

A30 Chiverton to Carland Cross Environmental Statement

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2015 Phase 1 Habitat Verification Survey
Report**

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A30 CHIVERTON TO CARLAND CROSS

A30 CHIVERTON TO CARLAND CROSS HABITAT VERIFICATION
SURVEY

November 2015
Highways England

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Figure 1: Survey Area and Gap Analysis Results

Figure 2: Statutory and Non-Statutory Sites within 2 km

Figure 3: Phase 1 Habitat Survey Results

1. Introduction



1.1 Overview

- 1.1.1 WSP | Parsons Brinckerhoff (WSP|PB) was commissioned by Highways England to undertake a Habitat Verification Survey of the A30 between Chiverton Cross and Carland Cross. This section of road is currently a 12.7 km length of single carriageway which is proposed to be replaced by a dual carriageway.
- 1.1.2 The purpose of this commission was to verify and update the findings of the 2003 Phase 1 Habitat Survey carried out by Hyder Consulting Ltd¹. The survey recorded and mapped broad habitat types, and identified the potential for protected/notable species. The need for further assessment was identified based upon a habitat or species comprising a potential ecological constraint to the proposed project scheme.
- 1.1.3 The current verification survey was carried out as a high-level assessment with surveyors using aerial maps and ground-truthing where access was possible. Due to the stage at which the project currently stands and the survey information required, access across private land was not acquired.

1.2 Site Context

- 1.2.1 The A30 is a major trunk road running through the centre of Cornwall from West to East. The A30 forms an important route through the county of Cornwall and is under pressure during the summer months due to the high number of tourists. The section of road between Carland Cross and Chiverton Cross is a traffic pinch point, where the dual carriageway narrows to single carriageway in both directions between the two roundabouts at Chiverton Cross and Carland Cross. The single carriageway sits between grid references SW 74759 46978 at the western end and SW 84665 53957 at the eastern end.
- 1.2.2 The survey area consists of the 12.7 km length of the carriageway and includes a 250 m buffer either side of the proposed routes (refer to Figure 1). At this stage there are still four design options, as such this buffer includes all four options.
- 1.2.3 The survey area covers a variety of habitats including heathland, farmland and woodland. The soft estate along this section of road contains hedgerows in some areas but also includes wide grass verges in others. The road at times is raised up offering panoramic views, at others it is cut into the bed rock with steep banks above.

1.3 Legislation and Planning Context

- 1.3.1 Articles of wildlife and countryside legislation, planning policy guidance and references to both local and national biodiversity action plans and regional/local strategies and plans are referred to in this report. Their context and applicability is explained in the relevant sections of the report.
- 1.3.2 The key articles of relevance are:

¹ Hyder Consulting Ltd., 2005. A30 Carland Cross to Chiverton Cross. Stage 3 Ecological Baseline Report. A report to the Highways Agency.

- | The Conservation of Habitats and Species Regulations 2010 (Habitats Regulations) (as amended)
- | The Wildlife and Countryside Act 1981 (as amended)
- | The Countryside and Rights of Way Act 2000
- | The Natural Environment and Rural Communities Act 2006
- | National Planning Policy Framework 2012
- | The Protection of Badgers Act 1992
- | The UK Biodiversity Action Plan
- | UK Post 2010 Biodiversity Framework
- | The Local Biodiversity Action Plan for Cornwall

2. Methodology



2.1 Desk Study

2.1.1 A desk study was undertaken to collate and review records of protected and notable species and habitats within the search area. The search included the 12.7 km length of the road and 2 km either side for statutory and non-statutory designated sites and protected or notable species. The search area was extended to 10 km for records of bats and 30 km for Special Areas of Conservation (SAC) where bats are a qualifying species.

2.1.2 The ecological desk study provides background information on the biodiversity interest of the site, which complements data collected in the field by providing additional context for the site and its surroundings. It should be noted that an absence of desk study records for particular species or habitats does not necessarily convey an absence of such species or habitats in that area, but may be indicative of under-recording.

