High Speed Two Phase 2a (West Midlands - Crewe)

Background Information and Data

Supplementary ecological baseline data
(BID-EC-004-000)

March 2018

G33

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Department for Transport

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1 Introduction

1.1.1 This document is an appendix, which forms part of the Background Information and Data (BID) documents that accompany the Supplementary Environmental Statement (SES) and Additional Provision Environmental Statement (AP ES).

1.1.2 This report details supplementary ecological baseline data not reported in the BID[1] documents that accompanied the High Speed Rail (West Midlands - Crewe) Environmental Statement (ES)[2] published in July 2017 (the main ES). This report should be read in conjunction with SES and AP ES Volume 2 (community area reports), Volume 3 (route-wide effects) and Volume 5: Appendix EC-002-000 and Volume 5: Appendix EC-003-000. In addition, this report should be read in conjunction with the following BID documents that accompanied the main ES:

- BID-EC-002-000, Ecological baseline data - phase 1 habitat survey;
- BID-EC-005-000, Ecological baseline data – hedgerows;
- BID-EC-007-000, Ecological baseline data - amphibian and pond surveys;
- BID-EC-009-000, Ecological baseline data - breeding and wintering birds;
- BID-EC-010-000, Ecological baseline data – otter and water vole; and
- BID-EC-012-000, Ecological baseline data - bats.

1.1.3 This document covers the following community areas (CAs):

- CA1: Fradley to Colton;
- CA2: Colwich to Yarlet;
- CA3: Stone and Swynnerton;
- CA4: Whitmore Heath to Madeley; and
- CA5: South Cheshire.

1.1.4 Maps referred to in this appendix are contained in the BID Map Series EC-02, EC-04, EC-05, EC-10, EC-11 and EC-12, which accompany the SES and AP ES. The ecological assessment is detailed in the SES and AP ES:

- Volume 2, Community area reports;
- Volume 3, Route-wide effects; and
- Volume 5, Appendices.

[1] HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data*, www.gov.uk/hs2.
[2] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe) Environmental Statement*, https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement.

1.1.5 Baseline data in this document is reported for the following ecological aspects and species:

- habitats;
- bats;
- birds;
- hedgerows;
- great crested newt;
- otter; and
- water vole.

1.1.6 Supplementary baseline badger data not reported in the BID documents that accompanied main ES is provided in appendix BID-EC-005-000, which accompanies the SES and AP ES. This report is not publically available.

1.1.7 In this report the scheme is referred to as the AP revised scheme, which is the original scheme (i.e. the Bill scheme submitted to Parliament in July 2017, which was assessed in the main ES) as amended by the SES changes and AP amendments.

2 Habitats

2.1 Introduction

2.1.1 This section of the appendix details supplementary ecological baseline data relating to habitats not reported in the BID documents that accompanied the main ES. It should be read in conjunction with BID document BID-EC-002-000[3], which accompanied the main ES.

2.2 Methodology

2.2.1 Details of the standard methodology used for extended Phase 1 habitat surveys are provided in the Technical note – Ecology and biodiversity – Ecological field survey methods and standards, which is included within Volume 5: Appendix CT-001-002 of the main ES[4].

2.2.2 The scoping, desk study exercises and surveys reported in the main ES can be found in BID-EC-002-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since production of the main ES.

2.3 Deviations, constraints and limitations

2.3.1 Phase 1 habitat surveys were conducted between January and March, and September and October 2017. Where access restrictions meant that survey was not possible, or incomplete, the survey findings were determined from aerial imagery.

2.4 Baseline

Fradley to Colton (CA1)

2.4.1 Approximately 43% of the area of land required for the construction of the AP revised scheme and within a 250m buffer from this boundary have been subject to Phase 1 habitat survey in the Fradley to Colton area prior to the end of October 2017.

2.4.2 The Fradley to Colton area comprises a large proportion of agricultural land, with scattered small woodlands, farmsteads and villages. The topography is relatively level across the River Trent floodplain near Kings Bromley and undulating north-west of Hill Ridware and south-west of Blithfield Reservoir.

2.4.3 Descriptions of the habitat types that have been subject to Phase 1 habitat survey, to verify the assumed baseline reported in BID-EC-002-000 (i.e. ground-truthed[5]), are provided below.

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[3] HS2 Ltd (2017), High Speed Two (HS2) Phase 2a (West Midlands - Crewe), *Background Information and Data, Ecological baseline data – phase 1 habitat survey, BID-EC-002-000*. www.gov.uk/hs2.

[4] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe), Environmental Statement Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-002*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.

[5] In the absence of access for the main ES an assumed baseline was assessed based on aerial photography. Additional Phase 1 surveys have been undertaken which have ground truthed previously aerial assessed areas.

Woodland

2.4.4 Three types of woodland habitat have been identified through ground-truthing surveys, comprising semi-natural broad leaved woodland, plantation broadleaved woodland and plantation mixed woodland, these are described below.

2.4.5 Semi-natural broadleaved woodland qualifies as lowland mixed deciduous woodland, a habitat of principal importance in Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)[6] and a conservation priority of the Staffordshire Biodiversity Action Plan[7] (BAP). Three areas of semi-natural broadleaved woodland, located within the land required for construction of the AP revised scheme have been additionally ground-truthed. These are:

- an un-named woodland (LP2060[8]) is located south of Quinton's Orchard, north-east of Hill Ridware;
- an un-named woodland (LP2330) is located south of Bank Top Farm, east of Colton. The woodland is dominated by pendunculate oak (*Quercus robur*); and
- an un-named woodland (LP2330) is located north-west of New Barn, south of Colton. The woodland is dominated by pendunculate oak and within the field layer, bramble (*Rubus fruticosus* agg.) is abundant.

2.4.6 An area of plantation broadleaved woodland, located adjacent to the land required for the construction for the AP revised scheme, has been additionally ground-truthed in one area. An un-named woodland (LP17415), located south-east of Colton Hall Farm, comprises holly (*Ilex aquifolium*), sweet chestnut (*Castanea sativa*), horse chestnut (*Aesculus hippocastanum*), lilac (*Syringa vulgaris*), Norway maple (*Acer platanoides*), sycamore (*Acer pseudoplatanus*), cherry (*Prunus avium*), field maple (*Acer campestre*), hazel (*Corylus avellana*), beech (*Fagus sylvatica*), downy birch (*Betulus pubescens*), rowan (*Sorbus aucuparia*), spindle (*Euonymus europaea*) and ash (*Fraxinus excelsior*). The field layer comprises wood-avens (*Geum urbanum*), common nettle (*Urtica dioica*) cow parsley (*Anthriscus sylvestris*), hedge bindweed (*Calystegia sepium*) and bramble.

2.4.7 An area of plantation mixed woodland, located within the land required for the construction for the AP revised scheme, has been additionally ground-truthed. An un-named woodland (LP17415), located south-west of Colton Hall Farm, comprises European larch (*Larix decidua*), hazel, dog rose (*Rosa canina* agg.), ash, pendunculate oak, spindle, rowan, snowberry (*Symphoricarpos alba*), goat willow (*Salix caprea*) and the invasive species Japanese rose (*Rosa rugosa*).

Scrub

2.4.8 Scrub is present in strips and patches adjacent to field, woodland and watercourse margins within the ground-truthed areas of land required for the construction of the AP revised scheme. Scrub is also present near Quinton's Orchard to the north-west of Hill Ridware. The most frequently recorded plant species are bramble, dog-rose,

[6] *Natural Environment and Rural Communities Act 2006 (2006 CHAPTER 16)*. Her Majesty's Stationery Office, London.
[7] Staffordshire Biodiversity Partnership (1998). *Staffordshire Biodiversity Action Plan*. http://www.sbap.org.uk/.
[8] Land parcel reference number.

hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*) and elder (*Sambucus nigra*).

Hedgerows

2.4.9 Hedgerows that comprise 80% native woody species qualify as a habitat of principal importance. Details of additionally ground-truthed hedgerows that are 'Important'[9], and which are located within the land required for the construction of the AP revised scheme are provided in Section 5.

Parkland and scattered trees

2.4.10 A low density of standard trees are present in clusters and lines within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. Scattered trees are present near Quinton's Orchard, north-west of Hill Ridware. The most frequently recorded tree species are pedunculate oak, ash, sycamore, common lime (*Tilia* × *cordata*) and horse-chestnut.

Grassland and marsh

2.4.11 The most frequent grassland habitat types present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme are improved grassland and species-poor semi-improved grassland. Two areas of more floristically diverse semi-improved neutral grassland have been created from wildflower seed mixture and are not considered to be semi-natural or naturalised. These are:

- a 7m wide wildflower grassland strip around arable land (LP2020) is located to the north-west of Church Farm. The grassland has been enhanced with wildflower seed mixture, which includes: white campion (*Silene latifolia*); black nightshade (*Solanum nigrum*); scentless mayweed (*Tripleurospermum inodorum*); annual meadow grass (*Poa annua*); yarrow (*Achillea millefolium*); corn spurrey (*Spergula arvensis*); field speedwell (*Veronica persica*); shepherd's-purse (*Capsella bursa-pastoris*); common knapweed (*Centaurea nigra*); smooth tare (*Vicia tetrasperma*); pineappleweed (*Matricaria discoidea*); cut-leaved crane's-bill (*Geranium dissectum*); ox-eye daisy (*Leucanthemum vulgare*); meadow vetchling (*Lathyrus pratensis*); thyme-leaved speedwell (*Veronica serpyllifolia*); and meadow crane's-bill (*Geranium pratense*); and
- a 7m wide wildflower grassland strip around arable land (LP2020) is located to the east of Bentley Hall Farm. The grassland has been enhanced with wildflower seed mixture, which includes: red clover (*Trifolium pratense*); white clover (*Trifolium repens*); field pansy (*Viola arvensis*); greater bird's-foot trefoil (*Lotus pedunculatus*); smooth tare; yarrow; meadow crane's-bill; mouse-ear (*Cerastium fontanum*); cut-leaved crane's-bill; and field scabious (*Knautia arvensis*).

[9] Hedgerows that qualify as Important with The Hedgerows Regulations 1997 'Wildlife and Landscape' criteria

Watercourses

2.4.12 An additional watercourse, located within the land required for the construction of the AP revised scheme, was ground-truthed. Luth Burn Stream (LP2020) has a channel width of approximately 1.5m and water depth of 0.3m (at the time of survey). The watercourse contains fool's water-cress (*Apium nodiflorum*). The banks of the watercourse support trees, shrubs and rough grassland.

Water bodies

2.4.13 There are 14 water bodies[10] that were additionally ground-truthed. In total, there are 64 water bodies within the land required for the construction of the AP revised scheme in the Fradley to Colton area.

Arable and cultivated land

2.4.14 Arable land is present mainly in the form of large fields and this habitat type is extensively distributed within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. The surveyed arable fields are frequently bordered by hedgerows and trees. No notable plant species were recorded within arable headlands and margins.

Buildings and structures

2.4.15 A low density of isolated residential buildings and farmsteads are present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. The farmsteads mainly comprise barns, sheds and residential dwellings.

2.5 Summary of updated habitat types within the Fradley to Colton area

2.5.1 Table 1 provides a summary of the habitat type metrics within the land required for the construction of the AP revised scheme in the Fradley to Colton area.

Table 1: Habitat type metrics within the land required for the construction of the AP revised scheme in the Fradley to Colton area

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Semi-natural broadleaved woodland	7.4ha	10.5ha
Plantation broadleaved woodland	0.9ha	0.5ha
Plantation coniferous woodland	None	2.1ha
Semi-natural mixed woodland	None	0.6ha
Plantation mixed woodland	0.4ha	None
Scrub	1ha	1.4ha

[10] This includes standing water in pools, ponds, lakes, reservoirs and ditches.

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Intact native species-rich hedge	17.5km	23km
Intact species-poor hedge	7.9km	None
Defunct native species-rich hedge	1.9km	None
Defunct species poor hedge	1.9km	229m
Native species-rich hedge with trees	7.8km	265m
Species-poor hedge with trees	4.3km	65m
Parkland and scattered trees	0.3ha	None
Semi-improved neutral grassland	10.1 ha	6.9ha
Species-poor semi-improved grassland	7.7ha	1.1ha
Improved grassland	124ha	39.8ha
Amenity grassland	0.8ha	21.1ha
Marshy grassland	0.7ha	None
Watercourses	1.1km	None
Water-bodies	0.6ha	1.3ha
Arable and cultivated land	179.2ha	208.6ha

Colwich to Yarlet (CA2)

2.5.2 Approximately 58% of the area of land required for the construction of the AP revised scheme plus a 250m buffer from this boundary have been subject to Phase 1 habitat survey in the Colwich to Yarlet area prior to the end of October 2017.

2.5.3 The Colwich to Yarlet area consists mainly of agricultural land, woodlands, farmsteads and villages. The topography is undulating with several low hills to the north-east of Little Haywood, the River Trent floodplain to the west of Great Haywood, and predominantly higher ground between Ingestre and Yarlet.

2.5.4 Descriptions of habitat types that have been subject to Phase 1 habitat survey to verify the assumed baseline reported within BID-EC-002-000 (i.e. ground-truthed), are provided below.

Woodland

2.5.5 Semi-natural broadleaved woodland qualifies as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Staffordshire BAP. A semi-natural broadleaved woodland, located within land required for construction of the AP revised scheme, has also been ground-truthed. This is an un-named woodland (LP6985), which is located north-west of Beacon Hill, south of Hopton.

Scrub

2.5.6 Scrub is present in strips and patches adjacent to field, woodland and watercourse margins within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. Scrub is also present on the west side of Hopton. The most frequently recorded plant species within scrub habitat are bramble, dog-rose, hawthorn, blackthorn and elder.

Hedgerows

2.5.7 Hedgerows that comprise 80% native woody species qualify as a habitat of principal importance. Details of additionally ground-truthed hedgerows that are 'Important' and which are located within the land required for the construction of the AP revised scheme are provided in Section 5.

Parkland and scattered trees

2.5.8 A low density of standard trees are present in clusters and lines within additionally ground-truthed land required for the construction of the AP revised scheme. Scattered trees are present to the south-west of Tithebarn Farm. The most frequently recorded tree species are pedunculate oak, ash and sycamore.

Grassland and marsh

2.5.9 The most frequent grassland habitat types present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme are improved grassland and species-poor semi-improved grassland. No areas of more floristically diverse grassland were recorded within the Colwich to Yarlet area.

Watercourses

2.5.10 A watercourse, located within the land required for the construction of the AP revised scheme, has been additionally ground-truthed. This un-named minor watercourse (LP4415) has a channel width of approximately 0.5m and water depth of 0.3m (at the time of survey). The watercourse contains reed canary grass (*Phalaris arundinacea*) and meadowsweet (*Filipendula ulmaria*). The watercourse banks support trees and shrubs.

Water bodies

2.5.11 There are 15 water bodies that were additionally ground-truthed. In total, there are 45 water bodies within the land required for the construction of the AP revised scheme within the Colwich to Yarlet area.

Arable and cultivated land

2.5.12 Arable land is present mainly in the form of large fields and this habitat type is extensively distributed within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. The surveyed arable fields are frequently bordered by hedgerows and trees. No notable plant species were recorded within arable headlands and margins.

Buildings and structures

2.5.13 A low density of isolated residential buildings and farmsteads are present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme within the Colwich to Yarlet area. The farmsteads mainly comprise barns, sheds and residential dwellings.

2.6 Summary of updated habitat types within the Colwich to Yarlet area

2.6.1 Table 2 provides a summary of the habitat type metrics within the land required for the construction of the AP revised scheme in the Colwich to Yarlet area.

Table 2: Habitat type metrics within the land required for the construction of the AP revised scheme in the Colwich to Yarlet area

Habitat type	**Surveyed area (ha)/length (km) verified during ground-truthing**	**Un-surveyed area (ha)/length (km) interpreted from aerial imagery**
Semi-natural broadleaved woodland	2.1ha	10ha
Plantation broadleaved woodland	4.6ha	0.3ha
Plantation coniferous woodland	0.04ha	None
Semi-natural mixed woodland	None	0.2ha
Plantation mixed woodland	2.4ha	None
Scrub	0.5ha	None
Parkland and scattered trees	3.6ha	0.05ha
Intact native species-rich hedge	6.5km	8.6km
Intact species-poor hedge	7.3km	83m
Defunct native species-rich hedge	297m	193m
Defunct species poor hedge	1.5km	69m
Native species-rich hedge with trees	3km	149m
Species-poor hedge with trees	3.7km	None
Unimproved neutral grassland	0.1ha	None
Semi-improved neutral grassland	7.9ha	4.2ha
Species-poor semi-improved grassland	31.5ha	None
Improved grassland	126.3ha	38.2ha
Amenity grassland	14.4ha	1.5ha
Marshy grassland	None	None
Watercourses	0.6km	None
Water-bodies	0.6ha	0.7ha

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Arable and cultivated land	105.3ha	84.9ha
Buildings and structures	0.7ha	0.7ha

Stone and Swynnerton (CA3)

2.6.2 Approximately 65% of the area of land required for the construction of the AP revised scheme plus a 250m buffer from this boundary have been subject to Phase 1 habitat survey in the Stone and Swynnerton area prior to the end of October 2017.

2.6.3 The Stone and Swynnerton area comprises a large proportion of agricultural land and woodland, with villages and farmsteads. The topography is undulating with areas of lower level agricultural land to the west of Stone and higher ground between Swynnerton and Swynnerton Old Park.

2.6.4 Descriptions of habitat types that have been subject to Phase 1 habitat survey to verify the assumed baseline reported within BID-EC-002-000 (i.e. ground-truthed), are provided below.

Woodland

2.6.5 Semi-natural broadleaved woodland qualifies as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Staffordshire BAP. A cluster of seven un-named semi-natural broadleaved woodlands (LP10065) have been additionally ground-truthed, six of which are located within the land required for construction of the AP revised scheme, and one which is located directly adjacent to the land required for the construction of the AP revised scheme. The seven un-named woodlands are located to the west and south-west of Meaford. Six un-named woodlands comprise a hybrid oak species (*Quercus robur* x *Q. petraea* = *Q. x rosacea*), grey willow (*Salix cinerea*), beech, ash, sycamore. The woodland field layer within the six un-named woodlands support bramble, red campion, common nettle and wood-avens. The other un-named woodland comprises sycamore, ash and wych elm (*Ulmus glabra*), with an understorey of hazel, hawthorn and elder and field layer of bramble, Dog's mercury (*Mercurialis perennis*) and common nettle.

Scrub

2.6.6 Scrub is present in strips and patches adjacent to field, woodland and watercourse margins within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. Scrub is present at Darlaston Farm to the west of Meaford. The most frequently recorded plant species are bramble, dog-rose, hawthorn, blackthorn and elder.

Hedgerows

2.6.7 Hedgerows that comprise 80% native woody species qualify as a habitat of principal importance. Details of additionally ground-truthed hedgerows that are 'Important' and which are located within the land required for the construction of the AP revised scheme are provided in Section 5.

Parkland and scattered trees

2.6.8 A low density of standard trees is present in clusters and lines within additionally ground-truthed land required for the construction of the AP revised scheme. Scattered trees are present at Darlaston Farm to the west of Meaford. The most frequently recorded tree species are pedunculate oak, ash, sycamore, beech, common lime and horse-chestnut.

Grassland and marsh

2.6.9 The most frequent grassland habitat types present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme are improved grassland and species-poor semi-improved grassland. No areas of more floristically diverse grassland were recorded.

Watercourses

2.6.10 No additional watercourses were ground-truthed within the land required for the construction of the AP revised scheme.

Water bodies

2.6.11 There are 23 water bodies that were additionally ground-truthed. In total, there are 65 water bodies within the land required for the construction of the AP revised scheme within the Stone and Swynnerton area.

Arable and cultivated land

2.6.12 Arable land is present mainly in the form of large fields and this habitat type is extensively distributed within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. The surveyed arable fields are frequently bordered by hedgerows and trees. No notable plant species were recorded within arable headlands and margins.

Buildings and structures

2.6.13 A low density of isolated residential buildings and farmsteads are present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme within the Stone and Swynnerton area. The farmsteads mainly comprise barns, sheds and residential dwellings.

2.7 Summary of updated habitat types within the Stone and Swynnerton area

2.7.1 Table 3 provides a summary of the habitat type metrics within the land required for the construction of the AP revised scheme in the Stone and Swynnerton area.

Table 3: Habitat type metrics within the land required for the construction of the AP revised scheme in the Stone and Swynnerton area

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Semi-natural broadleaved woodland	9ha	13.3ha

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Plantation broadleaved woodland	3.5ha	0.6ha
Plantation coniferous woodland	3.6ha	0.05ha
Semi-natural mixed woodland	5.6ha	0.01ha
Plantation mixed woodland	0.4ha	0.02ha
Scrub	2.3ha	0.5ha
Parkland and scattered trees	0.5ha	None
Intact native species-rich hedge	9.3km	6km
Intact species-poor hedge	12.7km	None
Defunct native species-rich hedge	2km	None
Defunct species poor hedge	4.4km	None
Native species-rich hedge with trees	4km	323m
Species-poor hedge with trees	6.2km	None
Semi-improved acid grassland	0.1ha	None
Unimproved neutral grassland	0.9ha	None
Semi-improved neutral grassland	22.3ha	1.5ha
Species-poor semi-improved grassland	8.3ha	4.5ha
Improved grassland	136.3ha	17ha
Amenity grassland	2.9ha	1.9ha
Marshy grassland	0.4ha	None
Watercourses	1km	None
Water-bodies	2.4ha	0.4ha
Arable and cultivated land	155.9ha	83.6ha
Buildings and structures	0.09ha	0.5ha

Whitmore Heath to Madeley (CA4)

2.7.2 Approximately 68% of the area of land required for the construction of the AP revised scheme plus a 250m buffer from this boundary have been subject to Phase 1 habitat survey in the Whitmore Heath to Madeley area prior to the end of October 2017.

2.7.3 The Whitmore Heath to Madeley area comprises a large proportion of agricultural land and woodland, with villages and farmsteads. The topography is undulating with areas of lower level agricultural land adjacent to the River Meece and River Lea, with higher ground around Whitmore.

2.7.4 Descriptions of habitat types that have been subject to Phase 1 habitat survey to verify the assumed baseline reported within the main ES (i.e. ground-truthed), are provided below.

Woodland

2.7.5 Three types of woodland habitat have been identified through ground-truthing surveys and comprise semi-natural broadleaved woodland, plantation broadleaved woodland and plantation coniferous woodland. These are described below.

2.7.6 Semi-natural broadleaved woodland qualifies as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Staffordshire BAP. Three semi-natural broadleaved woodlands, located within land required for construction of the AP revised scheme, have been additionally ground-truthed. These are:

- an un-named woodland (LP11300) is located on the east side of Snape Hall Road, Whitmore Heath. The woodland canopy comprises Scots pine (*Pinus sylvestris*), silver birch and sycamore. The understorey comprises holly and rhododendron. The field layer includes pedunculate oak saplings, foxglove (*Digitalis purpurea*), male fern (*Dryopteris filix-mas*) and lady fern (*Anthyrium filix-femina*);
- an un-named woodland (LP11590) is located adjacent to Manor Road, south of Madeley. The woodland canopy comprises pedunculate oak, sycamore and wych elm. The understorey consists of hawthorn and blackthorn. Plant species recorded in the field layer include ivy (*Hedera helix*), wood spurge (*Euphorbia amygdaloides*) and dog's mercury; and
- an un-named woodland (LP12425) is located adjacent to Bower End Lane, west of Madeley. The woodland canopy comprises pedunculate oak, beech and ash. The understory consists of hazel, elder and holly. Plant species recorded in the field layer include male fern and ground ivy (*Glechoma hederacea*).

2.7.7 An area of plantation broadleaved woodland, located within the land required for the construction of the AP revised scheme, has been additionally ground-truthed. This comprises a cluster of three un-named plantation broadleaved woodlands (LP10725), which are located adjacent to Bent Lane to the south-west of Whitmore, and comprise European larch, common lime, hawthorn and elder with a field layer of common nettle.

2.7.8 An area of plantation coniferous woodland, located within the land required for the construction of the AP revised scheme, has been additionally ground-truthed. An un-named woodland (LP10725), located adjacent to Bent Lane to the south-west of Whitmore, is dominated by European larch with a field layer of common nettle.

Scrub

2.7.9 Scrub is present in strips and patches adjacent to field, woodland and watercourse margins within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. Scrub is present around Wrinehill Farm. The most frequently recorded plant species within scrub habitat are bramble, dog-rose, hawthorn, blackthorn and elder.

Hedgerows

2.7.10 Hedgerows that comprise 80% native woody species qualify as a habitat of principal importance. Details of additionally ground-truthed hedgerows that are 'Important' and which are located within the land required for the construction of the AP revised scheme are provided in Section 5.

Parkland and scattered trees

2.7.11 A low density of standard trees is present in clusters and lines within additionally ground-truthed land required for the construction of the AP revised scheme. Scattered trees are present around Wrinehill Farm. The most frequently recorded tree species are pedunculate oak, ash, sycamore, beech and horse-chestnut.

Grassland and marsh

2.7.12 The most frequent grassland habitat types present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme are improved grassland and species-poor semi-improved grassland. A floristically diverse semi-improved neutral grassland (LP11540) is located to the south of Madeley. Plant species present in this grassland include creeping bent (*Agrostis stolonifera*), red fescue, creeping buttercup (*Ranunculus repens*), greater stitchwort (*Stellaria holostea*) and rough-stalked feather-moss (*Brachythecium rutabulum*).

Watercourses

2.7.13 Five watercourses, located within the land required for the construction of the AP revised scheme, have been additionally ground-truthed. These are:

- Meece Brook (LP10725), which has a channel width of approximately 2m and water depth of 0.1m (at the time of survey). The channel comprises pools and riffles. The watercourse contains yellow flag (*Iris pseudacorus*), meadowsweet and common nettle. The watercourse banks support trees and shrubs;
- an un-named watercourse (LP10725), which flows into the Meece Brook, has a channel width of approximately 2.5m and water depth of 0.1m (at the time of survey). The watercourse contains a rush species (*Juncus* sp.), great willowherb and fool's watercress;
- River Lea (LP11541), to the west of Hey Sprink, has a channel width of approximately 2m and water depth of 0.1m (at the time of survey). The watercourse banks support mature trees;

- River Lea (LP12515), to the north-west of Madeley, has a channel width of approximately 3m and water depth of 0.1m (at the time of survey). The watercourse banks support common nettle and the invasive species Indian balsam (*Impatiens glandulifera*); and
- an un-named watercourse (LP12515), to the north-east of Wrinehill Wood, has a channel width of approximately 0.5m and water depth of 0.2m (at the time of survey). The watercourse banks support trees, shrubs and rough grassland.

Water bodies

2.7.14 There are 19 water bodies that were additionally ground-truthed. In total, there are 48 water bodies within the land required for the construction of the AP revised scheme.

Arable and cultivated land

2.7.15 Arable land is present mainly in the form of large fields and this habitat type is extensively distributed within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. The surveyed arable fields are frequently bordered by hedgerows and trees. No notable plant species were recorded within arable headlands and margins.

Buildings and structures

2.7.16 A low density of isolated residential buildings and farmsteads are present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme within the Whitmore Heath to Madeley area. The farmsteads mainly comprise barns, sheds and residential dwellings.

2.8 Summary of updated habitat types within the Whitmore Heath to Madeley area

2.8.1 Table 4 provides a summary of the habitat type metrics within the land required for the construction of the AP revised scheme in the Whitmore Heath to Madeley area.

Table 4: Habitat type metrics within the land required for the construction of the AP revised scheme in the Whitmore Heath to Madeley area

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Semi-natural broadleaved woodland	7.4ha	12.8ha
Plantation broadleaved woodland	0.2ha	None
Plantation coniferous woodland	6.2ha	None
Semi-natural mixed woodland	0.02ha	0.02ha
Plantation mixed woodland	7ha	0.2ha
Scrub	0.4ha	None
Parkland and scattered trees	0.6ha	None
Recently felled broad-leaved woodland	0.4ha	0.3ha

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Intact native species-rich hedge	3.7km	2.7km
Intact species-poor hedge	5.6km	None
Defunct native species-rich hedge	2.1km	None
Defunct species poor hedge	2km	None
Native species-rich hedge with trees	4.3km	None
Species-poor hedge with trees	3.2km	None
Semi-improved acid grassland	0.3ha	None
Unimproved neutral grassland	3ha	None
Semi-improved neutral grassland	18ha	11.6ha
Species-poor semi-improved grassland	28.1ha	0.07ha
Improved grassland	145.6ha	20.4ha
Amenity grassland	1ha	0.9ha
Marshy grassland	5.1ha	4.1ha
Watercourses	1.1km	None
Water-bodies	1.2ha	0.4ha
Arable and cultivated land	61ha	19.6ha
Buildings and structures	0.3ha	0.05ha

South Cheshire (CA5)

2.8.2 Approximately 49% of the area of land required for the construction of the AP revised scheme plus a 250m buffer from this boundary have been subject to Phase 1 habitat survey in the South Cheshire area by the end of October 2017.

2.8.3 The South Cheshire area comprises a large proportion of agricultural land, with scattered small woodlands, becoming increasingly urban near Crewe. The topography is gently undulating and relatively level near Crewe.

2.8.4 Descriptions of habitat types that have been subject to Phase 1 habitat survey to verify the assumed baseline reported within BID-EC-002-000 (i.e. ground-truthed), are provided below.

Woodland

2.8.5 Semi-natural broadleaved woodland qualifies as lowland mixed deciduous woodland, a habitat of principal importance and a conservation priority of the Cheshire BAP[11]. Three semi-natural broadleaved woodlands, located within land required for construction of the AP revised scheme, have been additionally ground-truthed. These are:

- an un-named woodland (LP12905) is located to the north-west of Randilow Farm, west of Wrinehill. The woodland comprises pedunculate oak, alder and crack willow;
- an un-named woodland (LP13125) is located to the south-west of Lower Den Farm, north-west of Wrinehill. The woodland is dominated by pedunculate oak; and
- an un-named woodland (LP13180) is located to the west of Lower Den Farm, north-west of Wrinehill. The woodland canopy is dominated by pedunculate oak, with an understorey of hawthorn and elder and a field layer of bramble.

2.8.6 An area of semi-natural broadleaved woodland, located directly adjacent to the land required for the construction of the AP revised scheme, has been additionally ground-truthed. An un-named woodland (LP13670) is located to the south of Lane Ends Farm, Chorlton. The woodland canopy is dominated by pedunculate oak, with an understorey of hawthorn, blackthorn and elder.

Scrub

2.8.7 Scrub is present in strips and patches adjacent to field, woodland and watercourse margins within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. Scrub is present around Heath Farm to the east of Hough. The most frequently recorded plant species are bramble, dog-rose, hawthorn, blackthorn and elder.

Hedgerows

2.8.8 Hedgerows that comprise 80% native woody species qualify as a habitat of principal importance. Details of additionally ground-truthed hedgerows that are 'Important' and which are located within the land required for the construction of the AP revised scheme are provided in Section 5.

Parkland and scattered trees

2.8.9 A low density of standard trees is present in clusters and lines within additionally ground-truthed land required for the construction of the AP revised scheme. Scattered trees are present around Heath Farm to the east of Hough. The most frequently recorded tree species are pedunculate oak and ash.

[11] Cheshire Wildlife Trust (2007). *Cheshire Biodiversity Action Plan*. http://www.cheshirewildlifetrust.org.uk/biodiversity

Grassland and marsh

2.8.10 The most frequent grassland habitat types present within the additionally ground-truthed areas of land required for the construction of the AP revised scheme are improved grassland and species-poor semi-improved grassland. There is one area of more floristically diverse semi-improved neutral grassland within additionally ground-truthed areas of land required for the construction of the AP revised scheme. An un-named semi-improved neutral grassland (LP15055) is located on the east side of the West Coast Main Line (WCML) railway to the south of Casey Bridge. Plant species present in the grassland are yarrow, a St. John's-wort species (*Hypericum* sp.), self-heal (*Prunella vulgaris*) and a sedge species (*Carex* sp.).

Watercourses

2.8.11 Five watercourses, located within the land required for the construction of the AP revised scheme, have been additionally ground truthed. These are:

- River Lea (LP12580), to the west of Wrinehill Mill, which has a channel width of approximately 3m and water depth of 0.3m (at the time of survey). The watercourse contains brooklime (*Veronica beccabunga*), floating sweet grass (*Glyceria fluitans*), fool's water-cress, and reed canary-grass. The watercourse banks support trees, shrubs and rough grassland;
- Mere Gutter (LP13470), which is dominated by common reed (*Phragmites australis*). The watercourse banks support bramble thickets;
- Swill Brook (LP13670), which has a channel width of approximately 1m and water depth of 0.1m (at the time of survey). The watercourse contains common duckweed (*Lemna minor*) and the invasive species Indian balsam. The watercourse banks support bramble thickets and rough grassland; and
- Basford Brook (LP15530), which has a channel width of approximately 1m and water depth of 0.3m (at the time of survey). The watercourse contains hard rush, great willowherb, water forget-me-not (*Myosotis scorpioides*), reed canary-grass, brooklime, reed sweet-grass (*Glyceria maxima*), wild angelica (*Angelica sylvestris*) and fool's water-cress. The watercourse banks support tall ruderals and rough grassland.

Water bodies

2.8.12 There are 15 water bodies that were additionally ground-truthed. In total, there are 52 water bodies within the land required for the construction of the AP revised scheme.

Arable and cultivated land

2.8.13 Arable land is present mainly in the form of large fields and this habitat type is extensively distributed within the additionally ground-truthed areas of land required for the construction of the AP revised scheme. The surveyed arable fields are frequently bordered by hedgerows and trees. No notable plant species were recorded within arable headlands and margins.

Buildings and structures

2.8.14 A low density of isolated residential buildings and farmsteads are present within the land required for the construction of the AP revised scheme within the South Cheshire area. The farmsteads mainly comprise barns, sheds and residential dwellings. Buildings are present in higher densities near Crewe. These buildings mainly consist of residential and industrial buildings associated with the town.

2.9 Summary of updated habitat types within the South Cheshire area

2.9.1 Table 5 provides a summary of the habitat type metrics within the land required for the construction of the AP revised Scheme in the South Cheshire area.

