



St Asaph Flood Risk Management Strategy

Preliminary Ecological Appraisal

July 2015



ST ASAPH FLOOD RISK MANAGEMENT STRATEGY PRELIMINARY ECOLOGICAL APPRAISAL

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1. INTRODUCTION

1.1 Project Brief

Natural Resources Wales (NRW) are undertaking a flood risk management appraisal study for St Asaph, North Wales. The town was subject to severe flooding from the River Elwy during November 2012 with some 300 properties and businesses directly affected. A key objective for the study is to deliver a flood risk management scheme to provide a 1 in 200 annual chance of flood protection to the town. A Preliminary Ecological Appraisal (PEA) has been carried out to inform the design of a flood risk management scheme for the town.

1.2 Scope

This report presents the findings of the PEA; comprising a desk study and a site survey. The aim of the report is to:

- Determine the nature conservation value of the study area.
- To confirm the potential presence/absence of protected and/or notable species of flora and fauna within the study area.
- To identify any other ecological constraints or requirements associated with the scheme area.
- To make recommendations regarding nature conservation enhancements.
- To identify any further survey requirements.

The survey methodology is detailed in Section 2. The survey results are presented in Section 3 and on Phase 1 Habitat Maps in Appendix A, with site photographs provided in Appendix B. Nature conservation value, constraints and enhancement are discussed in Section 4.

2. METHODOLOGY

2.1 Desk Study

A desk study was undertaken to identify any nature conservation sites and/or any relevant protected or notable species records within 2km of the site.

The following sources of information were utilised:

- NRW Protected Sites Map (<http://www.ccg.gov.uk/interactive-maps/protected-sites-map.aspx>)
- NBN Gateway (<https://data.nbn.org.uk/>)
- Ordnance Survey website (<http://www.getamap.ordnancesurvey.co.uk/>)
- Wales Biodiversity Partnership (<http://www.biodiversitywales.org.uk/>)

A data enquiry was also made to NRW, for any records of legally protected and/or notable species of flora and fauna (including Schedule 9 species) relevant to the scheme which they hold.

2.2 Extended Phase 1 Habitat Survey

An extended Phase 1 Habitat Survey was undertaken over two dates, 21st August and 17th November 2014 by Russell Grey, MIEEM. This survey method follows the habitat assessment and classification procedure outlined by the Handbook for Phase 1 Habitat Survey (JNCC, 2010), whereby all habitats are identified, described and mapped using a standard classification. A buffer of 50-100m from the proposed scheme was surveyed except for ponds (see below), reflecting the extent of semi-natural habitat adjacent to the water-course.

The extended component of the survey is developed from the methodology described in Guidelines for Baseline Ecological Assessment (IEA, 1995). All habitats and features within the survey area are assessed for their potential to support legally protected or notable species (nationally or locally).

These species include:

- **Amphibians:** ponds within 250m of the survey area were considered for their suitability to support a range of amphibians, including great crested newts (GCN).
- **Reptiles:** the survey area was assessed for suitable habitats including rough grassland, allotments, brownfield sites and habitat edges in general which would provide cover, basking and foraging habitat for reptile species.
- **Otters:** watercourses within the survey area were checked for signs of otter and assessed for their suitability to support the species.
- **Water voles:** watercourses within the survey area were assessed for their potential to support the species.
- **Bats:** all trees and structures within or immediately adjacent to the survey area were considered for their suitability to support roosting bats at any point during the year, broadly following the Bat Survey – Good Practice Guidelines (Hundt, L., 2012).
- **Birds:** the survey area was assessed for suitable habitats for nesting birds, including habitats suitable for ground-nesting species.
- **Badgers:** all habitats within 30m of the survey area were surveyed where access was possible to identify the presence of any setts or signs of badger activity.

- **Invasive plant species:** this assessment does not constitute a full Schedule 9 (as listed under the Wildlife & Countryside Act) species survey. The potential for any Schedule 9 species was assessed and any clearly visible species that were encountered were mapped and noted.

2.3 Assessment of Ecological Value

Each of the identified statutory and non-statutory sites, habitat types and associated species/populations has been attributed a biodiversity value reflecting their geographic significance; examples are provided below:

- **International** e.g. biodiversity feature that is designated or warrants designation as an Special Area of Conservation (SAC), Special Protection Area (SPA), or Ramsar site
- **National** e.g. biodiversity feature that is designated or warrants designation as a Site of Special Scientific Interest (SSSI) or National Nature Reserve (NNR)
- **Regional** e.g. biodiversity feature which is one of the best examples of its type within North Wales
- **Borough** e.g. biodiversity feature that is designated or warrants designation as a Site of Biological Importance (SBI) or other feature which is one of the best examples of its type within the Borough
- **Local** e.g. biodiversity feature which is one of the best examples of its type within a local context (i.e. within ~1km of the scheme extent)
- Biodiversity features of value within the **zone of influence** (site plus approx. 250m buffer)
- Biodiversity features of **negligible** value.

Biodiversity values have also been based upon the following factors:

- Presence of sites or features designated for their nature conservation interest. Examples include internationally, nationally or locally designated sites
- Size of habitat or species population, habitats or species which are rare, species rich assemblages, species which are endemic or on the edge of their range, large populations or concentrations of uncommon or threatened species and/or plant communities that are typical of valued natural/semi-natural vegetation types
- Secondary and supporting value, for example, habitats or features which provide a buffer to valued features or which serve to link otherwise isolated features
- Presence of legally protected sites or species
- Presence of UK priority habitats and species (S42 of the Natural Environmental & Rural Communities Act 2006 (NERC Act)).

2.4 Limitations

The only limitation to the survey effort was the lack of access to any of the ponds within 250m of the scheme as they are all in private property. Likewise, there was no access into any of the residential gardens immediately adjacent to the scheme, although the majority were visible from the existing flood embankment.

3. RESULTS

3.1 Desk Study

(a) Designated Sites

There are no statutory designated sites for nature conservation located within 2km of the survey area.

There are three Local Wildlife Sites (LWS) located within 1km of the survey area. These are:

- Afon Clwyd and floodplain LWS; designated for its importance as a habitat corridor and for its lowland dry acid grassland and lowland calcareous grassland habitats. Located ~400m east of the northern end of the survey area.
- Mount Road Churchyard, St Asaph LWS; located ~200m east of the riparian corridor in the centre of St Asaph.
- Coed Fron and Eryl Hall Wood LWS; located ~500m west of the riparian corridor at the southern end of the survey area.

(b) NBN Records

Table 3.1 lists the species recorded within the same 10km grid square as the survey area within the last 10 years.

