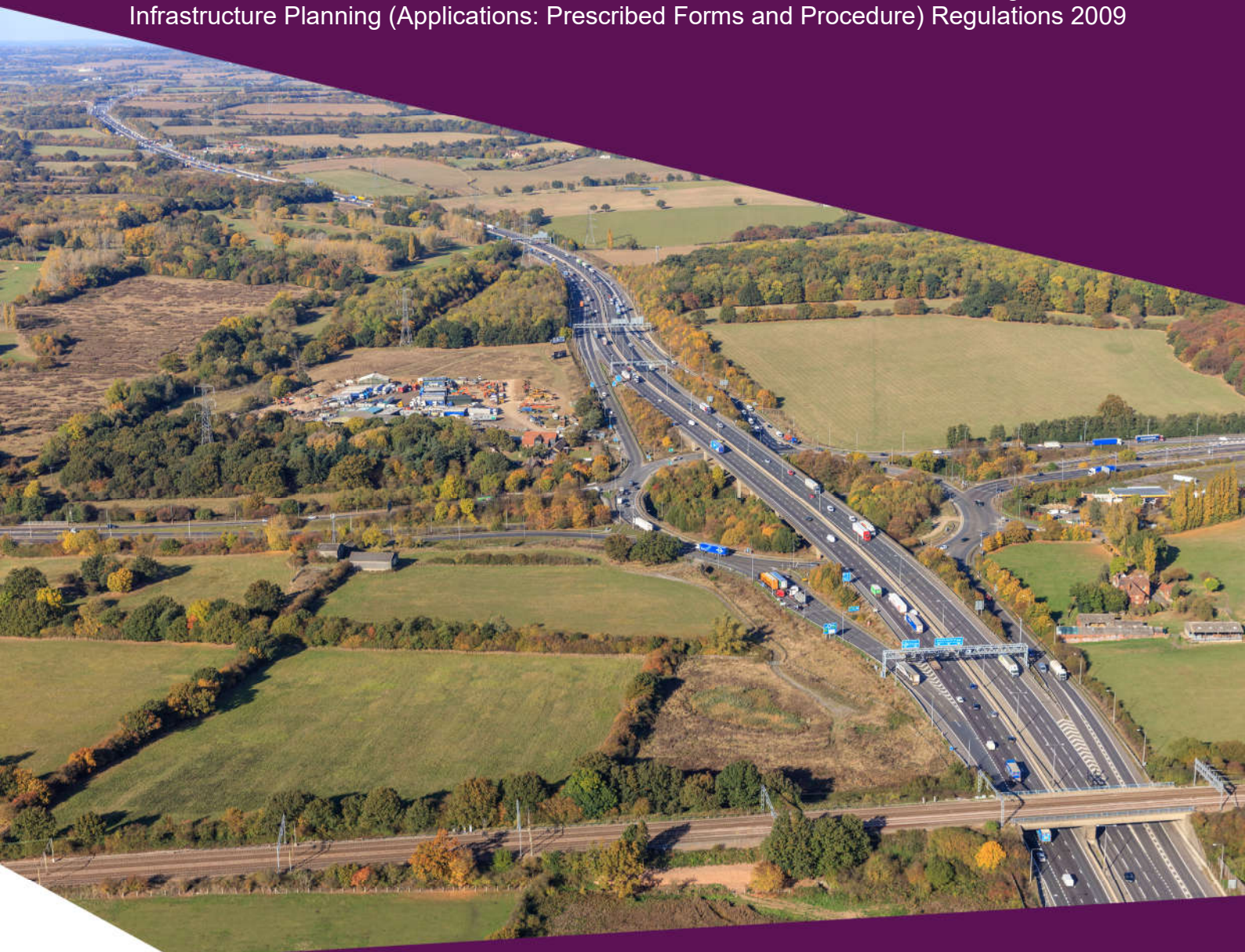
M25 junction 28 improvement scheme
TR010029
6.3 Environmental Statement
Appendix 7.3: Phase 1 habitat survey

APFP Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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M25 junction 28 scheme
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6.3 ENVIRONMENTAL STATEMENT
APPENDIX 7.3: PHASE 1 HABITAT SURVEY

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Appendix 7.3 Phase 1 habitat survey

Phase 1 Habitat Survey Report: Junction 28 M25

Date: January 2020

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Revision History

Revision	Date	Amendment
1	7th Nov 2017	1st version in relation to design drawing HE551519 - ATK - HGN -M25J28 - DR - D - 0294
2	1st May 2018	Report amendments to include additional areas of the site not previously surveyed due to access constraints.
3	7th June 2019	Edited to be ES appendix + 2019 updates. For HE review
4	25th November 2019	Additional land included within the phase 1 survey.
5	30th January 2020	DCO boundary update and final comments

Contents

1 Introduction

1.1 Background and Survey Objectives

ADAS were commissioned by Atkins to undertake a suite of ecological surveys of an area of land adjacent to M25 junction. The land is proposed to be re-developed as part of improvement works to the junction which Highways England will be undertaking.

This report has been prepared in accordance with guidance produced by the Chartered Institute of Ecology and Environmental Management (CIEEM 2013 and 2016) and the British Standard 42020:2013.

The objectives of this report are:

- *To record existing habitats on site and identify features of ecological interest within or in immediate proximity to the site;*
- *To record the presence of, or potential for, protected or notable plant species;*

Note that this report focuses on habitats and botanical plant species. In respect to fauna this is dealt with in a series of separate reports which covers: bats, badgers, otter, water vole, bird assemblages, reptiles, hazel dormouse, great crested newts and aquatic species.

1.2 Site Description

The survey area comprises c. 115ha and is located at Junction 28 (Grid reference: TQ 56759 92389), where the M25 links up to the A12, as shown in Figure 1. Located within Greater London and Essex, Romford is to the west and Brentwood to the east.

The survey area contains two woodlands, Alder Wood and The Grove and intersected with the perimeter of the woodlands The Oaks and Lower Vicarage Wood. A watercourse, Weald Brook, flows southwards, parallel with the M25 and along the western edge of Alder Wood and The Grove. River Ingrebourne flows parallel with the northern edge of the A12, joining Weald Brook, before culverting under the A12 (Grid reference: TQ 56456 92214), passing Oak Farm and then westwards through Romford.

Grove Farm is an active working site, comprising large sheds, storage containers and heavy machinery. A residential detached building with an associated garden is located to the north west of Junction 28. A large population of c.120 fallow deer (*Dama dama*) roam the site and as a result the habitats are heavily grazed.

The wider area comprises a mix of agricultural land, residential, watercourses and pockets of deciduous woodland.

Figure 1: DCO boundary highlighted in red (ADAS general mapping tool 2019)

2 Methods

2.1 Field Survey

A Phase 1 Habitat Survey was conducted on 19th July 2017 by ADAS Ecological Consultants (lead surveyor experience given in Annex 1) based on the techniques and methodologies described in the Handbook for Phase 1 Habitat Survey (JNCC 2010) and using standard nomenclature (Stace 2010). The habitats present were recorded on to a field map with written target notes providing supplementary information on, for example, species composition structure and management where relevant. Additional surveys were also undertaken between July and September 2017 by ADAS Associate Director, due to the large scale of the site and to observe seasonal habitat variations.

Following access permissions for additional areas south of the A12 and east of the M25, these areas were surveyed by ADAS Ecological Consultants in March 2018.

The Phase 1 Habitat Survey was updated in 2019 to incorporate changes to the DCO boundary and to determine whether there were any changes to the habitats recorded in 2017 and 2018. An area sound of the A12 was visited 22nd August 2019, which included land parallel the A12, incorporating Oak Farm and surround land. The rest of the survey area was re-surveyed in October and November 2019, when access was permitted for the survey.

2.2 Limitations

The survey incorporated the full site as shown by the red line boundary in Figure 1. Surveys were carried out over three survey seasons due to site boundary changes over this timeframe. The timings of the survey visits varied between March through to October which allowed most of the seasons to be covered by the visits, but not all areas would have had this same level of seasonal coverage and species that either flowered early or went over quickly could be missed in parts of the site, however given the level of survey input it is considered the appropriate habitat classifications for the site have been achieved. An additional habitat was also identified which is not covered by the phase 1 handbook but seemed relevant to this site, which covered the extensive blocks of non-native goldenrod.

3 Baseline Ecological Conditions

3.1 Habitats

The habitats identified within the Phase 1 Habitat Survey are listed and described below, due to the range of habitats on site these have been further broken down in subset habitat types. All habitats and Target Notes are marked on the Phase 1 Habitat map in Annex 2, each habitat type is illustrated with a photograph in Annex 3 and full species list is presented in Annex 4.