Table 5: Habitat type metrics within the land required for the construction of the AP revised scheme in the South Cheshire area

Habitat type	**Surveyed area (ha)/length (km) verified during ground-truthing**	**Un-surveyed area (ha)/length (km) interpreted from aerial imagery**
Semi-natural broadleaved woodland	4.4ha	7.6ha
Plantation broadleaved woodland	1.1ha	2.5ha
Plantation coniferous woodland	0.03ha	None
Semi-natural mixed woodland	None	0.2ha
Plantation mixed woodland	None	0.5ha
Scrub	4.4ha	4.8ha
Parkland and scattered trees	0.1ha	None
Intact native species-rich hedge	3.5km	3.4km
Intact species-poor hedge	4.4km	0.5km
Defunct native species-rich hedge	0.7km	None
Defunct species poor hedge	2.8km	None
Native species-rich hedge with trees	2.7km	None
Species-poor hedge with trees	5.9km	None
Semi-improved acid grassland	0.2ha	None
Unimproved neutral grassland	None	None
Semi-improved neutral grassland	4ha	5.9ha
Species-poor semi-improved grassland	56.5ha	0.2ha
Improved grassland	59ha	44.6ha
Amenity grassland	0.3ha	1.6ha
Marshy grassland	1.5ha	None

Habitat type	Surveyed area (ha)/length (km) verified during ground-truthing	Un-surveyed area (ha)/length (km) interpreted from aerial imagery
Watercourses	690m	None
Water-bodies	3.7ha	0.4ha
Arable and cultivated land	173.7ha	36.3ha
Buildings and structures	0.02ha	3.3ha

3 Bats

3.1 Introduction

3.1.1 This section of the appendix details supplementary ecological baseline data relating to bats not reported in the BID documents that accompanied the main ES. It should be read in conjunction with the BID document BID-EC-012-000[12] that accompanied the main ES.

3.2 Methodology

3.2.1 Details of the standard methodology utilised for bat surveys are provided in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards which is included within Volume 5: Appendix CT-001-002 of the main ES[13].

3.2.2 The scoping, desk study exercises and surveys reported in the main ES can be found in BID-EC-012-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since production of the main ES.

3.3 Deviations, constraints and limitations

3.3.1 Surveys undertaken were limited to locations where landowner permission had been obtained.

3.3.2 Where field survey has been constrained, the survey findings were augmented with key desk study data, aerial photography and surveyor local knowledge. Where appropriate a precautionary approach has been followed to provide a reasonable worst case baseline.

Trees

3.3.3 Surveys were undertaken from January until April 2017 which did not allow for any activity surveys (emergence / re-entry and activity) due to seasonal constraints. Detailed tree climbing inspection surveys of some trees was not possible due to health and safety risks or access constraints. A total of 23 trees were not climbed as they posed a health and safety risk.

3.3.4 There were no deviations from the tree survey methodologies.

Buildings and structures

3.3.5 Surveys were undertaken from October 2016 until April 2017 which did not allow for any activity surveys (emergence / re-entry and activity) due to seasonal constraints.

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[12] HS2 Ltd (2017), High Speed Two (HS2) Phase 2a (West Midlands - Crewe), *Background Information and Data, Ecological baseline data - bats, BID-EC-012-000*. www.gov.uk/hs2.

[13] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe), Environmental Statement Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-002*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.

3.3.6 The following buildings were only subject to an external bat assessment as access within the building was not possible:

- sports pavilion at Yarlet School (CA3); and
- residential building, garage and shed to the east of Snape Hill Road (CA4).

3.3.7 Where internal access was permitted surveys at a small number of sites was constrained due to health and safety concerns. These included sites with hazards, including structural safety and the presence or unknown status of asbestos, or where access was not physically possible.

3.3.8 There were no deviations from the building survey methodologies.

Activity surveys

3.3.9 Due to seasonal constraints, no bat activity surveys were undertaken.

Radio-tracking

3.3.10 Due to seasonal constraints, no radio-tracking surveys were undertaken.

3.4 Baseline

3.4.1 Table 6 to Table 8 provide detail on the new bat baseline information for the CA2 and CA4. The records are mapped within the BID Map Series EC-05 that accompanies the SES and AP ES.

Fradley to Colton (CA1)

Roosting (trees)

3.4.2 A total of 67 trees in the Fradley to Colton area were subject to an initial ground assessment between January and February 2017. Of these, 10 were subject to subsequent tree climbing inspection surveys. Following these surveys:

- no bat roosts were confirmed;
- a total of 11 trees were assessed as having high potential to support roosting bats;
- a total of 26 trees were assessed as having moderate potential to support roosting bats;
- a total 30 trees were assessed as having low or negligible potential to support roosting bats. These trees were subsequently scoped out of further survey.

3.4.3 Of the trees previously surveyed from the ground in 2016, four additional trees were subject to tree climbing inspection surveys:

- one tree was assessed as having high potential to support roosting bats which was previously assessed as having moderate potential from the initial ground assessment; and

- a total of three trees were assessed as having low potential to support roosting bats which were previously assessed as having a high potential from the initial ground assessment. These trees were subsequently scoped out of further survey.

Roosting (buildings and structures)

3.4.4 No buildings or structures were surveyed within the Fradley to Colton area in 2017.

Colwich to Yarlet (CA2)

Roosting (trees)

3.4.5 A total of 58 trees in the Colwich to Yarlet area were subject to an initial ground assessment between January and February 2017. Of these, 38 were subject to subsequent tree climbing inspection surveys. Following these surveys:

- no bat roosts were confirmed;
- a total of five trees were assessed as having high potential to support roosting bats;
- a total of 18 trees were assessed as having moderate potential to support roosting bats; and
- a total of 35 trees were assessed as having low or negligible potential to support roosting bats. These trees were subsequently scoped out of further survey.

3.4.6 Of the trees previously surveyed from the ground in 2016, 41 additional trees were subject to tree climbing inspection surveys:

- a total of 12 trees were assessed as having high potential to support roosting bats, eight of these trees were previously assessed as having a moderate potential from the initial ground assessment. Four of these trees retained a high potential from the initial ground assessment;
- a total of 10 trees were assessed as having moderate potential to support roosting bats, one of these trees was previously assessed as having a high potential from the initial ground assessment. Nine of these trees retained a moderate potential from the initial ground assessment; and
- a total of 19 trees were assessed as having low or negligible potential to support roosting bats which were previously assessed as having a moderate or high potential from the initial ground assessment. These trees were subsequently scoped out of further survey.

Roosting (buildings and structures)

3.4.7 A total of 43 buildings in the Colwich to Yarlet area were subject to an initial buildings and structures assessment between January 2017 and April 2017. Of these, 17 were internally inspected. Following these surveys:

- a total of three bat roosts were confirmed in three buildings via internal inspections;
- a total of four buildings and structures were assessed as having high potential to support roosting bats;
- a total of 18 buildings and structures were assessed as having moderate potential to support roosting bats; and
- a total of 18 buildings and structures were assessed as having low or negligible potential to support roosting bats. These buildings and structures were subsequently scoped out of further survey.

3.4.8 Details of confirmed roosts within buildings and structures in the Colwich to Yarlet area are provided in Table 6.

Table 6: Confirmed roosts within buildings and structures in the Colwich to Yarlet area

Ecology Survey code	CA	Location	OS grid reference	Building / structure type	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	Distance from the land required for the construction of the AP revised scheme (m) and orientation
000-BS1-207001	2	Ingestre Park Golf Club main building	SJ983242	Club house	*Pipistrellus* species (visual dropping identification) - low numbers of droppings found in the roof.	20 December 2016 - internal inspection	Day/summer	Two-storey, 40 year old brick built building with a single-storey extension used as a balcony, potential roof access via soffits. A small aggregate of droppings were found around the loft hatch.	29m north-west
000-BS1-215008	2	Main house of Yarlet School	SJ913292	Victorian mansion used as a school building	Likely used by brown long-eared bat (visual dropping identification) -isolated droppings found in one loft space, and an aggregate found in another loft space.	20 January 2017 - internal inspection	Day/summer	Victoria mansion built in 1870, mostly brick with some stonework. Multiple chimney stacks. Complex roof structures with multiple potential entry/egress points into three main roof voids.	6m south-east
000-BS1-215009	2	A semi-detached cottage in the grounds of Yarlet School	SJ914293	Residential cottage	Likely used by *Myotis* species (visual dropping identification) - droppings scattered below the ridge beam in one roof void.	20 January 2017 - internal inspection	Day/summer	Mid-19th century brick-built cottages with some modern extensions. Droppings found in the roof void on the northern orientation of the house. Gaps between the roof tiles and roof void across the building.	101m north-east

Stone and Swynnerton (CA3)

Roosting (trees)

3.4.9 A total of 25 trees in the Stone and Swynnerton area were subject to an initial ground assessment in January 2017. Of these, five were subject to subsequent tree climbing inspection surveys. Following these surveys:

- no bat roosts were confirmed;
- a total of four trees were assessed as having high potential to support roosting bats;
- a total of 15 trees were assessed as having moderate potential to support roosting bats; and
- a total of six trees were assessed as having low or negligible potential to support roosting bats. These trees were subsequently scoped out of further survey.

3.4.10 Of the trees previously surveyed from the ground in 2016, two additional trees were subject to tree climbing inspection surveys. These two trees were assessed as having low potential to support rooting bats having previously been assessed as having moderate potential from the initial ground assessment. These trees were subsequently scoped out of further survey.

Roosting (buildings and structures)

3.4.11 No buildings or structures were surveyed within the Stone and Swynnerton area in 2017.

Whitmore Heath to Madeley (CA4)

Roosting (trees)

3.4.12 A total of 42 trees in the Whitmore to Madeley area were subject to an initial ground assessment between January and March 2017. Of these, 35 were subject to subsequent tree climbing inspection surveys. Following these surveys:

- no bat roosts were confirmed;
- a total of nine trees were assessed as having high potential to support roosting bats;
- a total of 21 trees were assessed as having moderate potential to support roosting bats; and
- a total of 12 trees were assessed as having low or negligible potential to support roosting bats. These trees were subsequently scoped out of further survey.

3.4.13 Of the trees previously surveyed from the ground in 2016, 164 additional trees were subject to tree climbing inspection surveys:

- a total of two bat roosts were confirmed;

- a total of 32 trees were assessed as having high potential to support roosting bats, 22 of these trees were previously assessed as having moderate potential from the initial ground assessment. Ten of these trees retained a high potential from the initial ground assessment;
- a total of 43 trees were assessed as having moderate potential to support roosting bats, 10 of these trees were previously assessed as having high potential from the initial ground assessment. Thirty-three of these trees retained a moderate potential from the initial ground assessment; and
- a total of 87 trees were assessed as having low or negligible potential to support roosting bats. Eighty-four of these trees were previously assessed as having moderate or high potential from the initial ground assessment. Three of these trees retained a low or negligible potential from the initial ground assessment. These trees were subsequently scoped out of further survey.

3.4.14 Details of confirmed roots within trees in the Whitmore to Madeley area are provided in Table 7.

Table 7: Confirmed roosts within trees in the Whitmore Heath to Madeley area

Ecology Survey code	CA	Location	OS grid reference	Tree species	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	Distance from the land required for the construction of the AP revised scheme (m) and orientation
000-BT2-233209	4	Land around Whitmore Wood	SJ788418	Pedunculate oak (*Quercus robur*)	Soprano pipistrelle, (visual confirmation) (1).	14 February 2017 - tree climbing survey inspection	Transitional	Tree wound 10m on north-west aspect, facing west. Small cavity. Small dead snag protruding from base.	Within land required
000-BT2-233222	4	South-east of Hey Sprink		Sycamore (*Acer pseudoplatanus*)	Soprano pipistrelle, (visual confirmation) (1).	27 February 2017 - tree climbing survey inspection	Transitional	Trunk cavity extends upwards 60cm, clean smooth and dry. Soprano pipistrelle present at apex.	92m south-west

Roosting (buildings and structures)

3.4.15 A total of 20 buildings in the Whitmore to Madeley area were subject to an initial buildings and structures assessment between November 2016 and January 2017. Of these, 20 were inspected internally. Following these surveys:

- a total of three bat roosts were confirmed in two buildings via internal inspections;
- no buildings or structures were assessed as having high potential to support roosting bats;
- a total of four buildings and structures were assessed as having moderate potential to support roosting bats; and
- a total of 13 buildings and structures were assessed as having low or negligible potential to support roosting bats. These buildings were subsequently scoped out of further survey.

3.4.16 Details of confirmed roosts within buildings and structures in the Whitmore to Madeley are provided in Table 8.

Table 8: Confirmed roosts within buildings and structures in the Whitmore Heath to Madeley area

Ecology Survey code	CA	Location	OS grid reference	Building / structure type	Species confirmed as utilising roost and (peak count)	Date of peak count and nature of survey	Roost type	Roost description	Distance from the land required for the construction of the AP revised scheme (m) and orientation
000-BS1-232009	4	Residential farmhouse at Limpits Farm	SJ799414	Residential	Brown long-eared bat (visual dropping identification) - droppings present throughout roof void.	25 January 2017 - internal inspection	Maternity	Residential farmhouse with pitched tile roof. Large amounts of droppings in section un-used by the homeowner underneath the ridge beams.	58m north-east
000-BS1-235003	4	Garage at Hey House Lodge, south of Madeley	SJ773432	Garage	Unknown species (droppings not viable for DNA or visual analysis) - droppings were scattered around the garage.	7 December 2016 - internal inspection	Feeding	Brick-built garage with scattered low numbers of droppings present. Doors always open with some perching features present inside the garage.	Within land required
000-BS1-237012	4	Residential building at Bowerend Farm, west of Madeley	SJ761448	Residential	*Pipistrellus* species (visual dropping identification) and brown-long eared bat (visual dropping identification) – approximately 300 scattered droppings present.	14 December 2016 - internal inspection	Day/summer	Two-storey residential property with a pitched clay-tiled roof. The roof has timber framework with crevices. Gaps under roof tiles and felt, and gaps in the brickwork mortar. Gaps at top of gable ends and at eaves by chimney.	14m north-east

South Cheshire (CA5)

Roosting (trees)

3.4.17 A total of 56 trees in the South Cheshire area were subject to an initial ground assessment between January and February 2017. Of these, 36 were subject to subsequent tree climbing inspection surveys. Following these surveys:

- no bat roosts were confirmed;
- a total of two trees were assessed as having high potential to support roosting bats;
- a total of 49 trees were assessed as having moderate potential to support roosting bats; and
- a total of five trees were assessed as having low or negligible potential to support roosting bats. These trees were subsequently scoped out of further survey.

3.4.18 Of the trees previously surveyed from the ground in 2016, 52 additional trees were subject to tree climbing inspection surveys:

- a total of 13 trees were assessed as having high potential to support roosting bats, five of these trees were previously assessed as having moderate potential, and one of these trees was previously assessed as having low potential from the initial ground assessment. Seven of these trees retained a high potential from the initial ground assessment;
- a total of 14 were assessed as having moderate potential to support roosting bats, one of these trees was previously assessed as having low roosting potential from the initial ground assessment and seven of these trees were previously assessed as having high potential from the initial ground assessment. Six of these trees retained a moderate potential from the initial ground assessment, and
- a total of 25 trees were assessed as having low or negligible potential to support roosting bats, all of these trees were previously assessed as having moderate or high roosting potential from the initial ground assessment. These trees were subsequently scoped out of further survey.

Roosting (buildings and structures)

3.4.19 A total of six buildings in the South Cheshire area were subject to an initial buildings and structures assessment between October 2016 and January 2017. All of the buildings were inspected internally. Following these surveys:

- no bat roosts were confirmed;
- one building was assessed as having moderate potential to support roosting bats; and

- a total of five buildings or structures were assessed as having low or negligible potential to support roosting bats. These buildings were subsequently scoped out of further survey.

4 Birds

4.1 Introduction

4.1.1 This section of the appendix details supplementary ecological baseline data relating to wintering birds not reported in the BID documents that accompanied the main ES. It should be read in conjunction with the BID document BID-EC-009-000[14] that accompanied the main ES.

4.2 Methodology

4.2.1 Details of the standard methodology utilised for bird surveys are provided in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards which is included within Volume 5: Appendix CT-001-002 of the main ES[15].

4.2.2 The scoping, desk study exercises and surveys reported in the main ES can be found in BID-EC-009-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since production of the main ES.

4.2.3 Monthly wintering bird survey visits to each site were undertaken between January and March 2017, depending on when access was obtained to the site. Each site was therefore surveyed on up to three occasions.

4.2.4 Table 9 summarises the nine sites where surveys for wintering birds were undertaken.

Table 9: Summary of wintering bird field surveys undertaken within the West Midlands to Crewe area

Ecology survey code	CA	Survey site name	Location	Centroid OS grid reference	Habitat types included in survey	Survey date(s)	Distance from the land required for the construction of the AP revised scheme (m)
000-WB1-193001	CA1	Pipe Ridware Floodplain	East of Pipe Ridware	SK103175	Grassland, arable land, hedgerows, ditches and watercourses.	17 January 2017; 15 February 2017; and 14 March 2017.	Partly within land required
000-WB1-201001	CA1	Moreton Meadows	North-east of Colwich	SK033226	Grassland, hedgerows/tree-lines, ponds and watercourse.	18 January 2017; 16 February 2017; and 15 March 2017.	Partly within land required

[14] HS2 Ltd (2017), High Speed Two (HS2) Phase 2a (West Midlands - Crewe), *Background Information and Data, Ecological baseline data - breeding and wintering birds, BID-EC-009-000*. www.gov.uk/hs2. www.gov.uk/hs2.

[15] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe), Environmental Statement Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-002*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.

Ecology survey code	CA	Survey site name	Location	Centroid OS grid reference	Habitat types included in survey	Survey date(s)	Distance from the land required for the construction of the AP revised scheme (m)
000-WB1-204001	CA2	Tithebarn Farm	East of Great Haywood	SK009231	Woodland, grassland and arable land.	16 January 2017; and 15 February 2017.	Partly within land required
000-WB1-208001	CA2	Upper Hanyards	West of Ingestre	SJ964244	Woodland, grassland and arable land.	17 January 2017; 15 February 2017; and 16 March 2017.	Partly within land required
000-WB1-223001	CA3	Highlow Meadows	South-east of Swynnerton	SJ867348	Woodland, grassland, arable land, hedgerows and watercourse.	16 January 2017.	Partly within land required
000-WB1-228001	CA3	Hatton Common	North of Upper Hatton	SJ830381	Woodland, grassland, arable land and hedgerows.	17 January 2017; and 15 February 2017.	Partly within land required
000-WB1-231001	CA4	Meece Meadows	South of Whitmore	SJ808402	Woodland, grassland, hedgerows, watercourse and ponds.	19 January 2017; 15 February 2017; and 14 March 2017.	Partly within land required
000-WB1-233001	CA4	Whitmore	North of Madeley Park	SJ787419	Woodland, grassland, hedgerows and watercourses.	18 January 2017; 16 February 2017; and 13 March 2017.	Partly within land required
000-WB1-245001	CA5	Chorlton Heath	East of Hough	SJ720510	Grassland, arable land, hedgerows and ponds.	18 January 2017; 15 February 2017; and 13 March 2017.	Partly within land required

4.3 Evaluation

4.3.1 Notable bird species are those which are listed on:

- Annex 1 of the Birds Directive[16];
- Schedule 1 of the Wildlife and Countryside Act 1981[17];

[16] *Directive 2009/147/EC on the Conservation of Wild Birds*. European Parliament and Council, Brussels
[17] *Wildlife and Countryside Act 1981 (England and Wales) (as amended), Chapter 69*. Her Majesty's Stationery Office, London

- Section 41 of the National Environment and Rural Communities Act 2006[18] (species of principal importance);
- Staffordshire Local Biodiversity Action Plan[19];
- Cheshire Local Biodiversity Action Plan[20];
- Birds of Conservation Concern[21] (Red[22] and Amber[23] species); and
- the West Midland Bird Club and the Cheshire and Wirral Ornithological Society annual bird reports wintering status ('very rare', 'rare', 'scarce' or 'uncommon').

4.3.2 Wintering birds of county importance in Staffordshire were determined in accordance with the Staffordshire Wildlife Trust's selection criteria for sites of county biological importance (Webb *et al.* 2014[24]). The selection criteria for wintering birds are those sites that:

- regularly support more than 0.5% of the British non-breeding population of any wildfowl or wading bird species; and/or
- support a significant assemblage of wintering wildfowl.

4.3.3 Wintering birds of county importance in Cheshire were determined in accordance with the Cheshire Wildlife Trust's selection criteria for sites of county biological importance (Giles 2014[25]). The selection criteria for wintering birds are those sites that:

- regularly support a wintering county rare or scarce species which is listed in Table 7 of the guidelines; and/or
- regularly support a wintering population which is listed in Table 8 of the guidelines.

4.3.4 Records of notable species are summarised for each site in Section 4.5.

4.4 Deviations, constraints and limitations

4.4.1 Surveys undertaken were limited to locations where landowner permission had been obtained.

4.4.2 A reduced number of surveys were undertaken at three sites (Tithebarn Farm, Highlow Meadows and Hatton Common) because survey access to visit each of them on three occasions was not available for various reasons, including biosecurity issues.

[18] *Natural Environment and Rural Communities Act 2006, Chapter 16*. Her Majesty's Stationery Office, London
[19] Staffordshire Biodiversity Partnership. *Staffordshire Biodiversity Action Plan*. http://www.sbap.org.uk/.
[20] Cheshire Wildlife Trust. *Cheshire Biodiversity Action Plan*. http://www.cheshirewildlifetrust.org.uk/biodiversity.
[21] Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD, (2015), *Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds, 108, 708-746
[22] Red List criteria for breeding birds are those species which have experienced a severe decline of more than 50% of population and / or range over the last 25 years
[23] Amber List criteria for breeding birds are those species which have experienced a moderate decline of between 25% and 49% of population and / or range over the last 25 years
[24] Webb, J., Lawley, S., Cadman, D., Slawson, C., Smith, J. and Weightman, J. (2014), *Guidelines for the selection of sites of county biological importance in Staffordshire*. Staffordshire Wildlife Trust, Stafford
[25] Giles, R. (2014), *Local Wildlife Site Selection Criteria for the Cheshire Region*. Cheshire Wildlife Trust, Malpas

4.4.3 Where field survey has been constrained, the survey findings were augmented with key desk study data, aerial photography and surveyor local knowledge. Where appropriate a precautionary approach has been followed to provide a reasonable worst case baseline.

4.5 Baseline

4.5.1 Table 10 to Table 18 include new wintering bird baseline information for CAs 1 to 5. The records are mapped within the BID Map Series EC-09 which accompanies the SES and AP ES.

Fradley to Colton (CA1)

Pipe Ridware Floodplain (000-WB1-193001)

4.5.2 Three survey visits were carried out at Pipe Ridware Floodplain on 17 January, 15 February and 14 March 2017. A total of 54 species of bird were recorded during the surveys at Pipe Ridware Floodplain of which 26 are notable. Table 10 provides a summary of notable species recorded. No other species not listed in the Table 10 were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 10: Notable wintering bird survey records from Pipe Ridware Floodplain (000-WB1-193001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Teal	*Anas crecca*	Amber List	47	1(3)
Little egret	*Egretta garzetta*	'Uncommon'[26]	4	1(3)
Mute swan	*Cygnus olor*	Amber List	2	2(3)
Mallard	*Anas platyrhynchos*	Amber List	47	2(3)
Oystercatcher	*Haematopus ostralegus*	Amber List	2	1(3)
Golden plover	*Pluvialis apricaria*	Annex 1	45	1(3)
Lapwing	*Vanellus vanellus*	Species of Principal Importance, Staffordshire Local Biodiversity Action Plan (LBAP) and Red List	250	3(3)
Snipe	*Gallinago gallinago*	Staffordshire LBAP and Amber List	62	1(3)
Black-headed gull	*Chroicocephalus ridibundus*	Amber List	1	2(3)

[26] 'Uncommon' is defined as 20 to 100 non-breeding individuals annually.

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Lesser black-backed gull	*Larus fuscus* ssp. *graellsii*	Amber List	3	1(1)
Stock dove	*Columba oenas*	Amber List	35	1(3)
Kingfisher	*Alcedo atthis*	Schedule 1[27] and Amber List	2	1(3)
Kestrel	*Falco tinnunculus*	Amber List	1	2(3)
Skylark	*Alauda arvensis*	Species of Principal Importance, Staffordshire LBAP and Red List	2	1(3)
Starling	*Sturnus vulgaris*	Species of Principal Importance and Red List	10	1(3)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	40	2(3)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	3	2(3)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	3	2(3)
House sparrow	*Passer domesticus*	Species of Principal Importance, Staffordshire LBAP and Red List	10	3(3)
Tree sparrow	*Passer montana*	Species of Principal Importance, Staffordshire LBAP and Red List	3	1(3)
Meadow pipit	*Anthus pratensis*	Amber List	18	2(3)
Bullfinch	*Pyrrhula pyrrhula*	Species of Principal Importance, Staffordshire LBAP and Amber List	3	1(3)
Linnet	*Linaria cannabina*	Species of Principal Importance, Staffordshire LBAP and Red List	10	1(3)
Lesser redpoll	*Acanthis cabaret*	Species of Principal Importance and Red List	3	1(3)

[27] Bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) are subject to additional protection while breeding and hence is not applicable wintering birds.

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Yellowhammer	*Emberiza citrinella*	Species of Principal Importance, Staffordshire LBAP and Red List	9	1(3)
Reed bunting	*Emberiza schoeniclus*	Species of Principal Importance, Staffordshire LBAP and Amber List	6	1(3)

4.5.3 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Pipe Ridware Floodplain does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species recorded are in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

Moreton Meadows (000-WB1-201001)

4.5.4 Three survey visits were carried out at Moreton Meadows on 18 January, 16 February and 15 March 2017. A total of 37 species of bird were recorded during the surveys at Moreton Meadows of which 15 are notable. Table 11 provides a summary of notable species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 11: Notable wintering bird survey records from Moreton Meadows (000-WB1-201001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Wigeon	*Anas penelope*	Amber List	28	2(3)
Mallard	*Anas platyrhynchos*	Amber List	27	2(3)
Snipe	*Gallinago gallinago*	Staffordshire LBAP and Amber List	7	1(3)
Stock dove	*Columba oenas*	Amber List	6	1(3)
Kestrel	*Falco tinnunculus*	Amber List	1	1(3)
Starling	*Sturnus vulgaris*	Species of Principal Importance and Red List	12	1(3)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	4	1(3)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Song thrush	*Turdus philomelos*	Species of Principal Importance and Red List	1	1(3)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	6	2(3)
Mistle thrush	*Turdus viscivorus*	Red List	1	1(3)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	2	1(3)
Bullfinch	*Pyrrhula pyrrhula*	Species of Principal Importance, Staffordshire LBAP and Amber List	2	1(3)
Lesser redpoll	*Acanthis cabaret*	Species of Principal Importance and Red List	2	1(3)
Yellowhammer	*Emberiza citrinella*	Species of Principal Importance, Staffordshire LBAP and Red List	1	1(3)
Reed bunting	*Emberiza schoeniclus*	Species of Principal Importance, Staffordshire LBAP and Amber List	5	1(3)

4.5.5 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Moreton Meadows does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

CA1 summary

4.5.6 The wintering bird assemblages recorded at Pipe Ridware Floodplain and Moreton Meadows are of local/parish importance.

Colwich to Yarlet (CA2)

Tithebarn Farm (000-WB1-204001)

4.5.7 Two survey visits were carried out at Tithebarn Farm on 16 January and 15 February 2017. A total of 37 species of bird were recorded during the surveys at Tithebarn Farm of which 15 are notable. Table 12 provides a summary of notable species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 12: Notable wintering bird survey records from Tithebarn Farm (000-WB1-204001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Lapwing	Vanellus vanellus	Species of Principal Importance, Staffordshire LBAP and Red List	80	1(2)
Snipe	Gallinago gallinago	Staffordshire LBAP and Amber List	1	1(2)
Peregrine	Falco peregrinus	Schedule 1	1	1(2)
Skylark	Alauda arvensis	Species of Principal Importance, Staffordshire LBAP and Red List	14	1(2)
Starling	*Sturnus vulgaris*	Species of Principal Importance and Red List	10	1(2)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	205	2(2)
Song thrush	Turdus philomelos	Species of Principal Importance and Red List	10	2(2)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	150	2(2)
Mistle thrush	*Turdus viscivorus*	Red List	2	1(2)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	9	2(2)
House sparrow	*Passer domesticus*	Species of Principal Importance, Staffordshire LBAP and Red List	14	2(2)
Meadow pipit	Anthus pratensis	Amber List	4	2(2)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Bullfinch	*Pyrrhula pyrrhula*	Species of Principal Importance, Staffordshire LBAP and Amber List	5	2(2)
Yellowhammer	Emberiza citrinella	Species of Principal Importance, Staffordshire LBAP and Red List	1	1(2)
Reed bunting	Emberiza schoeniclus	Species of Principal Importance, Staffordshire LBAP and Amber List	2	1(2)

4.5.8 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Tithebarn Farm does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

Upper Hanyards (000-WB1-208001)

4.5.9 Three survey visits were carried out at Upper Hanyards on 17 January, 15 February and 16 March 2017. A total of 45 species of bird were recorded during the surveys of which 19 are notable. Table 13 provides a summary of the notable species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 13: Notable wintering bird survey records from Upper Hanyards (000-WB1-208001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Teal	Anas crecca	Amber List	10	1(3)
Mallard	Anas platyrhynchos	Amber List	2	3(3)
Lapwing	Vanellus vanellus	Species of Principal Importance, Staffordshire LBAP and Red List	7	1(3)
Black-headed gull	Chroicocephalus ridibundus	Amber List	23	1(3)
Stock dove	Columba oenas	Amber List	4	1(3)
Kestrel	Falco tinnunculus	Amber List	1	1(3)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Skylark	*Alauda arvensis*	Species of Principal Importance, Staffordshire LBAP and Red List	6	2(3)
Starling	*Sturnus vulgaris*	Species of Principal Importance and Red List	129	2(3)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	280	3(3)
Song thrush	*Turdus philomelos*	Species of Principal Importance and Red List	2	2(3)
Mistle thrush	Turdus viscivorus	Red List	3	3(3)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	1	2(3)
House sparrow	*Passer domesticus*	Species of Principal Importance, Staffordshire LBAP and Red List	20	2(3)
Tree sparrow	*Passer montana*	Species of Principal Importance, Staffordshire LBAP and Red List	18	1(3)
Meadow pipit	*Anthus pratensis*	Amber List	16	1(3)
Bullfinch	Pyrrhula pyrrhula	Species of Principal Importance, Staffordshire LBAP and Amber List	2	1(3)
Linnet	Linaria cannabina	Species of Principal Importance, Staffordshire LBAP and Red List	1	1(3)
Lesser redpoll	Acanthis cabaret	Species of Principal Importance and Red List	20	1(3)
Reed bunting	Emberiza schoeniclus	Species of Principal Importance, Staffordshire LBAP and Amber List	1	1(3)

4.5.10 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Upper Hanyards does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

CA2 summary

4.5.11 The wintering bird assemblages recorded at Tithebarn Farm and Upper Hanyards are of local/parish importance.

Stone and Swynnerton (CA3)

Highlow Meadows (000-WB1-223001)

4.5.12 One survey visit was carried out at Highlow Meadows on 16 January 2017. A total of 33 species of bird were recorded during the survey of which 13 are notable. Table 14 provides a summary of notable species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 14: Notable wintering bird survey records from Highlow Meadows (000-WB1-223001)

Common name	**Scientific name**	**Status**	**Maximum count of individuals during the survey period**	**Number of survey visits during which the species were recorded (out of the total)**
Lesser black-backed gull	*Larus fuscus* ssp. *graellsii*	Amber List	1	1(1)
Herring gull	*Larus argentatus* ssp. *argenteus*	Species of Principal Importance and Red List	1	1(1)
Stock dove	*Columba oenas*	Amber List	6	1(1)
Skylark	Alauda arvensis	Species of Principal Importance, Staffordshire LBAP and Red List	2	1(1)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	9	1(1)
Song thrush	*Turdus philomelos*	Species of Principal Importance and Red List	9	1(1)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	2	1(1)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	5	1(1)
Meadow pipit	*Anthus pratensis*	Amber List	15	1(1)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Bullfinch	*Pyrrhula pyrrhula*	Species of Principal Importance, Staffordshire LBAP and Amber List	1	1(1)
Lesser redpoll	*Acanthis cabaret*	Species of Principal Importance and Red List	1	1(1)
Yellowhammer	*Emberiza citrinella*	Species of Principal Importance, Staffordshire LBAP and Red List	1	1(1)
Reed bunting	*Emberiza schoeniclus*	Species of Principal Importance, Staffordshire LBAP and Amber List	1	1(1)

4.5.13 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Highlow Meadows does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

Hatton Common (000-WB1-228001)

4.5.14 Two survey visits were carried out at Hatton Common on 17 January and 15 February 2017. A total of 34 species of bird were recorded during the surveys at Hatton Common of which 12 are notable. Table 15 provides a summary of notable species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 15: Notable wintering bird survey records from Hatton Common (000-WB1-228001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Teal	*Anas crecca*	Amber List	10	1(2)
Mallard	*Anas platyrhynchos*	Amber List	9	2(2)
Herring gull	*Larus argentatus* ssp. *argenteus*	Species of Principal Importance and Red List	1	1(2)
Stock dove	*Columba oenas*	Amber List	7	1(2)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Skylark	*Alauda arvensis*	Species of Principal Importance, Staffordshire LBAP and Red List	43	2(2)
Starling	*Sturnus vulgaris*	Species of Principal Importance, Staffordshire LBAP and Red List	11	1(2)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	1	1(2)
Song thrush	*Turdus philomelos*	Species of Principal Importance and Red List	4	1(2)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	30	2(2)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	4	2(2)
Bullfinch	*Pyrrhula pyrrhula*	Species of Principal Importance, Staffordshire LBAP and Amber List	1	1(2)
Reed bunting	*Emberiza schoeniclus*	Species of Principal Importance, Staffordshire LBAP and Amber List	2	1(2)

4.5.15 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Hatton Common does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

CA3 summary

4.5.16 The wintering bird assemblages recorded at Highlow Meadows and Hatton Common are of local/parish importance.

Whitmore Heath to Madeley (CA4)

Meece Meadows (000-WB1-231001)

4.5.17 Three survey visits were carried out at Meece Meadows on 19 January, 15 February and 14 March 2017. A total of 48 species of bird were recorded during the surveys at Meece Meadows of which 20 are notable. Table 16 provides a summary of notable

species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 16: Notable wintering bird survey records from Meece Meadows (000-WB1-231001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Pink-footed Goose	Anser brachyrhynchus	Amber List	8	1(3)
Teal	Anas crecca	Amber List	47	1(3)
Mallard	*Anas platyrhynchos*	Amber List	20	3(3)
Shoveler	*Anas clypeata*	Amber List	2	1(3)
Lapwing	*Vanellus vanellus*	Species of Principal Importance, Staffordshire LBAP and Red List	4	2(3)
Snipe	*Gallinago gallinago*	Staffordshire LBAP and Amber List	33	2(3)
Black-headed gull	*Chroicocephalus ridibundus*	Amber List	40	2(3)
Lesser black-backed gull	*Larus fuscus* ssp. *graellsii*	Amber List	16	2(3)
Skylark	*Alauda arvensis*	Species of Principal Importance, Staffordshire LBAP and Red List	2	2(3)
Starling	*Sturnus vulgaris*	Species of Principal Importance and Red List	105	2(3)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	110	3(3)
Song thrush	*Turdus philomelos*	Species of Principal Importance and Red List	3	2(3)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	11	1(3)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	4	3(3)
Tree sparrow	*Passer montana*	Species of Principal Importance, Staffordshire LBAP and Red List	4	1(3)
Grey wagtail	Motacilla cinerea	Red List	2	1(3)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Meadow pipit	*Anthus pratensis*	Amber List	13	1(3)
Bullfinch	Pyrrhula pyrrhula	Species of Principal Importance, Staffordshire LBAP and Amber List	3	1(3)
Linnet	*Linaria cannabina*	Species of Principal Importance, Staffordshire LBAP and Red List	26	1(3)
Reed bunting	Emberiza schoeniclus	Species of Principal Importance, Staffordshire LBAP and Amber List	2	1(3)

4.5.18 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Meece Meadows does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

Whitmore (000-WB1-233001)

4.5.19 Three survey visits were carried out at Whitmore on 18 January, 16 February and 13 March 2017. A total of 48 species of bird were recorded during the surveys at Whitmore of which 18 are notable. Table 17 provides a summary of notable species recorded. No other species not listed in the table were recorded in numbers that would meet the threshold for county value: (>0.5% or British population) or trigger the 'significant wintering sites for wildfowl', as stated in the Staffordshire Wildlife Trust's selection criteria.