Table 3.1 NBN Records

Amphibians	Birds (Schedule 1 Wildlife & Countryside Act)
<ul style="list-style-type: none"> • Common frog • Common toad • Smooth newt • Palmate newt • Great crested newt 	<ul style="list-style-type: none"> • Brambling • Woodlark • Fieldfare • Redwing
Birds (red listed; Eaton et al 2009)	Bats
<ul style="list-style-type: none"> • Skylark • Yellowhammer • Spotted flycatcher • House sparrow • Tree sparrow • Marsh tit • Starling • Song thrush • Lapwing 	<ul style="list-style-type: none"> • Serotine • Daubenton's • Whiskered / Brandt's • Natterer's • Noctule • Common pipistrelle • Soprano pipistrelle • Brown long-eared • Lesser horseshoe
Reptiles	Terrestrial mammals
<ul style="list-style-type: none"> • Slow worm 	<ul style="list-style-type: none"> • Hedgehog

	<ul style="list-style-type: none"> • Otter • Badger
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(c) NRW Records

NRW have provided records for the following species within 1km of the scheme:

- Great crested newt
- Smooth newt
- Common frog
- Common toad
- Common lizard
- Slow worm
- Grass snake
- Adder
- Otter
- Badger
- Common pipistrelle
- Myotis sp.
- Brown long-eared bat
- Whiskered bat
- Spotted flycatcher
- House sparrow
- Barn owl
- Hobby
- Atlantic salmon (migratory route)
- European eel (migratory route)
- Lamprey sp. (migratory route)
- Brown trout
- Bullhead

NRW also note that Himalayan balsam is present throughout the riparian corridor and that the species is likely to persist. New Zealand pygmyweed and monkey-flower have also been recorded along the Afon Elwy through St Asaph (non-native invasive species of flora, listed on Schedule 9 of Wildlife and Countryside Act 1981 [as amended]).

Lowland dry acid grassland and lowland calcareous grassland, a S42 habitat, is also found within the search area (relating to flood embankments, gardens, etc.).

3.2 Habitats

A total of 21 habitats were found to be present within the survey area. These are listed below and mapped on Phase 1 Habitat plans in Appendix A. Details of these habitats are found in Table 3.2 Target Notes.

- Semi-natural broadleaved woodland
- Dense / continuous scrub
- Scattered scrub
- Scattered broadleaved trees
- Improved grassland

- Poor semi-improved grassland
- Tall ruderal
- Inundation vegetation
- Standing water
- Running water
- Arable land
- Amenity grassland
- Introduced shrub (non-native)
- Species-poor hedgerow (intact)
- Species-poor hedge with trees
- Fence
- Wall
- Caravan site
- Buildings
- Bare ground
- Other habitat - allotment

The survey area is centred on the Afon Elwy with a buffer of 50-100m on either side of the river banks, reflecting the extent of semi-natural habitat. The area is described in four sections; the right hand bank for 750m from Pentre-uchaf upstream, river corridor north of the A55 bridge, the corridor between the A55 bridge and the A525 bridge and the corridor south of the A525 bridge.

The northern section of the survey area is characterised by a row of mature and semi-mature alder and crack willows along the river bank, with scattered scrub and ruderal vegetation beneath. Landward of the right embankment are grazing pasture for horses and sheep, occasional woodland blocks and a small allotment. The river channel is ~5m wide, with a stony bed, earth banks and relatively shallow flow at the time of survey.

The section north of the A55 is defined by an arable field boundary on the left (west) bank of the river. The riparian corridor is characterised by a line of mature alder and crack willow on the left bank, a grassed earth embankment and an arable field beyond. On the right (east) bank there is a 5m wide corridor of mixed broadleaved trees dominated by alder, with amenity grassland over an earth embankment and a caravan site beyond. There is a minor road bridge at the southern end of the caravan park. South of the minor road bridge the left bank is as described above but with a row of residential properties at the landward toe of the earth embankment. The right bank continues to be dominated by a wooded corridor, with a water treatment works (WTW) beyond.

The A55 road bridge embankments comprise plantation broadleaved woodland with a diverse mix of tree species. Upstream (south) of the A55 the western bank comprises a 5-10m wide band of mature broadleaved trees, a grassy earth embankment and various land-uses beyond including a livestock market, cricket pitch, car park and amenity public open space. The right bank immediately upstream of the A55 is dominated by broadleaved woodland on a steep slope. Where the woodland ends there is a 5m corridor of bankside broadleaved trees, an open area of improved and amenity grassland with a graded embankment and residential properties beyond.

The A525 road bridge is a traditional stone bridge with numerous arches over the river channel. South of the bridge the western bank is dominated by a narrow

band of broadleaved trees on the river bank and residential properties immediately behind. After 250m the houses end and adjacent to the riparian trees is arable land. On the right bank to the south of the A525 is a public park, dominated by mature trees and improved grassland. The tree line beside the river is 5-15m wide and landward is a football pitch and an area of well-established planted trees.

Table 3.2 Target Notes

Target Number	Note (see Appendix A for plans)
1	Afon Elwy; ~5m wide and with a cobble bed. At the time of survey there was relatively little water flow, with water depth not greater than 50cm. The banks are disturbed and in places comprise rock-filled gabion baskets. Bankside vegetation is limited to tall ruderals, invasive species of flora and occasional reeds, with mature trees on the bank tops.
2	Semi-natural broadleaved woodland comprising alder and crack willows with occasional grey willow and osier.
3	Spring Gardens Holiday Park; a caravan site adjacent to the riparian corridor with static caravans over amenity grassland and various buildings.
4	Left bank of the Afon Elwy, dominated by mature alder and crack willows, many covered in ivy and some of which have been trimmed quite recently, with logs and some brash piled on the river bank. There is an earth flood embankment running parallel with the channel which is covered in a rank grassland sward comprising false oat-grass, common knapweed, ribwort plantain and white clover. To the west is an arable field under crop at the time of survey.
5	Minor road bridge across the Afon Elwy; otter spraint found beneath the bridge.
6	Stand of Himalayan balsam on the east bank located between the landward toe of the embankment and the adjacent WTW. The WTW boundary is comprised of a line of <i>Leylandii</i> .
7	Residential properties lining landward toe of the embankment along the left bank of the river. The left bank is lined by alder and sycamore with ivy cover.
8	Extensive Himalayan balsam along the right bank of the river. There is semi-improved grassland on the landward side of the embankment, with evidence of grazing by sheep and with more balsam within the grassland.
9	The Afon Elwy flows beneath the A55 road bridge, with a footpath along both banks. Otter spraint was found beneath the bridge on a wedged log within the channel. The steep embankments either side of the bridge comprise plantation broadleaved woodland including sycamore, field maple, ash, wild cherry and hawthorn.
10	Semi-natural broadleaved woodland block on steep slopes to the east of the river corridor. The woodland comprises sycamore, aspen, hornbeam and hawthorn. There are residential properties at the top of the slope and various footpaths which traverse the slopes and appear to link up with rear gardens.
11	10m wide band of semi-natural broadleaved woodland which lines the left bank of the River Elwy; hybrid black poplar, ash, sycamore and wych elm. The age structure of the woodland is mixed and there is extensive ivy cover on the majority of trees. The understorey is sparse owing to disturbance by amenity use and comprises snowberry, wild angelica, figwort and bramble. Himalayan balsam is present in low density throughout this section.