Built habitat types:

- *Building;*
- *Bare ground; and*
- *Fence.*

Grassland habitat types:

- *Amenity grassland;*
- *Improved grassland;*
- *Poor semi-improved grassland;*
- *Semi-improved neutral grassland;*
- *Tall ruderal; and*
- *Tall ruderal – goldenrod (non-native);*

Woodland habitat types:

- *Semi-natural broad-leaved woodland;*
- *Broadleaved plantation;*
- *Mixed plantation woodland;*
- *Dense scrub;*

- *Scattered scrub; and*
- *Scattered broad-leaved trees.*

Water habitat types:

- *Standing water;*
- *Running water;*
- *Wet ditch; and*
- *Dry ditch.*

Hedgerows:

- *Hedgerow and trees;*
- *Species rich defunct hedge; and*
- *Species poor intact hedge.*

The table below provides measurements for each of the habitats on site. The table includes features that are not strictly habitats such as sand bunkers but have been included for completeness. These features are also identified on the Phase 1 map.

Table 1: Habitat extents

Phase 1 Habitat	Area (ha) or length
Building	0.03
Bare ground (including sand bunkers)	0.91
Fence	2240m
Amenity grassland	2.19
Improved grassland	0.26
Poor semi-improved grassland	0.78
Semi-improved neutral grassland	21.31
Tall ruderal (including Goldenrod)	0.74
Semi-natural broad-leaved woodland	8.15
Broad-leaved plantation	4.71
Mixed plantation woodland	0.39
Dense scrub	9.87
Scattered scrub	0.10
Scattered broad-leaved trees	0.10

Phase 1 Habitat	Area (ha) or length
Standing water	0.05
Running water	2155m
Wet ditch	273m
Dry ditch	343m
Hedgerow and trees	213m
Species-rich defunct hedge	310m
Species-poor intact hedge	213m

3.2 Built Habitat Types

The site supports a range of built environments ranging from residential through to commercial buildings and associated facilities.

3.2.1 Building

On site were a range of buildings which included the following:

- *Building 1 – Barn type converted residential building with wood cladding and a tiled roof (Photograph 1);*
- *Building 2 – Barn type converted residential building with wood cladding and a tiled roof;*
- *Building 3 – A residential building of brick with a pitched tiled roof;*
- *Building 4 – A building constructed of corrugated material (Photograph 2);*
- *Building 5 - A building constructed of corrugated material (Photograph 3);*
- *Building 6 - A building constructed of corrugated material (Photograph 4);*
- *Building 7 - A building constructed of corrugated material (Photograph 5);*
- *Building 8 - A building constructed of corrugated material (Photograph 6);*
- *Building 9 – A building constructed of corrugated material (Photograph 6); and*
- *Building 10 – A breeze block built substation with a pitched roof (Photograph 7).*

Scattered around the buildings were a few caravans and various types of container (Photograph 8).

3.2.2 Bare ground

Bare ground extended around the location of the commercial buildings. The ground was made up of an aggregate and earth type formation compressed to create a hardstanding to allow vehicles to cross (Photograph 9). Another Photograph small area of bare ground was noted adjacent to the M25 consisting

of a mix of sub and top soil creating an area of made up ground (Photograph 10). Sand bunkers were also present within the golf course. A small amount (0.1 ha) of bare ground was present in the land directly south of the A12 and north of the Ingrebourne River. This was a composition of earth and gravel area used to allow vehicles to access the site.

3.2.3 Fence

Running almost in parallel to the M25 on both sides is a chain-linked fence which was approximately 2.4 m high and acting as a deer proof barrier (Photograph 11). Additionally the substation south of the A12 was surrounded by a metal fence.

3.3 Grassland Habitat Types

Across the survey area there were three grassland habitat types. The amenity grassland was defined by the way in which it was regularly managed through cutting. The poor semi-improved grassland and semi-improved grassland were more inter-changeable with some overlap and typically manged by grazing/browsing deer.

Some of the grassland habitats are located within The Ingrebourne Valley Site of Importance for Nature Conservation (SMI).

3.3.1 Amenity grassland;

There were three distinct areas of amenity grassland within the DCO boundary. One area was located around the residential houses (Photograph 12) and the second made up the fairways on the golf course (Photograph 13). The third area of amenity grassland was a small rectangle of grassland that was kept short, west of the Weald Brook. The species within these areas of amenity grassland were typical of a hard-wearing grassland surface dominated by perennial rye-grass (*Lolium perenne*), other species that were occasionally included: cock's-foot (*Dactylis glomerata*), creeping bent (*Agrostis stolonifera*), common cat's-ear (*Hypochaeris radicata*), common mouse-ear (*Cerastium fontanum ssp .vulgare*), daisy (*Bellis perennis*), selfheal (*Prunella vulgaris*), vervain (*Verbena officinalis*), white clover (*Trifolium repens*), and yarrow (*Achillea millefolium*). Additionally small pockets of amenity grassland were located on external fringes of the Junction 28 roundabout.

3.3.2 Improved grassland

This grassland covered the majority of the survey area between the A12 and the Ingrebourne River, adjacent to Oak Farm. The area was dominated by perennial rye-grass (*Lolium perenne*). Other occasionally noted species were: Yorkshire fog (*Holcus lanatus*), yarrow (*Achillea millefolium*), red bartsia (*Odontites vernus*) and wood avens (*Geum urbanum*). Creeping buttercup (*Ranunculus repens*) and smooth meadow grass (*Poa pratensis*) were recorded as rare in this grassland. Perforate St John's wort (*Hypericum perforatum*) was present as rare where improved grassland merged with semi-improved

grassland and bare ground. On this section of the survey area, this grassland was occasionally interspersed with regenerating brambles (*Rubus fruticosus*)

3.3.3 Poor semi-improved grassland;

The poor semi-improved grassland areas were typical of either areas dominated by tussock forming grasses that included cock's-foot (*Dactylis glomerata*) and false oat-grass (*Arrhenatherum elatius)* such as along the edges of the golf course or areas with a dominance of common bent (*Agrostis capillaris*) (Photograph 14). A range of forb species occurred occasionally within the grassland and included cleavers (*Galium aparine*), common bird's-foot-trefoil (*Lotus corniculatus*), common field-speedwell (*Veronica persica*), common mouse-ear (*Cerastium fontanum ssp. Vulgare*), common ragwort (*Senecio jacobaea*), red clover (*Trifolium pratense*), smooth tare (*Vicia tetrasperma*), spear thistle (*Cirsium vulgare*) and yarrow (*Achillea millefolium*). South of the A12 were three connected semi-improved grassland fields, separated by sections of scrub and a wooded ditch.

To the east of the M25 and to the north of the A12 was a patch of a dozen plants of pennyroyal (*Mentha pulegium*) (Target note 1), a species listed under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).

This habitat was present along the woodland and hedgerow boundary margins of the between the A12 and the Ingrebourne River, adjacent to Oak Farm. It was abundant with false oat-grass and Yorkshire fog. It was occasionally had common hemp-nettle (*Galeopsis tetrahit*), hedge mustard (*Sisymbrium officinale*) and common ragwort (*Senecio jacobaea*), noted most nearer the hedgerow boundary adjacent to the A12.

3.3.4 Semi-improved neutral grassland;

There were extensive areas of semi-improved grassland. Some areas, such as the grassland to the west of Weald Brook (Photograph 15), were of similar composition to the poor semi-improved grassland with a dominance of common bent (*Agrostis capillaris*), but within the sward was a greater diversity of forb species. In some areas, where the dominance of the grass relented, a more acid grassland composition was present that included biting stonecrop (*Sedum acre*), lesser stitchwort (*Stellaria graminea*), parsley piert (*Aphanes arvensis agg.),* sheep's sorrel [agg.] (*Rumex acetosella*) and tormentil (*Potentilla erecta*). The one acid indicator sneezewort (*Achillea ptarmica*) was growing near the M25 adjacent to tall ruderal vegetation.

In the main the dominant species which made up the grass sward were grasses that with common bent included: creeping bent (*Agrostis stolonifera*) crested dog's-tail (*Cynosurus cristatus*), marsh foxtail (*Alopecurus geniculatus*), meadow barley (*Hordeum secalinum*), meadow foxtail (*Alopecurus pratensis*), smaller cat's-tail (*Phleum bertolonii*), sweet vernal grass (*Anthoxanthum odoratum*), tall fescue (*Festuca arundinacea*) and Yorkshire-fog. The forbs that typically occurred occasionally included: agrimony

(*Agrimonia eupatoria*), common bird's-foot-trefoil (*Lotus corniculatus*), common centaury (*Centaurium erythraea*), common fleabane (*Pulicaria dysenterica*), common knapweed (*Centaurea nigra*), common mouse-ear (*Cerastium fontanum* ssp. *Vulgare*), common sorrel (*Rumex acetosa*), corn mint (*Mentha arvensis*), lady's bedstraw (*Galium verum*), meadow buttercup (*Ranunculus acris*), meadow vetchling (*Lathyrus pratensis*) and yarrow (*Achillea millefolium*) with grey sedge (*Carex divulsa*) and hairy sedge (*Carex hirta*). One area of grassland was very distinctive by its local abundance of common fleabane which was located to the north of the large expanse of bare ground (Photograph 16).

Occasionally non-native early goldenrod (*Solidago gigantea*) was starting to establish in areas where soils had become exposed and it likely going to continue to expand and outcompete the grassland habitat (Photograph 17).

