time, weather conditions, temperature, minimum night temp (night before), species caught and location caught (a rough map would suffice, eg area A, B or C) and, if possible, the sex and age of the animals, and if gravid. Ideally a report of the trapping operation, in which all of the capture records are summarised and evaluated, should be prepared at the end of the operation and submitted to the CCW and/or the local authority ecologist. There is no obligation to do so, but the keeping of clear and unambiguous records may be essential in establishing that there was full and reasonable compliance with the law in the event of there being any challenge to the methods used.

When to Trap

Ideally clearance should begin as early as 1 April, with the aim of the site being cleared by the end of July. Clearance operations are less desirable later in the summer, since after about June there is the chance that juvenile

[4] It is worth noting that there can be a conflict on sites where there is also an archaeological watching brief: archaeologists usually specify a bladed bucket to produce smearing in which archaeological layers can be seen. A tined bucket makes this much more difficult.

animals will also be present, which as well as being extremely difficult to see and catch, may also significantly increase the number of animals on the site.

Post-development Monitoring

In addition to the above, we would encourage the developer to put in place a scheme to monitor the effects of the development on the reptiles and to see if the mitigation has been successful. The design of any monitoring exercises should be discussed in advance with the NRW.

APPENDIX 4: SUITABLE NATIVE SPECIES FOR PLANTING

Trees & Shrubs	
Betula pendula	Silver birch
Betula pubescens	Downy birch
Corylus avellana	Hazel
Crataegus monogyna	Common hawthorn
Cytisus scoparius	Broom
Ilex aquifolium	Holly
Prunus avium	Wild cherry
Prunus spinosa	Blackthorn
Quercus robur	Pedunculate oak
Salix caprea	Goat willow
Salix cinerea	Grey willow
Sorbus aucuparia	Rowan
Ulex europaeus	Common gorse
Viburnum opulus	Guelder rose

Grassland Species	
Centaurea nigra	Common knapweed
Hypochaeris radicata	Common cat's-ear
Lathyrus pratensis	Meadow vetchling
Leontodon hispidus	Rough hawkbit
Leucanthemum vulgaris	Ox-eye daisy
Lotus corniculatus	Bird's-foot trefoil
Medicago lupulina	Black medick
Pilosella officinalis	Mouse-eared hawkweed
Plantago lanceoloata	Ribwort plantain
Primula veris	Cow-slip
Primula vulgaris	Primrose
Prunella vulgaris	Self-heal
Ranunculus acris	Meadow buttercup
Trifolium dubium	Least trefoil
Trifolium pratense	Red clover
Veronica chamaedrys	Germander speedwell
Vicia cracca	Tufted vetch
Vicia sativa	Common vetch

PHOTOGRAPHS OF SITE – 2019

Building 8

Bat droppings on wall interior – building 8

Building 8 - interior

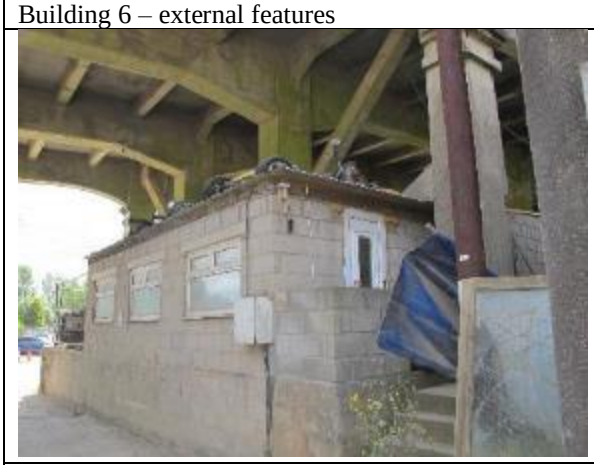
Building 7

Building 6 and viaduct

Building 6 - interior

Building 6 – external features

Building 6 – external features



Building 4

Building 4

Building 3

Building 2

Building 1

Building 10

Building 1 loft void interior

Building 1 loft void interior

Building 13

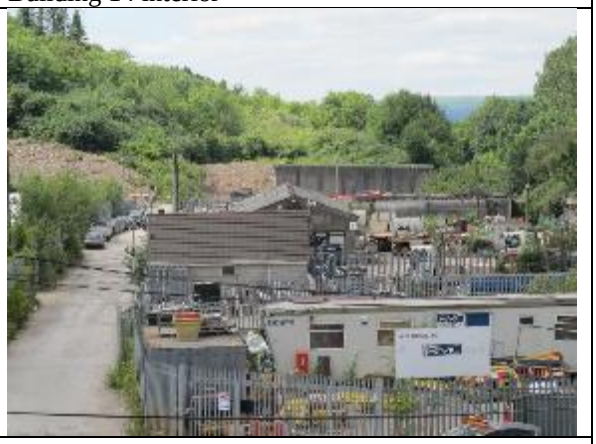
Building 14

Building 14

Building 14

Building 14 interior

Building 14 interior

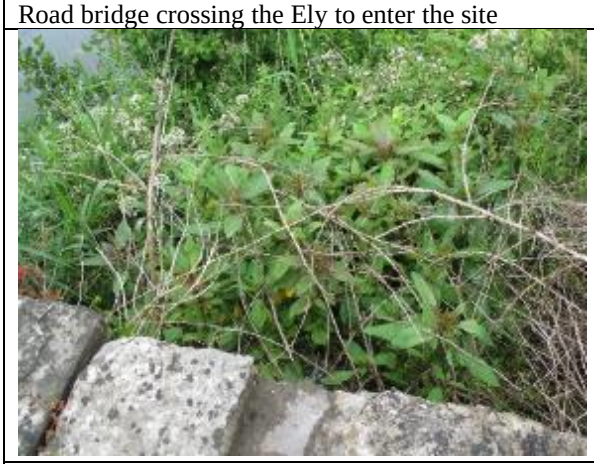


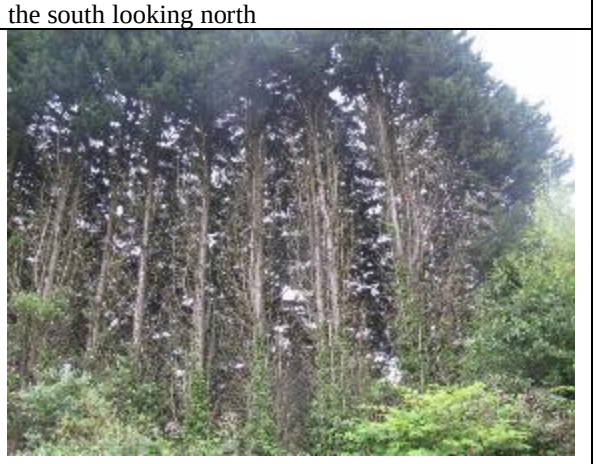
Buildings 13 and 14

Buildings 1 and 2

Building 9

	
Building 9 interior	Buildings 6 and 7
	
Otter foot print	Mud slide otter
	
Otter spraint	Japanese knotweed

	
Road bridge crossing the Ely to enter the site	River bank habitats
	
Himalayan balsam in the bank habitats	River Ely along the sites eastern boundary
	
Area of hardstanding to the north of the site	Hardstanding to the north of the site

	
Large expanse of bare ground to the south looking south	Large expanse of hardstanding and bare ground to the south looking north
	
Jetty to the east of the site	Coniferous trees to the south of the site
	
Grassland habitats to the south of the site	Grassland and ruderal habitats to the south of the site