Target Number	Note (see Appendix A for plans)
12	Right bank of the water-course is lined by a narrow band of broadleaved trees (crack willow, ash and sycamore), an improved grassland sward over the earth embankment and residential properties behind, with a line of trees and scrub screening them.
13	Afon Elwy; ~7m wide with a gravel and cobble bed. At the time of survey there was relatively little water flow, with water depth not greater than 50cm. The banks are disturbed throughout this section with easy access down to the channel. Bankside vegetation is limited to rank grasses and occasional tall ruderals.
14	Amenity grassland set behind the existing earth embankment and the residential properties beyond. The area is used by dog-walkers and playing children; there is a children's play area and a bowling green located to the south.
15	Amenity grassland area on the left bank of the river, located behind the existing earth embankment. The area has an obstacle course running alongside the embankment and a row of ornamental broadleaved trees.
16	Small area of amenity grassland with scattered specimen trees, west of the river and landward of the embankment. Tree species here include Scots pine, copper beech and firs.
17	Parkland on the right bank with a row of semi-mature sycamore trees at the entrance and improved grassland throughout. The area is well-used by the local community.
18	10-20m band of semi-natural broadleaved woodland south of the A525 bridge on the right bank of the river, comprising alder, horse chestnut and sycamore. There are a number of mature specimens of black poplar on the edge of this woodland block, of significant size, structure and ecological value.
19	Block of young plantation broadleaved trees with rank grassland and tall ruderal vegetation. The mix of trees includes ash, wild cherry and rowan with cocksfoot, foxtail, common knapweed and common nettle beneath.
20	Narrow band of broadleaved trees alongside the top of the left bank, dominated by alders. This section includes a well-trodden footpath and is heavily disturbed as a result.
21	Drainage channel which outfalls into the Afon Elwy. The channel is concrete lined and has no in-channel vegetation of any note. There was no water present at the time of survey and the channel appears to receive surface water drainage from the town. Surrounding vegetation is a mix of scattered bramble scrub and tall ruderals.
22	Football pitch comprising well-managed short sward grassland. There is a patch of Himalayan balsam adjacent to the northwest corner of the pitch.
23	Arable land at the southern end of the survey area, under crop at the time of survey.
24-27	Ponds – could not be accessed.
28	Stand of Japanese knotweed on the right bank of the Afon Elwy, approximately 5m x 5m in size.
29	Improved pasture immediately south of the survey area, used for grazing horses, with scattered bramble and gorse scrub and a patch of dense scrub on the flood bank adjacent to the survey section.
30	Left hand bank of the river is dominated by alder and crack willows at the river bank, with rank improved grassland behind on the flood bank.

Target Number	Note (see Appendix A for plans)
31	Flood embankment, comprised of rank grasses and tall ruderals which are particularly dominant behind the embankment. There are a number of scattered mature trees which line the adjacent field boundary.
32	Inside bank of a meander in the river, dominated by a bed of common reed.
33	Garden / community allotments with numerous poly-tunnels, sheds and cultivated areas.
34	Area of rank vegetation dominated by tall ruderals to the rear of the nearby Dol Afon farmstead. The Ordnance Survey map shows a ford for vehicles but this appears to be no longer present.
35	Fenced section of the flood embankment where a minor lane runs parallel and immediately adjacent to it. The river corridor is comprised of hawthorn, sycamore, wych elm and bramble and generally lacks any mature tree specimens.
36	Semi-natural broadleaved woodland borders the landward side of the lane, dominated by hawthorn and sycamore with extensive ivy coverage on the ground and lower trunks. The woodland is on a steep embankment, into which a mammal hole was observed to have been dug, with extensive excavated material in a large spoil heap outside the hole entrance. Access to inspect the hole was not possible due to dense vegetation cover. A pathway runs out of the southern tip of the wood into the adjacent grassland field.
37	Flood embankment comprises scattered broadleaved trees and scrub beneath on the river side. The landward side is fenced and comprises amenity grassland which is managed and well-kept, looking neat and tidy at the time of survey.
38	Improved pasture dominates the habitat landward of the flood embankment along the right hand bank, grazed by sheep at the time of survey.
39	Vehicle track allowing access from the main road onto the left hand bank and a footbridge. Adjacent land use is a mix of arable and grazing pasture.
40	Northern extent of the proposed scheme; right hand meander loop, with exposed shingle and gravel at the foot of the flood embankment and improved grassland on the embankment itself.
41	Pond 5, located adjacent to Pentre-uchaf farmyard. Could not be accessed at time of survey.
42	Pond 6, located near to Pentre-isaf beside a dismantled railway. Could not be accessed at time of survey.

3.3 Protected Species

(a) Amphibians

According to the OS map there are six ponds within 250m of the scheme, none of which could be accessed at the time of surveys.

These ponds are located within arable habitat to the west of the scheme, in residential areas to the east and in adjacent to a farmyard to the northeast. The north-western ponds (TN24 & 25) have very poor habitat connectivity to the scheme, being on the far side of the A525 dual carriageway. The eastern two ponds (TN 26 & 27) are well connected to the route, being located within woodland which runs alongside the riverside footpath. The northeast ponds (TN 41 & 42) are poorly connected to the river corridor as short-grazed grassland, a farmyard and minor tarmac roads block the way, whilst the field boundaries are predominantly just stock-proof fences.

From aerial imagery of the ponds, all appear to be potentially suitable for great crested newts (GCN). The predominantly arable land around the north-western ponds and pastoral land around the north-eastern ponds detracts from their value to GCN, but these habitat types can still support the species, albeit in low density. The other two ponds both appear to be garden ponds of decent sizes, with the most likely constraint to GCN being the presence of fish.

The terrestrial habitat within the survey area is generally considered to be quite poor for GCN, comprising predominantly of amenity or improved grassland of poor structure and with heavy disturbance. However, there are GCN records within St Asaph and GCN are known to be widespread in Denbighshire.

(b) Badgers

There is very little habitat present within the southern part of the survey area which could provide shelter or sett-building opportunities for badgers. The main area of potential habitat is the woodland around the embankments of the A55, particularly on the right bank of the river where there is semi-natural woodland as well as plantation. However, the A55 is a major road and there is a significant road mortality risk associated with this location.