2.1.3 The desk-based study included a search for all statutory designated sites within the respective search areas:

- i Special Areas of Conservation (SAC)
- i Special Protection Areas (SPA)
- i Ramsar Sites
- i Sites of Special Scientific Interest (SSSI)
- i National Nature Reserves (NNR)
- i Local Nature Reserve (LNR)
- i Sites of Nature Conservation Importance (SNCI)
- i County Wildlife Sites (CWS)
- i Cornwall Roadside Verge Inventory (CRVI)

2.1.4 The following sources were contacted / accessed to compile baseline data:

- i Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS)

2.1.5 The following web-based databases were consulted:

- i Multi Agency Geographic Information for the Countryside (MAGIC)

2.1.6 The desk study also included the review of previous reports associated with the project, these included the following:

- i A30 Carland Cross to Chiverton Cross: Stage 1 Environmental Assessment Report Hyder Consulting, November 2003;
- i A30 Carland Cross to Chiverton Cross: Stage 2 Environmental Assessment Scoping Report Hyder Consulting, February 2004;

- i A30 Carland Cross to Chiverton: Stage 2 Environmental Assessment Report Hyder Consulting, April 2004;
- i A30 Carland Cross to Chiverton Cross: Technical Appraisal Report Hyder Consulting, May 2004;
- i A30 Carland Cross to Chiverton Cross: Scheme Assessment Report Hyder Consulting, October 2004;
- i A30 Carland Cross to Chiverton Cross: Environmental Statement Scoping Report Hyder Consulting, December 2004;
- i A30 Carland Cross to Chiverton Cross: Stage 3 Ecological Baseline Report Hyder Consulting, June 2005.

2.2 Field Survey

- 2.2.1 A Phase 1 Habitat Verification Survey was undertaken by experienced PB ecologists between 4th and 6th August 2015. The weather conditions during the survey period were mixed with generally fair conditions, but also some heavy rain. The survey assessed the ecological value of the habitats present along the proposed route options. Protected habitats and evidence of or potential for any protected or notable species were recorded on site. The survey area covered a 250 m buffer either side of all of the route options.
- 2.2.2 The surveyors cross-referenced the survey findings with those previously carried out to verify previous results and also completed the survey where gaps were previously present. Due to access restrictions the surveyors used vantage points and binoculars in order to assess certain areas of habitat; however, wherever possible, full assessment was made using the standard methodology as published by the Joint Nature Conservation Committee (JNCC)².
- 2.2.3 The methodology is a standardised technique for rapidly obtaining baseline ecological information over a large area of land. All habitat types present are mapped with dominant plant species recorded in accordance with standard nomenclature and their abundance is assessed on the DAFOR scale where relevant:
- | | | |
|---|---|------------|
| i | D | Dominant |
| i | A | Abundant |
| i | F | Frequent |
| i | O | Occasional |
| i | R | Rare |
- 2.2.4 In accordance with best practice³, the standard Phase 1 Habitat Assessment methodology was extended to include all protected and notable fauna that may be present in the survey area. Any incidental records or evidence were target noted and each habitat evaluated for its potential to support protected or notable species.

² Joint Nature Conservation Committee, 2010. Handbook for Phase 1 habitat survey. A technique for environmental audit.

³ CIEEM (2016) guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester.

2.3 Survey Limitations

- 2.3.1 The surveys were carried out over a period of three consecutive days in August 2015, and as such it was not possible to observe the seasonal variations of the site. There is potential for some species to have been missed as a result and only a selection of the species present will have been recorded. Therefore the survey provides a general assessment of potential nature conservation value. However, it is considered that the combination of historic records from the desk study and the site survey provides an accurate representation of the various species and habitat types present at the site in order to identify constraints and potential requirements of further survey.
- 2.3.2 The Phase 1 Habitat maps have been reproduced from field notes, and whilst this fulfils the requirements of an extended Phase 1 Habitat Assessment; the maps are not intended to provide exact locations and distributions of key habitats, but an overview. It is likely that habitats will change over time and may therefore alter the results recorded.
- 2.3.3 Due to the stage of the project and the associated lack of access it was not possible to cover the entire site in detail. The surveyors had to make use of vantage points and binoculars in order to assess a number of areas. There is therefore a possibility that some areas will need further survey work in order to fully assess the species composition. However, this is not deemed to be a significant impact upon the results of this verification survey. The survey still provided an update and gap analysis across the site and identified the areas of high conservation value.
- 2.3.4 Species lists were made for each broad habitat type and not individually for each block of habitat; this was due to the high level of assessment and inability to access all areas. It is likely that some species may have been missed; however it is considered that the majority of dominant species were identified and therefore this does not pose a significant limitation to the survey.
- 2.3.5 Some hedgerows were also classified from a distance and therefore some may differ from the results within this report, however it is deemed that the survey provides a representation of what was found on site.
- 2.3.6 Streams and watercourses were not accessible and therefore their extent and potential to support wildlife was not fully assessed, therefore it was assumed that water courses were suitable of supporting a range of riverine species such as otter. The county is known to support a range of riverine species and often has high water quality. This approach provides a worst case scenario and further surveys will fully assess these water courses.