Grassland area occupying round about to the east of the site

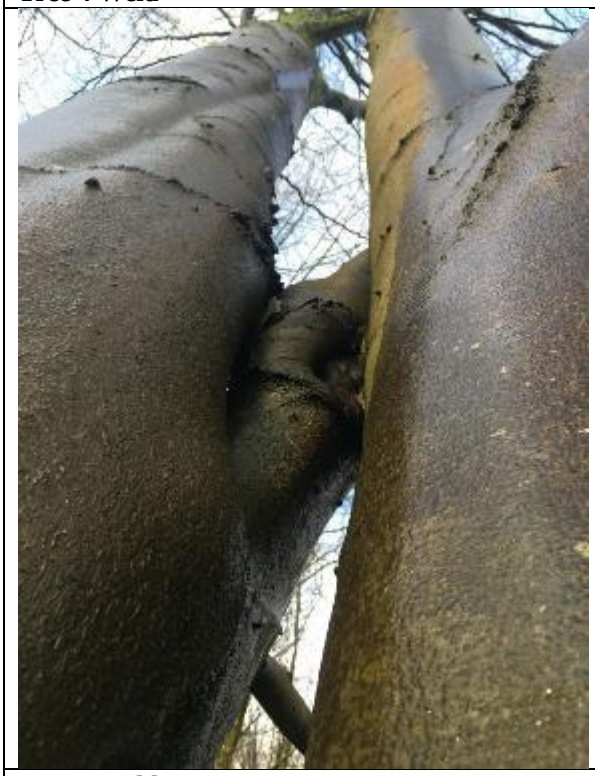
River Ely trail east of the site

Woodland in the southern portion

TREE PHOTOGRAPHS (January 2021)

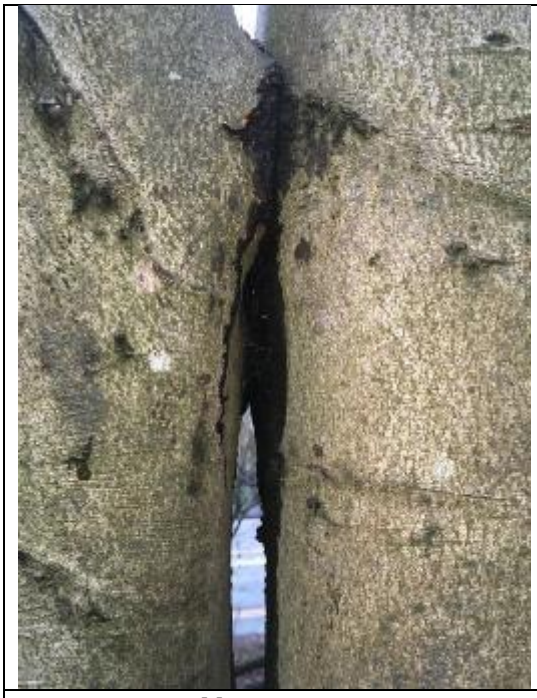
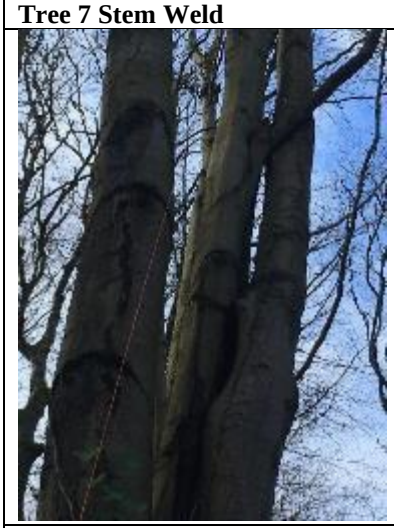
Tree 4 Weld

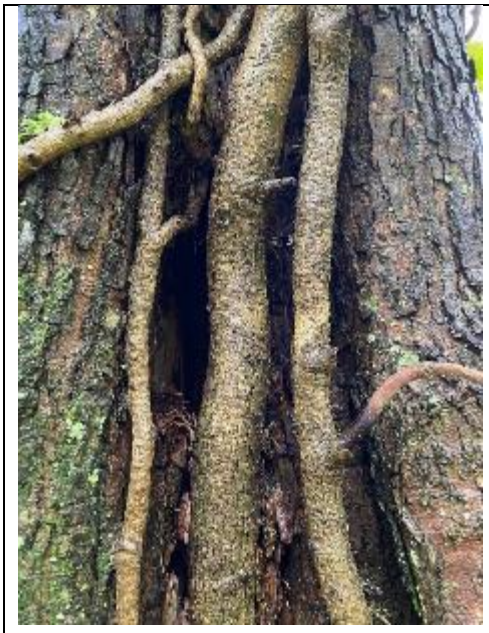
Tree 4 Weld



Tree 5 Weld

Tree 5 Compression fork

	
Tree 7 Stem Weld	**Tree 7 Weld**
	
Tree 7 Welds	**Tree 20**
	
Tree 20 Butt Rot Feature	**Tree 20 Wound**



Tree 20 Fluting type feature close to thick stemmed ivy

Tree 20 Knot hole feature

Tree 20 Interior of wound feature

Leckwith Yard, Cardiff
Ecological Assessment

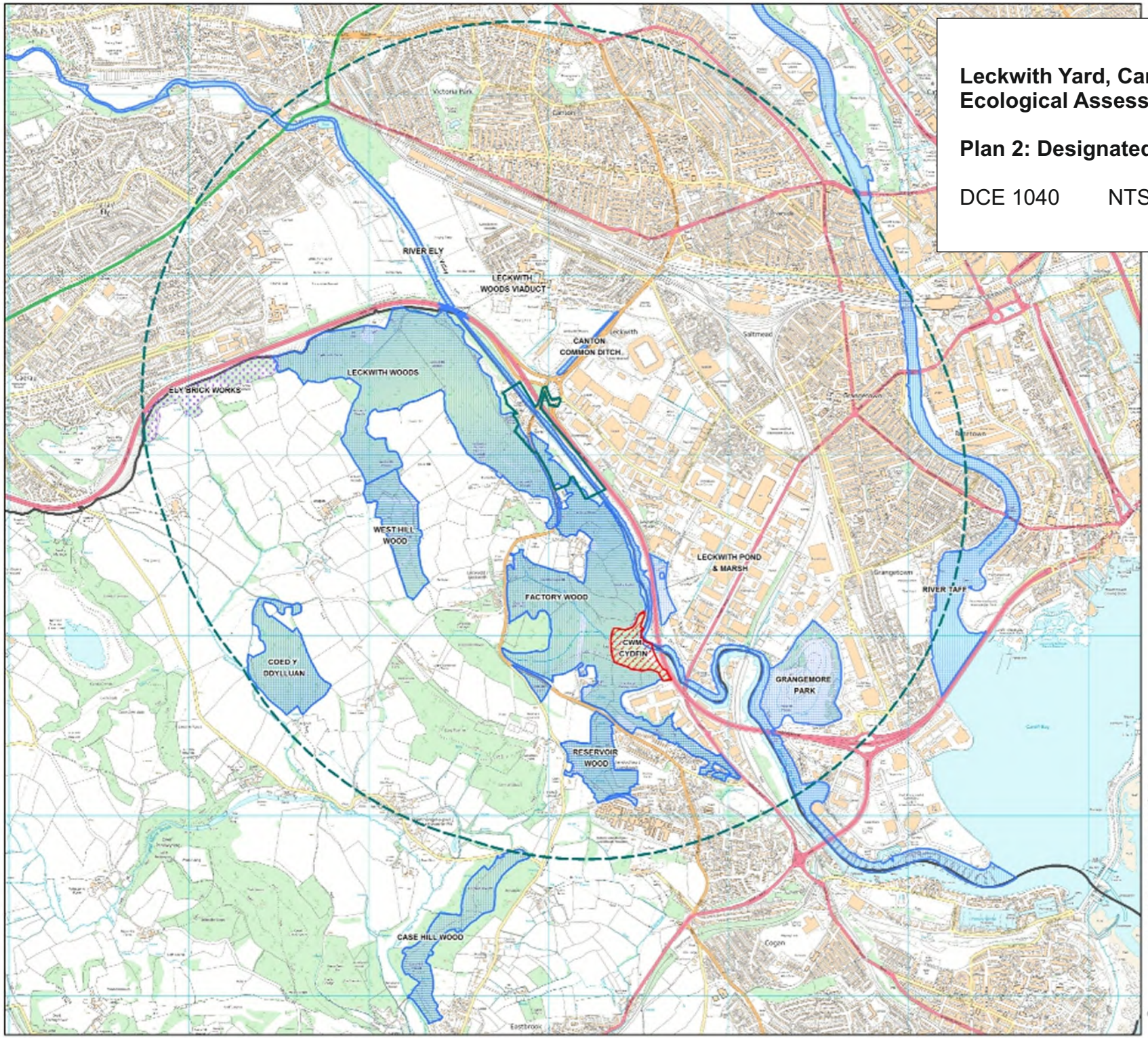
Plan 1: Location and Context

DCE 1040 NTS December 2019

Key

Site Boundary

N



Leckwith Yard, Cardiff
Ecological Assessment

Plan 2: Designated Sites

DCE 1040 NTS December 2019

Search Area

2km Search Buffer

Site of Special Scientific Interest

Site of Importance for Nature Conservation (SINC)