Table 17: Notable wintering bird survey records from Whitmore (000-WB1-233001)

Common name	**Scientific name**	**Status**	**Maximum count of individuals during the survey period**	**Number of survey visits during which the species were recorded (out of the total)**
Mallard	*Anas platyrhynchos*	Amber List	7	3(3)
Lapwing	*Vanellus vanellus*	Species of Principal Importance, Staffordshire LBAP and Red List	2	2(3)
Snipe	*Gallinago gallinago*	Staffordshire LBAP and Amber List	67	2(3)
Stock dove	Columba oenas	Amber List	16	1(3)
Kestrel	*Falco tinnunculus*	Amber List	2	1(3)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Skylark	*Alauda arvensis*	Species of Principal Importance, Staffordshire LBAP and Red List	15	2(3)
Starling	*Sturnus vulgaris*	Species of Principal Importance, Staffordshire LBAP and Red List	158	3(3)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	44	2(3)
Song thrush	Turdus philomelos	Species of Principal Importance and Red List	5	3(3)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	114	3(3)
Mistle thrush	*Turdus viscivorus*	Red List	5	1(3)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	4	3(3)
House sparrow	*Passer domesticus*	Species of Principal Importance, Staffordshire LBAP and Red List	2	3(3)
Grey wagtail	*Motacilla cinerea*	Red List	2	2(3)
Meadow pipit	*Anthus pratensis*	Amber List	10	2(3)
Lesser redpoll	Acanthis cabaret	Species of Principal Importance and Red List	9	1(3)
Yellowhammer	Emberiza citrinella	Species of Principal Importance, Staffordshire LBAP and Red List	5	1(3)
Reed bunting	Emberiza schoeniclus	Species of Principal Importance, Staffordshire LBAP and Amber List	2	1(3)

4.5.20 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Whitmore does not meet Staffordshire Wildlife Trust's selection criteria for county value. None of the species are present in numbers that are 0.5% of the total British non-breeding population and the site is not considered to be a significant wintering site for wildfowl. This site is therefore considered to be of local/parish importance.

CA4 summary

4.5.21 The wintering bird assemblages recorded at Meece Meadows and Whitmore are of local/parish importance.

South Cheshire (CA5)

Chorlton Heath (000-WB1-245001)

4.5.22 Three survey visits were carried out at Chorlton Heath on 18 January, 15 February and 13 March 2017. A total of 31 species of bird were recorded during the surveys at Chorlton Heath of which 12 are notable. Table 18 provides a summary of notable species recorded. No other species or population was recorded that would meet the threshold for county value for a site that regularly supports: a wintering county rare or scarce species (which is listed in Table 7 of the guidelines); and/or a wintering population (which is listed in Table 8 of the guidelines), as stated in the Cheshire Wildlife Trust's selection criteria.

Table 18: Notable wintering bird survey records from Chorlton Heath (000-WB1-245001)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Snipe	*Gallinago gallinago*	Amber List	46	1(3)
Lesser black-backed gull	*Larus fuscus* ssp. *graellsii*	Amber List	1	1(3)
Skylark	*Alauda arvensis*	Species of Principal Importance, Cheshire LBAP and Red List	3	1(3)
Starling	*Sturnus vulgaris*	Species of Principal Importance, Cheshire LBAP and Red List	22	1(3)
Fieldfare	*Turdus pilaris*	Schedule 1 and Red List	2	1(3)
Song thrush	*Turdus philomelos*	Species of Principal Importance, Cheshire LBAP and Red List	2	2(3)
Redwing	*Turdus iliacus*	Schedule 1 and Red List	84	1(3)
Mistle thrush	*Turdus viscivorus*	Red List	3	1(3)
Dunnock	*Prunella modularis*	Species of Principal Importance and Amber List	9	3(3)
House sparrow	*Passer domesticus*	Species of Principal Importance, Cheshire LBAP and Red List	4	3(3)
Meadow pipit	*Anthus pratensis*	Amber List	4	2(3)

Common name	Scientific name	Status	Maximum count of individuals during the survey period	Number of survey visits during which the species were recorded (out of the total)
Linnet	*Linaria cannabina*	Species of Principal Importance, Cheshire LBAP and Red List	2	1(3)

4.5.23 Based on these results (and also based on the desk study findings), the wintering bird assemblage recorded at Chorlton Heath does not meet Cheshire Wildlife Trust's selection criteria for county value. The site does not regularly support a wintering county rare or scarce species or population which is respectively listed in Tables 7 and 8 of the guidelines. This site is therefore considered to be of local/parish importance.

CA5 summary

4.5.24 The wintering bird assemblage recorded at Chorlton Heath is of local/parish importance.

5 Hedgerows

5.1 Introduction

5.1.1 This section of the appendix details supplementary ecological baseline data relating to hedgerows not reported in the BID documents that accompanied the main ES. It should be read in conjunction with BID document BID-EC-005-000[28] which accompanied the main ES.

5.2 Methodology

5.2.1 Details of the standard methodology utilised for hedgerow surveys are provided in the Technical Note Ecological Field Survey Methods and Standards which is included within Volume 5: Appendix CT-001-002[29] of the main ES.

5.2.2 The scoping, desk study exercises and surveys reported in the main ES can be found in BID-EC-005-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since production of the main ES.

5.2.3 Sites for hedgerow survey were identified as those that are within and up to 100m of the land required for the construction of the AP revised scheme.

5.3 Deviations, constraints and limitations

5.3.1 All hedgerows within and up to 100m from the land required for the construction of the AP revised scheme were identified from aerial photography and were then scoped and surveyed in the field.

5.3.2 Hedgerow surveys can be undertaken at any time of year but the optimal period is April to October (Department for Environment, Food and Rural Affairs (Defra), 2007[30]). The hedgerow surveys were conducted between July 2016 and January 2017 (hedgerow survey dates are provided in Table 19). Approximately 60% of surveys were undertaken outside of the optimal period. This may have led to an under recording of ground flora at some sites but overall this is unlikely to have detracted from the reliability of the results, as the majority of hedgerows are located in intensive farm land, where because of management practices, few ground flora species are expected to be present.

[28] HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data, Ecological baseline data - hedgerows, BID-EC-005-000*. www.gov.uk/hs2.

[29] HS2 Ltd (2017), High Speed Rail (West Midlands - Crewe), Environmental Statement *Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-0012*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.

[30] Department for Environment, Food and Rural Affairs (2007), *Hedgerow Survey Handbook: A standard procedure for local surveys in the UK*. 2nd edition. Defra, London

5.3.3 Hedgerows are listed as 'important'[31] because they qualify as such under The Hedgerows Regulations 1997 'Wildlife and Landscape' criteria[32]. See notes to Table 19 for descriptions of criteria.

5.4 Baseline

5.4.1 Table 19 provides detail on the new hedgerow baseline information for the respective CAs 1 to 5. The records are mapped within the BID Map Series EC-10 which accompanies the SES and AP ES.

Fradley to Colton (CA1)

5.4.2 Within the Fradley to Colton area a total of 34 additional hedgerows with a combined length of approximately 6.7km were surveyed to determine whether they meet the wildlife and landscape criteria to be considered an 'important' hedgerows under the Hedgerow Regulations. Of those surveyed, 10 qualified as 'important' hedgerows (with a combined length of approximately 2.8km). All 10 of those 'important' hedgerows are located within the land required for the construction of the AP revised scheme.

5.4.3 The surveys determined that:

- all 10 'important' hedgerows qualify under Criterion 7, which is that the hedgerow is adjacent to a bridleway or footpath, a road used as a public path, a byway open to all traffic and includes at least four woody species and at least two of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4;
- two 'important' hedgerows qualify under Criterion 3, which is that the hedgerow contains at least seven woody species specified in Schedule 3;
- four 'important' hedgerows qualify under Criterion 4, which is that the hedgerow contains at least six woody species specified in Schedule 3 and at least three features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4; and
- one 'important' hedgerow qualifies under Criterion 6, which is that the hedgerow contains at least five woody species specified in Schedule 3 and at least four of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4.

5.4.4 The most common woody species found within hedgerows in the Fradley to Colton area were hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*) and blackthorn (*Prunus spinosa*).

5.4.5 The hedgerows within the Fradley to Colton area also function as wildlife corridors. The hedgerow network within the Fradley to Colton area is of county value (and remains unchanged to what is reported in the main ES).

[31] Hedgerow which meets the necessary criteria defined in the Hedgerow Regulations (1997). Note the current assessment only takes into consideration the wildlife and landscape criteria, as archaeological and historical value does not form part of the scope of the ecological assessment

[32] *The Hedgerows Regulations 1997 (No. 1160),* Her Majesty's Stationery Office, London.

Colwich to Yarlet (CA2)

5.4.6 Within the Colwich to Yarlet area a total of 30 additional hedgerows (with a combined length of approximately 3.3km) were surveyed to determine whether they meet the wildlife and landscape criteria to be considered an 'important' hedgerow under the Hedgerow Regulations. Of those surveyed, eight qualified as 'important' hedgerows (with a combined length of approximately 1.1km). All eight of those 'important' hedgerows are located within the land required for the construction of the AP revised scheme.

5.4.7 The surveys determined that:

- four 'important' hedgerows qualify under Criterion 7, which is that the hedgerow is adjacent to a bridleway or footpath, a road used as a public path, a byway open to all traffic and includes at least four woody species and a least two of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4;
- three 'important' hedgerows qualify under Criterion 3, which is that the hedgerow contains at least seven woody species specified in Schedule 3;
- two 'important' hedgerows qualify under Criterion 4, which is that the hedgerow contains at least six woody species specified in Schedule 3 and at least three features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4; and
- one 'important' hedgerow qualifies under Criterion 6, which is that the hedgerow contains at least five woody species specified in Schedule 3 and at least four of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4.

5.4.8 The most common woody species found within hedgerows in the Colwich to Yarlet area were field maple (*Acer campestre*), hazel (*Corylus avellana*), hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), holly (*Ilex aquifolium*), blackthorn (*Prunus spinosa*), pedunculate oak (*Quercus robur*) and dog-rose (*Rosa canina*).

5.4.9 The hedgerows within the Colwich to Yarlet area also function as wildlife corridors. The hedgerow network within the Colwich to Yarlet area is of district/borough value (and remains unchanged to what is reported in the main ES).

Stone and Swynnerton (CA3)

5.4.10 Within the Stone and Swynnerton area a total of 17 additional hedgerows (with a combined length of approximately 3.1km) were surveyed to determine whether they meet the wildlife and landscape criteria to be considered an 'important hedgerow' under the Hedgerow Regulations. Of those surveyed, one qualified as an 'important' hedgerow (with a length of approximately 180m). This 'important' hedgerow is located within the land required for the construction of the AP revised scheme.

5.4.11 The survey determined that the one 'important' hedgerow qualifies under Criterion 6, which is that the hedgerow contains at least five woody species specified on Schedule 3 and at least four of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4.

5.4.12 The most common woody species found within this hedgerow were hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*).

5.4.13 The hedgerows within the Stone and Swynnerton area also function as wildlife corridors. The hedgerow network within the Stone and Swynnerton area is of district/borough value (and remains unchanged to what is reported in the main ES).

Whitmore Heath to Madeley (CA4)

5.4.14 Within the Whitmore Heath to Madeley area 17 additional hedgerows (with a combined length of approximately 1.5km) were surveyed to determine whether they meet the wildlife and landscape criteria to be considered an 'important' hedgerow under the Hedgerow Regulations. Of those surveyed one qualified as an 'important' hedgerow (with a length of approximately 60m). This 'important' hedgerow is located within the land required for the construction of the AP revised scheme.

5.4.15 The surveys determined that:

- the one 'important' hedgerow qualifies under Criterion 7 which is that the hedgerow is adjacent to a bridleway or footpath, a road used as a public path, a byway open to all traffic and includes at least four woody species and a least two of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4; and
- the one 'important' hedgerow qualifies under Criterion 4, which is that the hedgerow contains at least six woody species specified in Schedule 3 and at least three features specified on Schedule 1 Part II paragraph 7 sub-paragraph 4.

5.4.16 The most common woody species found within this hedgerow were hazel (*Corylus avellana*) and hawthorn (*Crataegus monogyna*).

5.4.17 The hedgerows within the Whitmore Heath to Madeley area also function as wildlife corridors. The hedgerow network within the Whitmore to Madeley area is of district/borough value (and remains unchanged to what is reported in the main ES).

South Cheshire (CA5)

5.4.18 Within the South Cheshire area five additional hedgerows (with a combined length of approximately 1km) were surveyed to determine whether they meet the wildlife and landscape criteria to be considered an 'important' hedgerow under the Hedgerow Regulations. Of those, three qualified as 'important' hedgerows (with a combined length of approximately 460m) and are detailed in Table 19. None of those 'important' hedgerows are located within the land required for the construction of the AP revised scheme.

5.4.19 The surveys determined that:

- all three 'important' hedgerows qualify under Criterion 7 which is that the hedgerow is adjacent to a bridleway or footpath, a road used as a public path, a byway open to all traffic and includes at least four woody species and a least two of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4; and

- all three 'important' hedgerows qualify under Criterion 6, which is that the hedgerow contains at least five woody species specified in Schedule 3 and at least four of the features specified in Schedule 1 Part II paragraph 7 sub-paragraph 4.

5.4.20 The most common woody species found within hedgerows in the South Crewe area were hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), holly (*Ilex aquifolium*), blackthorn (*Prunus spinosa*) and dog-rose (*Rosa canina*).

5.4.21 The hedgerows within the South Cheshire area also function as wildlife corridors. The hedgerow network within the Stone and Swynnerton area is of district/borough value (and remains unchanged to what is reported in the main ES).

Table 19: Summary of hedgerows qualifying as 'important' within the West Midlands to Crewe area

Ecology survey code	CA	Centroid OS grid reference	Survey date	Qualifying wildlife and landscape criteria*							Within the land required for the construction of the AP revised scheme (Yes/No)
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	
000-HS1-194028	1	SK0924918129	23 January 2017	No	No	No	Yes	No	No	Yes	Yes
000-HS1-194029	1	SK0924918129	23 January 2017	No	No	No	No	No	Yes	Yes	Yes
000-HS1-196006	1	SK0805619643	25 January 2017	No	No	No	Yes	No	No	Yes	Yes
000-HS1- 196017	1	SK0797819482	24 January 2017	No	No	Yes	No	No	No	Yes	Yes
000-HS1-196035	1	SK0785619256	24 January 2017	No	No	No	No	No	No	Yes	Yes
000-HS1-196036	1	SK0806619861	24 January 2017	No	No	No	No	No	No	Yes	Yes
000-HS1-198035	1	SK0584120949	27 January 2017	No	No	No	Yes	No	No	Yes	Yes
000-HS1-198036	1	SK0584120949	27 January 2017	No	No	No	No	No	No	Yes	Yes
000-HS1-199016	1	SK0577821431	11 October 2016	No	No	No	Yes	No	No	Yes	Yes
000-HS1-199040	1	SK0563021406	11 October 2016	No	No	Yes	No	No	No	Yes	Yes
000-HS1-202011	2	SK0268622856	17 November 2016	No	No	Yes	No	No	No	No	Yes
000-HS1-202012	2	SK0241722545	13 July 2016	No	No	Yes	No	No	No	No	Yes
000-HS1-204006	2	SK0068823700	5 October 2016	No	No	No	Yes	No	No	No	Yes
000-HS1-204007	2	SK0073323760	5 October 2016	No	No	No	Yes	No	No	Yes	Yes
000-HS1-206016	2	SJ9916223649	7 December 2016	No	No	Yes	No	No	No	Yes	Yes
000-HS1-206017	2	SJ9907923695	7 December 2016	No	No	No	No	No	Yes	Yes	Yes

Ecology survey code	CA	Centroid OS grid reference	Survey date	Qualifying wildlife and landscape criteria*							Within the land required for the construction of the AP revised scheme (Yes/No)
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	
000-HS1-213017	2	SJ9266927457	5 September 2016	No	No	No	No	No	No	Yes	Yes
000-HS1-215006	2	SJ9123728745	24 August 2016	No	No	No	No	No	Yes	No	Yes
000-HS1-217007	3	SJ9008530450	28 November 2016	No	No	No	No	No	Yes	No	Yes
000-HS1-238005	4	SJ7530745364	12 January 2017	No	No	No	Yes	No	No	Yes	Yes
000-HS1-246021	5	SJ7271152559	12 January 2017	No	No	No	No	No	Yes	Yes	No
000-HS1-247008	5	SJ7138852675	14 July 2016	No	No	No	No	No	Yes	Yes	No
000-HS1-247018	5	SJ7066852778	14 July 2016	No	No	No	No	No	Yes	Yes	No

***** Key to wildlife and landscape criteria used in Table 19

1. Hedgerow is obviously less than 30 years in age;

2. Hedgerow contains species listed on either:

- Schedule 1 Part I of the Wildlife and Countryside Act (1981 as amended);
- Schedule 5 of the Wildlife and Countryside Act (1981 as amended);
- Schedule 8 of the Wildlife and Countryside Act (1981 as amended); and/or
- categorised as either:
  - a declining breeder (Category 3) in 'Red Data Birds in Britain'; or
  - 'endangered', 'extinct', 'rare' or 'vulnerable' in Britain in British Red Data Books for vascular plants, insects, and invertebrates other than insects.

3. Hedgerow contains at least seven woody species that are listed in Schedule 3 of The Hedgerows Regulations 1997;

4. Hedgerow contains at least six woody species that are listed in Schedule 3 and at least three of the following features (such as at least three woodland species [listed in Schedule 2], ditches, banks and standard trees) described in Schedule 1 Part II paragraph 7 sub-paragraph 4 of The Hedgerows Regulations 1997, namely;

- a bank or wall which supports the hedgerow along at least one half of its length;
- gaps which in aggregate do not exceed 10% of the length of the hedgerow;
- where the length of the hedgerow does not exceed 50m, at least one standard tree;
- where the length of the hedgerow exceeds 50m but does not exceed 100m, at least 2 standard trees;
- where the length of the hedgerow exceeds 100m, such number of standard trees (within any part of its length) as would, when averaged over its total length, amount to at least one for each 50m;
- at least three woodland species (listed in Schedule 2) within 1m, in any direction, of the outermost edges of the hedgerow;
- a ditch along at least one half of the length of the hedgerow;
- connections scoring four points or more - connection with another hedgerow scores one point and a connection with a pond or a woodland in which the majority of trees are broad-leaved trees scores two points; and a hedgerow is connected with something not only if it meets it but also if it has a point within 10m of it and would meet it if the line of the hedgerow continued; and/or
- a parallel hedge within 15m of the hedgerow.

5. Hedgerow contains at least six woody species that are listed in Schedule 3 of The Hedgerows Regulations 1997, including one of the following:

- black-poplar tree (*Populus nigra* ssp. *betulifolia*);
- large-leaved lime (*Tilia platyphyllos*);
- small-leaved lime (*Tilia cordata*); and/or
- wild service-tree (*Sorbus torminalis*).

6. Hedgerow containing at least five woody species that are listed on Schedule 3 and at least four of the features (such as at least three woodland species [listed in Schedule 2], ditches, banks and standard trees) described in Schedule 1 Part II paragraph 7 sub-paragraph 4 of The Hedgerows Regulations 1997; and

7. Hedgerow is adjacent to a bridleway or footpath, a road used as a public path, a byway open to all traffic and includes at least four woody species and a least two of the features (such as at least three woodland species [listed in Schedule 2], ditches, banks and standard trees) described in Schedule 1 Part II paragraph 7 sub-paragraph 4 of The Hedgerows Regulations 1997.

6 Great crested newts

6.1 Introduction

6.1.1 This section of the appendix details supplementary ecological baseline data relating to amphibians not reported in the BID documents that accompanied the main ES. It should be read in conjunction with BID-EC-007-000[33].

6.2 Methodology

6.2.1 Details of the standard methodology utilised for amphibian (great crested newt) surveys are provided in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards, which is included within Volume 5: Appendix CT-001-002 of the main ES[34].

6.2.2 The scoping, desk study exercises and surveys reported in the main ES can be found in BID-EC-007-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since production of the main ES.

6.2.3 The scope of additional amphibian surveys undertaken in 2017 was informed by the pond scoping exercise for the original scheme, as reported in BID-EC-007-000.

6.2.4 Since completion of additional amphibian surveys in 2017, a subsequent pond scoping exercise was undertaken on the basis of the AP revised scheme and the results of the additional surveys. The intention of this scoping exercise was to identify any additional unsurveyed ponds that are considered relevant to the assessment of the AP revised scheme. These ponds are included within SES and AP ES Volume 5: Maps EC-04-301 to EC-04-317. The methodology for the updated scoping exercise followed that described within BID-EC-007-000.

6.3 Deviations, constraints and limitations

Deviations

6.3.1 Deviations from the methodology stated in the main ES Volume 5: Appendix CT-001-002 document for the 2017 great crested newt surveys were applied as follows:

- a number of water bodies were not surveyed within the times stated in Natural England guidance[35] (two visits required between mid-April and mid-May for P/A and three visits required for population size class (PSC) surveys during this period);

[33] HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data, Ecological baseline data – amphibian and pond and canal surveys, BID-EC-007-000.* www.gov.uk/hs2 .
[34] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe), Environmental Statement Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-002.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.
[35] English Nature (2001), Great Crested Newt Mitigation Guidelines. English Nature, Peterborough

- a number of water bodies were surveyed on fewer occasions than the required four visits for P/A survey or six visits for PSC surveys, as stated in Natural England guidance[36]. Where this has occurred with positive results for great crested newt presence, the results tables state this as partial surveys;
- where eDNA results were inconclusive or negative, and the pond margin was <80% accessible, then traditional P/A surveys were employed instead; and
- where traditional P/A survey methods indicated presence of great crested newt this took precedence over eDNA results that either indicated absence or were inconclusive.

6.3.2 The deviations above have been undertaken using professional judgement and a risk based approach to give sufficient confidence in the survey results.

Survey constraints and limitations

6.3.3 Samples of eDNA from the three ponds listed below (pond reference followed by result received and Community Area (CA) reference) were lost by the courier for a period of several weeks.

- pond 000-AA1-198004 (fail, CA1);
- pond 000-AA1-210018 (absent, CA2); and
- pond 000-AA1-245028 (absent, CA5).

6.3.4 All three samples were subsequently found and tested. None yielded positive results and all were deemed as having inconclusive results (due to the inability to trust the results received), with further surveys required.

6.3.5 Four ponds required full P/A survey, of either four or six visits, but received partial visits due to ponds drying out prior to completion of the required visits. Where this occurred the pond surveys are considered complete. These are:

- pond 000-AA1-197020 (CA1); and
- ponds 000-AA1-240004, 000-AA1-240015 and 000-AA1-240008 (CA5).

6.3.6 Six ponds required full P/A survey, of either four or six visits (if presence of great crested newt is established during the first four surveys, an additional two surveys are required for PSC), but received only partial visits due to inclement weather, avoidance of disturbance to nesting birds, and/or land access constraints during the survey period. These are:

- ponds 000-AA1-197019, 000-AA1-197014 and 000-AA1-197021 (CA1); and
- ponds 000-AA1-204012, 000-AA1-209001 and 000-AA1-213017 (CA2).

6.3.7 Three ponds, requiring a total of four P/A surveys, received less than two survey visits between mid-April and mid-May, due to inclement weather, avoidance of disturbance to nesting birds, and/or land access constraints during the survey period: These are:

[36] English Nature (2001), Great Crested Newt Mitigation Guidelines. English Nature, Peterborough

- ponds 000-AA1-198013 and 000-AA1-198015 (CA1); and
- pond 000-AA1-205005 (CA5).

6.3.8 Twelve ponds, requiring a total of three P/A or PSC surveys (great crested newt present), received less than the three required surveys between mid-April and mid-May, due to inclement weather, avoidance of disturbance to nesting birds, and/or land access constraints during the survey period. These are:

- ponds 000-AA1-198002 and 000-AA1-200032 (CA1);
- ponds 000-AA1-202012, 000-AA1-203024, 000-AA1-204004, 000-AA1-213003 and 000-AA1-213004 (CA2);
- ponds 000-AA1-222017, 000-AA1-222019, 000-AA1-222044 and 000-AA1-222050 (CA3); and
- pond 000-AA1-232003 (CA4).

6.3.9 Four ponds were surveyed beyond mid-June (up to 30th June 2017), due to land access constraints:

- pond 000-AA1-200007 - good spread of survey dates across season, but last survey undertaken on 27th June 2017 (CA1);
- 000-AA1-218012 - good spread of survey dates across season, but last survey undertaken on 19th June 2017 (CA3); and
- ponds 000-AA1-203005 - last two survey visits on 19th and 22nd June 2017 - and 000-AA1-204004 - last survey on 26th June 2017 (CA2).

6.3.10 The water levels of certain ponds between 2016 and 2017 have caused the surface area of some ponds to change due to the following situations, these are listed in Table 20:

- ponds have merged together, one or more ponds now forming one pond. These have either retained one of the Ecology Survey Codes or have been assigned a new Ecology Survey Code;
- some ponds have disappeared, pond found not to exist in 2017. The Ecology Survey Code has been removed; and
- mapped prior to site visit (from aerial mapping) as being two ponds, but upon first visit were found to be one pond (ponds that have merged or that were always one pond and were incorrectly mapped). One of the two Ecology Survey Codes has been removed from use.

Table 20: Revised Ecology Survey Codes following surveys undertaken in 2017

CA	Revised Ecology Survey Code	Previous Ecology Survey Codes, as reported in BID-EC-007-000 (merged ponds 2017)
CA1	000-AA1-191004	000-AA1-191004 and 000-AA1-192001
CA1	000-AA1-190004	000-AA1-190005, 000-AA1-190006, 000-AA1-190007, 000-AA1-190013, 000-AA1-190014, 000-AA1-190015, 000-AA1-190034, 000-AA1-190035, 000-AA1-190044 and 000-AA1-190047

CA	Revised Ecology Survey Code	Previous Ecology Survey Codes, as reported in BID-EC-007-000 (merged ponds 2017)
CA1	Code removed	000-AA1-195009
CA1	Code removed	000-AA1-195013
CA1	Code removed	000-AA1-199013
CA2	000-AA1-213019	000-AA1-213013 and 000-AA1-213014
CA2	000-AA1-203024	000-AA1-203012 and 000-AA1-203013
CA2	Code removed	000-AA1-202018
CA3	000-AA1-222050	000-AA1-222045 and 000-AA1-222046
CA3	000-AA1-223016	000-AA1-223016 and 000-AA1-223017
CA3	000-AA1-229009	000-AA1-229004, 000-AA1-229005, 000-AA1-229006 and 000-AA1-229007
CA3	Code removed	000-AA1-221031
CA4	000-AA1-223008	000-AA1-233008 and 000-AA1-233039
CA5	000-AA1-244016	000-AA1-244016 and 000-AA1-244017
CA5	000-AA1-241021	000-AA1-241021 and 000-AA1-241023
CA5	000-AA1-241023	000-AA1-241020 and 000-AA1-241022
CA5	000-AA1-244016	000-AA1-244016 and 000-AA1-241017
CA5	000-AA1-247081	000-AA1-247002, 000-AA1-247003, 000-AA1-247004, 000-AA1-247006 and 000-AA1-247057
CA5	000-AA1-246007	000-AA1-246008 and 000-AA1-246007
CA5	Code removed	000-AA1-242011
CA5	Code removed	000-AA1-243019
CA5	Code removed	000-AA1-247079
CA5	Code removed	000-AA1-247080

6.3.11 The following ponds were also found to have merged during surveys in 2017, but these have retained their Ecology Survey Codes due to them containing survey data from 2016, as reported in the BID document BID-EC-007-000 that accompanied the main ES:

- 000-AA1-196004 and 000-AA1-196003, 000-AA1-197038 and 000-AA1-197032 (CA1); and
- 000-AA1-234005 and 000-AA1-234004, 000-AA1-232010 and 000-AA1-232009 (CA4).

6.3.12 Certain ponds were found to have significantly dried out at the time of the eDNA and were dry at first P/A survey and were removed from further survey[37]. These include:

- 000-AA1-203016, 000-AA1-212006 000-AA1-212007, and 000-AA1-215013 (CA2); and
- 000-AA1-221003, 000-AA1-224003 and 000-AA1-224001 (CA3).

6.3.13 Occasionally HSI, and eDNA or P/A survey were undertaken on the same day, in which case, the need for surveys was not based on solely the HSI itself.

6.3.14 During P/A and PSC surveys certain survey methods (torching) made it difficult to determine species where both palmate newt and smooth newt were present in a pond and this had implications for the interpretation of the respective population size classes. This is further discussed in paragraph 6.4.121 (CA5).

6.3.15 Given the constraints set out above, key desk study data, aerial photography and surveyor local knowledge has been drawn on to augment the survey findings. Where field survey has been constrained, where appropriate, a precautionary approach has been followed to provide a reasonable worst case baseline.

6.4 Baseline

Fradley to Colton (CA1)

Survey extent

6.4.1 BID-EC-007-000 reported a total of 248 ponds that required further survey, which included:

- 28 ponds which subsequently had surveys completed in 2016;
- 199 unsurveyed ponds that had no access in 2016 and surveys remained outstanding; and
- 21 ponds that received a partial suite of survey types and/or incomplete survey visits in 2016 (and required completion).

6.4.2 Following the 2016 surveys reported in BID-EC-007-000, a total of 220 ponds required either full or partial surveys.

6.4.3 A total of 106 ponds were able to be surveyed in 2017, using at least one of the following survey methods: HSI, eDNA, P/A and/or PSC.

6.4.4 No additional ponds were identified as requiring survey within the Fradley to Colton area, as a result of the scoping exercise undertaken on ponds within 250m of the land required for the AP revised scheme.

[37] The majority of these have been listed in the tables of ponds scoped out at HSI as both P/A survey and HSI were done on the same day.

Field survey

HSI / walkover surveys

6.4.5 HSI surveys were conducted on a total of 86 ponds in 2017. Of these, 84 ponds were not previously subject to HSI and two were repeat surveys on ponds that were dry and/or surveyed late in the season in 2016.

6.4.6 Following the completion of the HSI surveys 18 waterbodies, identified in Table 21, were scoped out of requiring further survey.

Table 21: Summary of locations where requirement for further survey was scoped out following HSI in the Fradley to Colton area

Ecology Survey Code	CA	Location	Ordnance Survey (OS) Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-188019	CA1	South-west of the A513 Alrewas Road	SK1418915331	Large lined lagoon containing digestate (HSI score 0.52)	Within land required
000-AA1-188020	CA1	North-east of Alrewas Hayes	SK1410415356	Concrete lined effluent store full of hay and manure (HSI Score 0.41)	Within land required
000-AA1-193006	CA1	North-east of Pipe Ridware	SK0966917846	Ditch with flowing water (HSI Score 0)	Within land required
000-AA1-194002	CA1	South-west of Pipe Wood Lane	SK0925518130	Dry pond (HSI Score 0)	Within land required
000-AA1-196007	CA1	South-west of Stonyford Lane	SK0722919507	Dry pond (HSI Score 0)	Within land required
000-AA1-196011	CA1	South-east of B5014 Uttoxeter Road	SK0804219327	Running water (HSI Score 0.52)	20m east
000-AA1-196015	CA1	South-east of Black Flatts Farm	SK0709119097	Cess pit (HSI Score 0.51)	396m south-west
000-AA1-196016	CA1	South-west of Stonyford Lane	SK0741819575	Dry intersection of land-drains in woodland (HSI Score 0)	73m north-east
000-AA1-197006	CA1	North-west of Blithbury Road	SK0715120277	Dry pond (HSI Score 0)	Within land required
000-AA1-197025	CA1	North-east of Blithbury Road	SK0762320688	Dry former pond (HSI Score 0)	116m north-east

Ecology Survey Code	CA	Location	Ordnance Survey (OS) Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-197026	CA1	North-east of Blithbury Road	SK0768620702	Dry pond (unvegetated hollow) (HSI Score 0)	175m north-east
000-AA1-197027	CA1	South-west of Black Flatts Farm	SK0673719503	Cess pit (HSI Score 0.48)	358m south-west
000-AA1-197029	CA1	South-east of Blithbury Road	SK0641619121	Not a pond, slight depression in an arable field which may flood slightly after rain. Was almost completely dry (HSI Score 0)	112m south-east
000-AA1-198012	CA1	South-west of Blithbury Road	SK0548620383	Dry pond (HSI Score 0)	227m north-west
000-AA1-199008	CA1	South-east of Newlands Lane	SK0572121460	Dry pond (HSI Score 0)	Within land required
000-AA1-199010	CA1	South-east of Moor Lane, Colton (Hedge 1)	SK0509221233	Not a pond, part of a flowing-water stream immediately downstream of minor bridge/weir (HSI Score 0)	196m south-east
000-AA1-200003	CA1	South-east of the B5013 Uttoxeter Road	SK0454421554	Dry former pond (HSI Score 0)	Within land required
000-AA1-200027	CA1	South-east of the B5013 Uttoxeter Road	SK0442521332	Dry end of ditch (HSI Score 0)	Within land required

6.4.7 The HSI score indicated great crested newt suitability for 70 ponds in the Fradley to Colton area, these ponds were recommended for eDNA and/or P/A surveys.

eDNA surveys

6.4.8 The eDNA survey method was conducted at 54 ponds in the Fradley to Colton area. The summary of results of the eDNA surveys, including those with anomalies are detailed in Table 22.