3.3.5 Tall ruderal

Around the survey area were discreet patches of tall ruderal vegetation (Photograph 18) typically located in close proximity to the M25. The patches included a range of species that included: Michaelmas-daisy (*Aster* sp.), annual mercury (*Mercurialis annua*), black horehound (*Ballota nigra*), black medick (*Medicago lupulina*), black nightshade (*Solanum nigrum*), common poppy (*Papaver rhoeas*), goat's-rue (*Galega officinalis*), hedge mustard (*Sisymbrium officinale*), hemlock (*Conium maculatum*), mugwort (*Artemisia vulgaris*), Oxford ragwort (*Senecio squalidus*), scarlet pimpernel (*Anagallis arvensis*), swine-cress (*Coronopus squamatus*), upright hedge-parsley (*Torilis japonica*), weld (*Reseda luteola*), winter-cress (*Barbarea vulgaris*) and great horsetail (*Equisetum telmateia*).

3.3.6 Tall ruderal – non-native goldenrod

On the western side of Weald Brook were extensive areas of the non-native early goldenrod (*Solidago gigantea*), identified as such by the lack of hairs on the leaves and stems which are ID features of the very closely related Canadian goldenrod (*Solidago canadensis*), although both are likely to be present (Photograph 19). The goldenrod appears not to be eaten by the herds of fallow deer using the survey area and where they colonised are rapidly forming extensive stands of vegetation. The presence of goldenrod was also noticeable on the eastern side of the Weald Brook but at present growing in more discreet patches. The updated survey in 2019 found that the goldenrod west of the weald brook has become dense, outcompeting most other grassland species (Photograph 20).

3.4 Woodland Habitat Types

All the woodland habitat types have been affected by deer browsing creating very distinct browse lines. This deer browsing inevitably has impacted the structural diversity of the woody habitats. The only exception where deer have not impacted the woodland is where it has been fenced off by the chain-link fencing along the boundary of the M25.

The Grove and Alder Wood are located within The Ingrebourne Valley SMI.

3.4.1 Semi-natural broad leaved woodland

Located in the central sector of the survey area close to the residential dwellings is The Grove wood (Photograph 21). The Grove had a canopy dominated by pedunculate oak (*Quercus robur*) with ash (*Fraxinus excelsior*), beech (*Fagus sylvatica*), hornbeam (*Carpinus betulus*), wild cherry (*Prunus avium*) and silver birch (*Betula pendula*). The shrub layer was quite sparse with the occasional hazel (*Corylus avellana*) and patches of bramble (*Rubus fruticosus agg*.). The ground flora contained a number of woodland species that included bluebell (*Hyacinthoides non-scripta*), dog's mercury (*Mercurialis perennis*), enchanter's-nightshade (*Circaea lutetiana*), foxglove (*Digitalis purpurea*), garlic mustard (*Alliaria petiolata*), greater stitchwort (*Stellaria holostea*), wood sage (*Teucrium scorodonia*), broad buckler-fern (*Dryopteris dilatata*) and false-brome (*Brachypodium sylvaticum*).

Running along the entire length of the Weald Brook was a strip of woodland. The canopy layer was made up of alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*), blackthorn (*Prunus spinosa*), dog rose (*Rosa canina agg*.), elder (*Sambucus nigra*), field maple (*Acer campestre*), hawthorn (*Crataegus monogyna*), hazel (*Corylus avellana*), hornbeam (*Carpinus betulus*), pedunculate oak (*Quercus robur*) and white willow (*Salix alba*) (Photograph 22). Ground flora ranged from patches of nettles (*Urtica dioica*) to a scattering of woodland species that included male fern (*Dryopteris filix-mas agg*.), false-brome (*Brachypodium sylvaticum*), dog's mercury (*Mercurialis perennis*), greater stitchwort (*Stellaria holostea*), moschatel (*Adoxa moschatellina*), wood Speedwell (*Veronica montana*) and remote sedge (*Carex remota*).

To the east of the M25 was a woodland consisting of a thin ribbon of woody vegetation following the banks of the Ingrebourne River. The trees species that dominated was alder (*Alnus glutinosus*). The ground flora was dominated by grasses that included rough meadow grass, Yorkshire fog and creeping bent with occasional false wood brome (Photograph 23).

Further along the alder woodland along the Ingrebourne River the woodland opened up into a more dominant broadleaved woodland with a canopy dominated by an old coppiced hornbeam with occasional oak. The ground flora is very sparse due to deer browsing. This woodland has been identified as a Local Wildlife Site (No. Bre39 – Local Vicarage Wood). The citation for the woodland suggests that it is of ancient origin (Photograph 24). The woodland is separated by the A12, although this habitat is contained southwards along the River Ingrebourne and connected ditches.

To the very north of the site was a small section of broadleaved woodland which was similar in composition to The Grove wood (Photograph 25). Additionally the woodland running along the eastern edge of the M25 was also was similar to The Grove wood, although this habitat formed a much larger wood called The Oaks, measuring c. 15.12ha.

The extension of the DCO boundary including land between the A12 and the Ingrebourne River, adjacent to Oak Farm, contained broad leaved woodland. This was part of a larger section of woodland that was located north of the Ingrebourne River. This woodland was dominated by mature pedunculate oak with the ground flora assemblage recorded as bramble, blackthorn (*Prunus spinosa*) regeneration and common hawthorn (*Crataegus monogyna*) regeneration.

With the extension of the DCO boundary, there was further additional woodland, in the far west of the Scheme, approximately 275m west of the Weald Brook, was an area of broadleaved woodland. This was dominated by pedunculate oak. Due to impacts from deer, this woodland had a very limited understory, and groundflora. There was a small amount of blackthorn, dog rose, and nettles.

3.4.2 Broadleaved plantation

To the north of the site and split down the centre by an overhead electric line was a broadleaved plantation called 'Alder Wood.' Alder Wood was dominated by semi-mature ash (Photograph 26). The main shrub species was hawthorn. There was a very distinctive browse line throughout with no obvious regeneration of trees. The ground flora had an abundance of both dog's mercury and common false brome with occasional wood sedge (*Carex sylvatica*). Where the canopy had opened up patches of non-native goldenrod had established, which seemingly had not been browsed by deer. The northern end of the wood was increasingly dominated by hawthorn. To the southern end of the woodland was a small wet ditch which ran into the Weald Brook.

To the east of the woodland plantation was an embankment of the M25 planted up with broadleaved trees. This section of planted woodland along the embankment was separated by a chain-link fence. The woodland was younger in age to the main ash plantation but more diverse in structure as it was protected from deer browsing (Photograph 27). Species included: wild cherry, ash, hazel, bramble, hawthorn, hornbeam, wood avens (*Geum urbanum*), sycamore (*Acer pseudoplatanus*), dog's-mercury, herb-robert (*Geranium robertianum*), ivy (*Hedra helix*), hedge woundwort (*Stachys sylvatica*) and false wood brome. The ground flora is noticeably taller and there was abundant seedling regeneration and no obvious browse lines.

To the east of the M25 and north of the A12 was a small section of hybrid black-poplar (*Populus* x *canadensis agg*.) broadleaved planation located on the south side of the Ingrebourne River.

3.4.3 Mixed plantation woodland

In the south east corner of The Grove was an area of mixed woodland dominated by a plantation of Scots pine (*Pinus sylvestris*) with occasional oak, wild cherry, silver birch, and hornbeam. Like many other woodland types the scrub layer was not really present with a ground flora sparse in vegetation (Photograph 28).

3.4.4 Dense scrub

Dense scrub formed a belt of vegetation along the Ingrebourne River. The dominant species was blackthorn (*Prunus spinosa*), which formed thickets of vegetation. Frequently occurring was hawthorn with occasional oak and field maple. The ground flora was typically quite sparse with occasional patches of sparse bramble, with a range of more ruderal type vegetation such as willow herb (*Epilobium* sp.), spear thistle and common nettle (Photograph 29). Dense scrub was also dominant on the Junction 28 roundabout and adjacent to the slip roads leading to the M25 and A12. Dense scrub was present adjacent to the hedgerow boundary on land south of the A12 and was dominated by blackthorn.

There was patches of dense scrub interspersed amongst the goldenrod in the west of the site. This was predominantly bramble.

3.4.5 Scattered scrub

Occurring occasionally on the edge of the dense scrub or woodland were a few scattered hawthorn.

3.4.6 Scattered broadleaved trees

Around the edges of the woodlands were the occasional mature/over mature pedunculate oak (Photograph 30). Veteran trees have also been recorded (See Arboricultural Impact Assessment (Appendix 7.7 of the Environmental Statement), for further information).

Land south of the A12 near Oak Farm had a mixture of newly planted immature trees and semi-mature to mature trees near the broad-leaved woodland edges. Immature newly planted trees with protection fencing was hornbeam (*Carpinus betulus*) and callery pear (*Pyrus calleryana*) trees. These were placed parallel to the hedgerow that runs adjacent to the A12. Semi-mature and mature penduculate oaks were located in the south and east of this area of land. A single semi-mature ash was recorded towards the east of this section of the site.