Regionally Important Geological Site (RIGS)

Unitary Authority Boundary

Plot produced on 05/04/2019 on behalf of David Clements Ecology by

SEWBReC
SOUTH EAST WALES BIODIVERSITY RECORDS CENTRE
CANOLFAN GOFNODION BIOAMRYWIAETH DE DDWYRAIN CYMRU

N

Leckwith Yard, Cardiff
Ecological Assessment

Plan 3: Dormouse nest tube locations

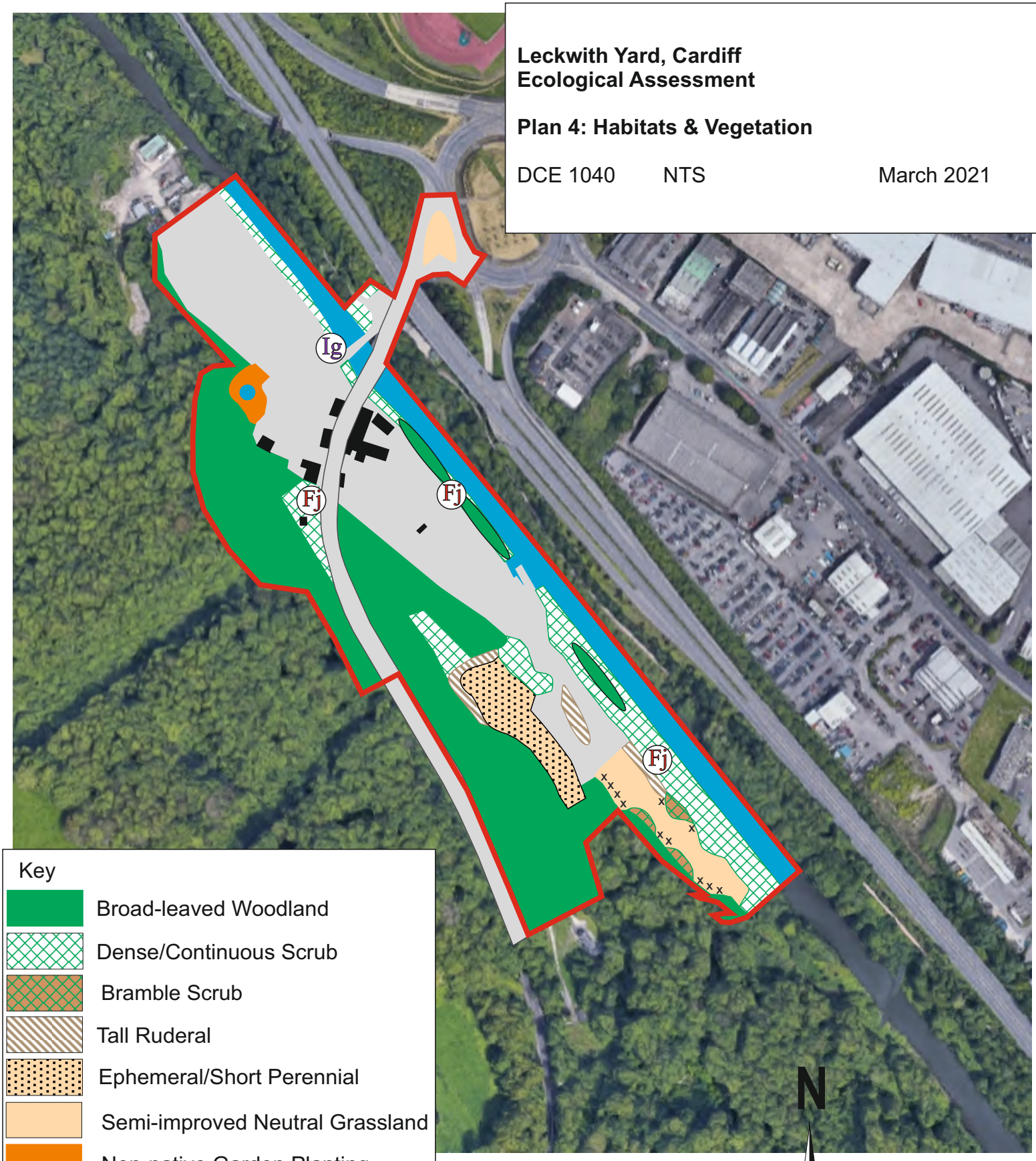
DCE 1040 NTS December 2019

N

Leckwith Yard, Cardiff
Ecological Assessment

Plan 4: Habitats & Vegetation

DCE 1040 NTS March 2021



Key

- Broad-leaved Woodland
- Dense/Continuous Scrub
- Bramble Scrub
- Tall Ruderal
- Ephemeral/Short Perennial
- Semi-improved Neutral Grassland
- Non-native Garden Planting
- Open Water
- Hardstanding
- Building
- Scattered Trees
- X Scattered Scrub
- Fj Japanese Knotweed
- Ig Himalayan Balsam

N

Leckwith Yard, Cardiff
Ecological Assessment

Plan 5: Building Access

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Key

- Interior and exterior surveyed
- Exterior only surveyed
- Not surveyed

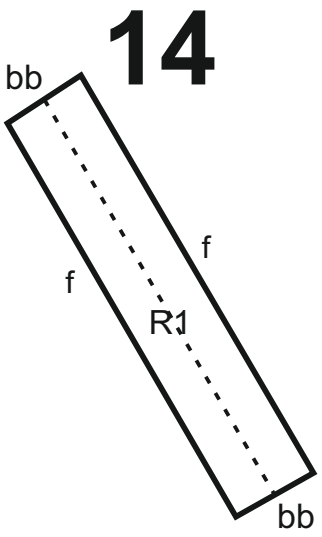
Leckwith Yard, Cardiff
Ecological Assessment