6.4.9 The eDNA analysis confirmed presence of great crested newt in six ponds. Those with negative results due to partial access, that were inconclusive, or that were found to have anomalies were put forward for traditional P/A surveys.

Table 22: Summary of relevant results from eDNA presence / absence surveys in the Fradley to Colton area

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-188005	CA1	North-west of Cranberry	SK1319814016	18 April 2017	70	No inflows present	Absent (Partial Access)	27m north-east
000-AA1-188009	CA1	South-west of Alrewas Hayes	SK1344914549	18 April 2017	100	Present and wet	Absent	Within land required
000-AA1-188011	CA1	North-west of Alrewas Hayes	SK1365914774	18 April 2017	100	Present and wet	Absent	Within land required
000-AA1-188013	CA1	North-west of Pool Wood And Fradley Reservoir	SK1399914469	30 May 2017	10	N/A	Absent (Partial Access)	403m south-east
000-AA1-188015	CA1	North-east of Pool Wood And Fradley Reservoir	SK1420314601	18 April 2017	50	Present and dry	Absent (Partial Access)	574m south-east
000-AA1-188016	CA1	North-east of Pool Wood And Fradley Reservoir	SK1420514610	18 April 2017	50	Present and dry	Absent (Partial Access)	573m south-east
000-AA1-188018	CA1	North-east of Alrewas Hayes	SK1394114940	18 April 2017	100	No inflows present	Absent	313m north-east
000-AA1-190001	CA1	South-west of Ashby Sitch	SK1235315261	19 April 2017	50	Present and wet	Absent (Partial Access)	85m south-east
000-AA1-190002	CA1	South-east of the A515 Lichfield Road	SK1233815251	19 April 2017	50	Present and wet	Absent (Partial Access)	73m north-east
000-AA1-190011	CA1	North-east of Trent and Mersey Canal	SK1099215287	21 June 2017	100	Present and wet	Absent (Discernible flow of water)	241m north-west
000-AA1-191001	CA1	North-west of A515 Lichfield Road	SK1182916553	08 May 2017	100	Present and wet	Absent	87m north-west
000-AA1-191002	CA1	North-east of Westfield Covert	SK1128816618	19 April 2017	50	No inflows present	Present	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-191003	CA1	South-east of Echills	SK1095416333	19 April 2017	80	No inflows present	Absent	Within land required
000-AA1-192002	CA1	South-west of A513 Rugeley Road.	SK1028316770	20 April 2017	100	No inflows present	Absent	90m south-west
000-AA1-192005	CA1	North-east of River Trent	SK1092517510	20 April 2017	100	Present and wet	Absent	324m south-east
000-AA1-192008	CA1	North-west of River Blithe	SK1100917413	23 May 2017	80	No inflows present	Absent	420m south-east
000-AA1-192009	CA1	North-east of Trentside Meadows	SK1034017091	20 April 2017	100	No inflows present	Fail	32m south-west
000-AA1-192010	CA1	South-west of Kings Bromley Lane	SK1041416787	20 April 2017	100	No inflows present	Absent	41m south-west
000-AA1-192011	CA1	South-west of Kings Bromley Lane	SK1033716747	20 April 2017	100	No inflows present	Absent	101m south-west
000-AA1-193002	CA1	South-west of A515 Lichfield Road	SK1031018098	21 April 2017	100	Present and wet	Absent	55m north-west
000-AA1-193005	CA1	North-west of Pipe Ridware	SK0943217889	30 May 2017	10	Present and wet	Absent (Partial Access)	Within land required
000-AA1-193007	CA1	North-west of Pipe Ridware	SK0952917862	30 May 2017	60	Present and wet	Absent (Partial Access)	Within land required
000-AA1-193011	CA1	North-east of the B5014 Uttoxeter Road	SK0923316972	27 April 2017	100	No inflows present	Absent	48m north-east
000-AA1-195003	CA1	North-east of Pipe Wood Lane (Hedge 4)	SK0873119463	21 April 2017	50	Present and wet	Absent (Partial Access)	208m north-east
000-AA1-196002	CA1	North-west of B5014 Uttoxeter Road	SK0792719838	31 May 2017	50	No inflows present	Absent (Partial Access)	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-196003	CA1	South-west of Stonyford Lane	SK0746219532	18 April 2017	60	Present and dry	Absent (Partial Access)	74m north-east
000-AA1-196004	CA1	South-west of Stonyford Lane	SK0742419543	18 April 2017	100	Present and dry	Absent	27m north-east
000-AA1-196010	CA1	South-east of Black Flatts Farm	SK0705519354	31 May 2017	65	No inflows present	Absent (Partial Access)	138m south-west
000-AA1-196017	CA1	South-west of Black Flatts Farm	SK0677619170	19 April 2017	80	No inflows present	Present	277m north-east
000-AA1-196035	CA1	South-west of Stonyford Lane	SK0738519515	08 May 2017	90	No inflows present	Absent	Within land required
000-AA1-197007	CA1	South-west of Stonyford Lane	SK0682519883	19 April 2017	80	No inflows present	Absent	247m south-west
000-AA1-197009	CA1	South-east of Blithbury Road	SK0660219815	23 May 2017	100	No inflows present	Present	264m north-east
000-AA1-197010	CA1	South-east of Newlands Lane Track (Hedge 1)	SK0728520869	08 May 2017	50	No inflows present	Absent (Partial Access) (Noting subsequent presence of great crested newt recorded through traditional P/A and PSC survey)	267m north-west
000-AA1-197022	CA1	South-west of Newlands Lane Track (Hedge 1)	SK0711821178	24 April 2017	100	No inflows present	Absent	356m north-east
000-AA1-197023	CA1	South-east of Long Mets Lane (Hedge 1)	SK0688120970	24 April 2017	60	No inflows present	Absent (Partial Access)	66m south-east
000-AA1-197032	CA1	North-east of New Barn	SK0586019777	20 April 2017	100	Present and dry	Absent	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-197033	CA1	North-east of New Barn	SK0571319713	20 April 2017	100	Present and dry	Absent	53m south-west
000-AA1-197038	CA1	North-east of New Barn	SK0581719738	20 April 2017	100	Present and dry	Absent	Within land required
000-AA1-198001	CA1	North-west of Newlands Lane Track (Hedge 1)	SK0700821349	31 May 2017	75	Present and dry	Fail (Partial Access)	380m north-east
000-AA1-198002	CA1	South-east of Newlands Lane	SK0660920850	21 April 2017	15	No inflows present	Present	Within land required
000-AA1-198003	CA1	North-east of Long Mets Lane (Hedge 1)	SK0684921202	02 May 2017	100	No inflows present	Absent	184m north-east
000-AA1-198004	CA1	South-east of Newlands Lane	SK0635820670	27 June 2017	40	Present and dry	Fail (Significant Delay, Partial Access)	Within land required
000-AA1-198005	CA1	South-west of Newlands Lane (Hedge 6)	SK0662621159	31 May 2017	90	No inflows present	Absent	Within land required
000-AA1-198007	CA1	North-west of Newlands Lane	SK0643521364	02 May 2017	60	No inflows present	Absent (Partial Access)	212m north-east
000-AA1-198009	CA1	North-west of Newlands Lane	SK0609321220	02 May 2017	10	No inflows present	Absent (Partial Access)	Within land required
000-AA1-198013	CA1	South-west of Blithbury Road	SK0593220025	20 April 2017	15	No inflows present	Absent (Partial Access)	Within land required
000-AA1-198015	CA1	South-west of Blithbury Road	SK0590720228	20 April 2017	20	Present and dry	Absent (Partial Access)	4m north-east
000-AA1-198016	CA1	North-east of New Barn	SK0566619746	20 April 2017	100	Present and dry	Absent	133m south-west
000-AA1-199001	CA1	North-west of Park Lane	SK0582721754	26 April 2017	100	No inflows present	Absent	247m north-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-199004	CA1	North-east of Sheracop Lane (Hedge 3)	SK0569721967	26 April 2017	90	No inflows present	Absent	330m north-east
000-AA1-200006	CA1	North-west of Inga Thorpe Road B5013	SK0452421739	02 May 2017	100	No inflows present	Present	Within land required
000-AA1-200008	CA1	North-west of Hamley Heath House	SK0445421721	02 May 2017	100	No inflows present	Present	Within land required
000-AA1-200020	CA1	South-west of Lea Hall Farm	SK0450522730	28 April 2017	90	No inflows present	Absent	334m north-west
000-AA1-201007	CA1	South-east of Lount Farm	SK0351321925	28 April 2017	80	No inflows present	Absent	28m south-west

P/A and PSC surveys

6.4.10 P/A or PSC surveys were conducted at 68 ponds in the Fradley to Colton area. The summary of results of the P/A and PSC surveys are detailed in Table 23. This table includes those ponds supporting great crested newt (any lifestage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

6.4.11 Great crested newt was confirmed present in 24 of the 68 ponds subject to P/A or PSC survey, comprising eight medium and 13 small population size classes (one of which was incompletely surveyed, pond 000-AA1-197020 which received two of the six required visits). The remaining three ponds all supported lower life stages of great crested newt (no adults recorded present), two ponds were fully surveyed and one pond had an incomplete survey (pond 000-AA1-191010, juvenile only after six visits, pond 000-AA1-200007, only eggs present after six visits and pond 000-AA1-197022 had juvenile present after four of the six required visits).

6.4.12 Thirty-nine ponds (six with an incomplete set of visits) were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 23.

6.4.13 Five ponds were identified as not supporting great crested newt in 2017 (noting one with historic presence of great crested newt through eDNA survey alone), but supported good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) these are also shown in Table 23.

6.4.14 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any pond in Table 23 with fewer than 6 visits completed.

Table 23: Summary of results of P/A or PSC surveys with associated amphibian populations in the Fradley to Colton area

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-188005	CA1	North-west of Cranberry	SK1319814016	P/A	4	28 March 2017	09 May 2017		10 (G)			3 (L)	27m north-east
000-AA1-188016	CA1	North-east of Pool Wood And Fradley Reservoir	SK1420514610	P/A	4	27 March 2017	16 May 2017		10 (G)		Tadpoles only		573m south-east
000-AA1-188018	CA1	North-east of Alrewas Hayes	SK1394114940	P/A	2	28 March 2017	18 April 2017		38 (G)		1 (L)		313m north-east
000-AA1-191001	CA1	North-west of A515 Lichfield Road	SK1182916553	P/A	3	06 April 2017	11 May 2017		40 (G)		Tadpoles only	1 (L)	87m north-west
000-AA1-191005	CA1	North-east of Trent and Mersey Canal	SK1051415496	PSC	6	30 March 2017	30 May 2017	18 (M)	6 (L)		1 (L)	1 (L)	221m north-east
000-AA1-191010	CA1	North-east of Trent and Mersey Canal	SK1056515833	PSC	6	30 March 2017	25 May 2017	Juveniles only			1 (L)		218m south-west
000-AA1-193001*	CA1	South-west of Trentside Meadows	SK0993817080	PSC	6	30 March 2017	06 June 2017	*See notes below	2 (L)		Juveniles, tadpoles and spawn	105 (G)	Within land required
000-AA1-194007	CA1	North-east of Pipe Wood Lane	SK0935718544	PSC	6	29 March 2017	23 May 2017	4 (S)	10 (G)		1 (L)	1 (L)	80m north-east

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-196017	CA1	South-west of Black Flatts Farm	SK0677619170	PSC	6	28 March 2017	23 May 2017	4 (S)	1 (L)		1 (L)	1 (L)	277m north-east
000-AA1-196019	CA1	South-west of Black Flatts Farm	SK0679719296	PSC	6	28 March 2017	23 May 2017	15 (M)	20 (G)		Tadpoles only		373m south-west
000-AA1-197002	CA1	South-west of Stonyford Lane	SK0697119825	PSC	6	28 March 2017	23 May 2017	9 (S)					125m north-west
000-AA1-197003	CA1	North-west of Blithbury Road	SK0738220439	PSC	6	29 March 2017	31 May 2017	1 (S)	2 (L)		1 (L)		84m south-west
000-AA1-197008	CA1	South-east of Newlands Lane Track (Hedge 1)	SK0749320964	PSC	6	28 March 2017	01 June 2017	11 (M)	10 (G)		Tadpoles only		289m north-west
000-AA1-197010	CA1	South-east of Newlands Lane Track (Hedge 1)	SK0728520869	PSC	6	29 March 2017	31 May 2017	2 (S)	5 (L)				267m north-west
000-AA1-197011	CA1	South-east of Newlands Lane Track (Hedge 1)	SK0737221009	PSC	6	27 March 2017	06 June 2017	15 (M)	4 (L)		1 (L)	1 (L)	349m north-west
000-AA1-197015	CA1	South-east of Newlands Lane Track (Hedge 1)	SK0721021136	PSC	6	27 March 2017	06 June 2017	8 (S)	4 (L)		1 (L)	1 (L)	416m north-east
000-AA1-197016	CA1	South-west of Blithbury Road	SK0646320169	PSC	6	29 March 2017	31 May 2017	1 (S)				5 (L)	60m south-west

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-197017	CA1	South-east of Long Mets Lane (Hedge 1)	SK0706621003	PSC	6	28 March 2017	06 June 2017	7 (S)	6 (L)			1 (L)	252m north-east
000-AA1-197020	CA1	North-west of Blithbury Road	SK0622319936	P/A	2	29 March 2017	20 April 2017	1 (S)	10 (G)				57m north-east
000-AA1-197022	CA1	South-west of Newlands Lane Track (Hedge 1)	SK0711821178	P/A	4	27 March 2017	18 May 2017	Juvenile only (during refuge search)					356m north-east
000-AA1-197024	CA1	South-east of Newlands Lane Track (Hedge 1)	SK0726021073	PSC	6	28 March 2017	06 June 2017	29 (M)	10 (G)		1 (L)	6 (L)	433m north-east
000-AA1-198002	CA1	South-east of Newlands Lane	SK0660920850	PSC	6	12 April 2017	13 June 2017	2 (S)					Within land required
000-AA1-199002	CA1	North-east of Newlands Lane	SK0569821566	PSC	6	30 March 2017	09 May 2017	2 (S)	2 (L)				67m north-east
000-AA1-199003	CA1	North-west of Stockwell Heath	SK0563221580	PSC	6	08 May 2017	07 June 2017	25 (M)	14 (G)				4m north-east
000-AA1-200006	CA1	North-west of the B5013 Uttoxeter Road	SK0452421739	PSC	6	02 May 2017	07 June 2017	17 (M)	16 (G)				Within land required
000-AA1-200007	CA1	North-west of Hamley Heath House	SK0446121679	PSC	6	06 April 2017	27 June 2017	Eggs only				1 (L)	10m south-west

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-200008	CA1	North-west of Hamley Heath House	SK0445421721	PSC	6	02 May 2017	07 June 2017	21 (M)	4 (L)	1 (L)			Within land required
000-AA1-200032	CA1	North-west of B5013 Uttoxeter Road	SK0453721737	PSC	6	11 May 2017	13 June 2017	1 (S)	1 adult male recorded during torch survey, indeterminate species: may be palmate or smooth newt.				Within land required
000-AA1-201009	CA1	South-west of Lount Farm	SK0334722090	PSC	6	04 April 2017	07 June 2017	2 (S)	5 (L)				125m south-west

Key:

Bracketed text within species column indicates relative population size class for the peak count obtained as follows:

-Great crested newt: peak count 1-10 individuals = Small (S); peak count 11-100 individuals = Medium (M); peak count >100 individuals = Large (L).

-Smooth and palmate newt: peak count <10 individuals = Low (L); peak count 10-100 individuals = Good (G); peak count >100 individuals = Exceptional (E).

-Common frog: peak count <50 individuals or spawn clumps counted = Low (L); peak count 50-500 individuals or spawn clumps counted = Good (G); peak count >500 individuals or spawn clumps counted = Exceptional (E).

-Common toad: peak count <100 individuals = Low (L); peak count 100-1000 individuals = Good (G); peak count >1000 individuals = Exceptional (E).

Notes:

The following ponds have anomalies in the P/A and PSC survey results, compared with the eDNA results:

-Pond 000-AA1-193001* (listed in the table above): 6 visits were undertaken in 2017 and despite a positive eDNA result in 2016, no further evidence of great crested newt presence was found through use of traditional survey methods.

-Pond 000-AA1-191002 (not listed in the table above): 6 visits were undertaken in 2017 and despite a positive eDNA result in 2017, no further evidence of great crested newt presence was found through use of traditional survey methods.

Discussion of combined results

6.4.15 Surveys undertaken concluded that 26 of the ponds surveyed in 2017 were found to support populations of great crested newt. These comprise two ponds identified through eDNA survey and 24 ponds identified through P/A survey and/or PSC surveys.

6.4.16 Of the 24 ponds with great crested newt that were subject to P/A and/or PSC survey in 2017, these comprise eight medium and 13 small population (including the incompletely surveyed 000-AA1-197020) size classes. No population size class has been determined for the three remaining ponds. Two of these ponds have been fully surveyed (pond 000-AA1-1910210 with only juvenile presence after six visits and pond 000-AA1-200007 with only egg presence after six visits) and one pond with incomplete PSC survey (pond 000-AA1-197022 with juvenile presence after four visits). In all of the three latter ponds great crested newts have been found in small numbers and can be assumed to represent at least small population size classes.

6.4.17 Over the 2016 and 2017 survey seasons, a total of 36 ponds were found to support populations of great crested newts (12 confirmed in 2016 and 26 confirmed in 2017 – noting some in 2017 are re-confirmations of 2016 ponds). These comprise three ponds identified through eDNA survey only and 33 ponds identified through P/A and/or PSC survey (two of these from incomplete surveys). Of the 33 ponds identified through P/A survey and/or PSC survey, these comprise 10 medium and 23 small population size classes.

6.4.18 Of the 106 ponds surveyed in 2017, 33 of these ponds are within the land required for the AP revised scheme. Of the 33 ponds, seven were found to support populations of great crested newts and 20 were confirmed as not supporting great crested newts (effluent store, pond with digestate, pond dry, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining six ponds is undetermined.

6.4.19 Of the 134 ponds surveyed in 2016 and 2017, 38 of these ponds are within the land required for the AP revised scheme. Of the 38 ponds, seven ponds were found to support populations of great crested newts and 25 ponds were confirmed as not supporting great crested newts (effluent store, pond with digestate, dry pond, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining six ponds is undetermined.

6.4.20 One of the ponds listed as supporting great crested newt (pond 000-AA1-197010) was found to be negative for presence of great crested newt through eDNA survey, but through traditional P/A and PSC survey was found to support this species.

6.4.21 A PSC survey of six visits was undertaken at pond 000-000-AA1-191002 in 2017 and despite a positive eDNA result from survey in 2017, no further evidence of great crested newt presence was found.

6.4.22 The 24 ponds surveyed through P/A and/or PSC surveys in 2017 and found to support populations of great crested newts, also support other amphibian species (smooth newt, palmate newt, common frog and/or common toad). Seven of these ponds were found to support good populations of smooth newt, namely ponds: 000-AA1-194007, 000-AA1-196019, 000-AA1-197008, 000-AA1-197020, 000-AA1-197024, 000-AA1-199003 and 000-AA1-200006.

6.4.23 Five ponds surveyed in 2017, found not to support great crested newt (noting one pond, 000-AA1-193001, was positive for great crested newt eDNA in 2016), support a good population of one of the other amphibian species: smooth newt or common toad. Four ponds were found to support a good population of smooth newt, namely ponds: 000-AA1-188005, 000-AA1-188016, 000-AA1-188018 and 000-AA1-191001. One pond, 000-AA1-193001, was found to support a good population of common toad.

Metapopulations

6.4.24 Following a review of the 2017 survey results four new great crested newt metapopulations (one as a result of merging two metapopulations AMP[38]1.2 and AMP1.3) have been identified. Combined with the 2016 survey data there are a total of nine great crested newt metapopulations identified in the Fradley to Colton area, as detailed in Table 24.

6.4.25 Table 24 provides details of the retained, revised and new metapopulations and the revised list of Ecology Survey Codes for these metapopulations which shows where these have changed significantly from the codes stated in BID-EC-007-000. Table 24 also includes detail of an isolated population at pond 000-AA1-191002.

[38] AMP: Assumed Metapopulation reference.

Table 24: Great crested newt metapopulations identified in the Fradley to Colton area

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
AMP30	South-east of the Trent and Mersey Canal, Fradley Wood area	000-AA1-187001 000-AA1187005 000-AA1-188003 No HS2 Phase2a reference number available/030-AA-187037 in HS2 Phase One[39]	Medium	26m south-east
AMP31	North and south of the Trent and Mersey Canal	000-AA1-188001 000-AA1-188002 000-AA1-188004 000-AA1-188006 000-AA1-188007 000-AA1-188008 000-AA1-188017	Assumed Medium	Within land required
AMP32	Hanch	000-AA1-190020 000-AA1-190021 000-AA1-190022 000-AA1-190023 000-AA1-190024 000-AA1-190025 000-AA1-190026	Assumed Medium	Within land required
AMP1.1	Kings Bromley, south of the River Trent	000-AA1-192014 000-AA1-193001 000-AA1-193016	Medium	Within land required
AMP1.4	Adjacent to the B5013 Uttoxeter Road south-west of Admaston	000-AA1-200006 000-AA1-200007 000-AA1-200008 000-AA1-200010 000-AA1-200013 000-AA1-200019 000-AA1-200021 000-AA1-200024 000-AA1-200030	Medium	Within land required

[39] HS2 Ltd (2015), *High Speed Rail (London – West Midlands), Supplementary Environmental Statement 3 and Additional Provision 4, Supplementary Ecological Baseline Data, Appendix EC-001-003*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/466970/Ecology__EC-001-001__EC-003-001__EC-001-002__EC-003-002__EC-001-003__EC-003-003__EC-001-004__EC-003-004_.pdf. This is a ditch with positive presence of great crested newt through eDNA survey in 2015 (stated in paragraphs 5.1.20 and 5.1.22 and Table 3 Summary of results from 2015 amphibian eDNA presence/absence surveys).

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-200031 000-AA1-200032 000-AA1-201001 000-AA1-201002 000-AA1-201006 000-AA1-201008 000-AA1-201032 000-AA1-201033		
AMP1.5	North of the Trent and Mersey canal and south of the A513 Kings Bromley Lane, near Kings Bromley Marina	000-AA1-191005 000-AA1-191006 000-AA1-191007 000-AA1-191008 000-AA1-191010 000-AA1-191014	Medium	218m south-west
AMP1.6	Between Hill Ridware and Hamstall Ridware	000-AA1-194001 000-AA1-194004 000-AA1-194007 000-AA1-194008 000-AA1-194023	Small	Within land required
AMP1.7	Between Rugeley and Hill Ridware (south of Colton)	000-AA1-195007 000-AA1-195008 000-AA1-195010 000-AA1-195011 000-AA1-195012 000-AA1-195014 000-AA1-195021 000-AA1-196002 000-AA1-196005 000-AA1-196010 000-AA1-196017 000-AA1-196019 000-AA1-196023 000-AA1-196024 000-AA1-196025 000-AA1-196027 000-AA1-196028 000-AA1-196029 000-AA1-197001 000-AA1-197002	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-197003 000-AA1-197008 000-AA1-197009 000-AA1-197010 000-AA1-197011 000-AA1-197014 000-AA1-197015 000-AA1-197016 000-AA1-197017 000-AA1-197019 000-AA1-197020 000-AA1-197021 000-AA1-197022 000-AA1-197024 000-AA1-197030 000-AA1-197031 000-AA1-197034 000-AA1-197035 000-AA1-197039 000-AA1-197040 000-AA1-198001 000-AA1-198002 000-AA1-198004 000-AA1-198008 000-AA1-198014		
AMP1.8	Stockwell Hill Village	000-AA1-199002 000-AA1-199003 000-AA1-199005 000-AA1-199012 000-AA1-199014 000-AA1-199015	Medium	Within land required
000-AA1-191002	North-east of Westfield Covert, adjacent to the southern boundary of Kings Bromley Marina	N/A	Assumed medium	Within land required

Colwich to Yarlet (CA2)

Survey extent

6.4.26 BID-EC-007-000 reported a total of 171 ponds that required further survey, which included:

- 35 ponds which subsequently had surveys completed in 2016;
- 118 unsurveyed ponds that had no access in 2016 and surveys remained outstanding; and
- 18 ponds that received a partial suite of survey types and/or incomplete survey visits in 2016 (and require completion).

6.4.27 Following the 2016 surveys reported in BID-EC-007-000, a total of 136 ponds required either full or partial surveys.

6.4.28 A total of 92 ponds were able to be surveyed in 2017, using at least one of the following survey methods: HSI, eDNA, P/A and/or PSC.

6.4.29 No additional ponds were identified as requiring survey within the Colwich to Yarlet area, as a result of the scoping exercise undertaken on ponds within 250m of the land required for the AP revised scheme.

Field survey

HSI / walkover surveys

6.4.30 HSI surveys were conducted on a total of 69 ponds in 2017. Of these, 63 ponds were not previously subject to HSI surveys and six were repeat surveys on ponds that were dry and/or surveyed late in the season in 2016.

6.4.31 Following the completion of the HSI surveys, 11 waterbodies identified in Table 25 were scoped out of requiring further survey.

Table 25: Summary of locations where requirement for further survey was scoped out following HSI in the Colwich to Yarlet area

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-201027	CA2	North-east of Lount Farm	SK0329222810	Dry pond (HSI Score 0)	Within land required
000-AA1-202015	CA2	South-east of Bishton	SK0245122117	Dry pond (HSI Score 0.36)	136m south-east
000-AA1-204007	CA2	North-east of Little Tixall Lane	SK0093722702	Dry Pond (HSI Score 0)	346m south-east
000-AA1-205007	CA2	North-west of Nursery Way	SJ9984923126	Shown on OS base plans as a stream, but is a section of running water from a pipe, which flows south-west into a	100m south-west

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
				deep steep-sided ditch (HSI Score 0)	
000-AA1-207008	CA2	South-east of Ingestre Wood	SJ9731024104	Pond habitat not evident (HSI Score 0)	38m south-west
000-AA1-213011	CA2	South-east of Marston Lane	SJ9224327266	Pond habitat not evident (HSI Score 0)	105m south-east
000-AA1-213016	CA2	South-east of Marston Lane	SJ9319827838	Pond habitat not evident (HSI Score 0)	195m north-east
000-AA1-215008	CA2	North-east of The Grove	SJ9153729305	Slurry run-off/pump-out pool, heavily polluted by effluent (HSI Score 0.45)	206m south-east
000-AA1-215012	CA2	North-west of A34 Stone Road	SJ9107429062	Pond habitat not evident (HSI Score 0)	Within land required
000-AA1-215014	CA2	South-west of Yarlet Lane	SJ9125728524	Pond habitat not evident (HSI Score 0)	70m south-west
000-AA1-216011	CA2	North-west of A34 Stone Road	SJ9118429602	Running water (stream) (HSI Score 0)	36m north-west

6.4.32 The HSI score indicated great crested newt suitability for 58 ponds in the Colwich to Yarlet area, these ponds were recommended for eDNA and/or P/A surveys.

eDNA surveys

6.4.33 The eDNA survey method was conducted at 46 ponds in the Colwich to Yarlet area. The summary of results of the eDNA surveys, including those with anomalies are detailed within Table 26.

6.4.34 The eDNA analysis confirmed presence of great crested newt in 10 ponds. Those with negative results due to partial access, that were inconclusive, or that were found to have anomalies were put forward for traditional P/A surveys.

Table 26: Summary of results from eDNA presence / absence surveys in the Colwich to Yarlet area

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-201013	CA2	South-east of Upper Moreton	SK0319021938	18 April 2017	100	No inflows present	Absent (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	317m south-west
000-AA1-201017	CA2	South-east of Upper Moreton	SK0314721811	01 June 2017	25	Present and dry	Absent (Partial Access)	404m south-west
000-AA1-201035	CA2	North-west of Lount Farm	SK0337321834	20 June 2017	100	No inflows present	Absent	200m south-west
000-AA1-201036	CA2	North-east of Lount Farm	SK0329522808	20 June 2017	100	Present and wet	Absent	Within land required
000-AA1-202001	CA2	North-west of Upper Moreton	SK0289122168	18 April 2017	80	No inflows present	Absent	148m south-west
000-AA1-202004	CA2	North-west of Lount Farm	SK0316522919	19 April 2017	100	No inflows present	Present	13m south-west
000-AA1-202005	CA2	North-west of Upper Moreton	SK0285122189	18 April 2017	80	No inflows present	Present	159m south-west
000-AA1-202006	CA2	North-east of Lount Farm	SK0306522922	19 April 2017	80	No inflows present	Absent (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	27m north
000-AA1-202007	CA2	North-east of Lount Farm	SK0299623124	19 April 2017	90	No inflows present	Absent	134m north-west
000-AA1-202008	CA2	South-west of Lount Farm	SK0273622748	19 April 2017	100	No inflows present	Absent	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-202014	CA2	North-east of Bishton	SK0245722174	04 May 2017	80	No inflows present	Present	131m north-east
000-AA1-203001	CA2	South-west of Moreton Lane	SK0210422961	02 June 2017	35	No inflows present	Absent (Partial Access)	Within land required
000-AA1-203002	CA2	South-east of Far Coley Farm	SK0191822498	20 April 2017	100	No inflows present	Absent	376m north-west
000-AA1-203003	CA2	North-west of Far Coley Farm	SK0171622562	20 April 2017	80	No inflows present	Absent	305m south-east
000-AA1-203004	CA2	North-west of Far Coley Farm	SK0166422543	20 April 2017	85	No inflows present	Absent	273m south-east
000-AA1-203018	CA2	South-west of Far Coley Farm	SK0175322497	20 April 2017	80	No inflows present	Absent	351m south-east
000-AA1-204008	CA2	North-west of Tithebarn Covert	SK0108122913	21 April 2017	100	No inflows present	Absent	180m south-west
000-AA1-204010	CA2	North-east of Little Tixall Lane	SK0096622675	21 April 2017	100	No inflows present	Absent	383m south-east
000-AA1-204012	CA2	North-west of Little Tixall Lane	SK0081122754	21 April 2017	100	No inflows present	Absent	251m south-east
000-AA1-205003	CA2	North-west of Nursery Way	SJ9980023135	02 June 2017	100	N/A	Absent	92m south-west
000-AA1-207007	CA2	South-east of Tixall Park Pool	SJ9721723655	18 May 2017	40	Present and wet	Absent (Partial Access)	6m south-east
000-AA1-208001	CA2	South-east of Hanyards Lane	SJ9645224099	20 June 2017	100	No inflows present	Absent	30m south-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-209003	CA2	North-west of Ingestre Wood	SJ9637925060	16 May 2017	50	No inflows present	Absent (Partial Access)	207m north-west
000-AA1-210002	CA2	North-west of A518 Weston Road	SJ9504824781	02 May 2017	90	No inflows present	Absent	211m north-west
000-AA1-210003	CA2	South-east of Hopton Pools	SJ9528625848	02 June 2017	70	Present and wet	Fail (Partial Access)	166m north-east
000-AA1-210005	CA2	South-west of Hopton Pools	SJ9514725781	02 June 2017	75	Present and wet	Absent (Partial Access)	8m north-east
000-AA1-210018	CA2	South-west of Hopton Pools	SJ9505825886	27 June 2017	100	No inflows present	Absent (Significant Delay)	135m north-west
000-AA1-211001	CA2	North-west of Wilmore Court	SJ9463526109	02 May 2017	80	No inflows present	Absent	95m north-east
000-AA1-211005	CA2	North-east of Hopton Bank	SJ9436226243	04 May 2017	80	No inflows present	Present	59m north-east
000-AA1-211010	CA2	North-west of Hopton Lane	SJ9400626296	03 May 2017	70	No inflows present	Absent (Partial Access)	Within land required
000-AA1-212003	CA2	North-west of B5066 Sandon Road	SJ9399026934	03 May 2017	80	No inflows present	Absent	Within land required
000-AA1-212004	CA2	South-east of B5066 Sandon Road	SJ9307125889	30 May 2017	75	No inflows present	Fail (Partial Access)	267m south-west
000-AA1-213001	CA2	South-west of Newbuildings Farm	SJ9276026720	03 May 2017	60	No inflows present	Present	310m south-west
000-AA1-213002	CA2	South-east of Marston Lane	SJ9333227583	05 May 2017	80	No inflows present	Absent	181m north-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-213005	CA2	South-east of Marston Lane	SJ93389277769	05 May 2017	100	No inflows present	Absent	353m north-east
000-AA1-213010	CA2	North-west of Marston Lane	SJ92891278835	30 May 2017	50	No inflows present	Present	Within land required
000-AA1-213018	CA2	North-west of Marston Lane	SJ9307827768	20 June 2017	100	No inflows present	Absent	63m north-east
000-AA1-214002	CA2	North-west of Marston Lane	SJ91998277315	30 May 2017	100	No inflows present	Absent	115m north-west
000-AA1-214003	CA2	North-west of Yarlet Lane	SJ92172277585	30 May 2017	100	No inflows present	Present	Within land required
000-AA1-214006	CA2	North-east of Yarlet Lane	SJ92049282202	31 May 2017	50	No inflows present	Absent (Partial Access)	Within land required
000-AA1-215004	CA2	North-east of Yarlet Lane	SJ91288282610	20 June 2017	50	No inflows present	Absent (Partial Access)	Within land required
000-AA1-215008	CA2	North-east of The Grove	SJ9153729305	20 June 2017	100	No inflows present	Fail	206m south-east
000-AA1-215009	CA2	North-west of The Grove	SJ91251290089	20 June 2017	80	No inflows present	Present	Within land required
000-AA1-216001	CA2	South-east of New Plantation	SJ90719292212	31 May 2017	100	No inflows present	Absent	47m south-west
000-AA1-216004	CA2	North-east of New Plantation	SJ90807292637	05 May 2017	80	No inflows present	Present	Within land required
000-AA1-217007	CA2	North-east of Pirehill Lane	SJ89679302342	25 April 2017	50	Present and wet	Present	104m south-east

P/A and PSC surveys

6.4.35 P/A or PSC surveys were conducted at 61 ponds in the Colwich to Yarlet area. The summary of results of the P/A and PSC surveys are detailed in Table 27. This table includes those ponds supporting great crested newt (any lifestage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

6.4.36 Great crested newts have been found in 25 of the 61 ponds subject to P/A or PSC survey, comprising eight medium and 16 small population size classes (noting one pond 000-AA1-203005 has had six visits, with no adult great crested newts recorded present and only great crested newt eggs were found). One further pond 000-Aa1-212001 had a juvenile great crested newt present, but has had an incomplete number of survey visits.