3. Results



3.1 Desk Study

DESIGNATED SITES

Statutory Nature Conservation Sites

- 3.1.1 There is one European site designated under the Habitats Directive (Council Directive 92/43/EEC) within the 2 km search areas. This is Newlyn Downs SAC which is located less than 50 m to the north of options 4 and 6 (refer to Table 3.1). There are no SAC's designated for bat interest within the 30 km search area of the proposed route.
- 3.1.2 There are four nationally designated SSSIs, designated under the Wildlife and Countryside Act 1981 (as amended), Countryside and Rights of Way Act 2000 and Natural Environment and Rural Communities Act 2006 within the 2 km search area. These are the Newlyn Downs SSSI, Carrick Heath (comprised of several components located across the length of the scheme), Carnkief Pond SSSI and Ventongimps SSSI. The closest nature conservation site to the footprint of the scheme is a component of the Newlyn Downs SSSI which lies less than 50 m from options 4 and 6, to the north of the road at Carland Cross roundabout end of the scheme.
- 3.1.3 There are no nationally designated NNRs or locally designated LNRs within the 2 km search area.
- 3.1.4 A summary of the statutory sites is presented in Table 3.1 below, together with a brief description of the reason for designation (refer to Figure 2 for location in relation to scheme).

Tale 3.1: Statutory designated sites within the 2 km search area

Site	Reasons for designation	Approximate distance from existing A30 (distance from options provided where appropriate)
Newlyn SAC	The site is primarily designated for the presence of the Annex 1 habitat Temperate Atlantic wet heaths with <i>Erica ciliaris</i> and <i>Erica tetralix</i> . This is the largest area of Dorset heath <i>E. ciliaris</i> in Cornwall and helps to represent the full geographical range of the distribution of this habitat.	200 m north at the eastern end (less than 50 m from options 4 and 6)
Newlyn SSSI	The site sits within the same footprint as the SAC and is also designated for the presence of the Atlantic wet heath. The site supports dry and wet heath/mire communities and stands of willow scrub.	200 m north at the eastern end (less than 50 m from options 4 and 6)
Carrick Heaths SSSI	The SSSI is comprised of ten components, six of which lie within the 2 km search area. The sites are characterised by a mosaic of wet and dry heathlands with populations of Dorset Heath which is nationally rare. Other important plant species include nationally scarce yellow centaury <i>Cicendia filiformis</i> and Cornish moneywort <i>Sibthorpia europa</i> . The sites support a range of fauna including	Various, closest at 400m to the south east at eastern end

Site	Reasons for designation	Approximate distance from existing A30 (distance from options provided where appropriate)
	the nationally scarce pearl-bordered butterfly <i>Boloria euphrosyne</i> and the Schedule 1 species, barn owl <i>Tyto alba</i> has been recorded at Penstraze Moor to the south west of the site.	
Carnkief Pond SSSI	The site encompasses a range of habitats including swamp vegetation, deciduous woodland, streams, herb-rich meadows, wet heath and bog. Open water areas are also present supporting red data book species balm-leaved figwort <i>Scrophularia scorodonia</i> and 12 species of dragonfly.	2km to the north central within the site
Ventongimps SSSI	The sites is comprised mainly of wet dwarf shrub heath with areas of bog and willow-alder carr. The heath is important for the presence of Dorset heath and eyebright <i>Euphrasia virgursii</i> . The site is also important for supporting 13 species of Odonata including the nationally rare scarce blue-tailed damselfly <i>Ischnura pumilio</i> and 99 species of Lepidoptera including the narrow-bordered hawk moth <i>Hemaris tityus</i> .	1.8 km to the north central within the site

Non-statutory Nature Conservation Sites

- 3.1.5 There are 15 non-statutory CWS within the 2 km search areas and 4 CRVI sites along the route. CWS and CRVI sites are designated for their presence of habitats or species of local or regional importance by local authorities. This will include species and habitats that are identified as of Principal Importance or previously identified under the Biodiversity Action Plans. These sites are detailed in Table 3.2 below.