There is also a significant level of disturbance throughout the southern part of the survey area as a result of footpaths which run along both banks of the Afon Elwy.

Much of the habitat does however, provide good foraging opportunities. The arable fields, grassland, woodland and patchy scrub, all offer prey items suitable for badgers.

The northern 750m section of the survey area is much more suited to badgers as it comprises a mix of woodland, scrub and tall ruderal habitats. The right embankment corridor in this section is wider than in the other sections and there is no public right of way, meaning there is less human disturbance.

A single hole sett was found within the wooded embankment adjacent to the access road leading to Pentre-uchaf (Target Note 36), approximately 100m from proposed embankment works. The sett could not be inspected closely due to restricted access but the entrance was of a suitable size and shape for badger and there was a large spoil heap outside. A pathway ran down from the hole and into the adjacent improved grassland. Although no definitive evidence of badger was found it is still considered likely that the hole is a badger sett.

No other evidence was found of badgers during the site surveys. The species is considered likely absent from the three southern sections.

(c) Bats

All trees with ivy are assigned to Bat Roost Potential (BRP) Category 2 (Hundt et al, 2012). In the majority of cases the ivy cover is sufficient to offer roosting habitat for individual bats as day roosts. The ivy cover also has the potential to cover other features suitable for roosting, such as rot holes, cracks and splits in the trunk and branches.

A number of trees were identified as having additional features other than moderate ivy cover that could support roosting bats. These trees are mapped on the Phase 1 Habitat plans (Appendix A) and are detailed in Table 3.3 below.

Table 3.3 Bat Roost Potential (BRP) Trees⁽¹⁾

Tree ID	BRP Features	BRP Category
1	Crack willow with a large split at approximately 5m height	1
2	Alder with dense ivy cover	2 - 1
3	Alder with dense ivy and extensive die-back	1
4	2 x crack willows, both with dense ivy cover and one with extensive die-back	1
5	Sycamore with extensive ivy cover	2 - 1
6	Alder with dense ivy cover	2 - 1
7	Ash with dense ivy cover	2 - 1
8	Ash with dense ivy cover	2 - 1
9	Hybrid black poplar with dense ivy cover and a number of knot holes	1*
10	Crack willow with dense ivy cover	2 - 1
11	3 x dead specimens, one with ivy cover	1
12	Sycamore with ivy cover and a number of knot holes	1
13	Ash with dense ivy cover	2 - 1
14	Ash with ivy cover and a number of knot holes	1
15	Sycamore with dense ivy cover	2 - 1
16	Crack willow with dense ivy cover	2 - 1
17	Crack willow with dense ivy cover	2 - 1
18	Alder with dense ivy cover	2 - 1
19	2 x larch, both with dense ivy, one with extensive die-back	1
20	Hybrid black poplar with dense ivy cover and numerous knot holes	1*
21	Horse chestnut with dense ivy cover	2 - 1
22	Sycamore with a bat box attached and some staining showing evidence of possible bat use	1*
23	Cluster of 5 x hybrid black poplars with ivy cover	1*
24	Alder with a number of knot holes	1
25	Mature crack willow with a divide at ~1m resulting in two large trunks with a number of splits noted.	1
26	Mature ash with a number of split and damaged limbs and branches.	1
27	Cluster of three specimens on the left hand bank of the Afon Elwy; an ash and two sycamore with some ivy cover and a few holes in trunks.	2 - 1
28	Sycamore with some damage to trunk and a couple of holes at mid-height.	2 - 1
29	Mature multi-stemmed crack willow with dense ivy cover and lots of trunk damage up to 5m height.	1*
30	Mature and multi-stemmed crack willow with occasional holes in the larger stems.	2 - 1
31	Crack willow on left hand bank of Afon Elwy, with dense ivy cover to 5m height and at least one split in the main trunk.	1

(1) Excludes trees with just moderate ivy cover which are all Category 2

The likely foraging and commuting value of the riparian corridor is very high. The corridor provides a mature, extensive and continuous band of semi-natural woodland, running water and shrub-layer which is likely to support a high volume of invertebrate prey items. The river corridor is also well connected to the adjacent field boundary network, allowing commuting and dispersal across the wider landscape.

Bridges and walls within the scheme area were assessed and had no potential. In particular it is noted that mortar lines on the St Asaph Bridge had recently been repaired and therefore offered no bat roosting potential.

(d) Birds

The survey area includes habitats considered to be of relatively high value to breeding birds and therefore likely to support a diverse assemblage. The main species assemblages are likely to be found within the riparian trees and wooded corridor, as well as within adjacent habitats such as woodland, parkland, arable, residential and the WTW.

During the non-breeding period the survey area is likely to be of some interest for waterfowl on the Afon Elwy and for winter thrushes and finches in the parkland, trees and woodland fringes.

Birds recorded during the survey visits included goldfinch, long-tailed tit, jay, grey heron and goosander.

(e) Otter

A number of otter spraints (old and new) were found throughout the survey area confirming that otters pass through the area. Grid references are given as follows;

- SJ 031 750 – beneath bridge over Afon Elwy leading to Spring Gardens Caravan Park.
- SJ 034 748 – on a log within the Afon Elwy beneath the A55.
- SJ 034 745 – boulder beside the west bank of the Afon Elwy, beneath a footbridge.
- SJ 035 738 – in-channel boulder near the west bank of the Afon Elwy.

No suitable den or holt sites were found within the survey area. In general the area is considered likely to be too heavily disturbed as a result of level of amenity use and access along the full length of both banks of the riparian corridor.

(f) Water vole

The Afon Elwy is assessed to be unsuitable for water voles given the poor bankside vegetation cover, structure and composition. The high level of human disturbance, the gentle gradients of the banks and their rocky composition all add to the sub-optimal nature of the site for the species.

There is a single tributary channel flowing into the Afon Elwy, at the southern end of the scheme (Target Note 21). The channel has been canalised and comprises a concrete bed and concrete slabs on the banks, with no in-channel or bank-side vegetation as a result. The tributary is assessed to be unsuitable for water voles.

(g) Reptiles

The habitats present within the survey area offer a poor structure for reptiles, being either sparsely vegetated and heavily disturbed, a uniform sward height and composition or else heavily shaded woodland.

The likelihood of reptiles being present is considered to be very low as there is very little low-disturbance semi-natural habitat within the survey area. There are however, desk study records of slow worm, grass snake, and common lizard in the wider study area.

(h) Other Notable Species

There may be diverse and/or notable assemblages of invertebrates found within the survey area, particularly associated with sections of the riparian corridor and marginal habitats, or with the numerous mature trees within the riparian corridor and parkland in the southern section of the scheme.

The Afon Elwy is likely to support a notable fisheries interest, which may include notable migratory species including salmonids, eel and lamprey. A number of bullhead were seen in the channel during the walkover survey – a species indicative of good water quality.