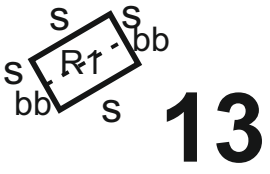
Plan 6a: Building Layout

DCE 1040 NTS December 2019

Key

-------	Ridge
R1	Number of storeys
f	fascia
s	soffits
bb	barge boards





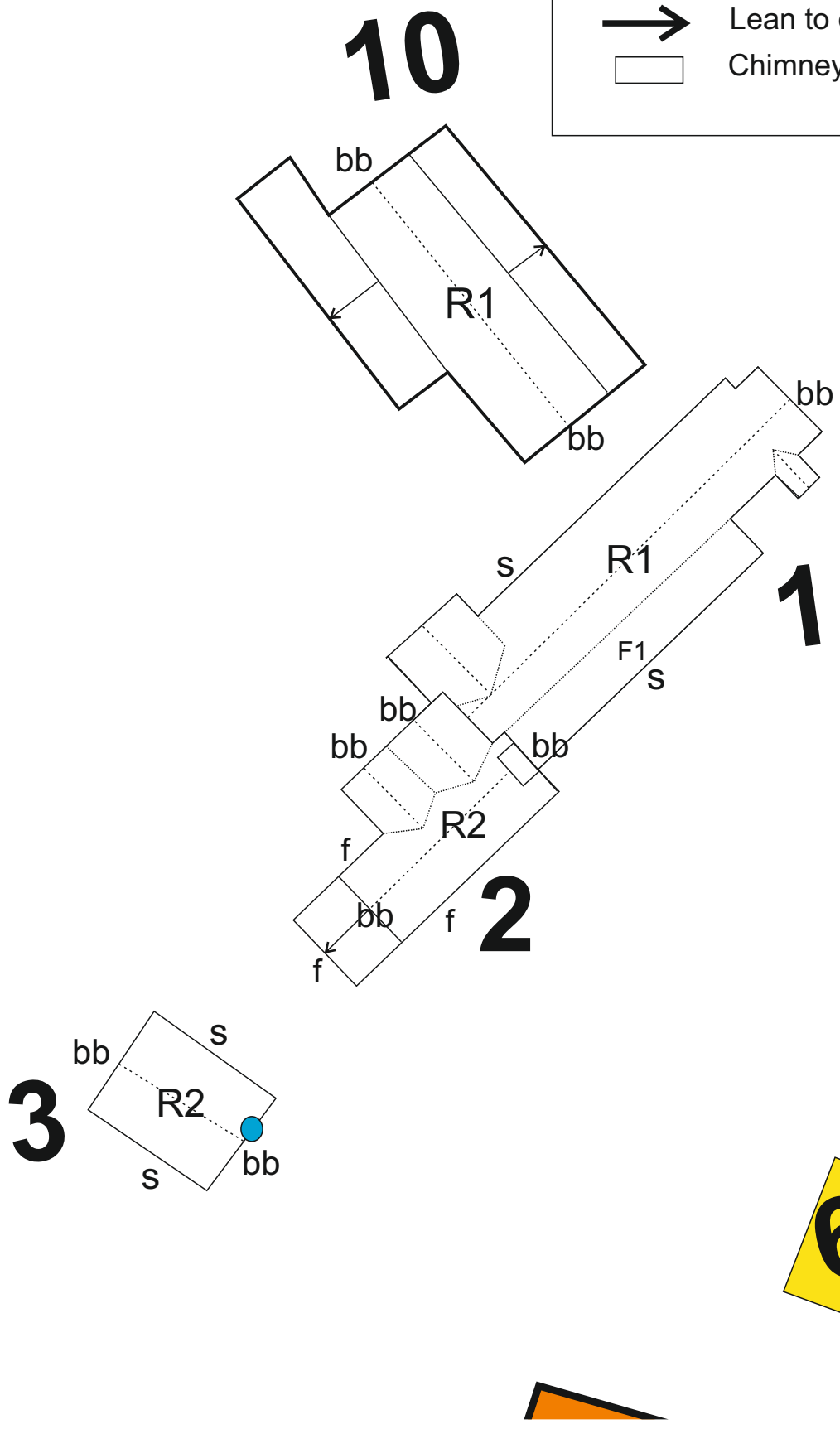
Leckwith Yard, Cardiff
Ecological Assessment

Plan 6b: Building Layout

DCE 1040 NTS December 2019

Key

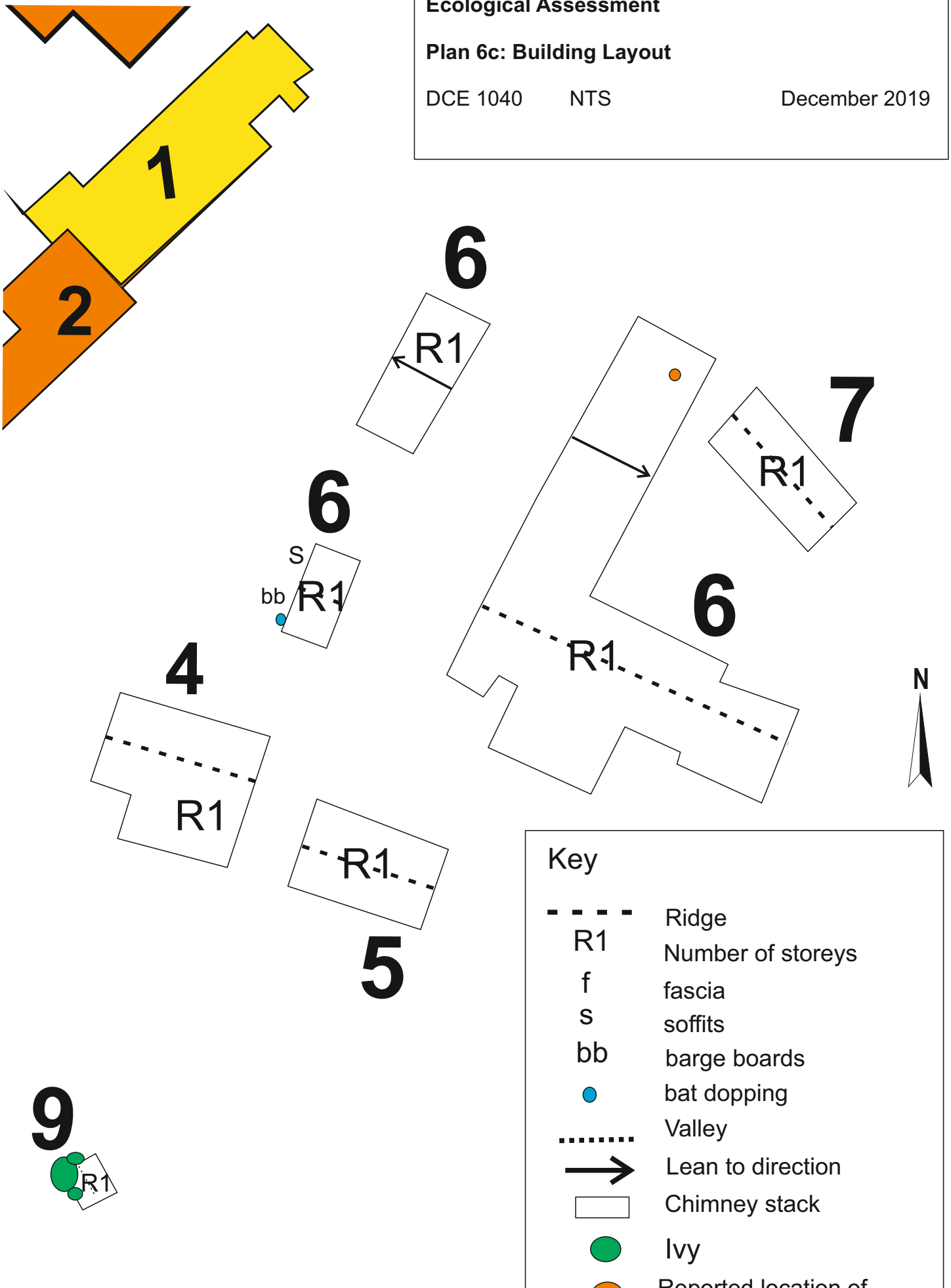
- Ridge
- R1 Number of storeys
- f fascia
- s soffits
- bb barge boards
- bat dopping
- Valley
- Lean to direction
- Chimney stack