3.5 Water habitat types

The water habitat types was dominated by the two brooks Weald Brook, running north to south through the survey area, and the Ingrebourne River which came in from the east under the M25 and finally joining the Weald Brook before running south under the A12. Results of a detailed River Corridor survey are provided in Appendix 7.5 of the Environmental Statement.

3.5.1 Standing water

There are two ponds within the DCO boundary. One is located in The Grove. This pond was heavily shaded by the canopy of the trees leaving the pond with no marginal vegetation. The pond was approximately 100m^2 in size with shallow draw down zones (Photograph 31).

A second pond is located west of Weald Brook. The pond is in a state of neglect and surrounded by dense stands of both golden rod and bramble. The water body itself was shallow in nature and likely to dry out annually and covered ab area of approximately 150m^2. The marginal vegetation present grew across the pond and was dominated by float grass (*Glyceria fluitans*) with occasional tussocks of soft rush (*Juncus effuses*).

Two other ponds shown on OS maps at Grove Farm, east of Weald Brook, were no longer present.

3.5.2 Running water

Weald Brook ran from north to south and morphologically had a range of meanders along its entire length. The width of the brook was approximately 3m wide. The water was fairly shallow (0.5m) with a very low flow rate at many woodland piles crossing the water course creating miniature wooded dams. The base of the banks had been primarily browsed by fallow deer leaving very little to no vegetation. The banks were approximately 1.5m high and varied from almost vertical to 45 degrees. The banks and the brook were heavily shaded by a belt of woodland which almost ran its entire length (Photograph 32).

Ingrebourne River ran from east to west and was more open. The brook was a similar width to the Weald Brook but had been engineered (probably by past road schemes) to be completely straight with no meanders. The Ingrebourne River passes under the A12, running in a south-easterly direction between Harold Park and Harold Court. The banks of the Ingrebourne River in contrast to the Weald Brook were very shallow gradually tapering back. The flow of Ingrebourne River appeared to be quite fast running over a gravel bottom and instream features such as pool and riffle were present along its length (Photograph 33). Himalayan balsam (*Impatiens glandulifera*) was recorded at either end of the box culvert which ran under the M25 (Target Note 2).

The Weald Brook and Ingrebourne River are located within Ingrebourne Valley SMI.

3.5.3 Wet ditch

There was a wet ditch which ran along the southern edge of the woodland plantation (Alder Wood) and ran down into the Weald Brook. The ditch was virtually devoid of vegetation except for creeping bent until it almost reached the Weald Brook where there was dominant patches of water mint (*Mentha aquatica*) (Photograph 34).

3.5.4 Dry ditch

A dry ditch occurred to the west of the Weald Brook which may have formed the boundary of an old field system. A second dry ditch was recorded to the north of site which led to a culvert.

3.6 Hedgerows

3.6.1 Hedgerow and trees

This habitat separated the A12 and land near Oak Farm. It had a varied density of trees and hedgerow species (see Photograph 35). Frequent species along this boundary feature included: common hawthorn, field maple (*Acer campestre*), common lime (*Tilia × europaea*) and blackthorn. English elm (*Ulmus Procera*) and horse chestnut (*Aesculus hippocastanum*) were observed as occasional. A single Leyland cypress (*Cupressus × leylandii*) was also recorded.

3.6.2 Species rich defunct hedge

Running between The Grove wood and the broadleaved plantation woodland was a defunct hedgerow. Species present within the woodland included: hawthorn, elder (*Sambucus nigra*), oak, blackthorn, hornbeam and field maple. A large dead oak tree formed an obvious feature with the middle of the hedgerow (Photograph 36).

3.6.3 Species poor intact hedge

Running in parallel with a slip road on to the M25 was a planted hedgerow dominated by hawthorn with occasional ash, field maple, oak and bramble.

Running parallel with the A12 adjacent to Oak Farm in the south of the site, a c. 50m long semi-mature privet hedge (*Ligustrum sp*.) was present.

3.7 Invasive plant species

Across the entire survey area only one non-native invasive species as listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was recorded which was Himalayan balsam which occurred on the Ingrebourne River either side of the box culvert going under the M25 (Target note 2). Under the London Invasive Species Initiative (LISI – species 2014 list) were two species goat's-rue (*Galega officinalis*), which occurred with the tall ruderal habitat which ran in parallel with the M25, the other species was Himlayan balsam. The other notable invasive species was early goldenrod which is identified as invasive under the Non-Native Species Secretariat website. This latter species has now formed extensive stands in particular down the western side of the Weald Brook and is likely to be spreading impacting mainly on the grassland flora. This species does not appear to be grazed by deer.

4 Conclusions

Many of the habitats on site have been adversely impacted by neglect and/or over grazing/browsing by a herd of fallow deer associated with the site and the wider area. These impacts have resulted in damage to many of the habitat features of interest across the site. This includes:

- *Extensive shading along the watercourses due to no land management action leading to a loss of marginal vegetation.*
- *Deer poaching the banks increasing sediment disposition which will likely impact the lower reaches of the Ingrebourne Valley SINC located to the south of the site which supports nationally important wetlands.*
- *The woodlands are structurally poor with a very clear browse line and a lack of regeneration and a reduced ground flora and shrub layer.*
- *The grasslands in the past are likely to have been seeded/improved and they are now diversifying. However the non-native invasive species of goldenrod is colonising areas of the grassland forming extensive patches, dominating the grassland and reducing species diversity and extent of grassland coverage.*

5 References

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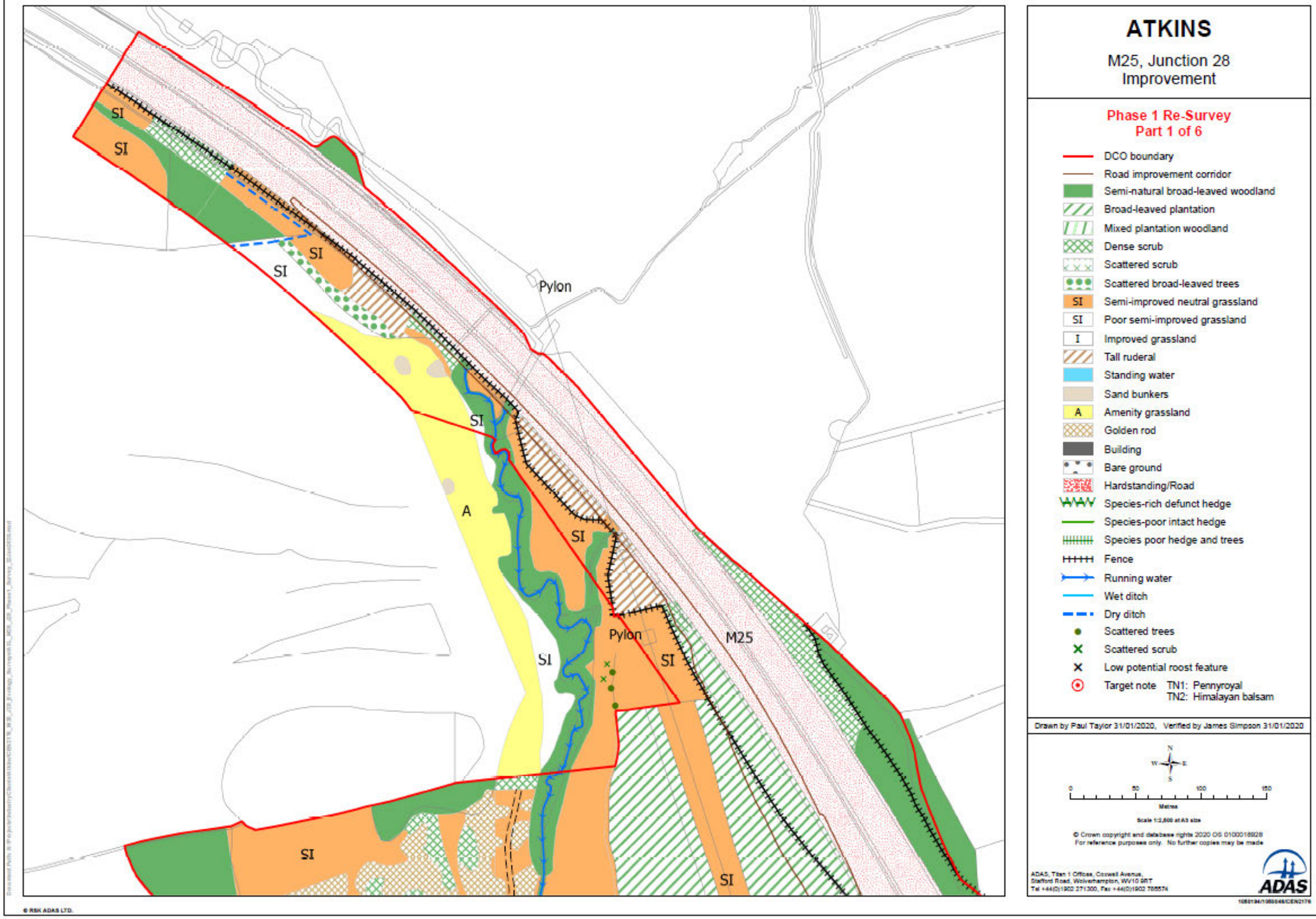
Annex 1: Lead surveyor experience

The lead surveyor is a chartered ecologist with CIEEM has an extensive knowledge of undertaking phase 1 surveyors based on experience gained over 15 years. Phase 1 surveys have covered a wide range of habitats from lowland habitat to upland moorland and extensive wetland habitats. The lead surveyor is also a trainer for CIEEM teaching people within the consultancy industry 'Phase 1 for development.' The lead surveyor has over the years attended a range of botanical courses that include:

- Moss identification – BCN Wildlife Trust (2016)
- Wetland Plant ID – Field Studies Council (2014)
- 'Sedge ID' – Field Studies Council (2013)
- 'Identification of Mosses' – Martha Newton (2008).
- 'Grasses, Sedges and Rushes' course – Field Studies Council (2005).
- 'Wildflower Identification' course - Field Studies Council (2000).