6.4.37 Thirty-two ponds (eight with an incomplete set of visits) were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 27.

6.4.38 Four ponds were identified as not supporting great crested newt, but supported good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) these are also shown in Table 27.

6.4.39 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any pond in Table 27 with fewer than 6 visits completed.

Table 27: Summary of results of P/A or PSC surveys with associated amphibian populations in the Colwich to Yarlet area

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-201013	CA2	South-east of Upper Moreton	SK0319021938	PSC	6	28 March 2017	15 May 2017	2 (S)	4 (L)				317m south-west
000-AA1-201016	CA2	South-west of Lount Farm	SK0335021592	PSC	6	04 May 2017	06 June 2017	6 (S)					288m south-west
000-AA1-201018	CA2	South-west of Lount Farm	SK0328921859	PSC	6	28 March 2017	10 May 2017	1 (S)	4 (L)				255m south-west
000-AA1-202004	CA2	North-west of Lount Farm	SK0316522919	PSC	6	13 April 2017	17 May 2017	8 (S)	10 (G)	2 (L)			13m south-west
000-AA1-202006	CA2	North-east of Lount Farm	SK0306522922	PSC	6	13 April 2017	17 May 2017	21 (M)	11 (G)			Tadpoles only	27m north
000-AA1-202008	CA2	South-west of Lount Farm	SK0273622748	P/A	2	02 May 2017	09 May 2017		10 (G)		Tadpoles only		Within land required
000-AA1-202009	CA2	North-east of Bishton	SK0246422368	PSC	6	27 March 2017	16 May 2017	1 (S)	4 (L)				102m south-east
000-AA1-202012	CA2	North-east of Moreton Lane	SK0229423397	PSC	6	04 April 2017	05 June 2017	31 (M)	28 (G)		1 (L)		271m north-east
000-AA1-202014	CA2	North-east of Bishton	SK0245722174	PSC	6	03 May 2017	06 June 2017	45 (M)	4 (L)				131m north-east

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-203005*	CA2	North-east of Coley Lane	SK0172023012	PSC	6	17 April 2017	22 June 2017	Eggs only (see notes below)	13 (G)		1 (L)		Within land required
000-AA1-203007	CA2	North-east of Moreton Lane	SK0174923538	PSC	6	04 April 2017	05 June 2017	55 (M)	39 (G)				89m north-west
000-AA1-203018	CA2	South-west of Far Coley Farm	SK0175322497	P/A	2	30 March 2017	18 April 2017				52 (G)	7 (L)	351m south-east
000-AA1-203024	CA2	North-west of Coley Lane	SK0132522761	PSC	6	06 April 2017	05 June 2017	3 (S)	2 (L)				104m south-west
000-AA1-204004	CA2	North-west of Tithebarn Covert	SK0074423289	PSC	6	02 May 2017	26 June 2017	1 (S)	2 (L)		1 (L)		Within land required
000-AA1-207007	CA2	South-east of Tixall Park Pool	SJ9721723655	P/A	4	13 April 2017	17 May 2017		20 (G)		2 (L)	Tadpoles only	6m south-east
000-AA1-210002	CA2	North-west of A518 Weston Road	SJ9504824781	P/A	3	11 April 2017	10 May 2017		21 (G)		1 (L)		211m north-west
000-AA1-211005	CA2	North-east of Hopton Bank	SJ9436226243	PSC	6	04 May 2017	15 June 2017	1 (S)	30 (G)		4 (L)	Tadpoles only	59m north-east
000-AA1-212001	CA2	South-west of B5066 Sandon Road	SJ9316925838	P/A	1	11 April 2017	11 April 2017	Juveniles only					183m south-west

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-213001	CA2	South-west of Newbuildings Farm	SJ9276026720	PSC	6	28 March 2017	31 May 2017	4 (S)	7 (L)		Tadpoles only		310m south-west
000-AA1-213003	CA2	South-east of Marston Lane	SJ9353427811	PSC	6	04 April 2017	07 June 2017	3 (S)	9 (L)		1 (L)		479m north-east
000-AA1-213004	CA2	South-east of Marston Lane	SJ9330527659	PSC	6	04 April 2017	07 June 2017	7 (S)	2 (L)		Tadpoles only	4 (L)	231m north-east
000-AA1-213006	CA2	South-east of Marston Lane	SJ9273327286	PSC	6	28 March 2017	24 May 2017	5 (S)	2 (L)		1 (L)	1 (L)	Within land required
000-AA1-213007	CA2	South-east of Marston Lane	SJ9240427176	PSC	6	10 April 2017	31 May 2017	23 (M)	6 (L)			1 (L)	276m south-east
000-AA1-213008	CA2	North-west of Marston Lane	SJ9274827669	PSC	6	10 April 2017	25 May 2017	3 (S)	4 (L)				Within land required
000-AA1-213009	CA2	South-west of Marston Lane	SJ9306927995	PSC	6	10 April 2017	23 May 2017	40 (M)	49 (G)		3 (L)	2 (L)	214m north-east
000-AA1-213019	CA2	South-west of Marston Lane	SJ9241827518	PSC	6	11 April 2017	31 May 2017	4 (S)	5 (L)		Spawn only		Within land required
000-AA1-214001	CA2	South-east of Marston Lane	SJ9227827571	PSC	6	11 April 2017	31 May 2017	29 (M)	23 (G)				Within land required
000-AA1-216004	CA2	North-east of New Plantation	SJ9080729637	PSC	6	13 April 2017	31 May 2017	1 (S)	1 (L)		Tadpoles only		Within land required
000-AA1-217007	CA2	North-east of Pirehill Lane	SJ8967930342	PSC	6	21 April 2017	14 June 2017	26 (M)	9 (L)		Tadpoles only	1 (L)	104m south-east

Key:

Bracketed text within species column indicates relative population size class for the peak count obtained as follows:

-Great crested newt: peak count 1-10 individuals = Small (S); peak count 11-100 individuals = Medium (M); peak count >100 individuals = Large (L).

-Smooth and palmate newt: peak count <10 individuals = Low (L); peak count 10-100 individuals = Good (G); peak count >100 individuals = Exceptional (E).

-Common frog: peak count <50 individuals or spawn clumps counted = Low (L); peak count 50-500 individuals or spawn clumps counted = Good (G); peak count >500 individuals or spawn clumps counted = Exceptional (E).

-Common toad: peak count <100 individuals = Low (L); peak count 100-1000 individuals = Good (G); peak count >1000 individuals = Exceptional (E).

Notes:

The following ponds have anomalies based on the results of either the P/A or PSC survey between 2016 and 2017, or between the P/A or PSC survey and eDNA results of 2016/2017:

-Pond 000-AA1-203005* (stated in the table above): received a greater sum of great crested newt individuals in the P/A or PSC assessment in 2016 (changes in population size classes for the other amphibians are not discussed here). This pond is classed as with no population size class (no adults recorded present and record of eggs only) in 2017. In 2016 this pond was reported in BID-EC-007-000 which accompanied the main ES as supporting a small (S) population size class.

-Pond 000-AA1-202005 (not listed in the table above): 6 visits were undertaken at this pond in 2017 and despite a prior positive eDNA result, no further evidence of great crested newt presence was found through use of traditional survey methods.

Discussion of combined results

6.4.40 Surveys undertaken in 2017 concluded that 29 of the ponds surveyed were found to support populations of great crested newts. These comprise four ponds identified through eDNA survey and 25 ponds identified through P/A survey and/or PSC surveys.

6.4.41 Of the 25 ponds subject to P/A survey and/or PSC survey in 2017, these comprise eight medium and 15 small population size classes. No population size class has been determined for two ponds with incomplete P/A surveys: 000-AA1-212001 (juveniles only) and 000-AA1-203005 (where only eggs were found in 2017, noting, however, in 2016 a small population of three individuals was found), although in both of these ponds great crested newts have been found in small numbers and can be assumed to represent at least small population size classes.

6.4.42 Over the 2016 and 2017 survey seasons, a total of 38 ponds were found to support populations of great crested newts (10 confirmed in 2016 and 28 confirmed in 2017, noting some in 2017 are reconfirmations of 2016 ponds). These comprise five ponds identified through eDNA survey only and 33 ponds identified through from P/A and/or PSC survey (one of these from incomplete surveys). Of the 33 ponds identified through P/A and/or PSC survey, these comprise 10 medium populations and 23 small population size classes.

6.4.43 Of the 92 ponds surveyed in 2017, 22 of these ponds are within the land required for the AP revised scheme. Of the 22 ponds, 11 were found to support populations of great crested newts and eight were confirmed as not supporting great crested newts (pond dry, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining three ponds is undetermined.

6.4.44 Of the 116 ponds surveyed in 2016 and 2017, 31 of these ponds are within the land required for the AP revised scheme. Of the 31 ponds, 11 ponds were found to support populations of great crested newts and 13 ponds were confirmed as not supporting great crested newts (scoped out at HSI survey, dry pond, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining seven ponds is undetermined.

6.4.45 Two of the ponds listed as supporting great crested newt (ponds 000-AA1-201013 and 000-AA1-202006) were both found to be negative for presence of great crested newt through eDNA survey, but through traditional P/A and PSC survey these were both found to support this species.

6.4.46 A PSC survey of six visits was undertaken at pond 000-000-AA1-202005 in 2017 and despite a positive eDNA result from survey in 2017, no further evidence of great crested newt presence was found.

6.4.47 Twenty-three of the 25 ponds surveyed through P/A and/or PSC surveys in 2017 and found to support populations of great crested newts, also support other amphibian species (smooth newt, palmate newt, common frog and/or common toad). Eight of these ponds were found to support good populations of smooth newt, namely ponds: 000-AA1-202004, 000-AA1-202006, 000-AA1-202012, 000-AA1-203005, 000-AA1-203007, 000-AA1-211005, 000-AA1-213009 and 000-AA1-214001.

6.4.48 Four ponds surveyed in 2017, found not to support great crested newt, support a good population of one of the other amphibian species: smooth newt or common frog. Three ponds were found to support a good population of smooth newt, namely ponds: 000-AA1-202008, 000-AA1-207007 and 000-AA1-210002. One pond, 000-AA1-203018, supported a good population of common frog.

Metapopulations

6.4.49 Following review of the 2017 survey results one new great crested newt metapopulation has been identified. Combined with the 2016 survey data there are a total of four great crested newt metapopulations identified in the Colwich to Yarlet area, as detailed in Table 28.

6.4.50 Table 28 provides details of the retained, revised and new metapopulations and the revised list of Ecology Survey Codes for these metapopulations which shows where these have changed significantly from the codes stated in BID-EC-007-000.

Table 28: Great crested newt metapopulations identified in the Colwich to Yarlet area

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	**Distance from the land required for the AP revised scheme (m) and orientation**
AMP2.1	North-west of Great Haywood	000-AA1-200002 000-AA1-200009 000-AA1-200011 000-AA1-201009 000-AA1-201010 000-AA1-201011 000-AA1-201013 000-AA1-201016 000-AA1-201018 000-AA1-201020 000-AA1-201021 000-AA1-201023 000-AA1-201024 000-AA1-202002 000-AA1-202003 000-AA1-202004 000-AA1-202005 000-AA1-202006 000-AA1-202009 000-AA1-202012 000-AA1-202013 000-AA1-202014 000-AA1-202017 000-AA1-202019	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	**Distance from the land required for the AP revised scheme (m) and orientation**
		000-AA1-202022 000-AA1-202023 000-AA1-202024 000-AA1-203001 000-AA1-203005 000-AA1-203006 000-AA1-203007 000-AA1-203010 000-AA1-203016 000-AA1-203017 000-AA1-203019 000-AA1-203020 000-AA1-203021 000-AA1-203022 000-AA1-203023 000-AA1-203024 000-AA1-203025 000-AA1-204002 000-AA1-204004 000-AA1-204006 000-AA1-204009		
AMP2.2	North of Tixall	000-AA1-205008 000-AA1-206001 000-AA1-206005 000-AA1-207001 000-AA1-207002 000-AA1-207003 000-AA1-207004 000-AA1-207005 000-AA1-207009 000-AA1-207010 000-AA1-209001 000-AA1-209002 000-AA1-209008 000-AA1-210009 000-AA1-210010	Medium	Within land required
AMP2.3	Hopton, Stafford	000-AA1-210006 000-AA1-210017	Small	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	**Distance from the land required for the AP revised scheme (m) and orientation**
		000-AA1-211002 000-AA1-211003 000-AA1-211004 000-AA1-211005 000-AA1-211006 000-AA1-211007 000-AA1-211009 000-AA1-211011 000-AA1-211013 000-AA1-211014 000-AA1-211015 000-AA1-212001 000-AA1-212004 000-AA1-212009 000-AA1-210007 000-AA1-210008 000-AA1-210012 000-AA1-210013 000-AA1-210014 000-AA1-210015 000-AA1-210016		
AMP2.4	Between B5066 Sandon Road and A34 Stone Rd/Whitgreave Lane, due north of Stafford Town Centre	000-AA1-212005 000-AA1-212008 000-AA1-213001 000-AA1-213003 000-AA1-213004 000-AA1-213006 000-AA1-213007 000-AA1-213008 000-AA1-213009 000-AA1-213010 000-AA1-213015 000-AA1-213016 000-AA1-213019 000-AA1-214001 000-AA1-214003 000-AA1-214006 000-AA1-214010 000-AA1-215001	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	**Distance from the land required for the AP revised scheme (m) and orientation**
		000-AA1-215002 000-AA1-215003 000-AA1-215004 000-AA1-215005 000-AA1-215009 000-AA1-215011		

Stone to Swynnerton (CA3)

Survey extent

6.4.51 BID-EC-007-000 reported a total of 237 ponds that required further survey, which included:

- 66 ponds which subsequently had surveys completed in 2016;
- 148 unsurveyed ponds that had no access in 2016 and surveys remained outstanding; and
- 23 ponds that received a partial suite of survey types and/or incomplete survey visits in 2016 (and require completion in 2017).

6.4.52 Following the 2016 surveys reported in BID-EC-007-000, a total of 171 ponds required either full or partial surveys.

6.4.53 A total of 133 ponds were able to be surveyed in 2017, using at least one of the following survey methods: HSI, eDNA, P/A and/or PSC.

6.4.54 No additional ponds were identified as requiring survey within the Stone and Swynnerton area, as a result of the scoping exercise undertaken on ponds within 250m of the land required for the AP revised scheme.

Field survey

HSI / walkover surveys

6.4.55 HSI surveys were conducted on a total of 109 ponds in 2017. Of these, 103 ponds were not previously subject to HSI and six were repeat surveys on ponds that were dry and/or surveyed late in the season in 2016.

6.4.56 Following the completion of the HSI surveys 21 waterbodies identified in Table 29, were scoped out of requiring further survey.

Table 29: Summary of locations where requirement for further survey was scoped out following HSI in the Stone to Swynnerton area

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-217004	CA3	South-east of Pirehill Cottage Farm	SJ9069630344	Pond not evident (HSI Score 0)	232m north-east
000-AA1-217010	CA3	North-east of Pirehill	SJ9056431118	Flowing water (stream) (HSI Score 0.47)	2m north-west
000-AA1-219003	CA3	South-west of Walton Farm House	SJ8920031572	Dry pond (HSI Score 0)	Within land required
000-AA1-219004	CA3	South-east of Walton Farm House	SJ8942331730	Dry pond (HSI Score 0)	Within land required
000-AA1-219005	CA3	South-east of Walton Farm House	SJ8939231762	Dry pond (HSI Score 0)	Within land required
000-AA1-219015	CA3	South-west of Walton Farm House	SJ8924331651	Dry pond (HSI Score 0)	Within land required
000-AA1-221004	CA3	North-west of Yarnfield Lane	SJ8787433623	Dry pond (HSI Score 0)	Within land required
000-AA1-221009	CA3	North-east of M6	SJ8761033594	Dry pond (HSI Score 0)	Within land required
000-AA1-221011	CA3	North-east of M6	SJ8760533794	Dry pond (HSI Score 0)	Within land required
000-AA1-221018	CA3	South-west of Poolhouse Wood	SJ8789033130	Dry pond (HSI Score 0)	Within land required
000-AA1-221022	CA3	South-west of M6	SJ8768133295	Rain-fed ditch at side of M6, in back of garden. Hard gravel base and moderate flow of water (HSI Score 0.41)	Within land required
000-AA1-221026	CA3	South-east of Hayeswater Grove	SJ8684633344	Dry pond (HSI Score 0)	89m south-west
000-AA1-221033	CA3	South-east of Yarnfield Lane	SJ8764433218	Lined garden pond, fish stocked (Carp) (HSI Score 0.32)	Within land required
000-AA1-222024	CA3	North-east of Highlowbank	SJ8662534346	Dry pond (HSI Score 0)	245m south-west

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-222032	CA3	North-west of Darlastonwood Farm	SJ8740735186	Dry pond (HSI Score 0)	348m north-east
000-AA1-222039	CA3	North-east of M6	SJ8734034782	Dry pond (HSI Score 0)	90m north-east
000-AA1-222047	CA3	South-east of Highlowbank	SJ8652233951	Dry pond (HSI Score 0)	388m north-west
000-AA1-226015	CA3	South-west of M6	SJ8537337523	Pond not evident (HSI Score 0)	180m south-east
000-AA1-226018	CA3	South-east of Top Lane	SJ8548137811	Dry pond (HSI Score 0)	298m north-east
000-AA1-227001	CA3	North-east of Clifford's Wood	SJ8369337103	Dry pond (HSI Score 0)	173m south-west
000-AA1-228003	CA3	North-west of Hatton Common	SJ8232638395	Slurry pit (HSI Score 0)	173m south-west

6.4.58 The HSI score indicated suitability for great crested newt for 88 ponds in the Stone to Swynnerton area, these ponds were recommended for eDNA and/or P/A surveys.

eDNA surveys

6.4.59 The eDNA survey method was conducted at 64 ponds in the Stone to Swynnerton area. The summary of results of the eDNA surveys, including those with anomalies are detailed in Table 30.

6.4.60 The eDNA analysis confirmed presence of great crested newt in seven ponds. Those with negative results due to partial access, that were inconclusive, or that were found to have anomalies were put forward for traditional P/A surveys.

Table 30: Summary of relevant results from eDNA presence / absence surveys in the Stone to Swynnerton area

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-216005	CA3	North-west of A34 Stone Road	SJ9099829840	24 April 2017	50	No inflows present	Fail (Partial Access)	164m north-east
000-AA1-217002	CA3	North-west of A34 Stone Road	SJ9086930380	24 April 2017	75	No inflows present	Absent (Partial Access)	353m south-east
000-AA1-217005	CA3	South-east of Pirehill Cottage Farm	SJ9068030354	25 April 2017	80	No inflows present	Absent	217m south-east
000-AA1-217006	CA3	South-east of Pirehill Cottage Farm	SJ9055830377	25 April 2017	100	No inflows present	Absent (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	97m south-east
000-AA1-217008	CA3	South-east of Pirehill Lane	SJ8998230794	26 April 2017	100	No inflows present	Absent	Within land required
000-AA1-217009	CA3	South-west of A34 Stone Road	SJ9110931047	25 April 2017	50	No inflows present	Present	336m south-east
000-AA1-217014	CA3	South-east of Pirehill Lane	SJ9081831250	28 April 2017	100	No inflows present	Absent	15m north-east
000-AA1-218004	CA3	South-east of Pirehill Lane	SJ8956030865	26 April 2017	40	No inflows present	Present	Within land required
000-AA1-218005	CA3	North-west of Pirehill Lane	SJ8961031071	26 April 2017	80	No inflows present	Absent	Within land required
000-AA1-218007	CA3	South-west of Pirehill Lane	SJ8931831011	26 April 2017	100	No inflows present	Fail	100m south-west
000-AA1-218009	CA3	South-east of Pirehill Lane	SJ8984531561	01 June 2017	30	No inflows present	Fail (Partial Access)	222m north-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-218011	CA3	South-east of Walton Farm House	SJ8940531 545	26 April 2017	20	No inflows present	Absent (Partial Access)	Within land required
000-AA1-218012	CA3	North-west of Pirehill Lane	SJ9033931 363	01 June 2017	100	No inflows present	Present	300m north-west
000-AA1-219001	CA3	South-east of Walton Farm House	SJ8931931 578	01 June 2017	90	No inflows present	Absent	Within land required
000-AA1-219002	CA3	South-east of Walton Farm House	SJ8931431 615	01 June 2017	60	No inflows present	Absent (Partial Access)	Within land required
000-AA1-219006	CA3	North-east of M6	SJ8906231 754	02 June 2017	75	No inflows present	Present	Within land required
000-AA1-219011	CA3	North-east of Walton Farm House	SJ8929132 106	02 June 2017	80	Present and dry	Absent	9m north-east
000-AA1-219012	CA3	North-west of Walton Farm House	SJ8913732 002	28 April 2017	80	Present and wet	Fail	Within land required
000-AA1-219016	CA3	North-east of M6	SJ8916031 550	02 June 2017	50	No inflows present	Fail (Partial Access)	Within land required
000-AA1-221001	CA3	South-east of Yarnfield Lane	SJ8868633 672	02 June 2017	50	No inflows present	Absent (Partial Access)	181m south-west
000-AA1-221005	CA3	North-east of M6	SJ8768333 543	05 June 2017	100	No inflows present	Absent	Within land required
000-AA1-221007	CA3	North-west of Yarnfield Lane	SJ8835934 065	05 June 2017	100	No inflows present	Absent	241m north-west
000-AA1-221008	CA3	North-west of Yarnfield Lane	SJ8820933 970	05 June 2017	100	No inflows present	Absent	147m north-east
000-AA1-221010	CA3	North-east of Moss Lane	SJ8735433 425	05 June 2017	40	No inflows present	Absent (Partial Access)	83m south-west

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-221012	CA3	South-west of M6	SJ8731733584	06 June 2017	100	No inflows present	Absent	Within land required
000-AA1-221013	CA3	North-west of Yarnfield Lane	SJ8807434172	02 May 2017	80	No inflows present	Absent	123m north-east
000-AA1-221020	CA3	North-west of Yarnfield Lane	SJ8708632941	28 April 2017	100	No inflows present	Absent	233m south-west
000-AA1-221025	CA3	North-west of Yarnfield Lane	SJ8701233049	28 April 2017	100	No inflows present	Absent	143m south-west
000-AA1-221030	CA3	North-east of M6	SJ8762833783	05 June 2017	100	No inflows present	Absent	Within land required
000-AA1-222001	CA3	North-east of M6	SJ8749034061	02 May 2017	80	No inflows present	Absent	Within land required
000-AA1-222003	CA3	North-east of M6	SJ8750334145	03 May 2017	85	No inflows present	Absent	Within land required
000-AA1-222005	CA3	North-east of M6	SJ8745834268	03 May 2017	80	No inflows present	Present	Within land required
000-AA1-222006	CA3	North-east of M6	SJ8743034307	03 May 2017	80	No inflows present	Absent	Within land required
000-AA1-222008	CA3	South-west of Highlow Meadows	SJ8715234100	08 May 2017	100	No inflows present	Absent (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	2m north-west
000-AA1-222009	CA3	South-west of Darlaston Wood	SJ8777234616	03 May 2017	75	No inflows present	Fail (Partial Access)	23m north-west
000-AA1-222011	CA3	South-west of Darlaston Wood	SJ8768334711	03 May 2017	60	No inflows present	Absent (Partial Access)	142m north-west

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-222012	CA3	North-east of M6	SJ8737134458	03 May 2017	90	Present and dry	Absent	9m north-east
000-AA1-222013	CA3	North-east of M6	SJ8736234480	03 May 2017	80	No inflows present	Absent	5m north-east
000-AA1-222016	CA3	South-west of Darlastonwood Farm	SJ8760134997	04 May 2017	80	No inflows present	Absent	431m north-east
000-AA1-222021	CA3	North-east of Highlowbank	SJ8666434328	06 June 2017	100	No inflows present	Absent	222m south-west
000-AA1-222022	CA3	North-east of Highlowbank	SJ8664034334	06 June 2017	100	No inflows present	Absent	237m south-west
000-AA1-222023	CA3	North-east of Highlowbank	SJ8661834336	06 June 2017	100	No inflows present	Absent	257m south-west
000-AA1-222025	CA3	North-east of M6	SJ8738235071	04 May 2017	100	No inflows present	Fail	287m north-east
000-AA1-222033	CA3	North-east of M6	SJ8737435176	07 June 2017	100	No inflows present	Absent	327m north-east
000-AA1-222035	CA3	North-west of Beatty Hall	SJ8688933810	07 June 2017	100	No inflows present	Present	49m north-west
000-AA1-222036	CA3	South-west of Beatty Hall	SJ8689033850	07 June 2017	100	No inflows present	Absent	91m north-west
000-AA1-222037	CA3	South-east of Beatty Hall	SJ8688333842	07 June 2017	100	No inflows present	Absent	92m north-west
000-AA1-222038	CA3	South-east of Beatty Hall	SJ8689133867	07 June 2017	100	Present and dry	Present	105m north-west
000-AA1-222041	CA3	South-west of Darlaston Wood	SJ8783434894	04 May 2017	100	No inflows present	Absent	291m north-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-222048	CA3	North-west of Darlaston Wood	SJ8782535000	04 May 2017	100	Present and dry	Absent	391m north-east
000-AA1-223002	CA3	North-east of M6	SJ8736435190	04 May 2017	75	No inflows present	Absent (Partial Access)	316m north-east
000-AA1-223004	CA3	North-east of M6	SJ8718535123	04 May 2017	90	No inflows present	Absent	132m north-east
000-AA1-223006	CA3	South-east of A51 Stone Road	SJ8754635588	05 May 2017	30	No inflows present	Absent (Partial Access)	205m south-west
000-AA1-223014	CA3	North-east of Pilstones Cottages	SJ8558334720	08 June 2017	80	Present and wet	Absent	573m south-west
000-AA1-224002	CA3	South-west of M6	SJ8626535640	27 April 2017	100	No inflows present	Absent	1m south-east
000-AA1-225009	CA3	North-east of Bottom Lane	SJ8531336956	08 June 2017	100	No inflows present	Absent	143m north-west
000-AA1-226001	CA3	South-east of A519 Newcastle Road	SJ8422636262	27 April 2017	100	No inflows present	Absent	536m south-west
000-AA1-226014	CA3	South-west of M6	SJ8534637455	27 April 2017	75	No inflows present	Absent (Partial Access)	194m south-east
000-AA1-226021	CA3	North-east of Top Lane	SJ8530438079	05 May 2017	80	No inflows present	Fail	346m north-east
000-AA1-226022	CA3	North-east of Top Lane	SJ8531037997	05 May 2017	85	No inflows present	Absent	302m north-east
000-AA1-227006	CA3	South-west of Swynnerton Old Park	SJ8363538264	04 May 2017	100	No inflows present	Absent	233m north-east
000-AA1-227007	CA3	North-east of Hatton Common	SJ8339438104	04 May 2017	100	No inflows present	Absent	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-227008	CA3	South-west of Swynnerton Old Park	SJ8342938240	04 May 2017	100	No inflows present	Fail	132m north-east
000-AA1-228002	CA3	South-west of Swynnerton Old Park	SJ8274338536	08 June 2017	100	No inflows present	Fail	Within land required

P/A and PSC surveys

6.4.61 P/A or PSC surveys were conducted at 83 ponds in the Stone to Swynnerton area. The summary of results of the P/A and PSC surveys in are detailed in Table 31. This table includes those ponds supporting great crested newt (any lifestage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and common toad).

6.4.62 Great crested newt was confirmed present in 22 of the 83 ponds subject to P/A or PSC survey, comprising three medium and 18 small population size classes. The remaining pond 000-AA1-221016 had only eggs present after six visits and can also be assumed to represent a small population.

6.4.63 Sixty ponds (four with an incomplete set of visits) were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 31.

6.4.64 The one remaining pond 000-AA1-221001 did not support great crested newt but did support a good population of smooth newt and is included in Table 31.

6.4.65 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any pond in Table 31 with fewer than 6 visits completed.

Table 31: Summary of results of P/A or PSC surveys with associated amphibian populations in the Stone and Swynnerton area

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-216007	CA3	North-west of A34 Stone Road	SJ9097630056	PSC	6	27 March 2017	18 May 2017	11 (M)	4 (L)			1 (L)	301m north-east
000-AA1-216008	CA3	North-east of New Plantation	SJ9076229941	PSC	6	28 March 2017	17 May 2017	9 (S)	5 (L)				78m south-east
000-AA1-217001	CA3	North-west of New Plantation	SJ9047529951	PSC	6	28 March 2017	17 May 2017	1 (S)	5 (L)			2 (L)	Within land required
000-AA1-217003*	CA3	South-east of Pirehill Cottage Farm	SJ9071030330	PSC	6	30 March 2017	16 May 2017	3 (S) (see notes below)	6 (L)				229m north-east
000-AA1-217006	CA3	South-east of Pirehill Cottage Farm	SJ9055830377	PSC	6	30 March 2017	16 May 2017	1 (S)	1 adult female recorded during torch survey, indeterminate species: may be palmate or smooth newt.				97m south-east
000-AA1-217009	CA3	South-west of A34 Stone Road	SJ9110931047	PSC	6	14 April 2017	26 May 2017	13 (M)	7 (L)				336m south-east
000-AA1-218004	CA3	South-east of Pirehill Lane	SJ8956030865	PSC	6	14 April 2017	17 May 2017	7 (S)	1 (L)		1 (L)		Within land required

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-218006	CA3	South-east of Pirehill Lane	SJ9013731449	PSC	6	07 April 2017	16 May 2017	1 (S)	18 (G)		1 (L)	1 (L)	372m north-west
000-AA1-218008	CA3	South-west of Pirehill Lane	SJ8927731000	PSC	6	06 April 2017	17 May 2017	8 (S)	6 (L)				134m south-west
000-AA1-218012	CA3	North-west of Pirehill Lane	SJ9033931363	PSC	6	07 April 2017	19 June 2017	3 (S)	46 (G)		2 (L)	1 (L)	300m north-west
000-AA1-221001	CA3	South-east of Yarnfield Lane	SJ8868633672	P/A	4	23 April 2017	18 May 2017		16 (G)		Tadpoles only		181m south-west
000-AA1-221014	CA3	South-west of Darlaston Wood	SJ8806234322	PSC	6	10 April 2017	31 May 2017	2 (S)	2 (L)		Tadpoles only		55m south-east
000-AA1-221016	CA3	North-east of M6	SJ8756434003	PSC	6	05 April 2017	31 May 2017	Eggs only	8 (L)		1 (L)		Within land required
000-AA1-222002	CA3	North-east of M6	SJ8768134228	PSC	6	11 April 2017	15 May 2017	2 (S)	1 (L)				Within land required
000-AA1-222008	CA3	South-west of Highlow Meadows	SJ8715234100	PSC	6	27 March 2017	05 June 2017	1 (S)	3 (L)		2 (L)		2m north-west
000-AA1-222017	CA3	South-west of Highlow Meadows	SJ8678434326	PSC	6	27 March 2017	13 June 2017	2 (S)	2 (L)		Tadpoles only		122m south-west
000-AA1-222019	CA3	South-west of Highlow Meadows	SJ8676834332	PSC	6	27 March 2017	13 June 2017	5 (S)	6 (L)		Tadpoles only	Tadpoles only	132m south-west

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-222026	CA3	North-east of M6	SJ8734835048	PSC	6	03 April 2017	24 May 2017	5 (S)	9 (L)		5 (L)	4 (L)	242m north-east
000-AA1-222044	CA3	South-east of Highlowbank	SJ8643133897	PSC	6	28 March 2017	13 June 2017	5 (S)	8 (L)		1 (L)	2 (L)	432m north-west
000-AA1-222050	CA3	North-west of Beatty Hall	SJ8657733916	PSC	6	28 March 2017	13 June 2017	33 (M)	5 (L)		2 (L)	15 (L)	304m north-west
000-AA1-227003*	CA3	North-west of Clifford's Wood	SJ8352437358	PSC	6	10 April 2017	15 May 2017	5 (S)	3 (L)		1 (L)	Tadpoles and spawn	1m south-east
000-AA1-228001	CA3	South-west of Swynnerton Old Park	SJ8357038639	PSC	6	27 March 2017	15 May 2017	2 (S)	2 (L)		Tadpoles and spawn		554m north-east
000-AA1-228010	CA3	South-east of Lower Hatton	SJ8313836702	PSC	6	30 March 2017	10 May 2017	4 (S)	3 (L)		Tadpoles only		224m south-east

Key:

Bracketed text within species column indicates relative population size class for the peak count obtained as follows:

-Great crested newt: peak count 1-10 individuals = Small (S); peak count 11-100 individuals = Medium (M); peak count >100 individuals = Large (L).

-Smooth and palmate newt: peak count <10 individuals = Low (L); peak count 10-100 individuals = Good (G); peak count >100 individuals = Exceptional (E).

-Common frog: peak count <50 individuals or spawn clumps counted = Low (L); peak count 50-500 individuals or spawn clumps counted = Good (G); peak count >500 individuals or spawn clumps counted = Exceptional (E).

-Common toad: peak count <100 individuals = Low (L); peak count 100-1000 individuals = Good (G); peak count >1000 individuals = Exceptional (E).