White-clawed crayfish may also be found present within the Afon Elwy. The in-channel habitat is considered to be potentially suitable for the species, comprising extensive areas of cobble bed and banks comprising rocky areas and boulders providing suitable refuges.

4. DISCUSSION

4.1 Designated Sites

As there are no designated sites located within 2km of the scheme, there should be no direct impacts posed to any such sites.

There are no downstream sites beyond 2km of the survey area until the river outfalls into Kinmel Bay, therefore no downstream / indirect impacts are anticipated to arise as a result of the scheme.

4.2 Habitats

The following habitats found within the survey area are found on the Section 42 List of the NERC Act, highlighting them as priority habitats for conservation within Wales and a material consideration for local planning authorities determining planning applications (*Borough value*):

- Wood pasture & parkland
- Lowland mixed deciduous woodland
- Rivers

The tree-lined riparian corridor is also considered to be an important habitat within the survey area (*Local value*).

It is anticipated that there will be some degree of adverse impact on the tree-lined corridor, woodland and river habitats. These impacts should be avoided or minimised and mitigated where possible. Compensatory habitat may be required e.g. tree planting.

Himalayan balsam and Japanese knotweed are found along the river corridor plus there are records of New Zealand pygmyweed and monkey-flower. An invasive species management plan will be required at the construction stage to prevent further spread of these species.

4.3 Protected Species

(a) Amphibians

St Asaph and the surrounding area is known to support GCN. It has not been possible to access any of the six ponds located within 250m of the survey area, or to fully assess their suitability for GCN (*Value unknown*).

There is moderate connectivity between ponds and the river corridor near the central portion of the scheme. However, the two ponds in this area are themselves isolated from any other ponds and from semi-natural habitats outside of St Asaph.

It is recommended that access permission is obtained to allow surveyors to fully inspect all ponds within at least 250m, ideally 500m, of the scheme and to conduct a Habitat Suitability Index (HSI) appraisal of each (Oldham et al 2000). Further full GCN survey may be required if the HSI score suggests suitable breeding habitat for the species and the scheme may have impacts on potential associated terrestrial habitat.

GCN are fully protected under the Wildlife and Countryside Act 1981 (as amended). GCN are also afforded additional protection under The Habitats and Species Regulations 2010 (as amended). A licence is required to harm or disturb GCN or to damage or destroy their habitat. The species is also found on the Section 42 list of the Natural Environment and Rural Communities Act 2006 (NERC).

(b) Badgers

A single hole badger sett has been identified within 30m of the right embankment of the Afon Elwy. The sett could not be inspected fully at the time of survey due to restricted access into the woodland from the adjacent lane (*Local value*).

The construction footprint is not more than 10m from the sett location, therefore there is a high likelihood that significant disturbance would be caused to the sett and any badgers within it during construction. Only with very careful construction methods could this disturbance be avoided. A pre-construction survey is recommended to confirm that the sett is in active use by badgers and to subsequently determine the level of badger activity in the surrounding area so that the likely impacts can be accurately assessed against the detailed scheme.

Badgers are protected under the Protection of Badgers Act 1992 from taking, killing or injuring and their setts are protected from interference including damage, destruction or obstruction. Badgers are also protected from disturbance whilst in occupation of a sett. A license is required for any activities which contravene this protection, which can be obtained from Natural Resources Wales. The license is likely to require the exclusion of all badger setts within the anticipated zone of disturbance, usually taken as a 30m radius. Exclusions should be undertaken during the period July to November inclusive only and take a minimum of 21 days to complete.

The poor value habitat, lack of field signs and high level of human activity and associated disturbance in the southern portion of the survey area close to St Asaph, means that badgers are considered unlikely to be present.

(c) Bats

There are 31 trees within the survey area assessed to be of BRP Category 2 or better. There are in excess of 100 trees within the riparian corridor with ivy cover which have been automatically rated as being of BRP Category 2, with the potential for this rating to go up or down (*Local to Regional value*).

Tree loss is the most significant potential impact on roosting bats associated with the scheme. At the time of writing it is uncertain as to the extent of tree loss arising from the scheme. Design should look to minimise loss of trees with BRP and any BRP trees proposed to be felled or lopped will require further survey work to be undertaken in relation to roosting bats

All bats and bat roosts are fully protected under the Wildlife and Countryside Act 1981 (as amended). Bats are also afforded additional protection under The Habitats and Species Regulations 2010 (as amended). A licence is required to destroy, disturb or obstruct access to a bat roost or bats using any such roost.

The riparian corridor has also been identified as a high value feature for foraging and commuting bats (*Local to Regional value*). The scheme design should seek to minimise the degradation of the corridor or its function as foraging or commuting habitat for bats. Any significant impacts will require mitigating and compensating (e.g. replacement planting).

Construction lighting will need to be designed so as not to pollute the river corridor. It is not envisaged there will be any operational lighting.

Opportunities to enhance the value of the survey area for bats should be considered, including the installation of bat boxes, shrub planting beneath and between the riparian trees and further tree planting.

(d) Birds

Nesting birds are protected during the nesting period under the Wildlife and Countryside Act 1981 (as amended). In addition, a number of species which may be present within the survey area are included on the Section 42 list of the NERC Act, including reed bunting, spotted flycatcher, willow tit, bullfinch and song thrush (*Local to Borough value*).

The scheme has the potential to adversely impact breeding birds through the permanent and/or temporary loss of semi-natural habitats suitable for nesting, including riparian trees.

Site clearance will need to be timed outside the breeding season.

Enhancement opportunities which may be delivered as part of the scheme include the installation of a targeted nest box scheme for those Section 42 listed species.

(e) Otter

The most likely impacts to otter as a result of the scheme will be disturbance effects during the construction period. There may also be permanent operational effects such as loss of habitat and potential access restrictions beneath any new bridges or other structures.

Disturbance impacts should be adequately covered by a selection of Reasonable Avoidance Measures such as works avoiding periods around dusk and dawn and directional lighting.

A pre-construction survey should be undertaken to confirm the absence of any den or holt sites within 100m of the required working area. If any such site is found then a licence is likely to be required as the species is fully protected under the Wildlife and Countryside Act 1981 (as amended) and The Habitats and Species Regulations 2010 (as amended). The otter is also on the Section 42 list of the NERC Act.

While the otter has a national value due to its statutory protection, given the lower value of habitat through St Asaph, the scheme area is considered to be of *Borough* value for otters unless a holt is found pre-construction.

Mitigation or enhancement opportunities for otter as part of the scheme may include the provision of artificial holt or den sites in a suitably quiet and

undisturbed location near to the water-course. General habitat enhancement measures along the riparian corridor would also benefit otters.