Annex 2: Phase 1 Habitat Survey Map

See following page



ATKINS

M25, Junction 28
Improvement

Phase 1 Re-Survey
Part 1 of 6

- DCO boundary
- Road improvement corridor
- Semi-natural broad-leaved woodland
- Broad-leaved plantation
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered broad-leaved trees
- SI — Semi-improved neutral grassland
- SI — Poor semi-improved grassland
- I — Improved grassland
- Tall ruderal
- Standing water
- Sand bunkers
- A — Amenity grassland
- Golden rod
- Building
- Bare ground
- Hardstanding/Road
- Species-rich defunct hedge
- Species-poor intact hedge
- Species poor hedge and trees
- Fence
- Running water
- Wet ditch
- Dry ditch
- Scattered trees
- Scattered scrub
- Low potential roost feature
- Target note TN1: Pennyroyal
  TN2: Himalayan balsam

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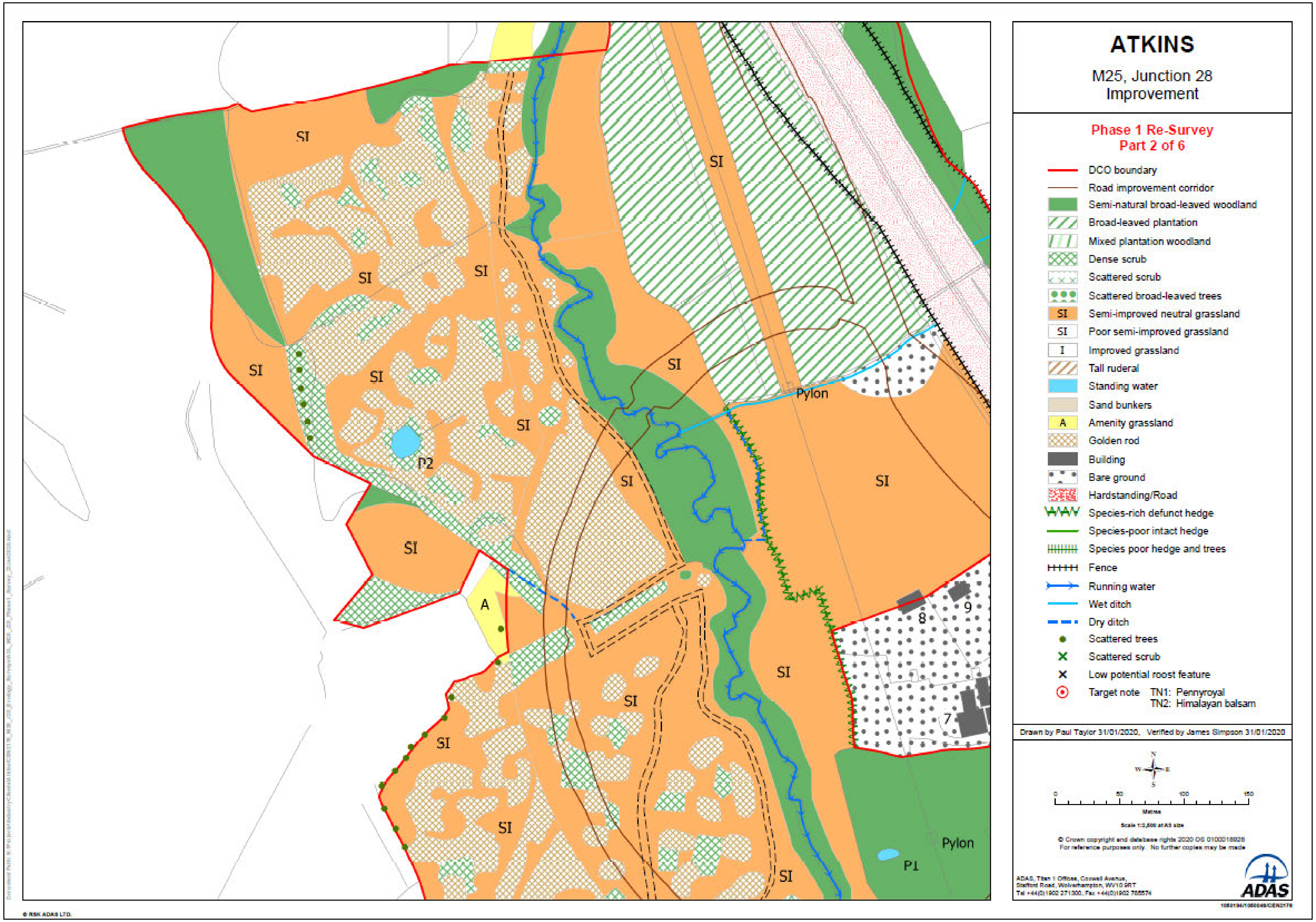
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Phase 1 Re-Survey Part 2 of 6
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Poor semi-improved grassland
Improved grassland
Tall ruderal
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Amenity grassland
Golden rod
Building
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Species-rich defunct hedge
Species-poor intact hedge
Species poor hedge and trees
Fence
Running water
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Target note TN1: Pennyroyal
TN2: Himalayan balsam
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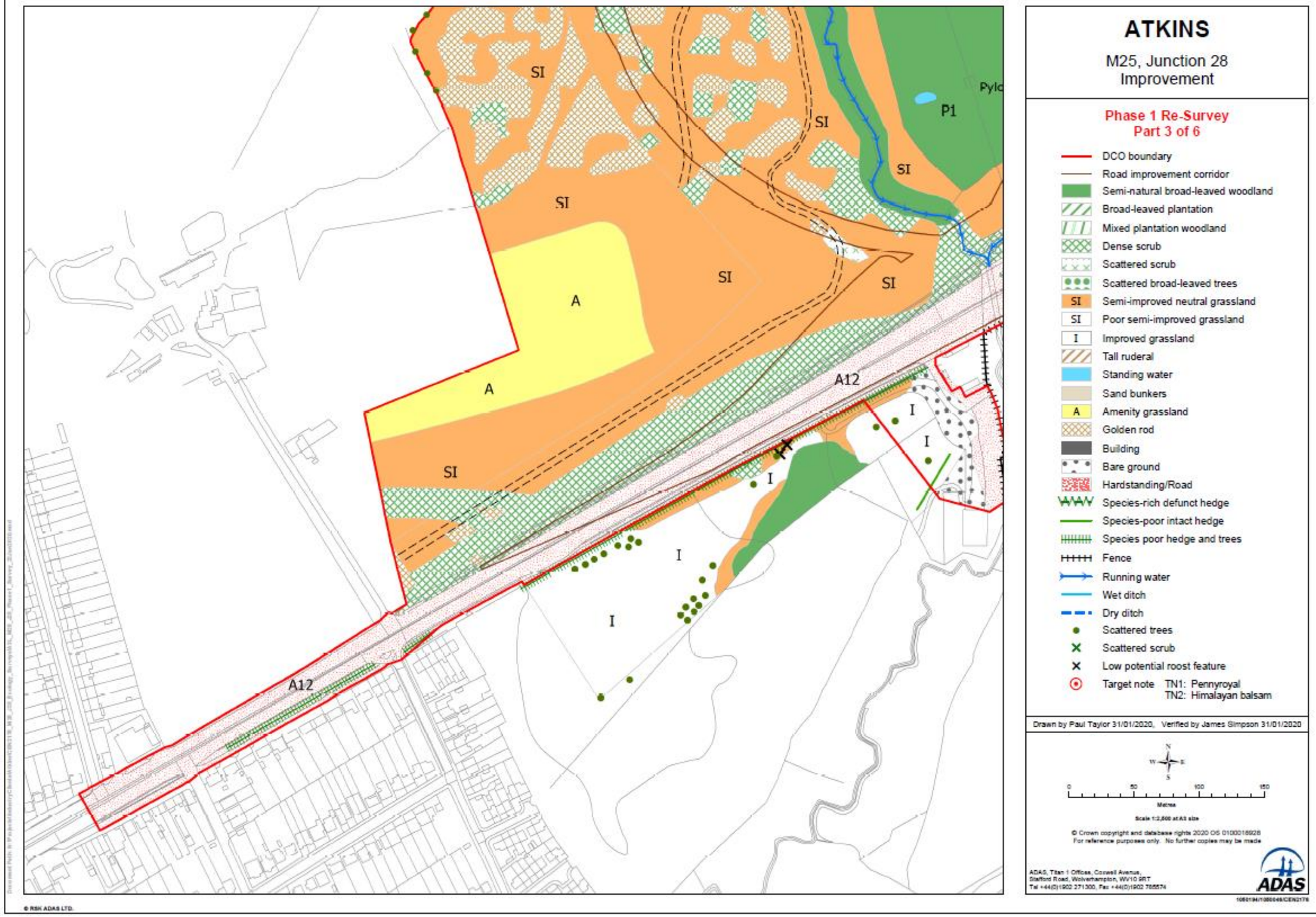