Notes:

The following ponds have anomalies based on the results of either the P/A or PSC survey between 2016 and 2017, or between the P/A or PSC survey and eDNA results of 2016/2017:

Pond 000-AA1-217003* (stated in the table above) received a greater sum of great crested newt individuals in the PSC assessment in 2016 (changes in population size classes for other amphibians

are omitted here). Three adult great crested newt are recorded from this pond in 2017 and is classed as with a small (S) population size class. In 2016 18 adults were recorded present and this pond was reported in BID-EC-007-000 which accompanied the main ES as supporting a medium (M) population size class.

Pond 000-AA1-222005 (not listed in the table above): 6 visits were undertaken in 2017 and despite a positive eDNA result in 2017, no further evidence of great crested newt presence was found through use of traditional survey methods.

Discussion of combined results

6.4.66 Surveys undertaken in 2017 concluded that 26 of the ponds surveyed were found to support populations of great crested newt. These comprise four ponds identified through eDNA survey and 22 ponds identified through P/A survey and/or PSC surveys.

6.4.67 Of the 22 ponds subject to P/A survey and/or PSC survey in 2017, these comprise three medium and 18 small population size classes. One pond, 000-AA1-221001 where great crested newt are present (eggs only), has not been assigned a population size class, but can be assumed to represent at least a small population size class.

6.4.68 Over the 2016 and 2017 survey seasons, a total of 38 ponds were found to support populations of great crested newts (13 confirmed in 2016 and 26 confirmed in 2017 – noting some in 2017 are re-confirmations of 2016 ponds). These comprise six ponds identified through eDNA survey only and 32 ponds identified through P/A and/or PSC survey. Of the 32 ponds identified though P/A and/or PSC survey, these comprise six medium and 26 small population size classes.

6.4.69 Of the 133 ponds surveyed in 2017, 44 of these ponds are within the land required for the AP revised scheme. Of the 44 ponds, seven were found to support populations of great crested newts and 33 were confirmed as not supporting great crested newts (negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining four ponds is undetermined.

6.4.70 Of the 191 ponds surveyed in 2016 and 2017, 67 of these ponds are within the land required for the AP revised scheme. Of the 67 ponds, 11 ponds were found to support populations of great crested newts and 44 ponds were confirmed as not supporting great crested newts (flowing water, fish stocked, dry pond, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining 12 ponds is undetermined.

6.4.71 One of the 22 ponds listed as supporting great crested newt (pond 000-AA1-217003) had a greater number of crested newt individuals recorded in the P/A survey in 2016 than in 2017. Three adult great crested newt are recorded from this pond in 2017 and comprises a small population size class. In 2016 18 adults were recorded present and this pond was reported as comprising a medium population size class.

6.4.72 Two of the ponds listed as supporting great crested newt (ponds 000-AA1-217006 and 000-AA1-222008) were both found to be negative for presence of great crested newt through eDNA survey, but through traditional P/A and PSC survey these were both found to support this species.

6.4.73 A PSC survey of six visits was undertaken at pond 000-AA1-222005 in 2017 and despite a positive eDNA result from survey in 2017, no further evidence of great crested newt presence was found.

6.4.74 Twenty-one of the 22 ponds surveyed through P/A and/or PSC surveys in 2017 and found to support populations of great crested newts, also support other amphibian species (smooth newt, common frog and/or common toad). Two of these ponds were found to support good populations of smooth newt, namely ponds: 000-AA1-218006 and 000-AA1-218012.

6.4.75 One pond (000-AA1-221001) surveyed in 2017, found not to support great crested newt, support a good population of smooth newt.

Metapopulations

6.4.76 Following a review of the 2017 survey results one new metapopulation has been identified and one metapopulation has been removed, as it likely now functions as an isolated population. Combined with the 2016 survey data there are a total of three great crested newt metapopulations identified in the Stone and Swynnerton area, as detailed in Table 32.

6.4.77 Table 32 provides details of the retained, revised and new metapopulations and the revised list of Ecology Survey Codes for these metapopulations which shows where these have changed significantly from the codes stated in BID-EC-007-000. Table 32 also includes details of the two isolated populations at ponds 000-AA1-226002 (previously listed as AMP3.3) and 000-AA1-228010.

Table 32: Great crested newt metapopulations identified in the Stone and Swynnerton area

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
AMP3.1	Between Yarnfield and Swynnerton	000-AA1-221006 000-AA1-221010 000-AA1-221014 000-AA1-221016 000-AA1-221028 000-AA1-221029 000-AA1-222002 000-AA1-222005 000-AA1-222008 000-AA1-222017 000-AA1-222019 000-AA1-222020 000-AA1-222026 000-AA1-222027 000-AA1-222029 000-AA1-222035 000-AA1-222038 000-AA1-222044 000-AA1-222049 000-AA1-222050 000-AA1-223001 000-AA1-223008 000-AA1-223010 000-AA1-223013	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-223018 000-AA1-223024 000-AA1-223025 000-AA1-223036 000-AA1-223037 000-AA1-224004 000-AA1-224005 000-AA1-224006 000-AA1-224008 000-AA1-224009 000-AA1-224010 000-AA1-225001 000-AA1-225002 000-AA1-225013 000-AA1-225015 000-AA1-225016 000-AA1-222045 000-AA1-222046		
AMP3.2	Around Clifford's Wood and Upper Hatton	000-AA1-226013 000-AA1-227003 000-AA1-227009 000-AA1-227010 000-AA1-227011 000-AA1-228001 000-AA1-228005 000-AA1-228007 000-AA1-228008	Medium	Within land required
AMP3.4	North-west of A34 Stone Road	000-AA1-216002 000-AA1-216004 000-AA1-216007 000-AA1-216008 000-AA1-216010 000-AA1-216013 000-AA1-216014 000-AA1-217001 000-AA1-217003 000-AA1-217006 000-AA1-217007 000-AA1-217009	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-217011 000-AA1-217012 000-AA1-218001 000-AA1-218002 000-AA1-218003 000-AA1-218004 000-AA1-218006 000-AA1-218008 000-AA1-218012 000-AA1-218013 000-AA1-219002 000-AA1-219006 000-AA1-219016 000-AA1-219017 000-AA1-219020		
000-AA1-226002	South-east of the A519 Newcastle Road	N/A	Small	283m south-west
000-AA1-228010	South-east of Lower Hatton	N/A	Small	224m south-east

Whitmore Heath to Madeley (CA4)

Survey extent

6.4.78 BID-EC-007-000 reported a total of 130 ponds that required further survey, which included:

- 27 ponds which subsequently had surveys completed in 2016;
- 68 unsurveyed ponds that had no access in 2016 and surveys remained outstanding; and
- 35 ponds that received a partial suite of survey types and/or incomplete survey visits in 2016 (and require completion).

6.4.79 Following the 2016 surveys reported in BID-EC-007-000, a total of 103 ponds required either full or partial surveys.

6.4.80 A total of 74 ponds were able to be surveyed in 2017, using at least one of the following survey methods: HSI, eDNA, P/A and/or PSC.

6.4.81 No additional ponds were identified as requiring survey within the Whitmore Heath to Madeley area, as a result of the scoping exercise undertaken on ponds within 250m of the land required for the AP revised scheme.

Field survey

HSI / walkover surveys

6.4.82 HSI surveys were conducted on a total of 32 ponds in 2017. Of these, 27 ponds were not previously subject to HSI surveys and five were repeat surveys on ponds that were dry and/or surveyed late in the season in 2016.

6.4.83 Following the completion of the HSI surveys five waterbodies, identified in Table 33, were scoped out of requiring further survey.

Table 33: Summary of locations where requirement for further survey was scoped out following HSI survey in the Whitmore Heath to Madeley area

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-233016	CA4	North-east of Eastwood Rise	SJ7848041573	Dry pond (HSI Score 0)	244m south-west
000-AA1-233040	CA4	North-west of Whitmore Wood	SJ7946841650	Dry pond (HSI Score 0.41)	Within land required

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-238003	CA4	South-west of Wrinehill Wood	SJ7542944629	Dry pond (HSI Score 0)	327m south-west
000-AA1-238007	CA4	North-east of The Lum (River Lea Corridor)	SJ7627545466	Dry pond (HSI Score 0)	234m north-east
000-AA1-239010	CA4	South-east of Wrinehill Hall	SJ7535345785	Slurry pit (HSI Score 0.39)	34m north-east

6.4.84 The HSI score indicated great crested newt suitability for 27 ponds[40] in the Whitmore Heath to Madeley area, these ponds were recommended for eDNA and/or P/A surveys.

eDNA surveys

6.4.85 The eDNA survey method was conducted at 35 ponds[40] in the Whitmore Heath to Madeley area. The summary of results of the eDNA surveys, including those with anomalies are detailed in Table 34.

6.4.86 The eDNA analysis confirmed presence of great crested newt in five ponds. Those with negative results due to partial access, that were inconclusive, or that were found to have anomalies were put forward for traditional P/A surveys.

[40] The difference between the 27 suitable ponds identified at HSI and the 35 where eDNA has been undertaken is due to either new ponds being identified during the surveys in 2017, or some ponds having received HSI in 2016 and requiring eDNA in 2017.

Table 34: Summary of relevant results from eDNA presence / absence surveys in the Whitmore Heath to Madeley area

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-232002	CA4	South-east of Snape Hall Road	SJ8007341402	17 May 2017	75	No inflows present	Present	147m north-east
000-AA1-232007	CA4	North-east of Snape Hall Road	SJ7988441591	26 April 2017	80	No inflows present	Present	125m north-east
000-AA1-232009	CA4	North-east of Moat Wood and Brickyard Wood	SJ8019742014	17 May 2017	90	No inflows present	Absent	191m south-east
000-AA1-232010	CA4	South-west of Moat Wood and Brickyard Wood	SJ8010742032	27 April 2017	85	No inflows present	Absent	147m south-east
000-AA1-233002	CA4	North-west of Snape Hall Road	SJ7928941332	24 April 2017	60	Present and wet	Absent (Partial Access)	Within land required
000-AA1-233003	CA4	North-east of Whitmore Wood	SJ7968441867	24 April 2017	60	No inflows present	Present	176m north-east
000-AA1-233004	CA4	South-east of Whitmore Wood	SJ7957941792	24 April 2017	60	No inflows present	Present	64m north-east
000-AA1-233007	CA4	North-east of Whitmore Wood	SJ7910841495	24 April 2017	100	No inflows present	Absent	Within land required
000-AA1-233010	CA4	North-west of North Of Whitmore Wood	SJ7922042163	25 April 2017	50	No inflows present	Absent (Partial Access)	3m south-west
000-AA1-233011	CA4	North-west of North Of Whitmore Wood	SJ7919242155	25 April 2017	60	No inflows present	Absent (Partial Access)	6m south-west

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-233012	CA4	South-east of Hey Sprink (Wood South-West Of)	SJ7926742305	25 April 2017	75	No inflows present	Absent (Partial Access) (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	Within land required
000-AA1-233014	CA4	South-west of Hey Sprink (Wood South-West Of)	SJ7896742118	25 April 2017	40	No inflows present	Absent (Partial Access)	3m south-west
000-AA1-233015	CA4	North-east of Whitmore Wood	SJ7960742061	24 April 2017	60	No inflows present	Absent (Partial Access)	106m south-west
000-AA1-233017	CA4	North-east of North Of Whitmore Wood	SJ7942442167	25 April 2017	40	No inflows present	Absent (Partial Access)	3m south-west
000-AA1-233019	CA4	North-east of North Of Whitmore Wood	SJ7942542220	26 April 2017	40	No inflows present	Absent (Partial Access)	9m north-east
000-AA1-233021	CA4	North-east of Hey Sprink (Wood South-West Of)	SJ7925942406	09 June 2017	100	No inflows present	Absent	Within land required
000-AA1-233032	CA4	North-east of Hey Sprink	SJ7970943086	03 May 2017	50	No inflows present	Absent (Partial Access)	Within land required
000-AA1-234001	CA4	North-east of South Of Hey Sprink	SJ7899842579	09 June 2017	75	No inflows present	Fail (Partial Access)	Within land required
000-AA1-234002	CA4	South-east of South Of Hey Sprink	SJ7857142277	25 April 2017	40	No inflows present	Absent (Partial Access)	Within land required
000-AA1-234003	CA4	North-east of South Of Hey Sprink	SJ7871242445	26 April 2017	90	Present and wet	Present	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-234004	CA4	South-west of South Of Hey Sprink	SJ7872342474	26 April 2017	90	Present and wet	Absent (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	1m south-west
000-AA1-234015	CA4	North-east of Netherset House	SJ7868543560	17 May 2017	75	No inflows present	Absent (Partial Access)	361m north-east
000-AA1-234018	CA4	South-east of Netherset House	SJ7867643213	17 May 2017	50	No inflows present	Absent (Partial Access)	313m north-east
000-AA1-234019	CA4	North-east of Netherset House	SJ7869443396	17 May 2017	80	Present and dry	Fail	367m north-east
000-AA1-234020	CA4	North-west of Hey Sprink	SJ7893543253	16 May 2017	100	No inflows present	Absent	218m south-west
000-AA1-236005	CA4	North-east of Red Lane	SJ7654243331	09 June 2017	100	No inflows present	Absent	3m north-west
000-AA1-236006	CA4	South-west of Red Lane	SJ7657743365	09 June 2017	100	No inflows present	Absent	4m west
000-AA1-236007	CA4	South-east of Bar Hill	SJ7676243949	09 June 2017	100	No inflows present	Absent	Within land required
000-AA1-237002	CA4	South-east of Bower End Lane	SJ7651744451	03 May 2017	100	No inflows present	Absent	6m north-east
000-AA1-237005	CA4	North-east of Bower End Lane	SJ7663544737	03 May 2017	80	No inflows present	Absent	7m north-east
000-AA1-237006	CA4	North-west of Bower End Lane	SJ7607944679	06 June 2017	99	No inflows present	Fail	112m south-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-237008	CA4	North-west of The Bridle Path	SJ7667445095	03 May 2017	80	No inflows present	Absent	215m north-east
000-AA1-238004	CA4	North-west of Wrinehill Wood	SJ7538944776	03 May 2017	100	No inflows present	Absent	216m south-west
000-AA1-239001	CA4	North-east of Wrinehill Hall	SJ7530746022	05 June 2017	70	Present and wet	Absent (Partial Access)	48m north-west
000-AA1-239002	CA4	South-east of Checkley Brook	SJ7469645681	03 May 2017	60	No inflows present	Absent (Partial Access)	183m south-west

P/A and PSC surveys

6.4.87 P/A or PSC surveys were conducted at 59 ponds in the Whitmore Heath to Madeley area. The summary of results of the P/A and PSC surveys are detailed in Table 35. This table includes those ponds supporting great crested newt (any lifestage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

6.4.88 Great crested newt was confirmed present in 18 of the 59 ponds subject to P/A or PSC survey, all comprising small population size classes.

6.4.89 Forty-one ponds (three with an incomplete set of visits) were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 35.

6.4.90 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any pond in Table 35 with fewer than six visits completed.

Table 35: Summary of results of P/A or PSC surveys with associated amphibian populations in the Whitmore Heath to Madeley area

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-232003	CA4	North-east of Snape Hall Road	SJ7988541696	PSC	6	29 March 2017	30 May 2017	2 (S)			3 (L)		172m north-east
000-AA1-232007	CA4	North-east of Snape Hall Road	SJ7988441591	PSC	6	29 March 2017	23 May 2017	4 (S)	7 (L)	3 (L)	8 (L)		125m north-east
000-AA1-232008	CA4	South-west of Moat Wood And Brickyard Wood	SJ8010341828	PSC	6	29 March 2017	24 May 2017	4 (S)	1 (L)				244m south-east
000-AA1-233003	CA4	North-east of Whitmore Wood	SJ7968441867	PSC	6	28 March 2017	22 May 2017	5 (S)	7 (L)				176m north-east
000-AA1-233004	CA4	South-east of Whitmore Wood	SJ7957941792	PSC	6	28 March 2017	22 May 2017	8 (S)	3 (L)				64m north-east
000-AA1-233005*	CA4	South-west of Whitmore Wood	SJ7944041665	PSC	6	03 April 2017	01 June 2017	2 (S)	3 (L)				Within land required

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-233012	CA4	South-east of Hey Sprink (Wood South-West Of)	SJ7926742305	PSC	6	29 March 2017	22 May 2017	1 (S)	3 (L)				Within land required
000-AA1-233013	CA4	North-west of Whitmore Wood	SJ7894842012	PSC	6	29 March 2017	23 May 2017	1 (S)	2 (L)				15m south-east
000-AA1-233020	CA4	North-east of North Of Whitmore Wood	SJ7954742243	PSC	6	28 March 2017	23 May 2017	2 (S)	1 (L)	1 (L)			78m north-west
000-AA1-233026	CA4	North-east of North Of Whitmore Wood	SJ7951342232	PSC	6	12 April 2017	23 May 2017	6 (S)	6 (L)		1 (L)		72m north-east
000-AA1-234003	CA4	North-east of South Of Hey Sprink	SJ7871242445	PSC	6	30 March 2017	23 May 2017	2 (S)	3 (L)				Within land required
000-AA1-234004	CA4	South-west of South Of Hey Sprink	SJ7872342474	PSC	6	30 March 2017	23 May 2017	1 (S)	2 (L)		1 (L)		1m south-west
000-AA1-234005	CA4	South-east of South Of Hey Sprink	SJ7870642481	PSC	6	30 March 2017	23 May 2017	3 (S)	2 (L)		1 (L)		Within land required

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-234007	CA4	North-west of South Of Hey Sprink	SJ7834642767	PSC	6	29 March 2017	22 May 2017	3 (S)	1 (L)				50m south-east
000-AA1-234009	CA4	North-west of South Of Hey Sprink	SJ7825742670	PSC	6	29 March 2017	22 May 2017	1 (S)	7 (L)	1 (L)			4m north-east
000-AA1-234010	CA4	North-west of South Of Hey Sprink	SJ7825342683	PSC	6	29 March 2017	22 May 2017	5 (S)	15 (G)	1 (L)			1m north-east
000-AA1-234011	CA4	North-east of Manor Road	SJ7787342009	PSC	6	27 March 2017	24 May 2017	9 (S)	3 (L)	2 (L)	Spawn only		291m south-east
000-AA1-237010	CA4	South-east of The Lum (River Lea Corridor)	SJ7622545052	PSC	6	04 April 2017	16 May 2017	1 (S)	49 (G)		3 (L)		24m south-west

Key:

Bracketed text within species column indicates relative population size class for the peak count obtained as follows:

-Great crested newt: peak count 1-10 individuals = Small (S); peak count 11-100 individuals = Medium (M); peak count >100 individuals = Large (L).

-Smooth and palmate newt: peak count <10 individuals = Low (L); peak count 10-100 individuals = Good (G); peak count >100 individuals = Exceptional (E).

-Common frog: peak count <50 individuals or spawn clumps counted = Low (L); peak count 50-500 individuals or spawn clumps counted = Good (G); peak count >500 individuals or spawn clumps counted = Exceptional (E).

-Common toad: peak count <100 individuals = Low (L); peak count 100-1000 individuals = Good (G); peak count >1000 individuals = Exceptional (E).

Notes:

The following ponds have anomalies based on the results of either the P/A or PSC survey between 2016 and 2017, or between the P/A or PSC survey and eDNA results of 2016/2017:

-Pond 000-AA1-233005* (stated in the table above) received a greater sum of great crested newt individuals in the P/A or PSC assessment in 2016 (3 adults) versus that for 2017 (2 adults). This does not affect the small (S) population size class assigned.

-Pond 000-AA1-232002 (not listed in the table above): 6 visits were undertaken in 2017 and despite a positive eDNA result in 2017, no further evidence of great crested newt presence was found through use of traditional survey methods.

Discussion of combined results

6.4.91 Surveys undertaken in 2017 concluded that 19 of the ponds surveyed were found to support populations of great crested newts. These comprise one pond identified through eDNA survey and 18 ponds identified through P/A survey and/or PSC surveys.

6.4.92 Of the 18 ponds subject to P/A survey and/or PSC survey in 2017, all comprise of small population size classes.

6.4.93 Over the 2016 and 2017 survey seasons, a total of 27 ponds were found to support populations of great crested newts (10 confirmed in 2016 and 19 confirmed in 2017, noting some in 2017 are re-confirmations of 2016 ponds). These comprise three ponds identified through eDNA survey only and 24 ponds identified through P/A and/or PSC survey (five of these from incomplete surveys). Of the 19 ponds identified through P/A survey and/or PSC survey, all comprise small population size classes.

6.4.94 Of the 74 ponds surveyed in 2017, 25 of these ponds are within the land required for the AP revised scheme. Of the 25 ponds, four were found to support populations of great crested newt and 17 were confirmed as not supporting great crested newts (pond dry, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining four ponds is undetermined.

6.4.95 Of the 99 ponds surveyed in 2016 and 2017, 34 of these ponds are within the land required for the AP revised scheme. Of the 34 ponds, six ponds were found to support populations of great crested newts and 23 ponds were confirmed as not supporting great crested newts (dry pond, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining five ponds is undetermined.

6.4.96 Two of the ponds listed as supporting great crested newt (ponds 000-AA1-233012 and 000-AA1-234004) were both found to be negative for presence of great crested newt through eDNA survey, but through traditional P/A and PSC survey these were both found to support this species.

6.4.97 A PSC survey of four visits was undertaken at pond 000-000-AA1-232002 in 2017 and despite a positive eDNA result from survey in 2017, no further evidence of great crested newt presence was found.

6.4.98 The 18 ponds surveyed through P/A and/or PSC surveys in 2017 and found to support populations of great crested newts, also support other amphibian species (smooth newt, palmate newt, common frog). Two of these ponds were found to support good populations of smooth newt, namely ponds: 000-AA1-234010 and 000-AA1-237010.

Metapopulations

6.4.99 Following review of the 2017 survey results no new great crested newt metapopulations have been identified, but there have been changes to the ponds within these metapopulations. There are three great crested newt metapopulations identified in the Whitmore Heath to Madeley area, as detailed in Table 36.

6.4.100 Table 36 provides details of the retained and revised metapopulations. It also includes the revised list of Ecology Survey Codes for these metapopulations which shows

where these have changed significantly from the codes stated in BID-EC-007-000. Table 36 also includes detail of an isolated population at pond 000-AA1-237010.

6.4.101 No further surveys have been undertaken in 2017 of the ponds in AMP4.3, but from the proximity of great crested newt ponds in AMP4.2 as indicated by the 2017 survey results, it may be that both AMP4.2 and 4.3 are linked and one metapopulation. In the absence of further confirmatory survey information, these are considered separate metapopulations.

Table 36: Great crested newt metapopulations identified in the Whitmore Heath to Madeley area

Assumed Metapopulation reference (AMP) or Isolated Pond reference (Ecology Survey Code)	**Location**	**Ecology Survey Code of water bodies within assumed metapopulation**	**Largest known great crested newt population from any fully surveyed pond within the metapopulation**	**Distance from the land required for the AP revised scheme (m) and orientation**
AMP4.1	Between Whitmore and Baldwin's Gate, south of the A53 Newcastle Road/A53 Whitmore Road	000-AA1-231002 000-AA1-231003 000-AA1-231001	Assumed Medium	Within land required
AMP4.2	North-west of Whitmore Heath	000-AA1-232002 000-AA1-232003 000-AA1-232004 000-AA1-232005 000-AA1-232006 000-AA1-232007 000-AA1-232008 000-AA1-232012 000-AA1-232013 000-AA1-233001 000-AA1-233003 000-AA1-233004 000-AA1-233005 000-AA1-233006 000-AA1-233012 000-AA1-233013 000-AA1-233020 000-AA1-233022 000-AA1-233023 000-AA1-233024 000-AA1-233025 000-AA1-233026 000-AA1-233028 000-AA1-233029 000-AA1-233030	Small	Within land required

Assumed Metapopulation reference (AMP) or Isolated Pond reference (Ecology Survey Code)	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-233031 000-AA1-233033 000-AA1-233034 000-AA1-233035 000-AA1-233036 000-AA1-233037 000-AA1-233038 000-AA1-233039 000-AA1-233043 000-AA1-234001 000-AA1-234003 000-AA1-234004 000-AA1-234005 000-AA1-234007 000-AA1-234009 000-AA1-234010 000-AA1-234011 000-AA1-234013 000-AA1-234014 000-AA1-235014		
AMP4.3	West of Onneley	000-AA1-235001 000-AA1-235002 000-AA1-235004 000-AA1-235006 000-AA1-235005 000-AA1-235003 000-AA1-235009 000-AA1-235011 000-AA1-236001 000-AA1-236004	Medium	Within land required
000-AA1-237010	South-east of the Lum (River Lea corridor)	N/A	Small	24m south-west

South Cheshire (CA5)

Survey extent

6.4.102 BID-EC-007-000 reported a total of 246 ponds that required further survey, which included:

- 71 ponds which subsequently had surveys completed in 2016;
- 146 unsurveyed ponds that had no access in 2016 and surveys remained outstanding; and
- 29 ponds that received a partial suite of survey types and/or incomplete survey visits in 2016 (and require completion).

6.4.103 Following the 2016 surveys reported in BID-EC-007-000, a total of 175 ponds required either full or partial surveys in 2017.

6.4.104 A total of 99 ponds were able to be surveyed in 2017, using at least one of the following survey methods: HSI, eDNA, P/A and/or PSC.

6.4.105 No additional ponds were identified as requiring survey within the South Cheshire area, as a result of the scoping exercise undertaken on ponds within 250m of the land required for the AP revised scheme.

Field survey

HSI / walkover surveys

6.4.106 HSI surveys were conducted on a total of 65 ponds in 2017. Of these, 45 ponds were not previously subject to HSI surveys and 20 were repeat surveys on ponds that were dry and/or surveyed late in the season in 2016.

6.4.107 Following the completion of the HSI surveys 12 waterbodies, identified in Table 37, were scoped out of requiring further survey.

Table 37: Summary of locations where requirement for further survey was scoped out following HSI in the South Cheshire area

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-242001	CA5	North-east of Mill Lane	SJ7277447816	Dry pond (HSI Score 0)	210m north-west
000-AA1-242006	CA5	South-west of Den Lane	SJ7293248051	Dry pond (HSI Score 0)	151m north-west
000-AA1-242007	CA5	South-west of Den Lane	SJ7280348221	Dry pond (HSI Score 0)	170m south-east
000-AA1-244015	CA5	South-east of Birch Lane	SJ7194450455	Dry pond (HSI Score 0)	223m north-west

Ecology Survey Code	CA	Location	OS Grid Reference	Brief rationale for scoping out with HSI score	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-245010	CA5	North-west of Chorlton Lane	SJ7209750888	Pond not evident (HSI Score 0)	Within land required
000-AA1-245011	CA5	North-west of Chorlton Lane	SJ7213550918	Pond not evident (HSI Score 0)	Within land required
000-AA1-245012	CA5	North-west of Chorlton Lane	SJ7215850936	Pond not evident (HSI Score 0)	Within land required
000-AA1-245013	CA5	North-west of Chorlton Lane	SJ7220650956	Dry pond, potentially not evident (HSI Score 0)	Within land required
000-AA1-245015	CA5	South-west of Chorlton Bank Farm	SJ7210451087	Slurry pond (HSI Score 0.41)	73m south-west
000-AA1-245016	CA5	South-east of Cobbs Lane	SJ7189851035	Pond not evident (HSI Score 0)	188m north-west
000-AA1-245019	CA5	South-east of Casey Lane	SJ7194651444	Koi carp pond (major presence). (HSI Score 0.44)	Within land required
000-AA1-245025	CA5	North-west of Chorlton Lane	SJ7212150908	Pond not evident (HSI Score 0)	Within land required

6.4.108 The HSI score indicated suitability for great crested newt for 53 ponds in the South Cheshire area, these ponds were recommended for eDNA and/or P/A surveys.

eDNA surveys

6.4.109 The eDNA survey method was conducted at 50 ponds in the South Cheshire area. The summary of results of the eDNA surveys, including those with anomalies are detailed in Table 38.

6.4.110 The eDNA analysis confirmed presence of great crested newt in 16 ponds. Those with negative results due to partial access, that were inconclusive, or that were found to have anomalies were put forward for traditional P/A surveys.

Table 38: Summary of relevant results from eDNA presence / absence surveys in the South Cheshire area

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-240001	CA5	North-west of Checkley Lane	SJ7492146752	02 May 2017	50	Present and dry	Absent (Partial Access)	Within land required
000-AA1-240009	CA5	South-west of Den Lane	SJ7447947275	02 May 2017	30	Present and dry	Present	Within land required
000-AA1-240012	CA5	South-east of Ash Coppice	SJ7343146668	05 June 2017	80	No inflows present	Absent	463m south-west
000-AA1-240014	CA5	South-east of Betley Mere	SJ7510347642	08 June 2017	30	No inflows present	Absent (Partial Access)	460m north-east
000-AA1-240018	CA5	North-east of Randilow Farmhouse	SJ7470346966	08 June 2017	70	No inflows present	Fail (Partial Access)	Within land required
000-AA1-241003	CA5	South-west of Fog Cottages	SJ7424147542	02 May 2017	50	Present and dry	Absent (Partial Access)	16m north-west
000-AA1-241016	CA5	North-east of Ash Coppice	SJ7321346858	05 June 2017	30	No inflows present	Absent (Partial Access)	413m south-west
000-AA1-241023	CA5	North-east of Ash Coppice	SJ7331446894	05 June 2017	30	No inflows present	Present	308m south-west
000-AA1-242002	CA5	North-east of Den Lane	SJ7339048193	03 May 2017	100	No inflows present	Absent	Within land required
000-AA1-242005	CA5	North-west of Mill Lane	SJ7272047915	19 June 2017	90	No inflows present	Present	289m north-west
000-AA1-242008	CA5	North-east of Den Lane	SJ7322348436	06 June 2017	80	Present and dry	Present	Within land required
000-AA1-242010	CA5	South-east of Gonsley Green Farm	SJ7331648614	06 June 2017	100	No inflows present	Present	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-242012	CA5	South-west of Gonsley Green Farm	SJ7294648575	07 June 2017	65	No inflows present	Absent (Partial Access)	Within land required
000-AA1-242016	CA5	North-east of Den Lane	SJ7275848594	07 June 2017	40	Present and dry	Absent (Partial Access)	Within land required
000-AA1-242017	CA5	North-east of Den Lane	SJ7275848607	07 June 2017	100	Present and dry	Absent	Within land required
000-AA1-243007	CA5	South-west of Waybutt Lane	SJ7292449438	12 June 2017	100	No inflows present	Present	Within land required
000-AA1-243010	CA5	South-east of Chorlton Lane	SJ7245449514	13 June 2017	100	No inflows present	Absent	85m south-west
000-AA1-243011	CA5	South-east of Chorlton Lane	SJ7247349545	13 June 2017	75	No inflows present	Absent (Partial Access)	68m south-west
000-AA1-243012	CA5	North-east of Freshwater Drive	SJ7328449907	03 May 2017	60	Present and dry	Absent (Partial Access)	217m north-east
000-AA1-243014	CA5	South-west of Chorlton Lane	SJ7241549622	13 June 2017	100	No inflows present	Present	110m north-west
000-AA1-243026	CA5	South-west of Chorlton Lane	SJ7220549680	13 June 2017	50	No inflows present	Absent (Partial Access)	327m south-west
000-AA1-244001	CA5	South-west of Kendal Way	SJ7310950050	03 May 2017	100	Present and dry	Absent	141m north-east
000-AA1-244002	CA5	South-west of Wychwood Park	SJ7321250155	03 May 2017	90	Present and dry	Absent	274m north-east
000-AA1-244005	CA5	North-west of Chorlton Lane	SJ7204150326	14 June 2017	100	No inflows present	Absent	74m north-west
000-AA1-244013	CA5	South-east of Cobbs Lane	SJ7194150150	22 May 2017	100	No inflows present	Present	219m south-west

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-244020	CA5	South-east of Birch Lane	SJ7189850280	22 May 2017	100	No inflows present	Absent	212m south-west
000-AA1-244021	CA5	South-east of Birch Lane	SJ7178850334	22 May 2017	100	Present and dry	Present	326m north-west
000-AA1-244022	CA5	South-east of Birch Lane	SJ7181050386	22 May 2017	5	No inflows present	Absent (Partial Access)	310m north-west
000-AA1-244023	CA5	South-east of Cobbs Lane	SJ7178150234	22 May 2017	75	Present and wet	Fail (Partial Access)	337m south-west
000-AA1-244024	CA5	South-east of Cobbs Lane	SJ7190650123	23 May 2017	75	No inflows present	Present	276m south-west
000-AA1-245004	CA5	North-west of Chorlton Lane	SJ7236250883	23 May 2017	90	No inflows present	Present	Within land required
000-AA1-245005	CA5	South-west of Kingswood Avenue	SJ7273551013	23 May 2017	100	No inflows present	Absent	100m north-east
000-AA1-245006	CA5	North-west of Chorlton Lane	SJ7227250882	23 May 2017	100	No inflows present	Present	Within land required
000-AA1-245008	CA5	North-west of Chorlton Lane	SJ7237750957	23 May 2017	100	No inflows present	Absent	Within land required
000-AA1-245009	CA5	South-west of Chorlton Lane	SJ7234150956	23 May 2017	100	No inflows present	Absent	Within land required
000-AA1-245018	CA5	South-west of Basford Brook And Mere Gutter	SJ7278551719	05 May 2017	30	Present and wet	Absent (Discernible Flow of Water, Partial Access)	241m north-east
000-AA1-245019	CA5	South-east of Casey Lane	SJ7194651444	24 May 2017	80	No inflows present	Fail	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-245020	CA5	South-west of Chorlton Lane	SJ7251250948	05 May 2017	50	No inflows present	Absent (Partial Access) (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	32m south-west
000-AA1-245028	CA5	South-east of Casey Lane	SJ7186351271	27 June 2017	100	No inflows present	Absent (Significant Delay)	23m south-east
000-AA1-246007	CA5	North-east of Weston Lane	SJ7088252254	14 June 2017	100	No inflows present	Present	231m south-west
000-AA1-246010	CA5	South-west of A500 Shavington Bypass	SJ7126952442	14 June 2017	100	No inflows present	Absent	6m north-west
000-AA1-246012	CA5	North-east of Weston Lane	SJ7088752329	09 May 2017	100	Present and wet	Present	153m south-west
000-AA1-246013	CA5	South-west of A500 Shavington Bypass	SJ7105752430	09 May 2017	100	No inflows present	Absent	12m south-east
000-AA1-246014	CA5	South-west of A500 Shavington Bypass	SJ7114652503	14 June 2017	30	No inflows present	Absent (Partial Access)	Within land required
000-AA1-247005	CA5	South-west of A500 Shavington Bypass	SJ7112952589	14 June 2017	100	No inflows present	Fail	Within land required
000-AA1-247008	CA5	North-east of A5020 David Whitby Way	SJ7265853244	04 May 2017	30	No inflows present	Present	334m north-east

Ecology Survey Code	CA	Location	OS grid reference	Date water sample taken	Approximate % pond margin accessible	Presence of inflows	GCN eDNA test result	Distance from the land required for the AP revised scheme (m) and orientation
000-AA1-247022	CA5	North-west of Basford Brook And Mere Gutter	SJ7216253235	10 May 2017	100	Present and dry	Absent (Noting subsequent presence of GCN recorded through traditional P/A and PSC survey)	64m north-west
000-AA1-247035	CA5	South-east of Basford Brook And Mere Gutter	SJ7171553293	09 May 2017	95	No inflows present	Present	36m north-west
000-AA1-247073	CA5	South-west of Basford Brook And Mere Gutter	SJ7228353292	10 May 2017	95	Present and dry	Fail	8m north-west
000-AA1-247081	CA5	North-east of A5020 David Whitby Road	SJ7253853058	04 May 2017	90	Present and dry	Absent	220m south-east

P/A and PSC surveys

6.4.111 P/A or PSC surveys were conducted at 49 ponds in the South Cheshire area. The summary of the P/A and PSC survey results are detailed within Table 39. This table includes those ponds supporting great crested newt (any lifestage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

6.4.112 Great crested newts have been found in 20 of the 49 ponds subject to P/A or PSC survey, comprising 18 medium and two small population size classes.