Table 3.2: Non-statutory designated sites found within 2 km search area

Site	Reasons for designation	Approximate distance from existing A30 (distance from options provided where appropriate)
Carland Moor CWS	The site runs along two valleys and the majority of this moor is within the Carrick Heaths SSSI. It is comprised largely of willow/gorse scrub and marshy grassland with small areas of purple moor grass <i>Molinia caerulea</i> . Mixed broadleaf woodland is also present. The site supports priority habitat wet woodland and priority species lesser horseshoe bat <i>Rhinolophus hipposideros</i> , brown long eared bat <i>Plecotus auritus</i> and otter <i>Lutra lutra</i> .	180 m south east

Site	Reasons for designation	Approximate distance from existing A30 (distance from options provided where appropriate)
Trenerry Wood CWS	The site occupies a sheltered valley along a stream with a variety of woodlands, these included wet woodland and mixed broadleaved woodland. Species present within these include grey willow <i>Salix cinerea</i> , downy birch <i>Betula pubescens</i> , alder <i>Alnus sp.</i> , ash <i>Fraxinus sp.</i> and oak <i>Quercus sp.</i> , with rich ground flora. Small glades and rides support butterflies and other invertebrates. Hedges occur throughout the site with mature trees present. Priority habitats include wet woodland, hedgerows, upland mixed woodland and upland oakwood. Priority species include bullfinch <i>Pyrrhula pyrrhula</i> and eel <i>Anguila anguilla</i> .	375 m south
Treworgan Quarry CWS & Lower Tolcarne CWS	The site extends along a tributary of the River Allen with a poorly drained valley bottom, and forms a continuation between the Trenerry Woods CWS and Bishops Wood CWS. The priority habitat wet woodland is dominated by grey willow, with abundant epiphytes and bryophytes throughout. The wet woodlands grade into marsh and wet meadow where soft rush dominates with greater tussock sedge <i>Carex paniculata</i> and a rich wetland flora. Priority species include linnet <i>Carduelis cannabina</i> and otter.	2 km south
Bishop's Wood CWS	The main part of the site is comprised of commercial coniferous woodland where the management results in many intermediate habitats. Additionally some ancient woodland remains such as neglected oak coppice. The site supports priority habitats wet woodland and upland oak wood along with priority species bastard balm <i>Melittis melissophyllum</i> , slow-worm <i>Anguis fragilis</i> , song thrush <i>Turdus philomelos</i> and otter.	2 km south
Allet Bog CWS	The site lies adjacent to parts of the Carrick Heath SSSI at the head of a valley near to the River Allen. Wet willow woodland dominates in the valley bottom, two areas of rough rush-dominated pasture are present which remain waterlogged for much of the year. Some remnant heath is present supporting Dorset heath. Priority habitats are wet woodland, purple moor grass and rush pastures, and hedgerows. Priority species include a number of birds, common toad <i>Bufo bufo</i> and common lizard <i>Zootoca vivipara</i> , a number of bats including lesser horseshoes and noctule <i>Nyctalus noctula</i> , and otter.	430 m south
Carnhot CWS	The site extends along a tributary of the River Carnon, it is fast flowing with grassy margins and several shallow pools. Wetland habitats surround the site and supports a range of wildlife and is considered worthy of conservation for Ordanata alone. Priority habitats are thought to be Lowland fens and priority species include grass snake <i>Natrix natrix</i> .	1.5 km south west
Silverwell Moor CWS	The site lies adjacent to part of the Carrick Heath SSSI and is comprised of two rush dominated pastures which include some moderately rich fen communities. These pastures are enclosed by Cornish hedges which support large stands of grey willow. Priority habitats include lowland fens and hedgerows.	690 m north west