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M25, Junction 28 Improvement

Phase 1 Re-Survey
Part 3 of 6

- DCO boundary
- Road improvement corridor
- Semi-natural broad-leaved woodland
- Broad-leaved plantation
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered broad-leaved trees
- SI — Semi-improved neutral grassland
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- I — Improved grassland
- Tall ruderal
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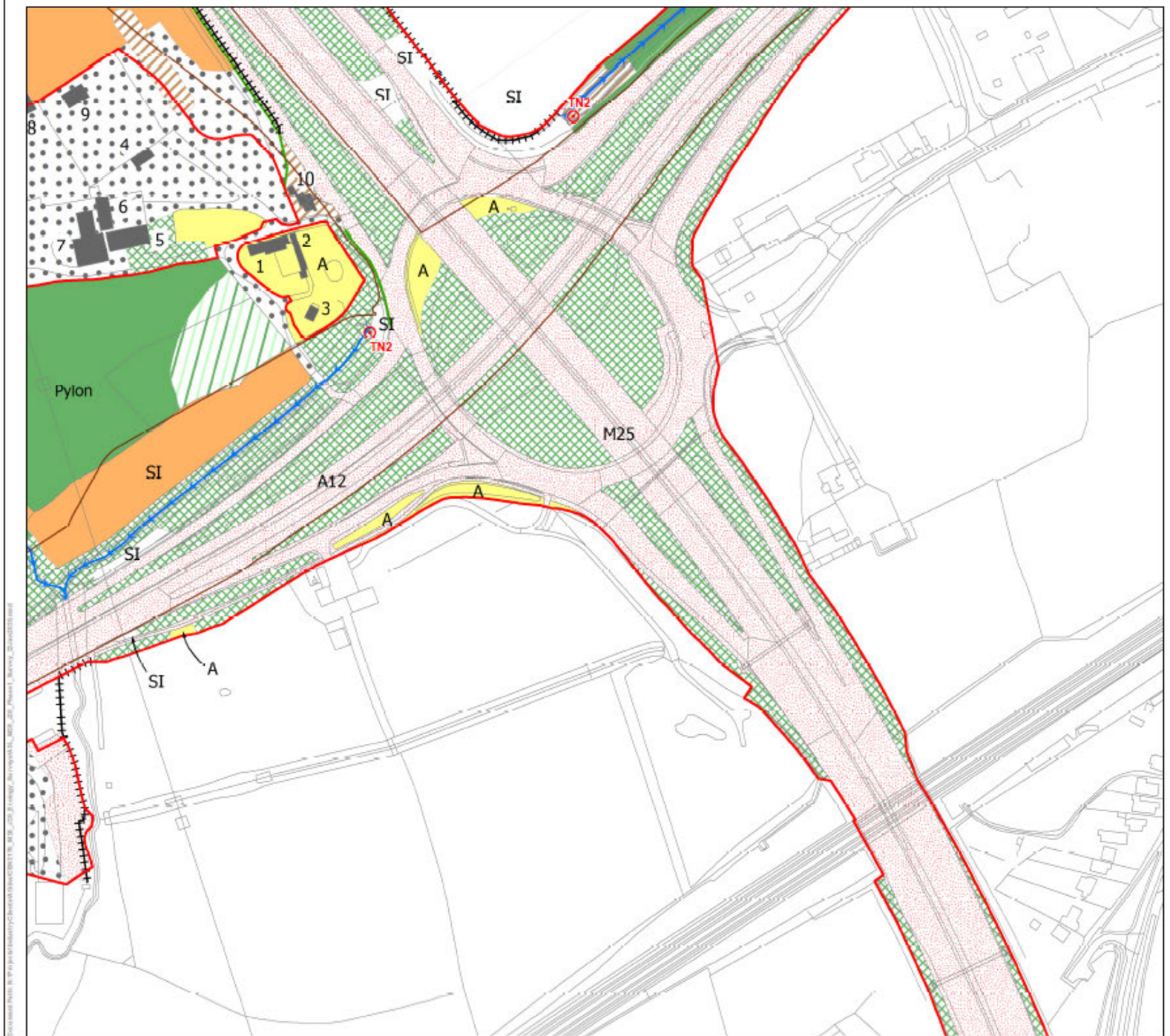

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M25, Junction 28 Improvement

Phase 1 Re-Survey
Part 4 of 6

- DCO boundary
- Road improvement corridor
- Semi-natural broad-leaved woodland
- Broad-leaved plantation
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered broad-leaved trees
- SI — Semi-improved neutral grassland
- SI — Poor semi-improved grassland
- I — Improved grassland
- Tall ruderal
- Standing water
- Sand bunkers
- A — Amenity grassland
- Golden rod
- Building
- Bare ground
- Hardstanding/Road
- Species-rich defunct hedge
- Species-poor intact hedge
- Species poor hedge and trees
- Fence
- Running water
- Wet ditch
- Dry ditch
- Scattered trees
- Scattered scrub
- Low potential roost feature
- Target note TN1: Pennyroyal
  TN2: Himalayan balsam

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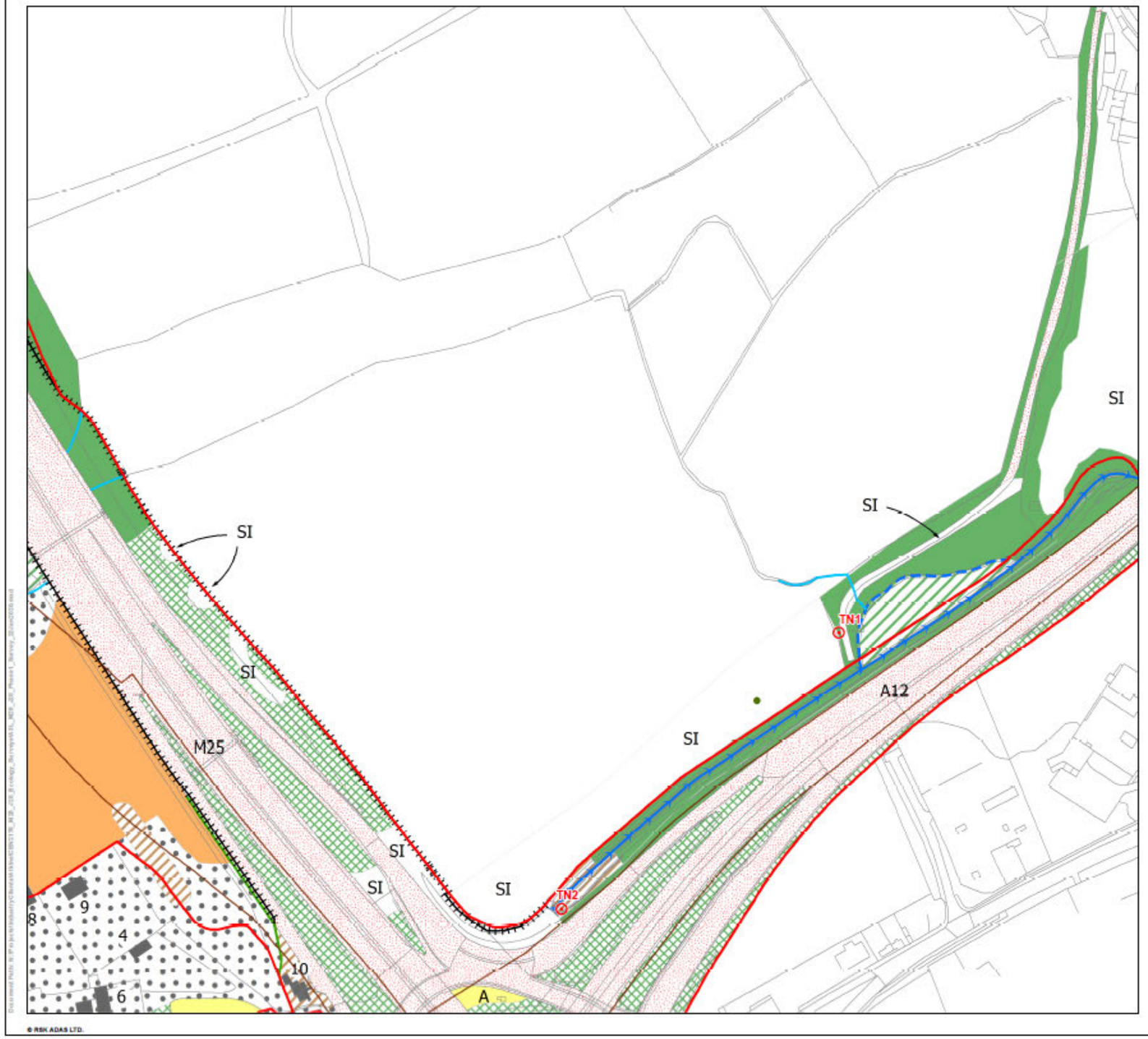