6.4.113 Twenty-seven ponds (two with an incomplete set of visits) were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 39.

6.4.114 Two further ponds did not support great crested newt but supported good populations of smooth newts and are included in Table 39.

6.4.115 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any pond in Table 39 with fewer than 6 visits completed.

Table 39: Summary of results of P/A or PSC surveys with associated amphibian populations in the South Cheshire area

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-240004	CA5	North-west of Checkley Lane	SJ7451546488	P/A	3	27 March 2017	08 May 2017	6 (S)	1 (L)	13 (G)			Within land required
									4 adult males and 5 adult females recorded during torch survey, indeterminate species: may be palmate or smooth newt.				
000-AA1-240007	CA5	South-west of Den Lane	SJ7465747087	PSC	6	28 March 2017	24 May 2017	31 (M)	4 (L)		Juveniles and tadpoles		Within land required
000-AA1-240008*	CA5	South-west of Den Lane	SJ7445147043	P/A	4	28 March 2017	09 May 2017	1 (S)					Within land required
000-AA1-240015**	CA5	South-west of Den Lane	SJ7448447327	P/A	2	18 May 2017	24 May 2017	2 (S)	1 (L)		1 (L)		Within land required
000-AA1-241013	CA5	North-east of Den Lane	SJ7350948055	PSC	6	27 March 2017	15 May 2017	1 (S)	13 (G)		Tadpoles and spawn	1 (L)	Within land required
000-AA1-242003***	CA5	North-east of Den Lane	SJ7340448211	PSC	6	27 March 2017	15 May 2017	4 (S)	2 (L)		2 (L)		Within land required
000-AA1-242009	CA5	South-east of Gonsley Green Farm	SJ7334748610	PSC	6	28 March 2017	15 May 2017	2 (S)	2 (L)				Within land required
000-AA1-242021	CA5	North-east of Gonsley Green Farm	SJ7299848860	PSC	6	28 March 2017	15 May 2017	1 (S)	14 (G)		1 (L)	15 (L)	Within land required

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-244002	CA5	South-west of Wychwood Park	SJ7321250155	P/A	4	29 March 2017	04 May 2017		10 (G)		1 (L)	43 (L)	274m north-east
000-AA1-245020	CA5	South-west of Chorlton Lane	SJ7251250948	PSC	6	27 March 2017	25 May 2017	4 (S)				4 (L)	32m south-west
000-AA1-246007	CA5	North-east of Weston Lane	SJ7088252254	P/A	4	27 March 2017	05 June 2017	1 (S)	1 (L)		Tadpoles only		231m south-west
000-AA1-246015	CA5	South-west of Basford Brook And Mere Gutter	SJ7206752834	PSC	6	29 March 2017	22 May 2017	9 (S)	21 (G)		3 (L)		132m north-west
000-AA1-247001	CA5	North-west of A500 Shavington Bypass	SJ7193452825	PSC	6	29 March 2017	22 May 2017	2 (S)	10 (G)		1 (L)		91m north-east
000-AA1-247007	CA5	South-west of Weston Road	SJ7282953247	P/A	4	20 April 2017	25 May 2017	1 (S)					496m north-east
000-AA1-247010	CA5	North-west of A500 Shavington Bypass	SJ7194552915	PSC	6	30 March 2017	22 May 2017	7 (S)	9 (L)		4 (L)		127m south-east

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-247018	CA5	North-east of A5020 David Whitby Road	SJ7258753291	PSC	6	29 March 2017	15 May 2017	1 (S)	5 (L)	2 (L)			266m north-east
									2 adult males and 20 adult females recorded during torch survey, indeterminate species: may be palmate or smooth newt.				
000-AA1-247022	CA5	North-west of Basford Brook And Mere Gutter	SJ7216253235	PSC	6	28 March 2017	06 June 2017	1 (S)	4 (L)		Juveniles and tadpoles		64m north-west
000-AA1-247032	CA5	South-west of Basford Brook And Mere Gutter	SJ7214053297	PSC	6	28 March 2017	06 June 2017	1 (S)	3 (L)		1 (L)		125m north-west
000-AA1-247033	CA5	South-west of Basford Brook And Mere Gutter	SJ7200253319	PSC	6	30 March 2017	23 May 2017	14 (M)	4 (L)		3 (L)		157m north-west
000-AA1-247035	CA5	South-east of Basford Brook And Mere Gutter	SJ7171553293	PSC	6	30 March 2017	23 May 2017	1 (S)	6 (L)		5 (L)		36m north-west
000-AA1-247066	CA5	South-west of B5472 Weston Road	SJ7269453358	P/A	4	29 March 2017	03 May 2017		28 (G)	3 (L)	1 (L)	Tadpoles and spawn	392m north-east

Ecology Survey Code	CA	Location	OS grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Distance from the land required for the AP revised scheme (m) and orientation
								Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad	
000-AA1-247083	CA5	North-east of A5020 David Whitby Road	SJ7256453236	PSC	6	05 April 2017	15 May 2017	1 (S)	4 (L)		Tadpoles only	Tadpoles only	233m north-east

Key:

Bracketed text within species column indicates relative population size class for the peak count obtained as follows:

-Great crested newt: peak count 1-10 individuals = Small (S); peak count 11-100 individuals = Medium (M); peak count >100 individuals = Large (L).

-Smooth and palmate newt: peak count <10 individuals = Low (L); peak count 10-100 individuals = Good (G); peak count >100 individuals = Exceptional (E).

-Common frog: peak count <50 individuals or spawn clumps counted = Low (L); peak count 50-500 individuals or spawn clumps counted = Good (G); peak count >500 individuals or spawn clumps counted = Exceptional (E).

-Common toad: peak count <100 individuals = Low (L); peak count 100-1000 individuals = Good (G); peak count >1000 individuals = Exceptional (E).

Notes:

The following ponds have anomalies based on the results of either the P/A or PSC survey between 2016 and 2017, or between the P/A or PSC survey and eDNA results of 2016/2017:

-Pond 000-AA1-240008* (stated in the table above) received a greater sum of great crested newt individuals in the P/A or PSC assessment in 2016 (3 adults) versus that for 2017 (2 adults). This does not affect the small (S) population size class assigned. In addition in 2016 one palmate newt was also recorded at this pond. This species not being re-recorded in 2017.

-Pond 000-AA1-240015** (stated in the table above) received a greater sum of great crested newt individuals in the PSC assessment in 2016. Two adult great crested newt are recorded from this pond in 2017 and is classed as with a small (S) population size class. In 2016 23 adults were recorded present and this pond was reported in BID-EC-007-00 which accompanied the main ES as supporting a medium (M) population size class. In addition in 2016 one smooth newt and one common frog was also recorded at this pond but the presence of common frog was not re-recorded in 2017.

-Pond 000-AA1-242003*** (stated in the table above) received similar numbers of great crested newts and smooth newts in 2016, but the presence of common frog was not re-recorded in 2017 surveys.

-Pond 000-AA1-247008 (not listed in the table above): 5 visits were undertaken in 2017 and despite a positive eDNA result in 2017, no further evidence of great crested newt presence was found through use of traditional survey methods.

Discussion of combined results

6.4.116 Surveys undertaken in 2017 concluded that 34 of the ponds surveyed were found to support populations of great crested newts. These comprise 14 ponds identified through eDNA survey and 20 ponds identified through P/A survey and/or PSC surveys.

6.4.117 Of the 20 ponds subject to P/A survey and/or PSC survey, these comprise two medium and 18 small population size classes.

6.4.118 Over the 2016 and 2017 survey seasons, a total of 56 ponds were found to support populations of great crested newt (27 confirmed in 2016 and 34 confirmed in 2017 – noting some in 2017 are re-confirmations of 2016 ponds). These comprise 16 ponds identified through eDNA survey only and 40 ponds identified through P/A and/or PSC survey (three of these from incomplete surveys). Of the 40 ponds identified through P/A and/or PSC survey, these comprise 13 medium and 27 small population size classes.

6.4.119 Of the 99 ponds surveyed in 2017, 35 of these ponds are within the land required for the AP revised scheme. Of the 35 ponds, 14 were found to support populations of great crested newts and 17 ponds were confirmed as not supporting great crested newts (pond dry, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining four ponds is undetermined.

6.4.120 Of the 151 ponds surveyed in 2016 and 2017, 49 of these ponds are within the land required for the AP revised scheme. Of the 49 ponds, 18 ponds were found to support populations of great crested newts and 22 ponds were confirmed as not supporting great crested newts (dry pond, negative for great crested newt eDNA or likely absent through P/A survey). The potential for great crested newt presence at the remaining nine ponds is undetermined.

6.4.121 The 20 ponds surveyed through P/A and/or PSC surveys in 2017 and found to support populations of great crested newts, also support other amphibian species (smooth newt, palmate newt, common frog and common toad). Five of these ponds were found to support good populations of smooth newt or palmate newt, namely ponds: 000-AA1-241013, 000-AA1-242021, 000-AA1-246015, 000-AA1-24004 and 000-AA1-247018. The torching method can be difficult to distinguish between presence of smooth newt or palmate newt (particularly of adult females and/or when both species are known to be present) and this results in a difference as to how this information could be interpreted:

- Pond 000-AA1-240004 recorded a peak count of 1 smooth newt and 13 palmate newt, but also nine 'smooth or palmate' newt adults (note: this would not affect the assumed low population size class of either species at this pond); and
- Pond 000-AA1-247018 recorded a peak count of 1 smooth newt and 13 palmate newt, but also 22 'smooth or palmate' newt adults (note: this could affect the assumed population size class of either species at this pond to increase from a low population size class to a good one).

6.4.122 Two of the ponds listed as supporting great crested newt (ponds 000-AA1-247022 and 000-AA1-245020) were both found to be negative for presence of great crested newt through eDNA survey, but through traditional P/A and PSC survey these were both found to support this species.

6.4.123 A PSC survey of five visits was undertaken at pond 000-000-AA1-247008 in 2017 and despite a positive eDNA result from survey in 2017, no further evidence of great crested newt presence was found.

6.4.124 Two ponds surveyed in 2017, found not to support great crested newt, support a good population of one of the other amphibian species: smooth newt or common toad. Two ponds 000-AA1-244002 and 000-AA1-247066 were found to support good populations of smooth newt.

Metapopulations

6.4.125 Following a review of the 2017 survey results no new great crested newt metapopulations have been identified, but there have been changes to the ponds within these metapopulations and to the assigned population size class. There are four great crested newt metapopulations identified in the South Cheshire area, as detailed in Table 40.

6.4.126 Table 40 provides details of the retained and revised metapopulations. It also includes the revised list of Ecology Survey Codes for these metapopulations which shows where these have changed significantly from the codes stated in BID-EC-007-000.

6.4.127 There is the possibility that AMP5.1, AMP5.2 and AMP5.3 may be linked as one metapopulation (through linked populations between AMP5.1 and AMP5.2 across Den Lane and across farmland between AMP5.2 and AMP5.3). In the absence of further confirmatory survey information (post 2017 surveys), these are considered separate metapopulations.

Table 40: Great crested newt metapopulations identified in the South Cheshire area

Assumed metapopulation reference (AMP) or isolated pond reference	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
AMP5.1	South-west of Checkley, and north and south of Checkley Lane	000-AA1-239004 000-AA1-239005 000-AA1-239006 000-AA1-239020 000-AA1-240004 000-AA1-240007 000-AA1-240008 000-AA1-240009 000-AA1-240015 000-AA1-240016 000-AA1-240017 000-AA1-241004 000-AA1-241015	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-241005 000-AA1-241006 000-AA1-241007 000-AA1-241008 000-AA1-241014 000-AA1-241016 000-AA1-241019 000-AA1-241020 000-AA1-241022 000-AA1-241023 000-AA1-239001 000-AA1-239010 000-AA1-241009 000-AA1-241010		
AMP5.2	South of Chorlton and north of Blakenhall	000-AA1-242003 000-AA1-242005 000-AA1-242008 000-AA1-242009 000-AA1-242010 000-AA1-242012 000-AA1-241013 000-AA1-242014 000-AA1-242018 000-AA1-242019 000-AA1-242020 000-AA1-242021 000-AA1-243004 000-AA1-243005 000-AA1-243006 000-AA1-243007 000-AA1-243008 000-AA1-243009 000-AA1-243011 000-AA1-243013 000-AA1-243014 000-AA1-243015 000-AA1-243016 000-AA1-243017 000-AA1-243018 000-AA1-243025 000-AA1-243026	Small	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-243029		
AMP5.3	West and south-west of Hough to Chorlton	000-AA1-244004 000-AA1-244006 000-AA1-244009 000-AA1-244012 000-AA1-244013 000-AA1-244014 000-AA1-244016 000-AA1-244019 000-AA1-244021 000-AA1-244022 000-AA1-244023 000-AA1-244024 000-AA1-244026 000-AA1-245003 000-AA1-245004 000-AA1-245006 000-AA1-245007 000-AA1-245017 000-AA1-245020 000-AA1-245026 000-AA1-245027 000-AA1-245028	Small	Within land required
AMP5.4	South of Crewe and north of the A500 Shavington Bypass	000-AA1-246007 000-AA1-246011 000-AA1-246015 000-AA1-246017 000-AA1-246018 000-AA1-247001 000-AA1-247008 000-AA1-247010 000-AA1-247013 000-AA1-247018 000-AA1-247022 000-AA1-247026 000-AA1-247027 000-AA1-247029 000-AA1-247030 000-AA1-247032 000-AA1-247033	Medium	Within land required

Assumed metapopulation reference (AMP) or isolated pond reference	Location	Ecology Survey Code of water bodies within assumed metapopulation	Largest known great crested newt population from any fully surveyed pond within the metapopulation	Distance from the land required for the AP revised scheme (m) and orientation
		000-AA1-247035 000-AA1-247036 000-AA1-247039 000-AA1-247040 000-AA1-247041 000-AA1-247042 000-AA1-247043 000-AA1-247044 000-AA1-247046 000-AA1-247049 000-AA1-247058 000-AA1-247059 000-AA1-247060 000-AA1-247061 000-AA1-247062 000-AA1-247063 000-AA1-247064 000-AA1-247068 000-AA1-247069 000-AA1-247070 000-AA1-247075 000-AA1-247076 000-AA1-247077 000-AA1-247078 000-AA1-247081 000-AA1-247083 000-AA1-246008 000-AA1-246010 000-AA1-246012 000-AA1-246014 000-AA1-247005 000-AA1-247007 000-AA1-247011 000-AA1-247012 000-AA1-247014 000-AA1-247015 000-AA1-247016 000-AA1-247017		

7 Otters

7.1 Introduction

7.1.1 This section of the appendix details supplementary ecological baseline data relating to otter not reported in the BID documents that accompanied the main ES. It should be read in conjunction with the BID document BID-EC-010-000[41] that accompanied the main ES.

7.2 Methodology

7.2.1 Details of the standard methodology used for otter surveys are provided in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards, which is included within Volume 5: Appendix CT-001-002 of the main ES[42].

7.2.2 The scoping and desk study exercises and surveys reported in the main ES can be found in BID-EC-010-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since production of the main ES.

7.2.3 Table 41 summarises those sites that were scoped in for a detailed survey.

[41] HS2 Ltd (2017), High Speed Two (HS2) Phase 2a (West Midlands - Crewe), *Background Information and Data, Ecological baseline data – otter and water vole, BID-EC-010-000*. www.gov.uk/hs2.
[42] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe), Environmental Statement Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-002*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.

Table 41: Summary of features subject to otter survey

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Pond south-west of Alrewas Hayes	CA1	Pond	SK134145	Full	000-OT3-188020	17 January 2017	Within land required
River Trent	CA1	River	SK101174	Little	000-OT3-193007 000-OT3-193009	28 February 2017	Within land required
Unnamed watercourse south-east of the B5014 Uttoxeter Road	CA1	Stream	SK079193	Moderate	000-OT3-196005	28 June 2016	Within land required
Pond south-east of Newlands Lane	CA1	Pond	SK066208	Full	000-OT3-198001	19 January 2017	Within land required
Pond north-west of Newlands Lane	CA1	Pond	SK060212	Full	000-OT3-198005	17 January 2017	Within land required
Pond north-west of the B5013 Uttoxeter Road	CA1	Pond	SK045217	Full	000-OT3-200011	18 January 2017	Within land required
Unnamed watercourse south-east of the B5013 Uttoxeter Road	CA1	Ditch	SK047222	Moderate	000-OT3-200018	16 January 2017	Partially within land required
Pond north-west of Hamley Heath House	CA1	Pond	SK045217	Full	000-OT3-200021	18 January 2017	Within land required
Unnamed watercourse south-east of Moreton House flowing into a unnamed watercourse north-west of Moreton Brook	CA2	Ditch	SK031227 SK030228 SK028229 SK029228 SK027229 SK027228 SK027228	Majority	000-OT3-202007 000-OT3-202013 000-OT3-202025 000-OT3-202027 000-OT3-202031 000-OT3-202032 000-OT3-202033	05 January 2017	Within land required Within land required Within land required Within land required 68m north-east 13m north-west Within land required
Pond north-west of Moreton Brook	CA2	Pond	SK031229	Full	000-OT3-202004	05 January 2017	13m south-west

[43] Full (100%)/Majority (75% - 99%)/Moderate (25-75%)/Little (<25%)/None (0%)

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Unnamed watercourse north-west of Moreton Brook	CA2	Ditch	SK032231 SK033231 SK032232	Full	000-OT3-202006 000-OT3-202011 000-OT3-202016	05 January 2017	6m north-west 3m north-west 43m north-west
Pond north-west of Moreton Brook	CA2	Pond	SK030229	Full	000-OT3-202019	05 January 2017	27m north
Pond south-east of Tithebarn Farm	CA2	Pond	SK016230	Full	000-OT3-203003	13 December 2016	Within land required
Pond north-east of Tithebarn Covert	CA2	Pond	SK013230	Full	000-OT3-203004	13 December 2016	Within land required
Pond south-west of Tithebarn Farm	CA2	Pond	SK012232	Full	000-OT3-203005	13 December 2016	Within land required
Pond north-west of Tithebarn Farm	CA2	Pond	SK013232	Full	000-OT3-203006	13 December 2016	Within land required
Shallow stream south-west of Tithebarn Farm within Tithebarn Covert.	CA2	Stream	SK009230 SK009231 SK010231 SK010230 SK010230 SK011230	Full	000-OT3-204012 000-OT3-204008 000-OT3-204009 000-OT3-204005 000-OT3-204003 000-OT3-204007	04 July2016	88m south-west Within land required 60m south-west 86m south-west 141m south-west 83m south-west
Pond north-west of Tithebarn Covert	CA2	Pond	SK007232	Full	000-OT3-204015	13 December 2016	Within land required
Unnamed watercourse north-west of Trent and Mersey Canal	CA2	Stream	SJ997240 SJ997238 SJ997239 SJ996237	Moderate	000-OT3-205021 000-OT3-205034 000-OT3-205036 000-OT3-205040	06 January 2017	2m south-east Within land required 2m south-east Within land required
Pond south-east of Trent and Mersey Canal	CA2	Marina	SJ997235	Moderate	000-OT3-205028	03 October 2016	9m south-west

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
River Trent	CA2	River	SJ996238 and SJ994234	Moderate	000-OT3-205022 000-OT3-205037 000-OT3-205038 000-OT3-205039 000-OT3-205043 000-OT3-205044 000-OT3-205046 000-OT3-205050	29 June 2016 26 July 2016 06 January 2017	Within land required Within land required 37m north-west Within land required Within land required 6m north-west 6m north-west 3m south-west
Unnamed watercourse north-west of Hoo Mill Lane	CA2	Ditch	SJ994239	Little	000-OT3-205047 000-OT3-205053	26 July 2016	3m north-east 12m north-east
Unnamed tree lined stream north-west of the Trent and Mersey Canal	CA2	Stream	SJ997240	Moderate	000-OT3-205032	06 January 2017	2m north-east
Unnamed watercourse south-east of the A518 Weston Road	CA2	Stream	SJ953247	Little	000-OT3-210001	11 July 2016	Within land required
Pond north-west of Hopton Bank	CA2	Pond	SJ942262	Moderate	000-OT3-211014	17 August 2016	52m north-east
Pond south-east of Marston Lane	CA2	Pond	SJ927272	Full	000-OT3-213001	11 July 2016	Within land required
Unnamed watercourse south-east of Marston Lane	CA2	Stream	SJ929276 SJ928275 SJ930276	Moderate	000-OT3-213002 000-OT3-213003 000-OT3-213005	12 July 2016	27m south-east 1m north-west 27m south-east
Filly Brook	CA3	Stream	SJ890334 and SJ892334	Little	000-OT3-220007 000-OT3-220009 000-OT3-220043 000-OT3-220046 000-OT3-220047	26 June 2016 27 June 2016	Within land required Within land required 1m south-west Within land required Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Unnamed watercourse south-west of the M6	CA3	Stream	SJ871344 and SJ872340	Moderate	000-OT3-222009 000-OT3-222020 000-OT3-222026 000-OT3-222030 000-OT3-222032 000-OT3-222033	27 June 2016 28 June 2016 29 June 2016	Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ869345 and SJ870343	Full	000-OT3-222024 000-OT3-222027 000-OT3-222034	27 June 2016	Within land required Within land required 1m north-east
Pond south-west of the M6	CA3	Pond	SJ870345	Full	000-OT3-222028	27 June 2016	Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ870345 and SJ869346	Full	000-OT3-222029 000-OT3-222031 000-OT3-222040 000-OT3-222042	29 June 2016 27 June 2016 28 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ870345	Full	000-OT3-222035	27 June 2016	Within land required
Unnamed watercourse south-west of Birchwood	CA3	Ditch	SJ869346	Full	000-OT3-222036	29 June 2016	Within land required
Pond south-west of Birchwood	CA3	Pond	SJ869345	Full	000-OT3-222037	28 June 2016	Within land required
Pond north-east of Birchwood	CA3	Pond	SJ869347	Full	000-OT3-222043	29 June 2016	Within land required
Unnamed watercourse south-east of Birchwood	CA3	Ditch	SJ870347	Moderate	000-OT3-222038	28 June 2016	Within land required
Unnamed watercourse south-east of Birchwood	CA3	Ditch	SJ870347 SJ870346 SJ870347 SJ869347	Moderate	000-OT3-222044 000-OT3-222045 000-OT3-222046 000-OT3-222047	28 June 2016	Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Pond south-west of Birchwood	CA3	Pond	SJ869346	Full	000-OT3-223001	28 June 2016	Within land required
Pond north-west of Birchwood	CA3	Pond	SJ870347	Full	000-OT3-223002	29 June 2016	Within land required
Pond south-east of Birchwood	CA3	Pond	SJ869347	Full	000-OT3-223003	29 June 2016	Within land required
Pond south-west of the A51: Stone Road	CA3	Pond	SJ849366	Full	000-OT3-225009	30 June 2016	Within land required
Pond north-west of Swynnerton Heath Farm	CA3	Pond	SJ842369	Full	000-OT3-226004	30 June 2016	81m north-west
Pond south-east of Clifford's Wood	CA3	Pond	SJ841371	Full	000-OT3-226005	30 June 2016	Within land required
Pond north-west of Bent Lane	CA3	Pond	SJ815390	Full	000-OT3-229003	01 July 2016	50m south-west
Pond north-east of Chorlton Brook Cottage	CA3	Pond	SJ815392	Full	000-OT3-230003	19 July 2016	Within land required
Unnamed watercourse south-west of Bent Lane	CA3 CA3 CA3	Stream	SJ816396 and SJ814394 SJ815395 SJ815395	Moderate	000-OT3-230009 000-OT3-230011 000-OT3-230012 000-OT3-230013	19 July 2016	Within land required 1m south-east Within land required Within land required
Unnamed watercourse south-west of Bent Lane	CA4	Stream	SJ808400 SJ806399 SJ807400 SJ814394	Moderate	000-OT3-231004 000-OT3-231006 000-OT3-231007 000-OT3-230011	22 June 2016 19 July 2016	Within land required Within land required Within land required 1m south-east
Meece Brook	CA4	Stream	SJ807405 and SJ813394	Moderate	000-OT3-230014 000-OT3-230020 000-OT3-230024 000-OT3-230027 000-OT3-230030	23 June 2016 19 July 2016	Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
					000-OT3-230032 000-OT3-230033 000-OT3-230034 000-OT3-231001 000-OT3-231002 000-OT3-231003 000-OT3-231005 000-OT3-231009 000-OT3-231011 000-OT3-231013 000-OT3-231015 000-OT3-231017		
Unnamed watercourse south-west of Hey Sprink	CA4	Ditch	SJ783419 and SJ780424	Majority	000-OT3-234001 000-OT3-234005 000-OT3-234009 000-OT3-234014 000-OT3-234015 000-OT3-234019 000-OT3-234026	25 October 2016	86m south-west 68m south-east 5m south-west 50m south-west 67m south-west 27m south-west Within land required
Unnamed watercourse north-east of Manor Road	CA4	Ditch	SJ780422 SJ779422 SJ779423 SJ778424 SJ779425 SJ778423	Majority	000-OT3-234016 000-OT3-234017 000-OT3-234023 000-OT3-234025 000-OT3-234027 000-OT3-234029	25 October 2016	159m south-west 114m south-east 29m south-east Within land required Within land required Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Unnamed watercourse north-east of Manor Road	CA4	Ditch	SJ780425	Little	000-OT3-234020	25 October 2016	Within land required
River Lea	CA4	River	SJ780427 and SJ779430	Moderate	000-OT3-235006 000-OT3-235011 000-OT3-235012 000-OT3-235013	29 September 2016	Within land required
Checkley Brook	CA4	Stream	SJ750462 and SJ746459	Moderate	000-OT3-239036 000-OT3-239043 000-OT3-239048 000-OT3-239050	23 June 2016 27 June 2016	138m south-west 118m south-east 107m north-east 61m south-west
Pond north-east of Checkley Brook	CA4	Pond	SJ746459	Full	000-OT3-239049	23 June 2017	37m south-west
Checkley Brook	CA5	Stream	SJ750461 and SJ748459	Moderate	000-OT3-239028 000-OT3-239031 000-OT3-239032 000-OT3-239033 000-OT3-239034	23 June 2016 27 June 2016	7m south-east 9m south-west Within land required Within land required Within land required
Pond north-east of Checkley Brook	CA5	Pond	SJ748461	Full	000-OT3-239041	23 June 2017	Within land required
Pond south-east of Checkley Lane	CA5	Pond	SJ745462	Full	000-OT3-239054	23 June 2017	Within land required
Unnamed watercourse north-east of Chorlton Lane	CA5	Ditch	SJ726506	Full	000-OT3-244016	12 January 2017	60m north-east

7.3 Deviations, constraints and limitations

7.3.1 Every effort was made to establish as complete a picture as possible of otter activity and to fully record the presence of otters and their resting places. However, the following constraints and limitations were encountered:

- field surveys were limited to locations where landowner permission had been obtained;
- surveys were carried out from both banks of the watercourse where possible. However, at some locations access or health and safety constraints prevented this;
- at some locations topography and vegetation structure restricted surveys by reducing access and visibility, therefore there is the potential for evidence to have been under-recorded;
- in order to complete the maximum number of surveys within the survey timeframe, some surveys were completed during periods when water levels were high and/or after periods of heavy rainfall. While signs of otter activity can still be detected under such conditions, evidence may be under recorded as field signs may have been washed away or be less visible, thus reducing the confidence in negative results obtained during these surveys;
- due to limitations regarding land access, it was not possible to carry out four survey visits to all sites or to carry out surveys at three-monthly intervals. This resulted in fewer opportunities for encountering otter field signs within a restricted survey season. Evidence of otter activity at the sites where fewer surveys were carried out, or where the interval between surveys was shorter, may be under recorded for these sites. This reduces the confidence in any negative results obtained during surveys at these sites; and
- due to land access constraints, a deviation from the methodology stated in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards (see the main ES Volume 5: Appendix CT-001-002) was made, whereby otter surveys were undertaken only along those watercourses and on those water bodies within 100m (instead of 300m) of the land required for the construction of the AP revised scheme. Where watercourses were at least in part within the land required for the construction of the AP revised scheme, these watercourses were subject to surveys to a 300m (instead of 2km) extent both upstream and downstream of where they cross the land required for the construction of the AP revised scheme.

7.3.2 Otters are a highly mobile species and range over large distances. Confirmed and possible otter activity has been recorded on the River Trent, Meece Brook, River Lea, Checkley Brook and a limited number of minor watercourses/water bodies surveyed. Therefore, in drawing conclusions on the presence of otters on watercourses/water bodies within each of the community areas, a precautionary approach has been adopted, taking into consideration the above deviations, constraints and limitations. For example: where access was restricted, or where fewer than four surveys were possible, provided suitable habitat exists, then it has been assumed that otters are present.

7.4 Baseline

7.4.1 Stretches of watercourses or water bodies were scoped out from detailed otter survey, where there was a lack of suitable habitat (river, streams and large water bodies) within and up to 100m of the land required for the construction of the AP revised scheme. The decision to scope out watercourses or water bodies also considered: presence of barriers to dispersal; availability of suitable terrestrial breeding habitats; adjoining land use; level of disturbance; depth, flow and width of watercourse; connectivity; and pollution.

7.4.2 Table 42 provides a summary of additional potential holts and potential couches recorded during surveys. The additional potential holts are highlighted in the BID Map Series EC-11 that accompanies the SES and AP ES.

Table 42: Summary of holts, potential holts and couches recorded during survey

Name of watercourse and ecology survey code	Community Area	Location	OS grid reference	Nature of record[44]	Distance from land required for the AP revised scheme (m) and orientation
Unnamed watercourse 000-OT2-231-001	CA4	South-west of Bent Lane	SJ807400	Possible holt under roots of tree.	Within land required
Meece Brook 000-OT2-231-003	CA4	South-east of the A53 Whitmore Road	SJ807406	Potential holt on the bank close to the brook. Appears to be badger sett but due to location on the bank close to the brook has some suitability for use by otter.	Within land required
Meece Brook 000-OT2-231-002	CA4	South-east of the A53 Whitmore Road	SJ807406	Possible holt under roots of hawthorn tree on bank with slight faint prints in mud.	Within land required
River Lea	CA4	South-east of Hey House	SJ780428	Potential holt with internal diameter of	Within land required

[44] Potential holts were identified by the presence of a tunnel (or cavity of similar dimensions such as drain pipe, log pile, rock/boulder pile) with an internal diameter of at least 250mm and extending 1m into the bank (or where the end is out of sight) under structures such as bridges or buildings. Active holts were identified where features met the aforementioned potential holt criteria, with any of the following additional signs of otter presence: visual sighting, presence of otter spraints or footprints beside or inside tunnel; evidence of where an animal's body has rubbed against wall or roots; presence of hairs ca. 25mm long and mid brown in colour; and/or presence of scratch marks. The survey methods are detailed in greater detail within Technical note – Ecology and biodiversity – Ecological field survey methods and standards which is included within the main ES Volume 5: Appendix CT-001-002.

Name of watercourse and ecology survey code	Community Area	Location	OS grid reference	Nature of record[44]	Distance from land required for the AP revised scheme (m) and orientation
000-OT2-235-002				approximately 300mm extending into bank.	
Checkley Brook 000-OT2-239001	CA5	South-east of Little Meadow	SJ746459	Potential holt under/behind roots of hawthorn.	68m south
Checkley Brook 000-OT2-239002	CA5	North-west of Wrinehill Hall	SJ749459	Potential couch. Pile of old deadwood within dense overgrown field margin, approximately 5m from bank. Offers potential place of shelter for otter and relatively undisturbed.	Within land required
Checkley Brook 000-OT2-239003	CA5	South-east of Little Meadow	SJ747459	Possible couch on northern bank. Grass flattened in wide area up to water's edge.	91m south-east

Fradley to Colton (CA1)

7.4.3 No holts or potential holts were recorded within the Fradley to Colton area. There were no additional field signs recorded within the Fradley to Colton area during field surveys.

Pyford Brook area

7.4.4 A pond south-west of Alrewas Hayes, within the land required for the AP revised scheme, was surveyed with full access. No holts or other field signs were recorded during the survey. There was a moderate level of pollution in the water and vegetation surrounding the pond had recently been cleared. There is suitable terrestrial habitat surrounding the pond and due to its proximity to Pyford Brook, it offers potential for otter.

River Trent

7.4.5 A short section of the River Trent, within the land required for the AP revised scheme, was surveyed with little access. The area surveyed had suitable terrestrial habitat, but no signs of otter were evident during the field survey. Historic desk study information reported in the main ES, identified records of otter on the River Trent and due to the presence of the suitable terrestrial habitat, the river is still considered suitable to support otter.