Site	Reasons for designation	Approximate distance from existing A30 (distance from options provided where appropriate)
Park Hoskyn CWS	The site lies along a steep sided valley with a fast flowing stream. It is comprised of broadleaved woodland, small areas of fen, scrub, a small quarry and disused mineshaft. Priority habitat is lowland fen with priority species including 10 moth species. Badger <i>Meles meles</i> have also been recorded within the site.	1 km north west
Callestick Vean CWS	The site is a narrow sheltered valley along a stream comprising a range of habitats including broadleaved woodland, wet woodland and oak woodland. Fen is present within the site along with patches of scrub. Priority habitats are wet woodland, lowland fens and upland oakwoods, priority species are otter.	0.5 km north
Polvenna Wood CWS	The site sits on either side of part of the Carrick Heath SSSI. The larger section is dominated by wet willow woodland supporting rich epiphytic growth and particularly rich ground flora. The smaller section includes wet woodland and open marshy areas with a man-made pond. Priority habitat is wet woodland and priority species include greater horseshoe bat <i>Rhinolophus ferrumequinum</i> and lesser horseshoe bat.	375 m north
Carnkief Pond CWS	The site is situated near to the Carnkief Pond SSSI and comprises small areas of mixed broadleaved woodland, herb rich grassland and a series of poorly drained fields separated by wide hedgerows. Priority species include common toad, grass snake and hedgehog <i>Erinaceus europaeus</i> .	1.5 km north
Lelight CWS & Brickmoor Plantation CWS	The site lies adjacent to part of the Carrick Heath SSSI. Leight Plantation is dominated by a mosaic of commercial coniferous and broadleaved plantations; it contains a number of species and includes the occasional wet flush. Brickmoor Plantation is dominated by silver birch woodland where there is a rich and diverse bryophyte and lichen flora and ferns. The site also contains a small larch plantation and wet willow woodland. Priority habitat is wet woodland, with priority species of moth being present.	1 km north
Carn Moor CWS	The site is bisected by a disused railway and supports a diversity of habitats and species. The moor is wet and dry heathland with scattered scrub and a man-made pond. The site is poorly drained and wetland areas are present. Priority habitats are lowland heathland, purple moor grass and rush pasture, and wet woodland. Priority species include several butterflies such as pearl-bordered fritillary, reptiles such as adder <i>Vipera berus</i> and grass snake. A number of flora species are present including penny royal <i>Metha pulegium</i> and pale dog violet <i>Viola lactea</i> .	2 km north
Goonwinnow CWS	The site is a low lying valley following a stream with well-developed and undisturbed wet willow woodland with abundant bryophytes and lichens. The priority habitat is wet woodland.	875 m north east

Site	Reasons for designation	Approximate distance from existing A30 (distance from options provided where appropriate)
Benny Mill Valley CWS	The site contains a range of undisturbed habitats along a 4 km stretch of stream. The site is made up of grey willow dominated wet woodland and herb rich meadow. Drier broadleaved woodland occurs in the northern part of the site containing species such as Cornish elm <i>Ulmus stricta</i> and oak. The priority habitat is wet woodland and the site supports a number of notable species such as willow warbler <i>Phylloscopus trochilus</i> whiskered bat <i>Myotis mystacinus</i> and badger.	300 m north east
Roadside Inventory BS316	The site supports lowland heathland vegetation with Dorset heath.	Online at western end
Roadside Inventory BS214	The site supports wild parsnip <i>Pastinaca sativa</i> which is local and rare in Cornwall	Online at western end
Roadside Inventory BS315	The site supports Dorset heath.	Online, central near Callestick
Roadside Inventory BS22	The site supports Babington's leek (<i>Ilium ampeloprasum babingtonii</i>).	On side road centrally near to Shortlanesend

Priority Habitats Action Plans

- 3.1.6 Six priority habitats were identified within the search area; these were purple moor grass and rush pasture, deciduous woodland, good quality semi-improved grassland, lowland heathland lowland fen, and traditional orchards. The majority of these areas of priority habitat were associated with the designated sites, and only two were adjacent to the road.
- 3.1.7 Lowland heath is identified at the eastern end of the site opposite Newlyn Downs SAC/SSSI. Deciduous woodland is located throughout the search area and is adjacent to the road in three locations around Marazanvose.

PROTECTED OR NOTABLE SPECIES

- 3.1.8 Protected species records returned by the desk study within the last 10 years within the 2 km and 10 km (for bat species only) search area from the road development are identified below.

Badger

- 3.1.9 The desk study returned a total of 109 records of badger within the search area. This included 2 setts and 73 records within 250 m of the route.
- 3.1.10 Previous survey of the site indicated the presence of badger across the site including a main sett near to Marazanvose, two substantial active setts near Carland Cross and nine active or partially used setts.

Otter

- 3.1.11 The desk study returned nine records of otter within the 2 km search area. This included four records of otter along the route itself; these were all records for otter seen dead on the road. The two main locations of these records are at Zelah and the Chybucca junction.
- 3.1.12 Previous surveys of the site did not identify any further evidence of otters.