ATKINS

M25, Junction 28
Improvement

Phase 1 Re-Survey
Part 5 of 6

- DCO boundary
- Road improvement corridor
- Semi-natural broad-leaved woodland
- Broad-leaved plantation
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered broad-leaved trees
- SI — Semi-improved neutral grassland
- SI — Poor semi-improved grassland
- I — Improved grassland
- Tall ruderal
- Standing water
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- Fence
- Running water
- Wet ditch
- Dry ditch
- Scattered trees
- Scattered scrub
- Low potential roost feature
- Target note TN1: Pennyroyal TN2: Himalayan balsam

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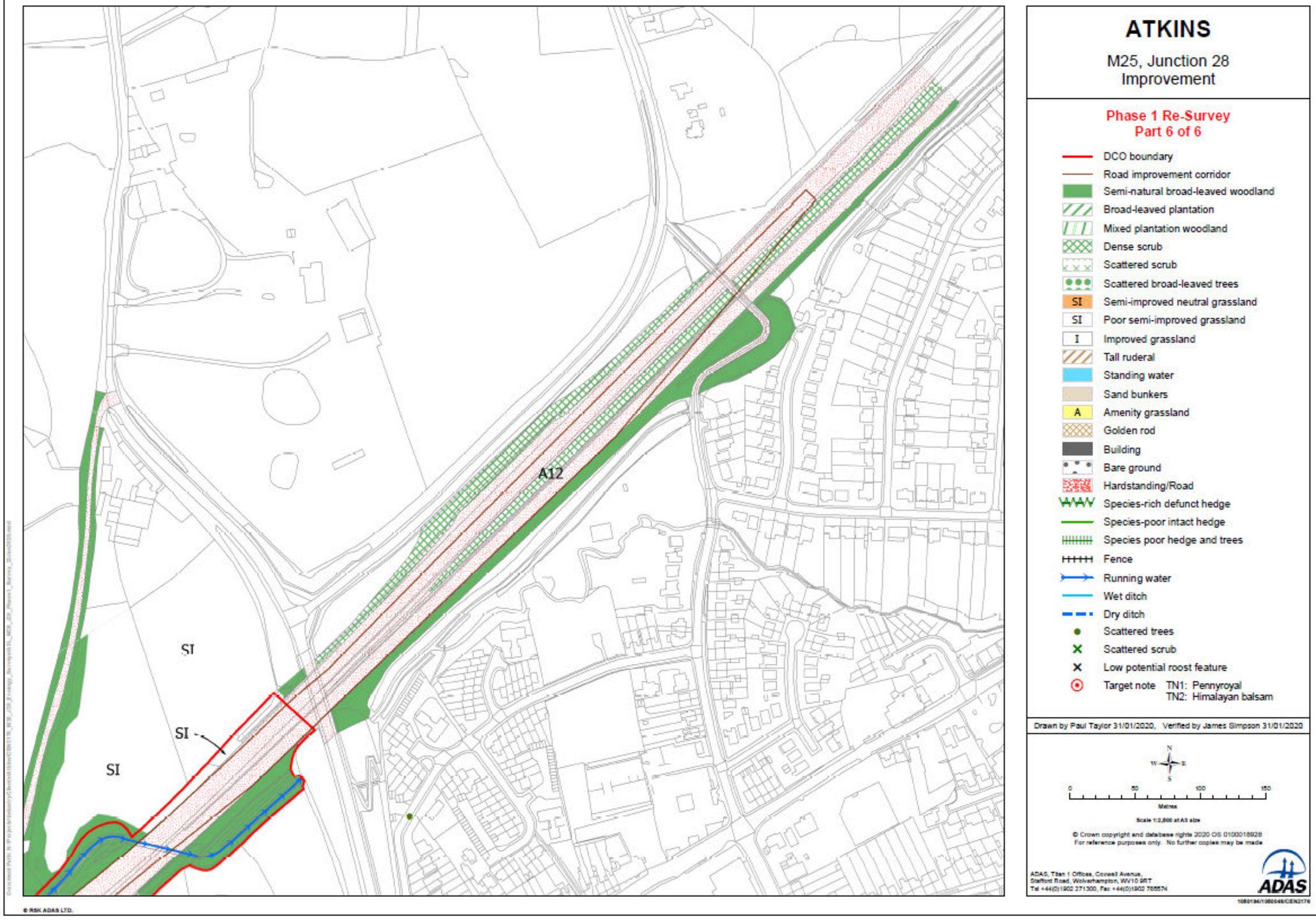
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Improvement
Phase 1 Re-Survey
Part 6 of 6
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Broad-leaved plantation
Mixed plantation woodland
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Scattered scrub
Scattered broad-leaved trees
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Annex 3: Photographs of the Site (2017 unless otherwise stated)

	
Photograph 1 – building 1.	Photograph 2 – Building 4
	
Photograph 3 – building 5	Photograph 4 – building 6
	
Photograph 5 – building 7	Photograph 6 – buildings 8 (background on right) and 9 (behind Geest sign)

Photograph 7 – building 10.

Photograph 8 – containers

Photograph 9 – bare ground

Photograph 10 – bare ground

Photograph 11 – chain-link fence

Photograph 12 – amenity grassland adjacent to residential houses.

Photograph 13 – amenity grassland golf course

Photograph 14 – poor semi-improved grassland

Photograph 15 – semi-improved grassland located to the west of Weald brook.

Photograph 16 – semi-improved grassland with an abundance of common fleabane.

Photograph 17 – Goldenrod starting to colonise grassland

Photograph 18 – tall ruderal vegetation adjacent to the M25

Photograph 19 – patch of goldenrod

Photograph 20 – Dense goldenrod (2019)

Photograph 21 – The Grove

Photograph 22 – broadleaved wood and a ong Weald Brook

Photograph 23 – broadleaved woodland dominated by alder beside the Ingrebourne.

Phot graph 24 – Local icarage Wood

Photograph 25 – broadleaved woodland located to the very north of the site

Photograph 26 – Broadleaved plantation.

Photograph 27 – showing a comparison of the woodland either side of the chain-linked fence.

Photograph 28 – mi ed plantat on woodl nd within Grove Wood.

Photograph 29 – dense scrub with a very noticeable browse line.

Photograph 30 – scattered broadleaved trees.

Photograph 31 – pond located in The Grove

Photograph 32 – W ald B ook sho ing on of the man meanders.

Photograph 33 – Ingrebourne River with a gravel bottom.

Photograph 34 – wet ditch at the southern end of the wood.

Photograph 35 – hedgerow and tree habitat seperating a section of the site from the south of the A12.

Photograph 36 – defunct species rich hedgerow.

Photograph 37 –Ingrebourne River south of the A12.

Photograph 38 – Semi-improved grassland field south of A12, railway line in distance (2019).

Photograph 39 – Glade seperating Lower Vicarage Wood from the northern wood.

Target Note 1 – Pennyroyal recorded to west of Local Vicarage Wood (see Phase 1 habitat map).

Target Note 2 – Himalayan balsam recorded on either side of the box culvert under the M25 (see Phase 1 habitat map)

Annex 4: Species List 2017 - 2019

Type	Common name	Scientific name
Fern	Broad Buckler-fern	*Dryopteris dilatata*
Fern	Hart's-tongue	*Phyllitis scolopendrium*
Fern	Male fern	*Dryopteris filix-mas agg.*
Grass	Annual meadow-grass	*Poa annua*
Grass	Cock's-foot	*Dactylis glomerata*
Grass	Common bent	*Agrostis capillaris*
Grass	Creeping bent	*Agrostis stolonifera*
Grass	Crested dog's-tail	*Cynosurus cristatus*
Grass	False oat-grass	*Arrhenatherum elatius*
Grass	False-brome	*Brachypodium sylvaticum*
Grass	Floating Sweet-grass	*Glyceria fluitans*
Grass	Marsh foxtail	*Alopecurus geniculatus*
Grass	Meadow barley	*Hordeum secalinum*
Grass	Meadow foxtail	*Alopecurus pratensis*
Grass	Perennial Rye-grass	*Lolium perenne*
Grass	Red fescue	*Festuca rubra agg.*
Grass	Rough meadow-grass	*Poa trivialis*
Grass	Smaller Cat's-tail	*Phleum bertolonii*
Grass	Smooth Meadow-grass	*Poa pratensis sens.lat.*
Grass	Sweet Vernal Grass	*Anthoxanthum odoratum*
Grass	Tall fescue	*Festuca arundinacea*