(f) Water vole

Water voles are considered to be absent from the survey area as none of the water-courses are deemed to be suitable to support the species.

(g) Reptiles

Reptiles are considered to be likely absent from the survey area as none of the habitats present are deemed to be suitable to support the species. However, records indicate that four species of reptile have been known to occur in habitat within 1km of the riparian corridor. Further consideration as to the occurrence of the species should be given when the footprint of all construction activity has been determined.

(h) Other Notable species

The data search identified a significant fisheries interest associated with this stretch of the Elwy, namely for migratory eel, lamprey, and Atlantic trout.

There are no records of white-clawed crayfish within this stretch of the Afon Elwy, although this may be due to the absence of survey data rather than species absence. Further survey effort may be required to determine their current status if in-channel works are likely to be required during the construction of the scheme.

Any in-channel works associated with the scheme would have the potential to adversely affect fisheries interests (*Regional value*) and white-clawed crayfish (*Value unknown*) which may be present within the Afon Elwy. Removal of over-hanging vegetation could also affect their habitat.

5. CONCLUSION

A preliminary ecological appraisal of the Afon Elwy and surrounding habitat through St Asaph, Denbighshire, has been carried out as part of the St Asaph FRMS. NRW are investigating the options for flood risk management in response to flood events in 2012.

The appraisal included a desk study, Extended Phase 1 Habitat survey and consideration of the broad impacts which are likely to be associated with a flood risk management scheme.

No designated sites for nature conservation are present within 2km of the survey area.

The most notable habitats within the survey area are the tree-lined riparian corridor of the Afon Elwy and woodland blocks. Protected species potential includes GCN, badgers, roosting and commuting bats, nesting birds, otters, white-clawed crayfish and fisheries interests. Records also indicate the presence of reptiles within 1km of the survey area but habitat within the likely scheme area is poor. Water voles have been scoped out of any further detailed assessment due to lack of habitat suitability. Himalayan balsam and Japanese knotweed occur along the river corridor, and two other non-native invasive species of flora (New Zealand pygmyweed and monkey-flower) have been identified through desk study.

At the time of writing there are a number of design options being considered and developed in St Asaph for the purpose of flood risk management, therefore specific impacts could not be identified or considered. However, the most likely significant impacts associated with such works would be the loss of mature riparian trees and other vegetation (of value to bats, birds and otter), the disturbance to otters and badgers during construction activity and the damage to channel habitat (of potential value to fisheries and white-clawed crayfish).

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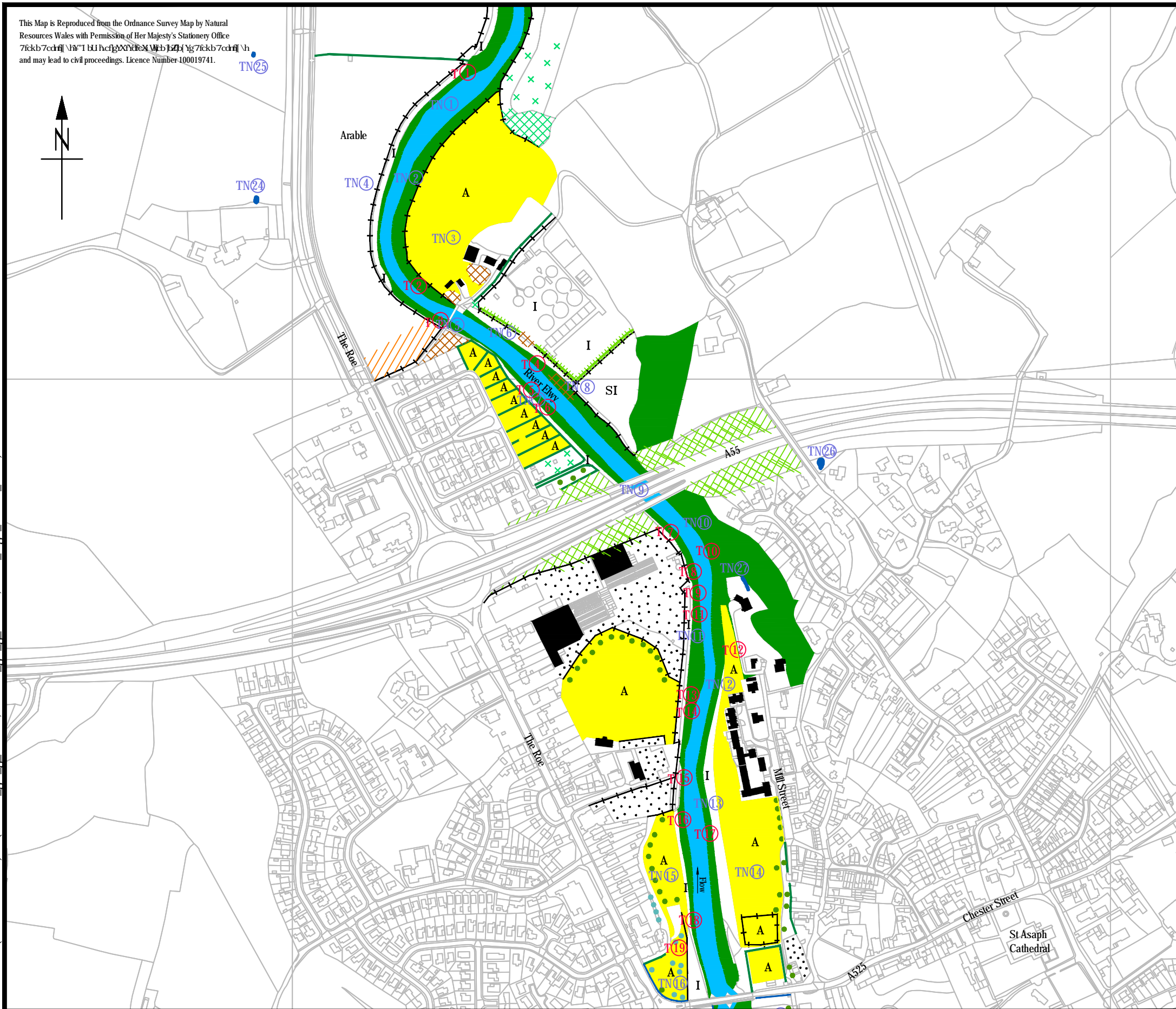
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APPENDICES

APPENDIX A: FIGURE 1 – PHASE 1 HABITAT MAP

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KEY

WOODLAND AND SCRUB

- BROADLEAVED SEMI-NATURAL WOODLAND
- BROADLEAVED PLANTATION WOODLAND
- SCATTERED BROADLEAVED TREE
- SCATTERED CONIFEROUS TREE
- CONTINUOUS SCRUB
- SCATTERED SCRUB
- INTRODUCED SHRUB