Leckwith Yard, Cardiff
Ecological Assessment

Plan 6c: Building Layout

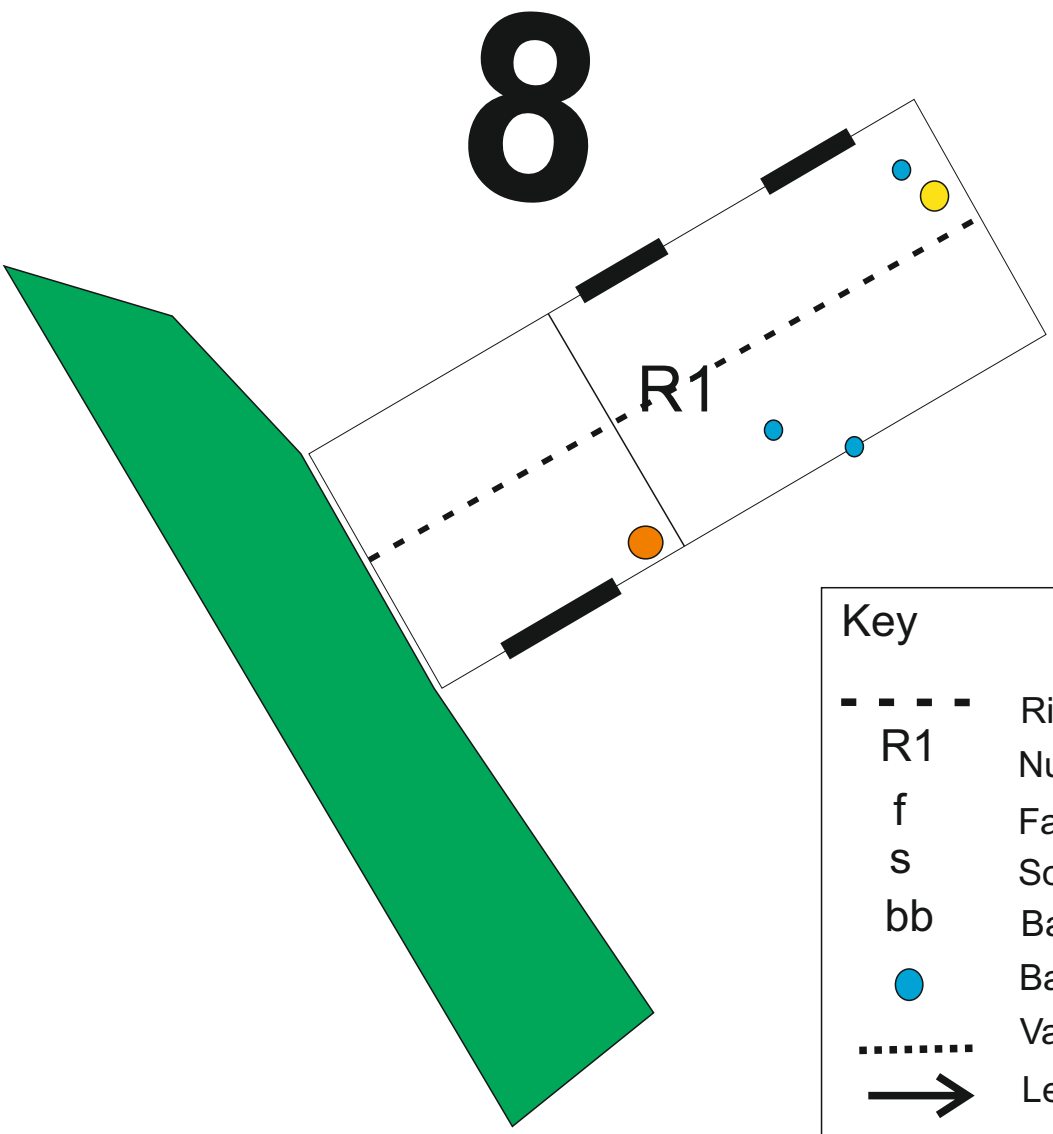
DCE 1040 NTS December 2019



Leckwith Yard, Cardiff
Ecological Assessment

Plan 6d: Building Layout

DCE 1040 NTS December 2019



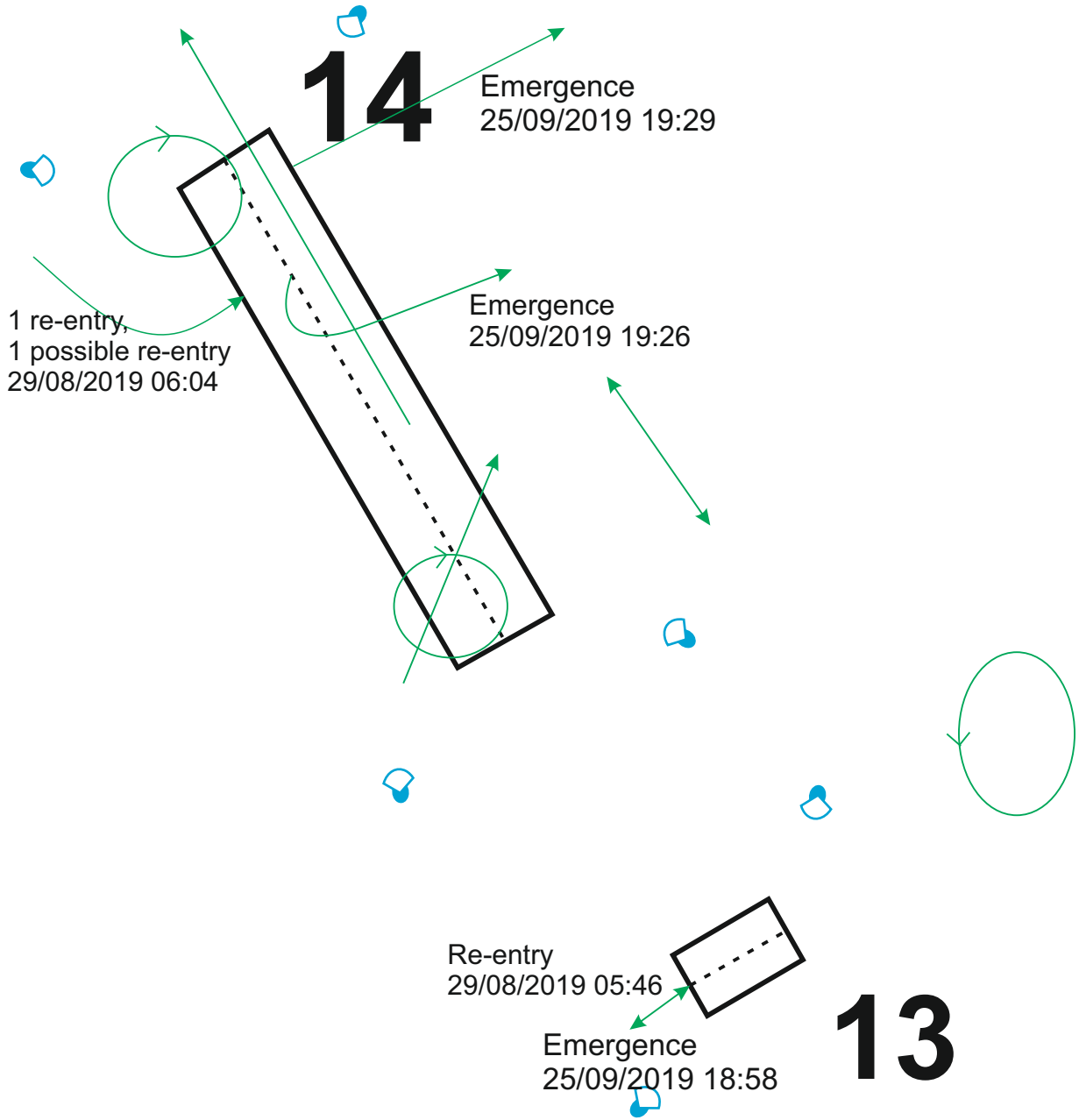
Key

- Ridge
- R1 Number of storeys
- f Fascia
- s Soffits
- bb Barge boards
- Bat doppings
- Valley
- Lean to direction
- Open door/window
- Bird nest
- Feeding remains (moth wings)
- Vegetation