7.4.6 A shallow stream consisting of silt and stone south-east of the B5014 Uttoxeter Road, within the land required for the AP revised scheme, was surveyed with moderate access. No otter field signs were noted and there is no suitable terrestrial habitat to provide cover and offered limited evidence of food supply. This section of the watercourse was scoped out of further surveys.

7.4.7 A pond south-east of Newlands Lane, within the land required for the AP revised scheme, was surveyed with full access. No suitable terrestrial habitat was noted

immediately adjacent to the pond for otter, however there is a small patch of woodland to the east. This pond is isolated and offered limited evidence of food supply. This water body was scoped out of further surveys.

7.4.8 A pond north-west of Newlands Lane, within the land required for the AP revised scheme, was surveyed with full access. A limited amount of scrub surrounds the pond, however, there is no suitable terrestrial habitat. The surrounding fields are arable and the pond is isolated from watercourses. This water body was scoped out of further surveys.

7.4.9 A ditch south-east of the B5013 Uttoxeter Road, that partially crosses the land required for the AP revised scheme, was surveyed with moderate access. The ditch held a small amount of water (recent rainfall prior to and during the field survey), with unsuitable terrestrial habitat (lack of cover) and limited evidence of food supply. Additionally, the ditch is isolated from adjacent major watercourses and a main road presents a barrier, which further reduces the suitability for otter. This section of the watercourse was scoped out of further surveys.

7.4.10 A pond north-west of the B5013 Uttoxeter Road and one pond north-west of Hamley Heath House, both within the land required for the AP revised scheme, were surveyed with full access. There is no suitable terrestrial habitat to provide cover for otter and limited evidence of food supply. Although further ponds are present within the adjacent area, these ponds appear to have medium levels of pollution and are isolated from watercourses. The pond margins experience regular disturbance from horse grazing. These water bodies were scoped out of further surveys.

Colwich to Yarlet (CA2)

7.4.11 No active holts or potential holts were recorded within the Colwich to Yarlet area. Otter footprints were noted on a field survey along the River Trent, within the land required for the AP revised scheme.

Moreton Brook area

7.4.12 A ditch flowing from south-east of Moreton House to the north-west of Moreton Brook, adjacent to the land required for the AP revised scheme, was surveyed with majority access. There is suitable terrestrial habitat present with moderate connectivity to other watercourses or water bodies. No field signs were found. The presence of suitable terrestrial habitat and connectivity to adjacent water courses and water bodies mean this ditch has the potential to support otter.

7.4.13 A pond north-west of Moreton Brook, 13m south-west of the land required for the AP revised scheme, was surveyed with full access. There is suitable terrestrial habitat present. No otter signs were recorded. The presence of suitable terrestrial habitat and connectivity to Moreton Brook mean this ditch has the potential to support otter.

7.4.14 A ditch flowing into Moreton Brook, originating north-west of the brook, immediately adjacent to the land required for the AP revised scheme, was surveyed with full access. There is limited suitable terrestrial habitat and no evidence of field signs during the survey. There is moderate connectivity to surrounding watercourses or water bodies and there is potential food supply at sections flowing towards Moreton Brook. Despite limited suitable terrestrial habitat, the connectivity to Moreton Brook and its' potential food supply, mean this ditch has the potential to support otter.

7.4.15 A pond north-west of Moreton Brook, 27m north of the land required for the AP revised scheme, was surveyed with full access. There is limited suitable habitat present with limited evidence of food supply. No otter signs were recorded and the immediate arable habitat did not offer potential for breeding. This water body was scoped out of further surveys.

Trent and Mersey Canal area

7.4.16 A pond south-east of Tithebarn Farm and a pond south-west of Tithebarn Farm, both within the land required for the AP revised scheme, were surveyed with full access. There is no suitable terrestrial habitat present and no evidence of food supply. The ponds were found to be dry at the time of survey. Both water bodies were scoped out of further surveys.

7.4.17 A pond north-east of Tithebarn Covert, within the land required for the AP revised scheme, was surveyed with full access. There is suitable terrestrial habitat present, however there is no dense impenetrable cover adjacent to the pond. A high level of pollution was observed. The woodland is managed for game which increases disturbance and further reduces suitability for otter. This water body was scoped out of further surveys.

7.4.18 A pond north-west of Tithebarn Farm, within the land required for the AP revised scheme, was surveyed with full access. There is suitable habitat present, however high levels of pollution were noted and there is limited evidence of food supply. No otter signs were noted. This water body was scoped out of further surveys.

7.4.19 A shallow stream south-west of Tithebarn Farm within Tithebarn Covert, partially within the land required for the AP revised scheme, was surveyed with full access. There is suitable terrestrial habitat present, however there is no dense impenetrable cover adjacent to the stream. There is limited evidence of food supply and sections of the stream were dry. This section of the watercourse was scoped out of further surveys.

7.4.20 A pond north-west of Tithebarn Covert within Little Covert, within the land required for the AP revised scheme, was surveyed with full access. The pond offered limited food availability and the pond water level was low. There is disturbance on the terrestrial habitat surrounding the pond due to game management, reducing the likelihood of otter in the area. No field signs were noted during survey. This water body was scoped out of further surveys.

7.4.21 An unnamed stream north-west of the Trent and Mersey Canal, partially within the land required for the AP revised scheme, was surveyed with moderate access. There is suitable terrestrial habitats present, however there is no dense impenetrable cover noted in stretches of the stream. There is poor connectivity to major watercourses and a moderate level of pollution was noted. There is limited evidence of food supply, reducing the suitability for otter. This section of the watercourse was scoped out of further surveys.

7.4.22 The Great Haywood Marina south-east of the Trent and Mersey Canal, 9m south-west of the land required for the AP revised scheme, was surveyed with moderate access. There is no suitable terrestrial habitat present and there were no field signs noted. Although the marina may offer foraging opportunities, the high levels of pollution

from boats and disturbance from moorings reduce the suitability for otter. This water body was scoped out of further surveys.

River Trent

7.4.23 The River Trent, crossing the land required for the AP revised scheme, was surveyed with moderate access. There were no confirmed holts recorded, however otter footprints (SJ 995236) were found on a sandy bank within the land required for the AP revised scheme. The river is known to support otter.

7.4.24 A shallow ditch connecting to the River Trent north-west of Hoo Mill Lane, immediately adjacent to the north-east of the land required for the AP revised scheme, was surveyed with little access. The ditch is located in a residential garden. Despite high levels of connectivity to the river, there is no suitable terrestrial habitat and limited evidence of food supply. This section of the watercourse was scoped out of further surveys.

7.4.25 A tree-lined stream flowing to the River Trent north-west of the Trent and Mersey Canal, partially within the land required for the AP revised scheme was surveyed, with moderate access. A moderate level of food supply and high connectivity were noted. There was a limited amount of terrestrial habitat for otter and no field signs were found. The presence of connectivity to the River Trent (prior historic record for otter) and Trent and Mersey Canal, with food supply mean this stream has the potential for otter presence.

7.4.26 A shallow stream south-east of the A518 Weston Road, within the land required for the AP revised scheme, was surveyed with little access. The stream is isolated from major watercourses and there is a lack of food supply. No evidence of otter was found adjacent to the stream and the surrounding woodland habitat. The stream is located adjacent to a main road further reducing suitability for otter. This section of the watercourse was scoped out of further surveys.

7.4.27 A pond north-west of Hopton Bank, 52m north-east of the land required for the AP revised scheme, was surveyed with moderate access. The pond is unsuitable for otter as it was dry at the time of survey and is isolated from other suitable aquatic habitats. This water body was scoped out of further surveys.

7.4.28 A pond south-east of Marston Lane, within the land required for the AP revised scheme, was surveyed with full access. There is no suitable terrestrial habitat and the pond is isolated from other suitable aquatic habitats. There is limited evidence of food supply. This water body was scoped out of further surveys.

7.4.29 A stream south-east of Marston Lane, immediately adjacent to the north-west of the land required for the AP revised scheme, was surveyed with moderate access. There is no suitable terrestrial habitat and there is limited evidence of food supply. This section of the watercourse was scoped out of further surveys.

Stone and Swynnerton (CA3)

7.4.30 No holts or potential holts were recorded within the Stone and Swynnerton area. There were no additional field signs recorded within the Stone and Swynnerton area during field surveys.

Filly Brook

7.4.31 A section of Filly Brook, crossing the land required for the AP revised scheme, was surveyed with little access. Tree lines and scrub habitat are present along the brook, however this section did not offer suitable terrestrial habitat for breeding. The presence of cattle and evidence of poaching along the banks further reduces suitability for breeding. Despite the potential for Filly Brook to provide commuting opportunities for otter, this section of the watercourse was scoped out of further surveys.

7.4.32 A stream south-west of the M6, within the land required for the AP revised scheme, was surveyed with moderate access. No signs of otter were noted and the stream was shallow in places, often with silt. The stream is considered to be of low suitability for otter as there is limited terrestrial habitat and limited evidence of food supply. This section of the watercourse was scoped out of further surveys.

7.4.33 A ditch south-west of the M6, partially within the land required for the AP revised scheme, was surveyed with full access. This ditch was situated in wet meadow and grassland habitat and found to be shallow in places. There is no suitable terrestrial habitat and there is limited evidence of food supply. This section of the watercourse was scoped out for further surveys.

7.4.34 A pond south-west of the M6, within the land required for the AP revised scheme, was surveyed with full access. There is no suitable terrestrial habitat and there is limited food supply. This pond was almost dry at the time of survey and was located in wet meadow habitat. This water body was scoped out of further surveys.

7.4.35 A ditch south-west of the M6, within the land required for the AP revised scheme, was surveyed with full access. There is no suitable terrestrial habitat and there is limited evidence of food supply. The ditch is silted up and located in wet meadow. This section of the watercourse was scoped out of further surveys.

7.4.36 A pond south-west of the M6, within the land required for the AP revised scheme, was surveyed with full access. There is no suitable terrestrial habitat and there is limited evidence of food supply. The pond was silted up at the time of survey and dominated by aquatic vegetation. This water body was scoped out of further surveys.

7.4.37 Two ditches and two ponds south-west of Birchwood, all within the land required for the AP revised scheme, were surveyed with full access. The ditches and the ponds are located within a wet meadow. There is no suitable terrestrial habitat for otter and there is limited evidence of food supply. Furthermore, both ditches were silted up. These sections of watercourse and the water bodies were scoped out of further surveys.

7.4.38 A pond north-east of Birchwood, within the land required for the AP revised scheme, was surveyed with full access. The pond is located at the edge of woodland within a wet meadow. There is no terrestrial habitat suitable for otter adjacent to the pond. This water body was scoped out of further surveys.

7.4.39 Two ditches south-east of Birchwood, both within the land required for the AP revised scheme, were surveyed with moderate access. The ditches are partially located within a wet meadow. Although there is woodland cover, no concealing habitat for otter was

noted. These watercourses were silted up and offered no evidence of food supply. The sections of these watercourses were scoped out of further surveys.

7.4.40 Three ponds, one south-west, one south-east and one north-west of Birchwood, each within the land required for the AP revised scheme were surveyed, with full access. The ponds are partially located in woodland and wet meadow. Despite being within woodland, there is no concealing breeding habitat for otter and there is limited evidence of food supply. In addition, the ponds were found to be silted up reducing suitability for otter. These water bodies were scoped out of further surveys.

7.4.41 A pond south-west of the A51 Stone Road and located in Stabhill Plantation, within the land required for the AP revised scheme, was surveyed with full access. The pond was noted to be highly eutrophic. Despite being within woodland, no concealing habitat suitable for breeding was recorded and there is limited evidence of food supply. This water body was scoped out of further surveys.

7.4.42 A pond north-west of Swynnerton Heath Farm, 81m north-west of the land required for the AP revised scheme, was surveyed with full access. This pond was filled with slurry and there is no suitable terrestrial habitat and limited evidence of food supply. This water body was scoped out of further surveys.

7.4.43 A pond south-east of Clifford's Wood, within the land required for the AP revised scheme, was surveyed with full access. This pond is silted up and there is no suitable terrestrial habitat for otter. There is limited evidence of food supply. This water body was scoped out of further surveys.

7.4.44 A pond north-west of Bent Lane, 50m south-west of the land required for the AP revised scheme, was surveyed with full access. The pond is located within a landscaped garden and there is no suitable terrestrial habitat. There is limited evidence of food supply. This water body was scoped out of further surveys.

Meece Brook area

7.4.45 A pond north-east of Chorlton Brook Cottage, within the land required for the AP revised scheme, was surveyed with full access. There is no suitable terrestrial habitat and there is limited evidence of food supply despite the pond's proximity to Meece Brook. The pond is also silted up. This water body was scoped out of further surveys.

7.4.46 A stream joining the Meece Brook south-west of Bent Lane, within the land required for the AP revised scheme, was surveyed with moderate access. There is no suitable habitat, limited evidence of food supply and a high level of pollution. The watercourse is located within cattle grazing land. This section of the watercourse was scoped out of further surveys.

Whitmore Heath to Madeley (CA4)

7.4.47 Four potential holts were recorded during surveys in the Whitmore Heath to Madeley area and are summarised in Table 42. Additional activity was noted on Meece Brook, the River Lea and their surrounding areas.

Meece Brook

7.4.48 A tributary of Meece Brook south-west of Bent Lane, within the land required for the AP revised scheme, was surveyed with moderate access. A spraint (SJ808400) was

recorded within the land required for the AP revised scheme. The dry and intact spraint consisting of fish bones was located on a wooden plank over a drain. A potential lying up site (SJ808400) was noted in the vicinity of the confirmed spraint. Two potential tracks (SJ808404) and (SJ809402) were noted within the land required for the AP revised scheme. The field signs at this tributary of Meece Brook and in the vicinity indicate confirmed presence of otter.

7.4.49 A section of Meece Brook, within the land required for the AP revised scheme, was surveyed with moderate access. In addition to the potential holts and couches detailed in Table 42, footprints (SJ808404) were recorded within the land required for the AP revised scheme.

7.4.50 A potential lying up site (SJ809402) was recorded within the land required for the AP revised scheme under a fallen tree approximately 5m from the brook within concealing vegetation.

7.4.51 A second potential lying up site (SJ809402) was recorded within the land required for the AP revised scheme under a fallen willow *Salix sp.* providing opportunities for sheltering next to the bank.

7.4.52 A potential slide into Meece Brook (SJ812396) near a culvert was noted, within the land required for the AP revised scheme. This field sign is adjacent to a mammal run.

River Lea

7.4.53 A ditch south-west of Hey Sprink leading to the River Lea, partially within the land required for the AP revised scheme, was surveyed with majority access. The habitats offer potential food supply for otter and is well connected to other watercourses. Due to the connectivity to other watercourses and presence of potential food supply, there is potential for otter presence in this location.

7.4.54 A ditch north-east of Manor Road, within the land required for the AP revised scheme, was surveyed with little access. This ditch offers potential foraging opportunities for otter due to connectivity with other watercourses and potential food supply.

7.4.55 A ditch north-east of Manor Road connecting to the River Lea, partially within the land required for the AP revised scheme, was surveyed with majority access. This ditch offers potential foraging opportunities for otter due to connectivity and potential of food supply.

7.4.56 A section of the River Lea, within the land required for the AP revised scheme, was surveyed with moderate access. In addition to the potential holts and couches detailed in Table 42, potential footprints (SJ778424) were recorded immediately east of the land required for the AP revised scheme. Surveyors were unable to fully confirm the footprints as otter footprints due to disturbance to the prints from recent light rainfall. Due to the presence of potential holts and couches and the potential footprints, there is potential for otter presence in this location.

7.4.57 A potential lying up site (SJ773428) under open roots of a mature oak tree was recorded, within the land required for the AP revised scheme, adjacent to a pond north of Manor Farm and west of the River Lea.

Checkley Brook

7.4.58 Sections of Checkley Brook, 60m south-west of the land required for the AP revised scheme, were surveyed with moderate access. The Checkley Brook continues beyond the surveyed sections to cross the land required for the AP revised scheme. There is suitable terrestrial habitat and foraging habitats for otter, within the surveyed sections and this is assumed to continue into the section within the land required for the AP revised scheme.

7.4.59 A pond north-east of Checkley Brook, 37m south-west of the land required for the AP revised scheme, was surveyed with full access. This pond was found to be filled in, offering no potential for otter. This water body was scoped out of further surveys.

South Cheshire (CA5)

7.4.60 Two potential couches and a potential holt were recorded during surveys in the South Cheshire area and are summarised in Table 42. Additional activity was noted on Checkley Brook and surrounding areas.

Checkley Brook

7.4.61 A section of Checkley Brook, partially crossing the land required for the AP revised scheme, was surveyed with moderate access. A potential lying up site (SJ748459) was recorded, within the land required for the AP revised scheme, underneath roots of a mature sycamore providing a potential above ground cover. No confirmed evidence of use by otter were found, however the site is potentially suitable. Other potential otter field signs noted include footprints (SJ747459) and a slide (SJ747459) on the bank leading to the water south of the land required for the AP revised scheme.

7.4.62 A pond north-east of Checkley Brook and a pond south-east of Checkley Lane, within the land required for the AP revised scheme, were surveyed with full access. These ponds have some suitability for otter due to their proximity to the brook, potential availability of food supply and presence of mature trees with root systems that may offer suitable resting sites for otter.

7.4.63 A shallow ditch within Wychwood Park Golf Club, north-east of Chorlton Lane and the land required for the AP revised scheme, was surveyed with full access. There is no suitable terrestrial habitat and there is limited evidence of food supply. This section of watercourse was scoped out of further surveys.

8 Water vole

8.1 Introduction

8.1.1 This section of the appendix details supplementary ecological baseline data relating to water vole not reported in the BID documents that accompanied the main ES. It should be read in conjunction with the BID document BID-EC-010-000[45] which accompanied the main ES.

8.2 Methodology

8.2.1 Details of the standard methodology used for water vole surveys are provided in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards, which is included within Volume 5: Appendix CT-001-002 of the main ES[46].

8.2.2 The scoping, desk study exercises and surveys reported in the main ES can be found in BID-EC-010-000. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES, or because the surveys have been undertaken since the production of the main ES.

8.2.3 Table 43 provides a summary of watercourses and water bodies subject to survey for water vole. This information is cross referenced to the BID Map Series EC-12 which accompanies the SES and AP ES.

[45] HS2 Ltd (2017), High Speed Two (HS2) Phase 2a (West Midlands - Crewe), *Background Information and Data, Ecological baseline data – otter and water vole, BID-EC-010-000*. www.gov.uk/hs2.
[46] HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe), Environmental Statement Scope and Methodology Report Addendum, Volume 5: Appendix CT-001-002*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf.

Table 43: Summary of watercourses and water bodies subject to water vole survey

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Marina south-east of Trent and Mersey Canal	CA2	Marina	SJ997235	Majority	000-WV1-205028	03 October 2016	9m south-west
Unnamed watercourse north-east of River Trent	CA2	Stream	SJ994239 and SJ994240	Moderate	000-WV1-205047 000-WV1-205053 000-WV1-205056	16 July 2016 30 September 2016	3m north-east 12m north-east 7m south-west
River Trent	CA2	River	SJ995240	Little	000-WV1-205050	26 July 2016	3m south-west
Unnamed watercourse south-east of the A518 Weston Road	CA2	Stream	SJ953247	Little	000-WV1-210001	11 July 2016	Within land required
Pond north-west of Hopton Bank	CA2	Pond	SJ942262	Moderate	000-WV1-211014	17 August 2016	52m north-east
Pond south-east of Marston Lane	CA2	Pond	SJ927272	Full	000-WV1-213001	11 July 2016	Within land required
Unnamed watercourse south-east of Marston Lane	CA2	Stream	SJ929276 SJ928275 SJ930276	Moderate	000-WV1-213002 000-WV1-213003 000-WV1-213005	30 September 2016	27m south-east 1m north-west 27m south-east
Filly Brook	CA3	Stream	SJ892334 SJ891334 SJ890334 SJ890334	Little	000-WV1-220007 000-WV1-220043 000-WV1-220046 000-WV1-220047	27 June 2016	Within land required 1m south-west Within land required Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ872340 SJ871343 SJ871344 SJ870345 SJ870346 SJ870346	Moderate	000-WV1-222009 000-WV1-222020 000-WV1-222026 000-WV1-222030 000-WV1-222032 000-WV1-222033	27 June 2016 28 June 2016 29 June 2016	Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
			SJ870347		000-WV1-222038		
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ870343 and SJ869345	Full	000-WV1-222024 000-WV1-222027 000-WV1-222034	27 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ870345	Full	000-WV1-222028	27 June 2016	Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ870345	Full	000-WV1-222029	29 June 2016	Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ870345 and SJ869346	Full	000-WV1-222031 000-WV1-222040 000-WV1-222042	27 June 2016 28 June 2016	Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ869346	Full	000-WV1-222036	29 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ869345	Full	000-WV1-222037	28 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ869347	Full	000-WV1-222043	29 June 206	Within land required
Unnamed watercourse south-west of the M6	CA3	Ditch	SJ870347 SJ870346 SJ870347 SJ869347	Moderate	000-WV1-222044 000-WV1-222045 000-WV1-222046 000-WV1-222047	28 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ869346	Full	000-WV1-223001	28 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ870347	Full	000-WV1-223002	29 June 2016	Within land required
Pond south-west of the M6	CA3	Pond	SJ869347	Full	000-WV1-223003	29 June 2016	Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Pond north-east of Swynnerton	CA3	Pond	SJ852357	Full	000-WV1-225001	01 July 2016	Within land required
Pond south-west of the A51 Stone Road	CA3	Pond	SJ849366	Full	000-WV1-225009	30 June 2016	Within land required
Pond north-west of Swynnerton Heath Farm	CA3	Pond	SJ842369	Full	000-WV1-226004	30 June 2016	81m north-west
Pond south-east of Clifford's Wood	CA3	Pond	SJ841371	Full	000-WV1-226005	30 June 2016	Within land required
Pond north-east of Chorlton Brook Cottage	CA4	Pond	SJ815392	Full	000-WV1-230003	19 July 2016	Within land required
Pond south-east of Chorlton Brook Cottage	CA4	Pond	SJ814391	Full	000-WV1-230004	30 September 2016	15m north-west
Unnamed watercourse south-west of Bent Lane	CA3 /CA4	Stream	SJ816396 SJ814394 SJ815395 SJ815395	Moderate	000-WV1-230009 000-WV1-230011 000-WV1-230012 000-WV1-230013	19 July 2016	Within land required 1m south-east Within land required Within land required
Short section of Meece Brook north east of Chorlton Brook	CA4	Stream	SJ813394	Moderate	000-WV1-230014	19 July 2016	1m south-east
Unnamed watercourse leading to River Lea north-east of Manor Road	CA4	Drain	SJ779425	Little	000-WV1-234027	26 October 2016	Within land required
Unnamed watercourse north-east of Den Lane	CA5	Ditch	SJ733483 SJ732482 SJ733483	Little	000-WV1-242011 000-WV1-242015 000-WV1-242027	28 July 2016	Within land required
Pond north-east of Den Lane	CA5	Pond	SJ732484	Full	000-WV1-242028	28 July 2016	Within land required
Pond north-east of Gonsley Green Farm	CA5	Pond	SJ732487	Full	000-WV1-242032	28 July 2016	Within land required
Pond south-west of Gonsley Green Farm	CA5	Pond	SJ729485	Full	000-WV1-242033	28 July 2016	Within land required

Watercourse or water body and site name	CA	Feature type	OS grid reference (start and finish)	Level of access within required extent[43]	Ecology survey code	Survey dates	Distance from the land required for the AP revised scheme (m) and orientation
Pond north-east of Gonsley Green Farm	CA5	Pond	SJ731487	Full	000-WV1-242036	28 July 2016	Within land required
Pond north-east of Gonsley Green Farm	CA5	Pond	SJ731489	Full	000-WV1-242041	28 July 2016	Within land required
Pond north-west of Gonsley Green Farm	CA5	Pond	SJ729489	Full	000-WV1-243002	28 July 2016	Within land required
Unnamed watercourse south-west of Waybutt Lane	CA5	Ditch	SJ731492	Moderate	000-WV1-243012	28 July 2016	Within land required
Unnamed watercourse north-east of Half Moon Farm	CA5	Ditch	SJ727491 SJ726491 SJ727492	Moderate	000-WV1-243017 000-WV1-243018 000-WV1-243020	28 July 2016	Within land required
Unnamed watercourse north-east of Chorlton Lane	CA5	Ditch	SJ726506	Full	000-WV1-244016	12 January 2017	60m north-east

8.3 Deviations, constraints and limitations

8.3.1 Every effort was made to establish as complete a picture as possible of water vole activity and to fully record the presence of water voles and their burrows. However, the following constraints and limitations were encountered:

- field surveys were limited to locations where landowner permission had been obtained or areas that were accessible to the public;
- surveys were carried out from within the watercourse or from both banks of the watercourse where possible. However, at some locations access or health and safety constraints prevented this;
- at some locations topography and vegetation structure restricted surveys alongside watercourses/water bodies, therefore there is the potential for evidence to have been under-recorded;
- in order to complete the maximum number of surveys within the survey timeframe, some surveys were completed during periods when water levels were high and/or after periods of heavy rainfall. While signs of water vole activity can still be detected under such conditions, evidence may have been under-recorded as field signs may have been washed away or be less visible, thus reducing the confidence in negative results obtained during these surveys;
- due to limitations regarding land access, it was not possible to carry out two survey visits to each site between April and October or to carry out surveys at two-monthly intervals at all sites. This resulted in fewer opportunities for encountering water vole field signs within a restricted survey season. Evidence of water vole activity at the sites where fewer surveys were carried out, or where the interval between surveys was shorter, may be under recorded for these sites. This reduces the confidence in any negative results obtained during surveys at these sites;
- due to land access constraints, a deviation to the methodology stated in the Technical note – Ecology and biodiversity - Ecological field survey methods and standards (see main ES Volume 5: Appendix CT-001-002) was made, whereby water vole surveys were undertaken only along those watercourses and on those water bodies within 100m (instead of 300m) of the land required for the construction of the AP revised scheme. Where watercourses were at least in part within the land required for the construction of the AP revised scheme, watercourses were subject to surveys to a 300m (instead of 2km) extent both upstream and downstream of where they cross the land required for the construction of the AP revised scheme; and

- due to the low number of water vole signs encountered and the partial access to watercourses, the application of the population formula for estimating water vole population size (Morris *et al.* 1998)[47] was not possible.

8.3.2 Where particular limitations are relevant to the interpretation of the baseline these are discussed within the baseline section of the relevant community area.

8.3.3 On a precautionary basis it is assumed that water vole may be present in suitable habitats in areas where access was not possible within the land required for the AP revised scheme. In sections of watercourses or water bodies where field signs were confirmed, it is possible that water voles may disperse into surrounding habitats, should they be suitable. Given that only a few signs are noted, it is unlikely that large populations are present.

8.4 Baseline

8.4.1 A summary of all positive evidence of water vole is provided in Table 44. This was limited to the recording of two signs at one unnamed watercourse (drain) within the land required for the construction of the AP revised scheme in the Whitmore to Madeley area (CA4).

Table 44: Summary of positive evidence of water vole

Name of watercourse (and ecology survey code)	CA	Location	OS grid reference	Nature of activity recorded	Distance from the land required for the AP revised scheme (m) and orientation
Unnamed watercourse 000-WV1-234027	CA4	North-east of Manor Road	SJ779425	Latrine	Within land required
Unnamed watercourse 000-WV1-234027	CA4	North-east of Manor Road	SJ779425	Feeding signs	Within land required

Fradley to Colton (CA1)

8.4.2 No additional water vole surveys have been undertaken in the Fradley to Colton area.

Colwich to Yarlet (CA2)

8.4.3 No additional water vole activity was recorded within the Colwich to Yartlet area from field surveys.

Trent and Mersey Canal area

8.4.4 The Great Haywood Marina south-east of the Trent and Mersey Canal, 9m south-west of the land required for the AP revised scheme, was surveyed with moderate access. The habitat is unsuitable for water vole. The banks are a mixture of concrete and earth on shallow sections and there is regular disturbance from boat moorings. This water body was scoped out of further surveys.

[47] Morris, P., Morris, M., MacPhearson, D., Strachan, R., and Woodroff, G. (1998), *Estimating numbers of water voles Arvicola terrestris: a correction to the published method*, Journal of Zoology, 246, 61-62

River Trent

8.4.5 A shallow stream north-east of the River Trent, 3m north-east from the land required for the AP revised scheme, was surveyed with moderate access. There is available food sources and high connectivity to other suitable habitats. This section of the watercourse is potentially suitable for water vole.

8.4.6 A section of the River Trent, 3m south-west of the land required for the AP revised scheme, was surveyed with little access. This section is partially shaded and there is limited availability of food sources. This section of the watercourse was scoped out of further survey.

8.4.7 A short section of a stream south-east of the A518 Weston Road, within the land required for the AP revised scheme, was surveyed with little access. There is a high level of shading from mature trees and scrub. Furthermore, the watercourse has poor connectivity to other suitable habitats. This section of the watercourse was scoped out of further surveys.

8.4.8 A pond north-west of Hopton Bank, 52m north-east of the land required for the AP revised scheme, was surveyed with moderate access. The pond was dry at the time of survey. Furthermore, there is limited availability of food sources and the surrounding land is grazed. The pond is isolated from other suitable habitats. This water body was scoped out of further surveys.

8.4.9 A pond south-east of Marston Lane, within the land required for the AP revised scheme, was surveyed with full access. There is poor connectivity with other suitable habitats and there is limited availability of food sources. Furthermore, the surrounding habitats are grazed. This water body was scoped out of further surveys.

8.4.10 A stream south-east of Marston Lane, immediately adjacent to the north-west of the land required for the AP revised scheme, was surveyed with moderate access. Although no field signs were found, there are available food sources. This section of the watercourse is potentially suitable for water vole.

Stone and Swynnerton (CA3)

8.4.11 No additional water vole activity was recorded within the Stone and Swynnerton area from field surveys.

Filly Brook

8.4.12 A section of Filly Brook, partially within the land required for the AP revised scheme, was surveyed with little access. There is good availability of food sources and high connectivity. Although no water vole signs were noted, this section of the watercourse is potentially suitable for water vole.

8.4.13 A series of six ponds and six ditches, located south-west of the M6 within the land required for the AP revised scheme, were surveyed with moderate to full access. Although they are located in proximity to each other improving connectivity in the landscape, the water levels were low and the ditches and ponds were silted up. These water bodies and watercourses were scoped out of further surveys.

8.4.14 A pond north-east of Swynnerton, within the land required for the AP revised scheme, was surveyed with full access. There is limited availability of food sources, poor connectivity, disturbance from anglers and excess shading from bankside vegetation. This water body was scoped out of further surveys.

8.4.15 A pond south-west of the A51 Stone Road, within the land required for the AP revised scheme, was surveyed with full access. There is limited availability of food sources, poor water quality and excess shading from bankside vegetation. This water body was scoped out of further surveys.

8.4.16 A pond north-west of Swynnerton Heath Farm, within the land required for the AP revised scheme, was surveyed with full access. The pond has a poor water quality due to silt and slurry. This water body was scoped out of further surveys.

8.4.17 A pond south-east of Clifford's Wood, 81m north-west of the land required for the AP revised scheme, was surveyed with full access. The pond has poor water quality from silt and slurry. This water body was scoped out of further surveys.

Whitmore Heath to Madeley (CA4)

8.4.18 Confirmed water vole activity was recorded within the Whitmore Heath to Madeley area to include a latrine (SJ779425) and feeding signs (SJ779425), as detailed in Table 44.

Meece Brook

8.4.19 A pond north-east of Chorlton Brook Cottage, within the land required for the AP revised scheme, was surveyed with full access. There is a high level of shading from bankside vegetation and the pond was silted up. This water body was scoped out of further surveys.

8.4.20 A pond south-east of Chorlton Brook Cottage, 15m north-west of the land required for the AP revised scheme, was surveyed with full access. This pond is an ornamental garden pond with limited availability of food sources and flat banks unsuitable for burrow creation. This water body was scoped out of further surveys.

8.4.21 A short section of Meece Brook, immediately adjacent to the land required for the AP revised scheme, was surveyed with moderate access. There are some available food sources for water vole and moderate connectivity to other habitats. This section of the watercourse is potentially suitable for water vole.

8.4.22 A shallow stream south-west of Bent Lane, immediately adjacent to the land required for the AP revised scheme, was surveyed with moderate access. There is limited availability of food sources, flat banks reducing suitability for burrow creation and disturbance from grazing habitats adjacent to the stream. This section of the watercourse was scoped out of further surveys.

River Lea area

8.4.23 A water vole latrine (SJ779425) and pile of vegetation (SJ779425) were recorded on a drain leading towards the River Lea within the land required for the AP revised scheme.

South Cheshire (CA5)

8.4.24 No additional water vole activity was recorded within the South Cheshire area from field surveys.

8.4.25 A ditch north-east of Den Lane, within the land required for the AP revised scheme, was surveyed with little access. The ditch is dry with a high level of shading. This section of the watercourse was scoped out of further surveys.

8.4.26 A pond north-east of Den Lane, within the land required for the AP revised scheme, was surveyed with full access. There is a high level of shading and the pond was drying. There is limited availability of food sources. This water body was scoped out of further surveys.

8.4.27 Three ponds north-east of Gonsley Green Farm, within the land required for the AP revised scheme, were surveyed with full access. There is a high level of shading and the ponds were drying. There is a lack of available food sources. These water bodies were scoped out of further surveys.

8.4.28 A pond south-west of Gonsley Green Farm, within the land required for the AP revised scheme, was surveyed with full access. There is a high level of shading and the ponds were drying. There is limited availability of food sources. This water body were scoped out of further surveys.

8.4.29 A pond north-west of Gonsley Green Farm, within the land required for the AP revised scheme, was surveyed with full access. There is a high level of shading and the pond was drying. There is limited availability of food sources. This water body was scoped out of further surveys.

8.4.30 A ditch south-west of Waybutt Lane and a ditch north-east of Half Moon Farm, within the land required for the AP revised scheme, were surveyed with moderate access. There is a high level of shading from overgrown vegetation and the channel is choked with low water levels present. These watercourses were scoped out of further surveys.

8.4.31 A ditch north-east of Chorlton Lane, 60m north-east of the land required for the AP revised scheme, was surveyed with full access. This ditch is within the Wychwood Park Golf Club and is isolated from other watercourses and water bodies. There is limited availability of food sources and the water level is low. This watercourse was scoped out of further surveys.

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