GRASSLAND AND MARSH

- TALL RUDERAL VEGETATION
- IMPROVED GRASSLAND
- SPECIES POOR SEMI-IMPROVED GRASSLAND
- RUNNING WATER
- STANDING WATER

MISCELLANEOUS

- AMENITY GRASSLAND
- TARGET NOTES
- TREES SUITABLE FOR BAT ROOSTING (1)

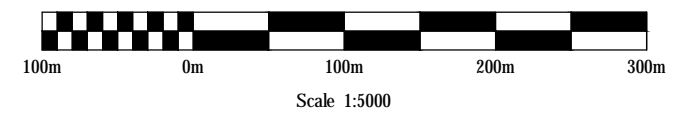
BOUNDARIES

- INTACT HEDGE (SPECIES-POOR)
- INTACT HEDGE (CONIFEROUS)
- HEDGE AND TREES (SPECIES-POOR)
- FENCE
- WALL

BUILT UP AREAS

- BUILDING
- BARE GROUND

(1.) Also >100 trees with bat roost potential due to ivy cover.



Note : The scale ratios defined in this drawing apply when printed at A3-size only

Rev.	Nature of revision	Drawn	Check	Review	Approved	Date	Approved	Name	Date
A	FOR ISSUE	NEs	HMB	NSt	NSt	29.JUL.15	Reviewed:	NSt	29.JUL.15
							Drawn:	NEs	28.OCT.14
							Checked:	HMB	29.JUL.15

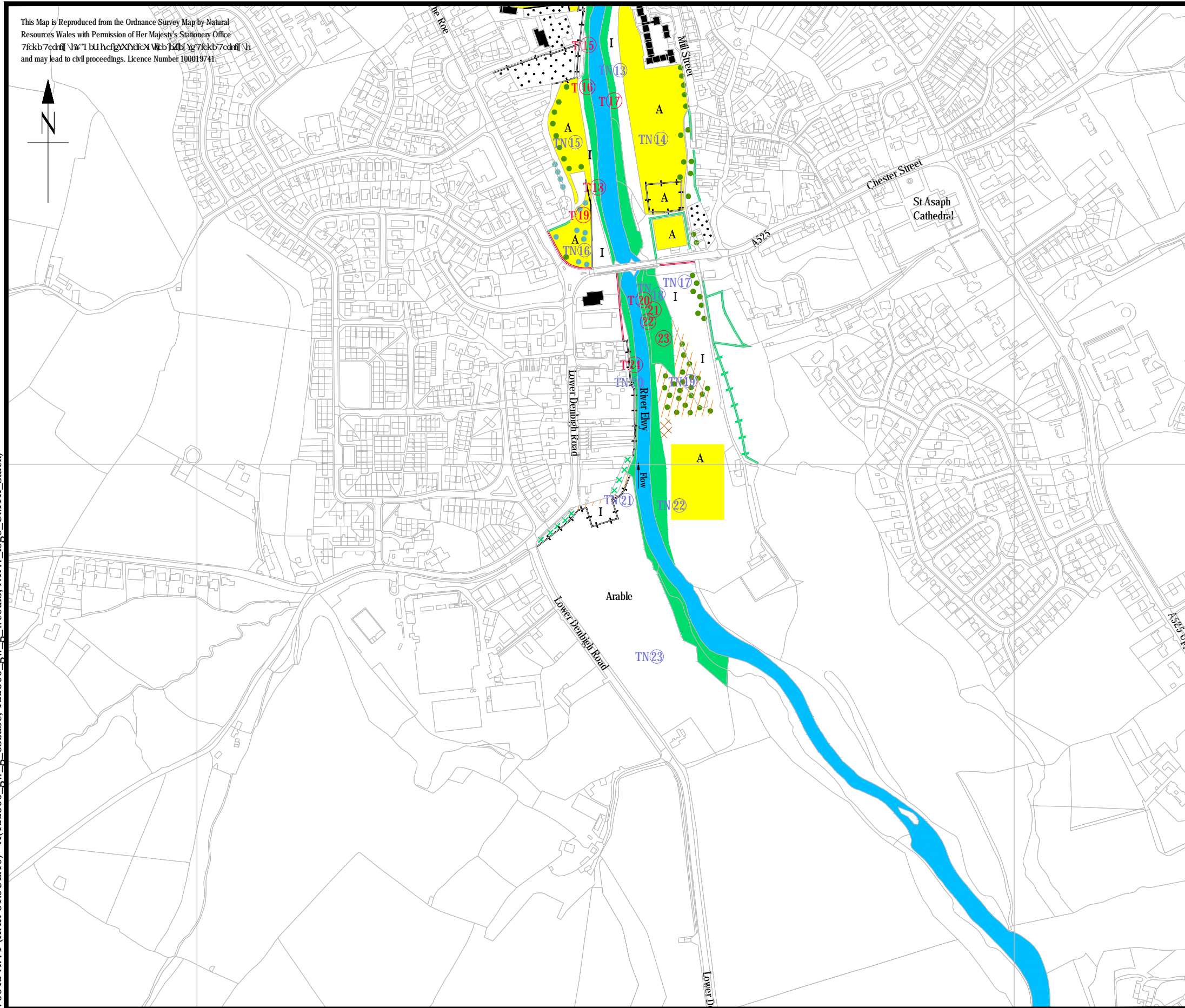
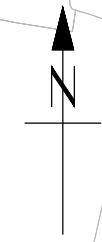
**ST ASAPH FRMS
PHASE 1 HABITAT SURVEY PLAN
SHEET 1 OF 2 (NORTH)**



Drawing no.
122366-70041

122366/50/50.0201/122366-70041-A.V1 (HAR 31.JUL.15) - X(122366_gw_g_osbase, 122366_gw_g_wcours, NRW_logo_CMYK_stack)

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KEY

WOODLAND AND SCRUB

- BROADLEAVED SEMI-NATURAL WOODLAND
- SCATTERED BROADLEAVED TREE
- SCATTERED CONIFEROUS TREE
- CONTINUOUS SCRUB
- SCATTERED SCRUB
- INTRODUCED SHRUB

GRASSLAND AND MARSH

- TALL RUDERAL VEGETATION
- IMPROVED GRASSLAND
- SPECIES POOR SEMI-IMPROVED GRASSLAND
- RUNNING WATER

MISCELLANEOUS

- AMENITY GRASSLAND
- TARGET NOTES
- TREES SUITABLE FOR BAT ROOSTING (1)

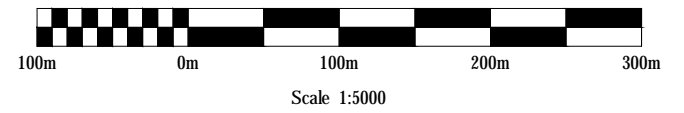
BOUNDARIES

- INTACT HEDGE (SPECIES-POOR)
- INTACT HEDGE (CONIFEROUS)
- HEDGE AND TREES (SPECIES-POOR)
- FENCE
- WALL

BUILT UP AREAS

- BUILDING
- BARE GROUND

(1.) Also >100 trees with bat roost potential due to ivy cover.