Leckwith Yard, Cardiff
Ecological Assessment

Plan 7a: Flight Survey Results

DCE 1040 NTS December 2019



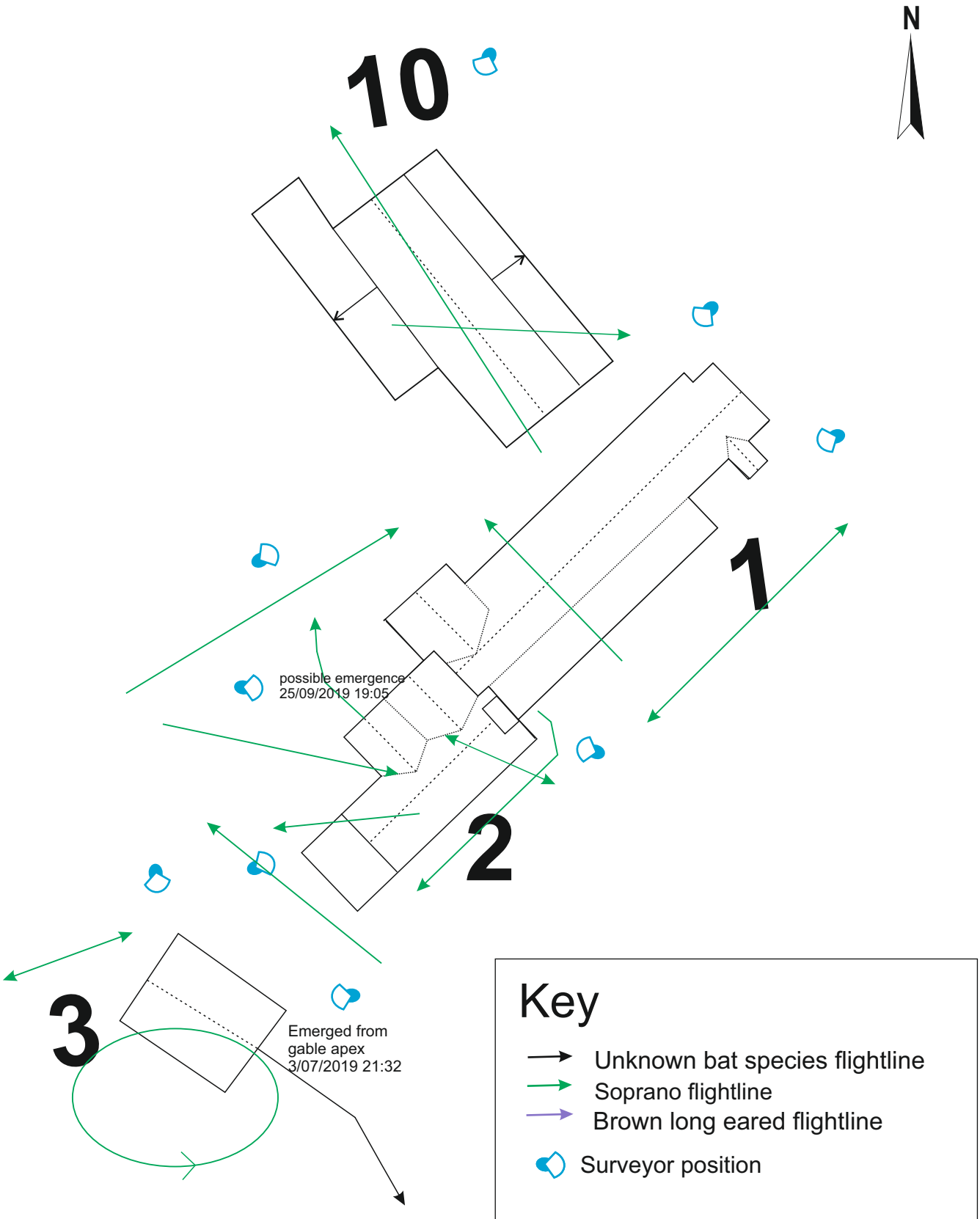
Key

- Unknown bat species flightline
- Soprano flightline
- Brown long eared flightline
- Surveyor position