Type	Common name	Scientific name
Grass	Tufted Hair-grass	*Deschampsia caespitosa*
Grass	Wood meadow-grass	*Poa cf. nemoralis*
Grass	Yorkshire-fog	*Holcus lanatus*
Ground flora	a michaelmas-daisy	*Aster sp.*
Ground flora	Agrimony	*Agrimonia eupatoria*
Ground flora	Annual mercury	*Mercurialis annua*
Ground flora	Biting stonecrop	*Sedum acre*
Ground flora	Black Horehound	*Ballota nigra*
Ground flora	Black medick	*Medicago lupulina*
Ground flora	Black nightshade	*Solanum nigrum*
Ground flora	Bluebell	*Hyacinthoides non-scripta*
Ground flora	Bramble	*Rubus fruticosus agg.*
Ground flora	Broad-leaved dock	*Rumex obtusifolius*
Ground flora	Brooklime	*Veronica beccabunga*
Ground flora	Celery-leaved buttercup	*Ranunculus sceleratus*
Ground flora	Cleavers	*Galium aparine*
Ground flora	Clustered dock	*Rumex conglomeratus*
Ground flora	Colt's-foot	*Tussilago farfara*
Ground flora	Common bird's-foot-trefoil	*Lotus corniculatus*
Ground flora	Common cat's-ear	*Hypochaeris radicata*
Ground flora	Common Centaury	*Centaurium erythraea*
Ground flora	Common chickweed	*Stellaria media*
Ground flora	Common Duckweed	*Lemna minor*
Ground flora	Common field-speedwell	*Veronica persica*
Ground flora	Common fleabane	*Pulicaria dysenterica*

Type	Common name	Scientific name
Ground flora	Common knapweed	*Centaurea nigra*
Ground flora	Common mouse-ear	*Cerastium fontanum ssp. vulgare*
Ground flora	Common nettle	*Urtica dioica*
Ground flora	Common poppy	*Papaver rhoeas*
Ground flora	Common ragwort	*Senecio jacobaea*
Ground flora	Common sorrel	*Rumex acetosa*
Ground flora	Common toadflax	*Linaria vulgaris*
Ground flora	Corn mint	*Mentha arvensis*
Ground flora	Cow parsley	*Anthriscus sylvestris*
Ground flora	Creeping buttercup	*Ranunculus repens*
Ground flora	Creeping cinquefoil	*Potentilla reptans*
Ground flora	Creeping thistle	*Cirsium arvense*
Ground flora	Creeping-jenny	*Lysimachia nummularia*
Ground flora	Curled dock	*Rumex crispus*
Ground flora	Daisy	*Bellis perennis*
Ground flora	Dog's mercury	*Mercurialis perennis*
Ground flora	Dove's-foot Crane's-bill	*Geranium molle*
Ground flora	Early goldenrod	*Solidago gigantea*
Ground flora	Enchanter's-nightshade	*Circaea lutetiana*
Ground flora	Field bindweed	*Convolvulus arvensis*
Ground flora	Fool's water-cress	*Apium nodiflorum*
Ground flora	Foxglove	*Digitalis purpurea*
Ground flora	Garlic mustard	*Alliaria petiolata*
Ground flora	Germander speedwell	*Veronica chamaedrys*
Ground flora	Goat's-rue	*Galega officinalis*
Ground flora	Greater stitchwort	*Stellaria holostea*

Type	Common name	Scientific name
Ground flora	Ground-elder	*Aegopodium podagraria*
Ground flora	Ground-ivy	*Glechoma hederacea*
Ground flora	Groundsel	*Senecio vulgaris*
Ground flora	Hedge bindweed	*Calystegia sepium*
Ground flora	Hedge mustard	*Sisymbrium officinale*
Ground flora	Hedge Woundwort	*Stachys sylvatica*
Ground flora	Hemlock	*Conium maculatum*
Ground flora	Hemp-agrimony	*Eupatorium cannabinum*
Ground flora	Herb-robert	*Geranium robertianum*
Ground flora	Hoary plantain	*Plantago media*
Ground flora	Hogweed	*Heracleum sphondylium*
Ground flora	Indian balsam	*Impatiens glandulifera*
Ground flora	Ivy	*Hedera helix*
Ground flora	Lady's bedstraw	*Galium verum*
Ground flora	Lemon balm	*Melissa officinalis*
Ground flora	Lesser Celandine	*Ranunculus ficaria*
Ground flora	Lesser stitchwort	*Stellaria graminea*
Ground flora	Lords-and-ladies	*Arum maculatum*
Ground flora	Marsh Thistle	*Cirsium palustre*
Ground flora	Meadow buttercup	*Ranunculus acris*
Ground flora	Meadow vetchling	*Lathyrus pratensis*
Ground flora	Meadowsweet	*Filipendula ulmaria*
Ground flora	Moschatel	*Adoxa moschatellina*
Ground flora	Mugwort	*Artemisia vulgaris*
Ground flora	Opium poppy	*Papaver somniferum*
Ground flora	Oxeye Daisy	*Leucanthemum vulgare*

Type	Common name	Scientific name
Ground flora	Oxford ragwort	*Senecio squalidus*
Ground flora	Parsley Piert	*Aphanes arvensis agg.*
Ground flora	Pennyroyal	*Mentha pulegium*
Ground flora	Perforate St. John's-wort	*Hypericum perforatum*
Ground flora	Ramsons	*Allium ursinum*
Ground flora	Red Bartsia	*Odontites vernus*
Ground flora	Red campion	*Silene dioica*
Ground flora	Red clover	*Trifolium pratense*
Ground flora	Redshank	*Persicaria maculosa*
Ground flora	Scarlet Pimpernel	*Anagallis arvensis*
Ground flora	Selfheal	*Prunella vulgaris*
Ground flora	Sheep's Sorrel [agg.]	*Rumex acetosella*
Ground flora	Smooth tare	*Vicia tetrasperma*
Ground flora	Sneezewort	*Achillea ptarmica*
Ground flora	South African ragwort	*Senecio inaequidens*
Ground flora	Spear thistle	*Cirsium vulgare*
Ground flora	Spear-leaved orache	*Atriplex prostrata agg.*
Ground flora	Starwort	*Callitriche sp.*
Ground flora	Sticky Mouse-ear	*Cerastium glomeratum*
Ground flora	Stone Parsley	*Sison amomum*
Ground flora	Swine-cress	*Coronopus squamatus*
Ground flora	Thyme-leaved speedwell	*Veronica serpyllifolia*
Ground flora	Tormentil	*Potentilla erecta*
Ground flora	Upright Hedge-parsley	*Torilis japonica*
Ground flora	Vervain	*Verbena officinalis*
Ground flora	Violet sp.	*Viola sp.*

Type	Common name	Scientific name
Ground flora	Water figwort	*Scrophularia auriculata*
Ground flora	Water mint	*Mentha aquatica*
Ground flora	wavy bitter-cress	*Cardamine flexuosa*
Ground flora	Weld	*Reseda luteola*
Ground flora	White clover	*Trifolium repens*
Ground flora	White Dead-nettle	*Lamium album*
Ground flora	Wild carrot	*Daucus carota*
Ground flora	Wild teasel	*Dipsacus fullonum*
Ground flora	Willowherb sp.	*Epilobium sp.*
Ground flora	Winter-cress	*Barbarea vulgaris*
Ground flora	Wood sage	*Teucrium scorodonia*
Ground flora	Wood Speedwell	*Veronica montana*
Ground flora	Wood-aven's	*Geum urbanum*
Ground flora	yarrow	*Achillea millefolium*
Horsetail	Great horsetail	*Equisetum telmateia*
Rush	Hard rush	*Juncus inflexus*
Rush	Soft rush	*Juncus effusus*
Sedge	False fox-sedge	*Carex otrubae*
Sedge	Grey sedge	*Carex divulsa*
Sedge	Hairy sedge	*Carex hirta*
Sedge	Pendulus Sedge	*Carex pendula*
Sedge	Remote sedge	*Carex remota*
Sedge	wood-sedge	*Carex sylvatica*
Woody species	Alder	*Alnus glutinosa*
Woody species	Ash	*Fraxinus excelsior*
Woody species	Beech	*Fagus sylvatica*

Type	Common name	Scientific name
Woody species	Blackthorn	*Prunus spinosa*
Woody species	Crack willow	*Salix fragilis*
Woody species	Dog rose	*Rosa canina agg.*
Woody species	Dogwood	*Cornus sanguinea*
Woody species	Elder	*Sambucus nigra*
Woody species	Field maple	*Acer campestre*
Woody species	Goat willow	*Salix caprea*
Woody species	Gorse	*Ulex europaeus*
Woody species	Hawthorn	*Crataegus monogyna*
Woody species	Hazel	*Corylus avellana*
Woody species	Hornbeam	*Carpinus betulus*
Woody species	Hybrid black-poplar	*Populus x canadensis agg.*
Woody species	Pedunculate oak	*Quercus robur*
Woody species	Scots pine	*Pinus sylvestris*
Woody species	Silver birch	*Betula pendula*
Woody species	sycamore	*Acer pseudoplatanus*
Woody species	White willow	*Salix alba*
Woody species	Wild cherry	*Prunus avium*

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