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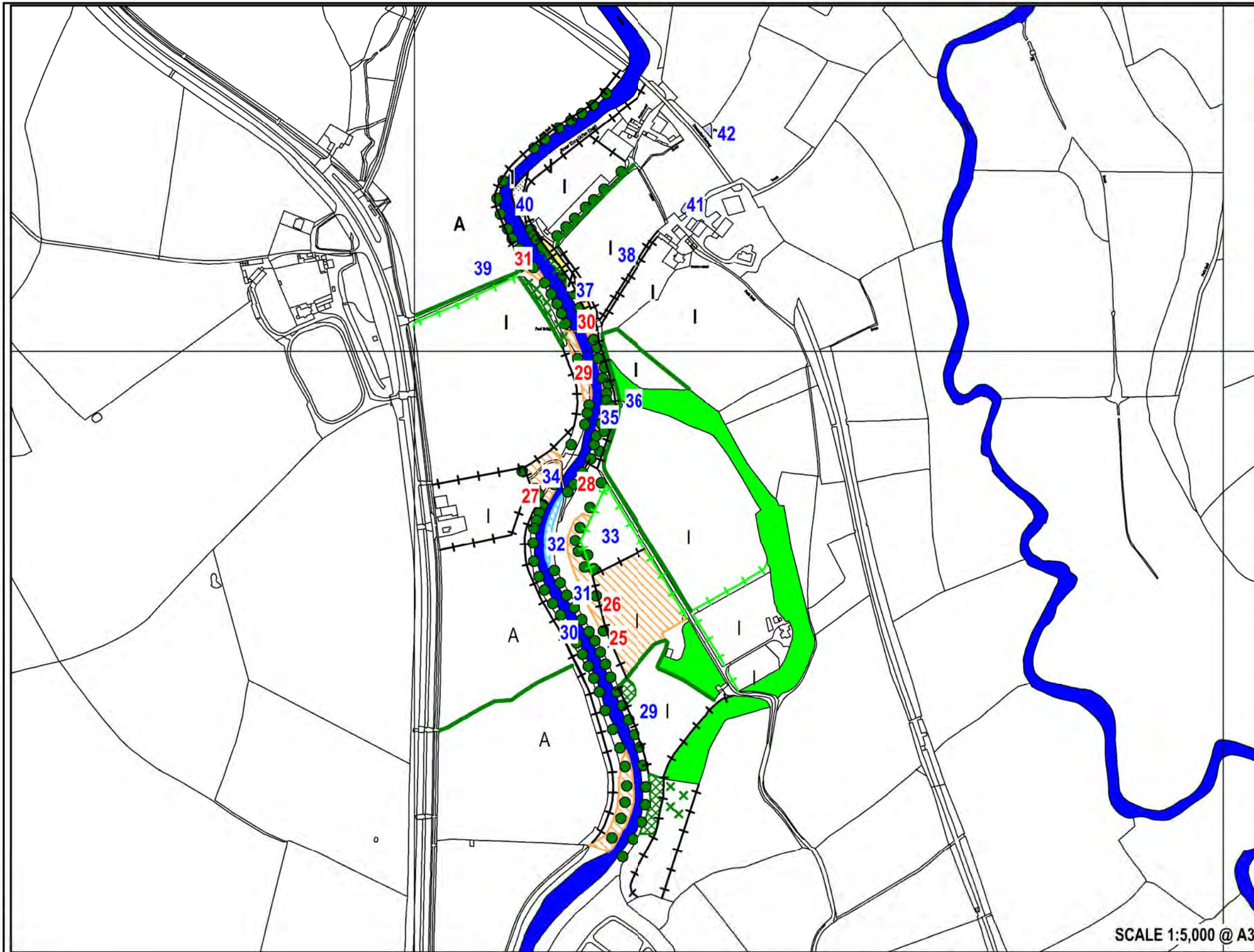


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Rev.	Nature of revision	Drawn	Check	Review	Approved	Date	Approved	Date
A	FOR ISSUE	NEs	HMB	NSt	NSt	29.JUL.15	Reviewed: NSt	29.JUL.15
							Drawn: NEs	28.OCT.14
							Checked: HMB	29.JUL.15

ST ASAPH FRMS	
PHASE 1 HABITAT SURVEY PLAN	
SHEET 2 OF 2 (SOUTH)	
	Drawing no. 122366-70042



- Key**
- BROADLEAVED SEMI-NATURAL WOODLAND
 - SCATTERED BROADLEAVED TREE
 - SCATTERED SCRUB
 - TALL RUDERAL
 - RUNNING WATER
 - POND
 - BARE GROUND
 - DENSE SCRUB
 - INUNDATION VEGETATION
 - AMENITY GRASSLAND
 - HEDGE AND TREES (SPECIES-POOR)
 - INTACT HEDGE (SPECIES-POOR)
 - FENCE
 - 01 TARGET NOTES (TN28 - 42)
 - 01 TREES SUITABLE FOR BAT ROOSTING (T25-31)
 - A ARABLE
 - I IMPROVED GRASSLAND

SCALE 1:5,000 @ A3



Note: The scale ratios defined in this drawing apply when printed at A3 size only

Rev.	Nature of revision	Drawn	Check	Review	App'd	Date	Approved	Name	Date
A	Final Issue	NG	HMB	NSt	NSt	07/15	Reviewed:	NSt	31/07/15
							Checked:	HMB	31/07/15
							Drawn:	NG	31/07/15

ST ASAPH FRMS PROJECT APPRAISAL

PHASE 1 HABITAT SUVEY PLAN SHEET 3 (DOWNSTREAM)



A GALLIFORD TRY, BLACK & VEATCH JOINT VENTURE

DRAWING NO. 122366 - 70043

APPENDIX B: SITE PHOTOGRAPHS

	
<p>Caravan park at Target Note 3</p>	<p>Embankment between WTW and Afon Elwy</p>
	
<p>Himalayan balsam, present throughout</p>	<p>A55 road bridge over Afon Elwy</p>
	
<p>Tree-lined riparian corridor</p>	<p>Public open space beside Afon Elwy</p>
	
<p>Football pitch on east bank of Afon Elwy</p>	<p>Otter spraint on the Afon Elwy</p>
	
<p>Right embankment in northern sector</p>	<p>Badger sett in woodland on right of lane</p>