Water vole

- 3.1.13 No records for water vole *Arvicola amphibius* were returned for the search area. It is considered that the water vole is extinct from Cornwall apart from where small scale reintroductions have taken place in the north east of the county. This species is therefore not considered further.

Dormice

- 3.1.14 No records for dormice *Muscardinus avellanarius* were returned within the desk study.
- 3.1.15 Previous surveys within the study area around Chyverton Park and Marazanvose have proved inconclusive with no evidence shown.

Bats

- 3.1.16 The desk study returned over one thousand records for twelve species of bat within the search 10 km area. These included the following species:

- | Barbastelle *Barbastella barbastellus*
- | Brown Long-Eared Bat
- | Common Pipistrelle *Pipistrellus pipistrellus*
- | Daubenton's Bat *Myotis daubentonii*
- | Greater Horseshoe Bat
- | Lesser Horseshoe Bat
- | Nathusius Pipistrelles *Pipistrellus nathusii*
- | Natterer's Bat *Myotis nattereri*
- | Noctule
- | Serotine *Eptesicus serotinus*
- | Soprano Pipistrelle *Pipistrellus pygmaeus*
- | Whiskered Bat

- 3.1.17 Many results were not distinguished to species level and were either classed as bat, bat sp. or pipistrelle.
- 3.1.18 Of these results a number indicated the presence of bat roosts within 10 km for species such as brown long eared bat, common pipistrelle, greater horseshoe bat, lesser horseshoe bat and natterer's bat. A number of these roosts were located within 250 m of the route including roosts for lesser horseshoe bat, common pipistrelle bat, and natterer's bat.
- 3.1.19 Greater and lesser horseshoe bats are identified as a local priority species within the Cornwall BAP

and the UK BAP. The UK BAP also includes soprano pipistrelle, brown long eared bat, noctule, and barbastelle bats.

- 3.1.20 Previous surveys identified the presence of common pipistrelle bat roosts at two locations near Trevalso and Nancarrow Farm. Additionally a known hibernation roost (species not specified) was surveyed at Little Tresawsen.

Birds

- 3.1.21 The desk study returned 950 records of 91 species within the search area. This included 16 Schedule 1 species such as barn owl, brambling *Fringilla montifringilla*, hobby *Falco subbuteo*, kingfisher *Alcedo atthis* and peregrine falcon *Falco peregrinus*.
- 3.1.22 Barn owl records numbered 95 and were noted to contain many roosts and or nest sites. Due to the sensitivity of these records, the grid references were not supplied, however for flight observations they were. Where location could be identified, five records were shown to be adjacent to the route, at Chiverton Cross, Zelah, Carland Cross and Mitchell. Whilst most of these records were from 2004, one of the Zelah records was determined in 2011.
- 3.1.23 Previous surveys recorded up to 35 species on site, these included red list species such as skylark *Alauda arvensis*, song thrush, starling *Sturnus vulgaris*, linnet, and bullfinch. Amber listed species included kestrel *Falco tinnunculus*, house martin *Delichon urbica*, and meadow pipit *Anthus pratensis*. During the bat surveys associated with previous surveys, a barn owl was noted to fly over the A30 near to Marazanvose.

Herpetofauna

- 3.1.24 The desk study returned records for all four common species of reptile within the search area and two species of amphibian. These were slow worm, common lizard, grass snake and adder; common frog *Rana temporaria* and common toad.
- 3.1.25 Previous surveys identified the presence of common lizard and adder within the heathland at the Carland Cross end of the site.

Fish

- 3.1.26 Two records for fish were returned within the survey area, these were eel *Anguilla anguilla* and bullhead *Cottus gobio*. These were located at the Ventongimps Nature Reserve and the River Allen respectively.
- 3.1.27 Additionally previous baseline reports indicate that the water from the existing A30 runs into tributaries of the River Allen, Kenwyn, Tresillian, and Tinney along with a number of smaller streams. These are classed as having good or very good water quality for fish species.

Crayfish

- 3.1.28 Crayfish are identified as being outside of their known geographical distribution, and as such are not considered further within this report.