Leckwith Yard, Cardiff
Ecological Assessment

Plan 7d: Flight Survey Results

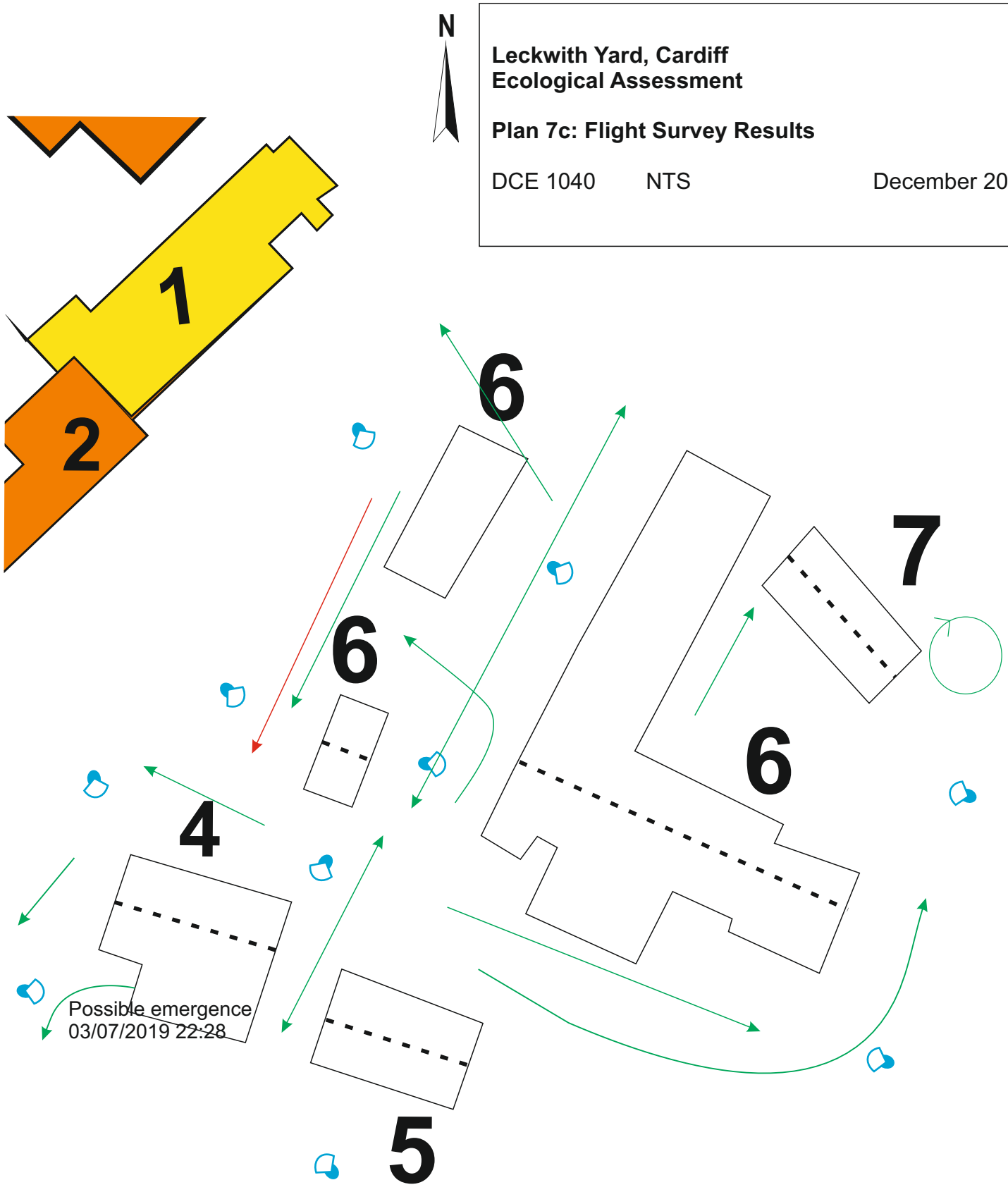
DCE 1040 NTS December 2019



Leckwith Yard, Cardiff
Ecological Assessment

Plan 7c: Flight Survey Results

DCE 1040 NTS December 2019



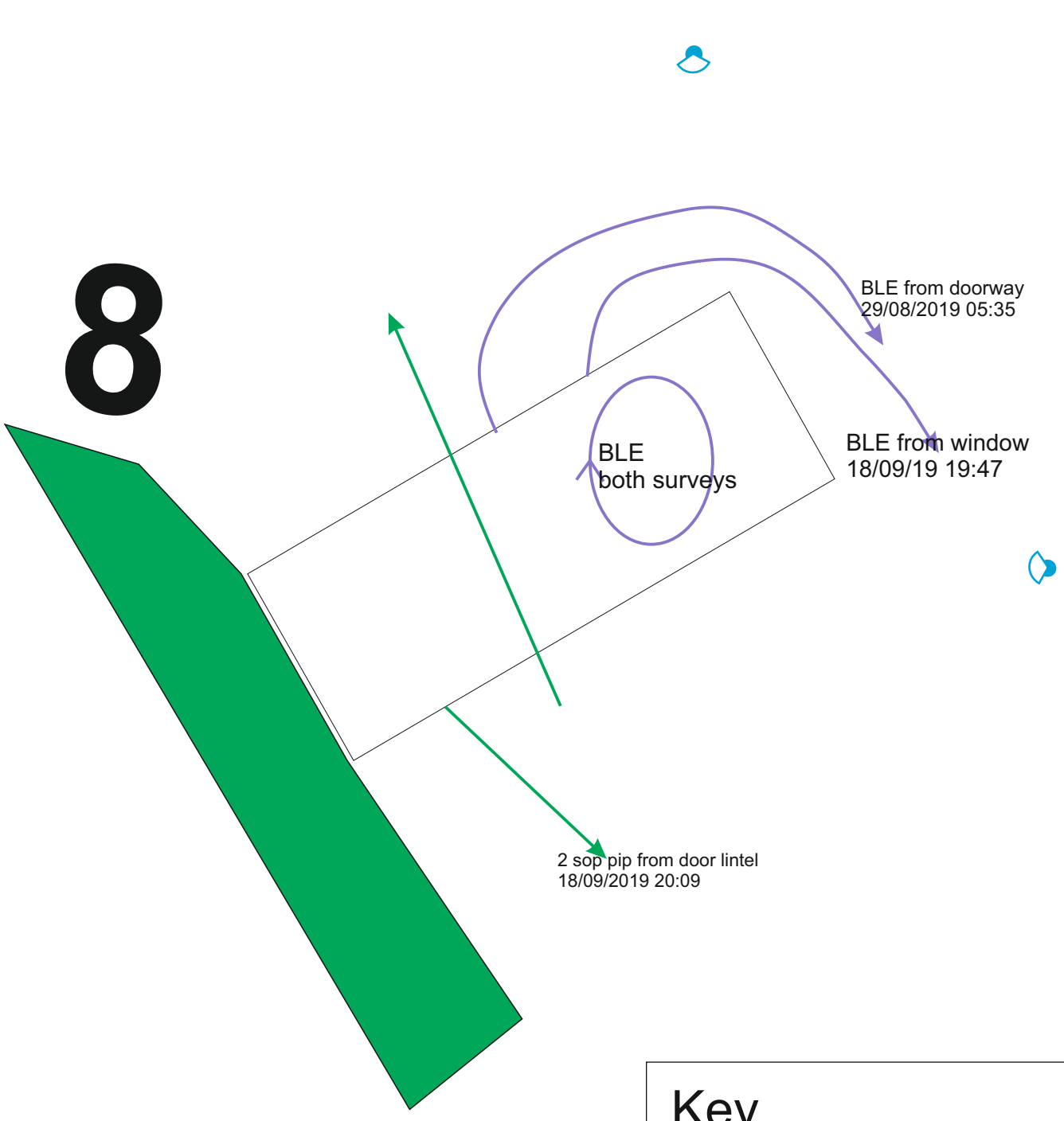
Key

- Unknown bat species flightline
- Soprano flightline
- Brown long eared flightline
- Noctule flightline
- Surveyor position

Leckwith Yard, Cardiff
Ecological Assessment

Plan 7d: Flight Survey Results

DCE 1040 NTS December 2019



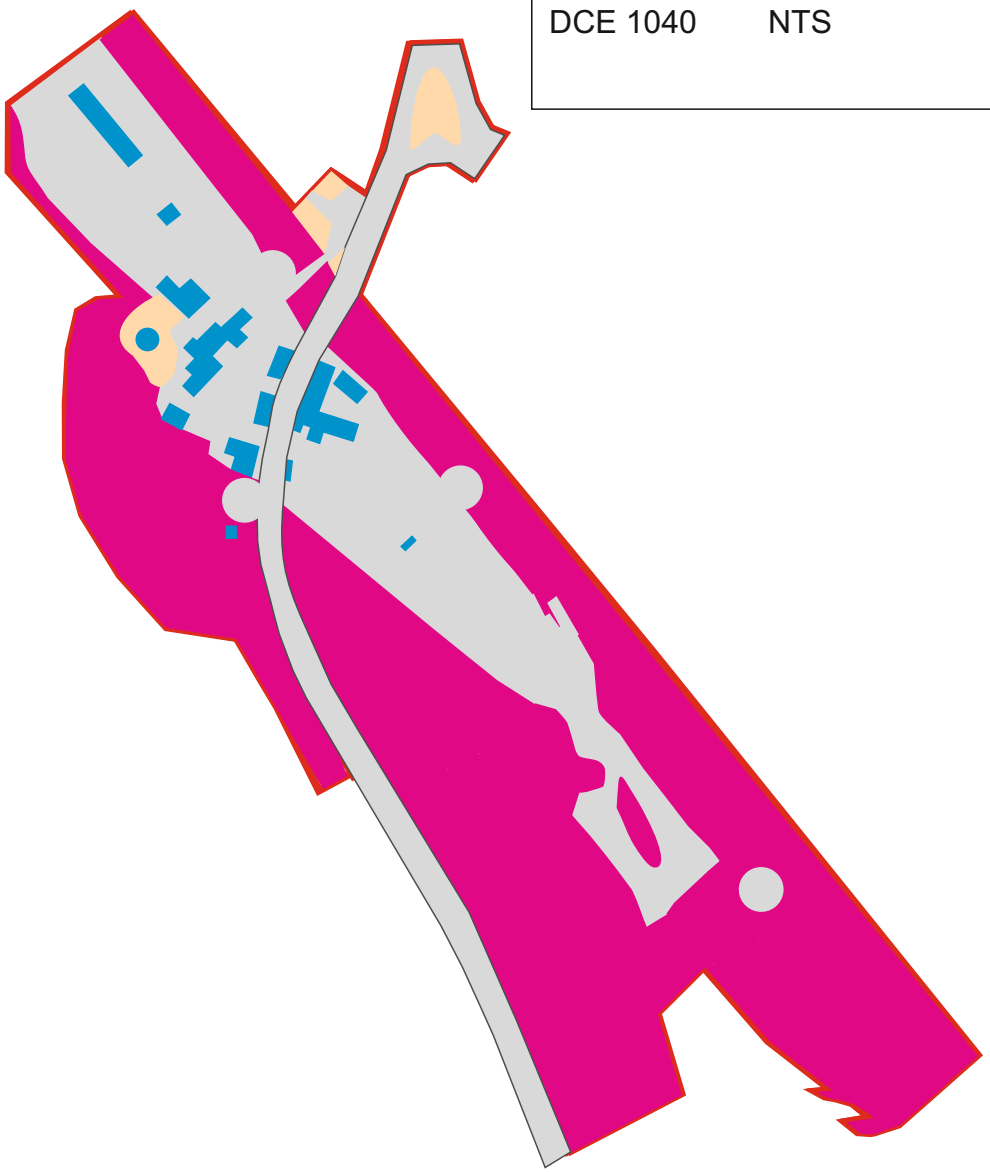
Key

- Soprano flightline
- Brown long eared flightline
- Surveyor position

Leckwith Yard, Cardiff
Ecological Assessment

Plan 8: Ecological Evaluation

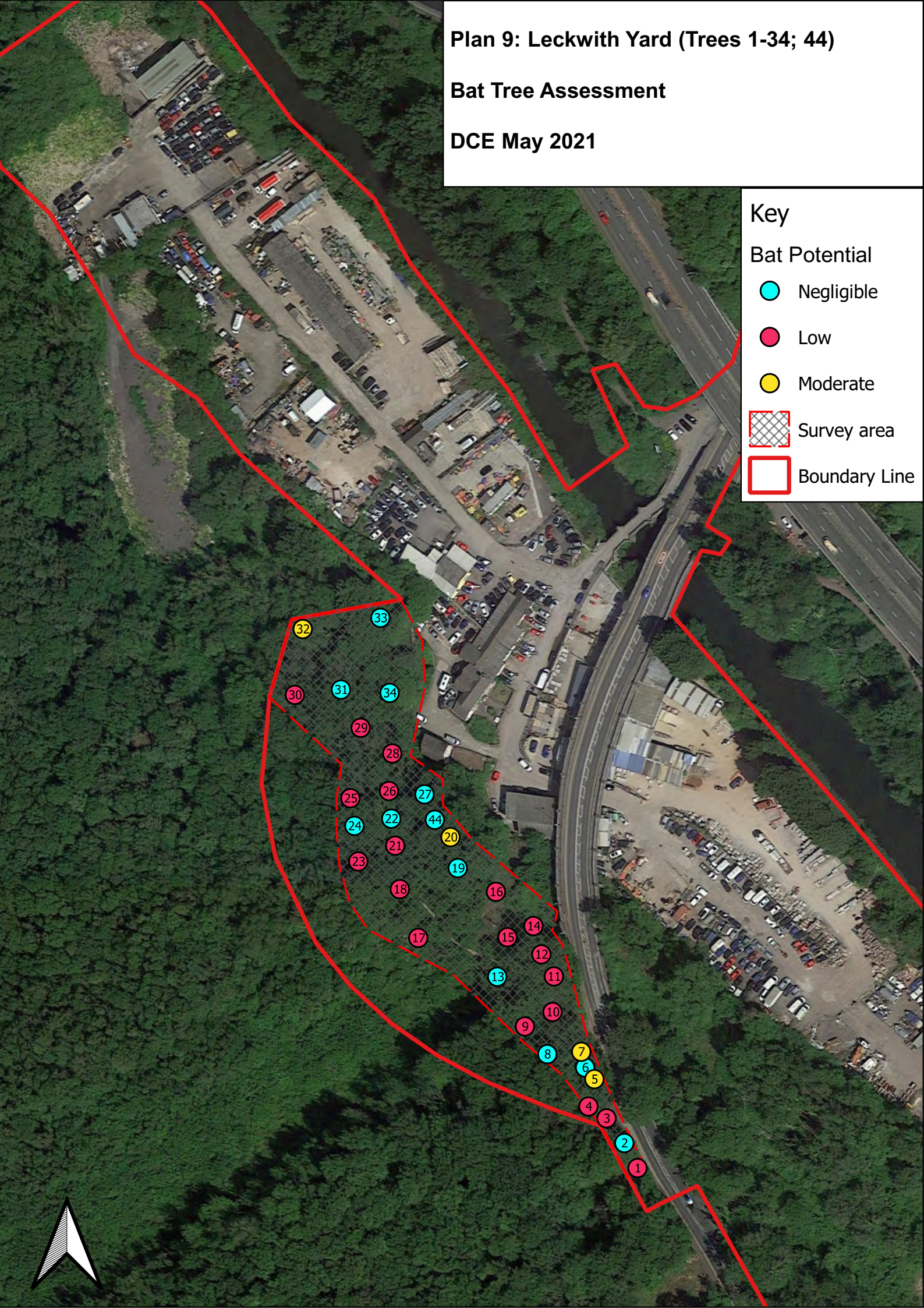
DCE 1040 NTS March 2021



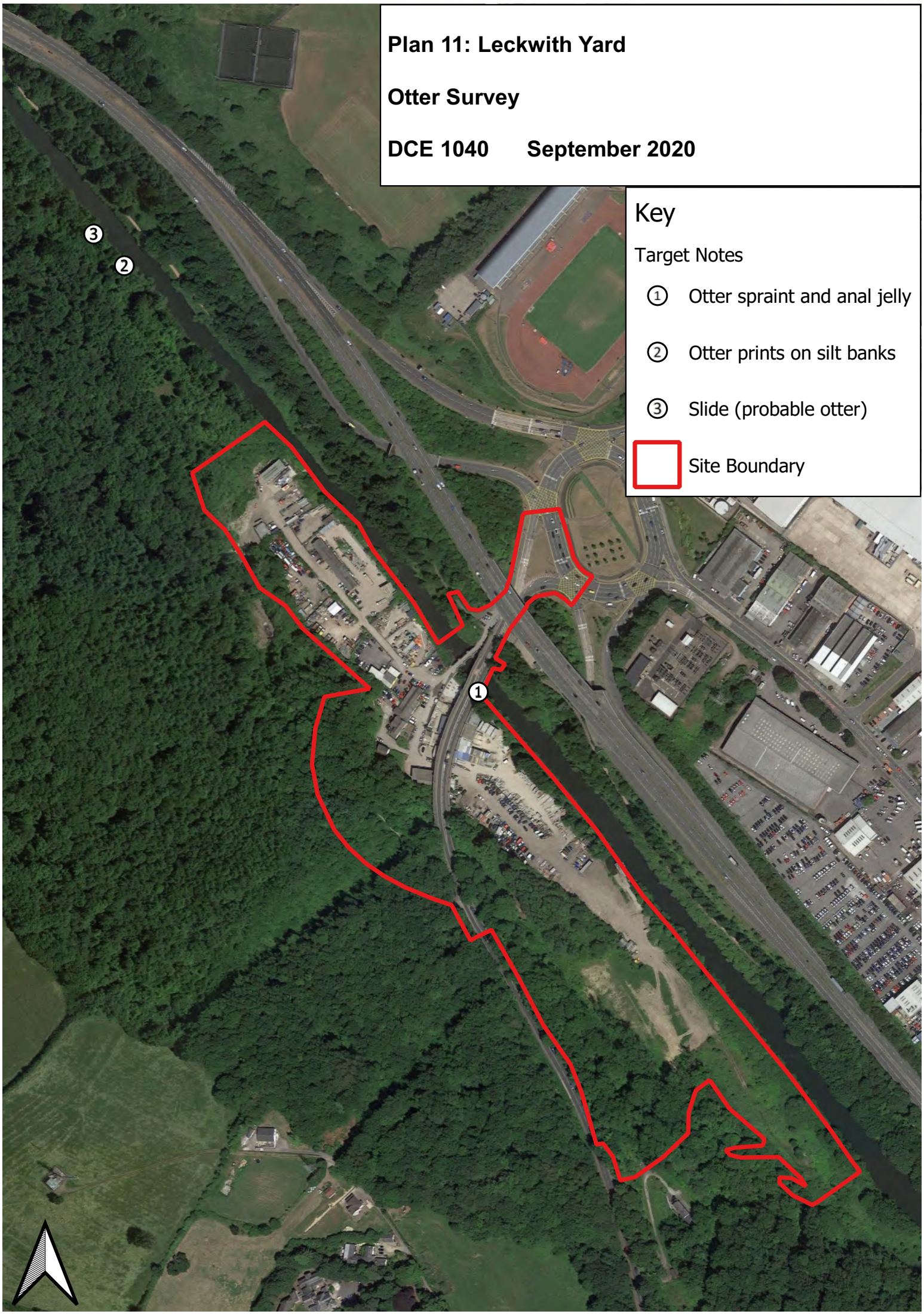
Key

- District Value
- High Local Value
- Local Value
- Negligible Value

N


Plan 9: Leckwith Yard (Trees 1-34; 44)
Bat Tree Assessment
DCE May 2021
Key
Bat Potential
Negligible
Low
Moderate
Survey area
Boundary Line
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
44


Plan 10: Leckwith Yard (Trees 35-43)
Bat Tree Assessment
DCE May 2021
Key
Bat Potential
Low
Moderate
Survey area
Boundary Line
43
42
41
40
37
38
36
39
35


Plan 11: Leckwith Yard
Otter Survey
DCE 1040 September 2020
Key
Target Notes
1 Otter spraint and anal jelly
2 Otter prints on silt banks
3 Slide (probable otter)
Site Boundary
1
2
3