Invertebrates

- 3.1.29 The data search returned numerous records for invertebrates within the search area, this included 29 species of Principal Importance (as classified under the Natural Environment and Rural Communities Act (2006)). These included sawfly moth *Xanthia ictertia*, cinnabar moth *Tyria jacobaeae* and oil beetle *Meloe procarabacus*, and a Schedule 5 species the silver studded blue butterfly *Plebejus argus*.
- 3.1.30 Previous studies identified the fragmented heathland site near to Carland Cross as potentially being of importance to invertebrates. A preliminary assessment was made in September 2004, with little interest being identified. It is possible that the timing of this survey may have affected the suitability of this survey.

Flora

- 3.1.31 The desk study returned a large volume of records for plants within the search area. This included specially protected species such as reindeer moss *Cladonia portentosa* and bog moss (*Sphagnum* sp.) which are protected under the Habitats Directive Annex 5. Additionally one Schedule 8 species were identified as bluebell *Hyacinthoides non-scripta* along with 23 Section 41 species of Principal Importance (as listed under the Natural Environment and Rural Communities Act (2006)), including cornflower *Centaurea cyanus* and fused tooth fungus *Phellodon confluens*.
- 3.1.32 Within Newlyn Downs SSSI/SAC records of the nationally rare Dorset heath and Section 41 species pale dog violet (*Viola lactea*) are present and previous surveys indicate that the Dorset heath is present within a fragment of heathland located in proximity to Carland Cross.

3.2 Field Survey

GENERAL HABITAT TYPES

- 3.2.1 This site supports a number of habitat types as defined by the JNCC standard methodology Phase 1 Habitat Assessment. The code used for the associated categorisation is included in brackets after the habitat type to allow for cross reference.
- 3.2.2 Given the length of the survey area, a wide variety of habitats were found to be present. The road runs west to east through farmland and woodland with some areas of heathland. Numerous hedgerows and belts of trees were identified throughout the survey area.

Semi-natural broadleaved woodland (A.1.1.1)

- 3.2.3 This habitat was found throughout the site in small and larger sections. They were often linear belts associated with streams or forming larger blocks that connected to wider habitats.
- 3.2.4 In particular, large sections were noted at the eastern end of the site to the north of Carland Cross roundabout, large areas of woodland were identified to the north and south of the road adjacent to Zelah, including Chyverton House Estate woodlands and a further section was noted towards the western end.
- 3.2.5 These woodlands contained a mixture of species, those identified included sycamore *Acer*

pseudoplatanus, oak, holly *Ilex quifolium*, hawthorn *Crataegus monogyna*, goat willow *Salix caprea*, ash, beech *Fagus sylvatica* and Italian alder *Alnus cordata*.

Semi-natural coniferous woodland (A.1.2.1)

- 3.2.6 This habitat was found in a few small areas across the site including adjacent to the heathland at the eastern end of the site near Carland Cross and at the western end alongside roads. These were small isolated patches that were not very well connected to the wider landscape.
- 3.2.7 Species present within this habitat were primarily Scot's pine *Pinus sylvestris* and *Leylandii* sp.

Semi-natural mixed woodland (A.1.3.1)

- 3.2.8 This habitat was found at the eastern end of the site adjacent to the services at Carland Cross. Species included Scot's pine, sycamore, ash, elder *Sambucus nigra* and wild privet *Ligustrum vulgare*.

Scrub (A.2.1 / A.2.2)

- 3.2.9 Scrub was present across the site in small and larger areas; it was dense or scattered and often associated with woodlands or hedgerows. Species identified included dominating bramble *Rubus fruticosus* agg. and European gorse *Ulex europaeus*, and included goat willow and blackthorn *Prunus spinosa*.

Semi-improved acid grassland (B.1.2)

- 3.2.10 This habitat was found in one location at the eastern end of the site, adjacent to the heathland. It is possible that with more detailed survey this habitat may be upgraded to unimproved acid grassland. The dominant species present were purple moor grass and hard fescue *Festuca lemni*. Additional species present included bell heather *Erica cinerea*, bramble, European gorse, catmint *Nepeta* sp., wood sage *Teucrium scorodonia*, and tormentil *Potentilla erecta*.

Improved grassland (B.4)

- 3.2.11 This habitat was fairly dominant across the site, with numerous fields supporting livestock. The species identified included perennial rye grass *Lolium perenne* and Yorkshire fog *Holcus lanatus*.

Marshy grassland (B.5)

- 3.2.12 This habitat was found in a few small areas across the site, usually associated with wet woodland and streams. The habitat was characterised by large areas of rushes *Juncus* spp. and grasses such as Yorkshire fog, cocksfoot *Dactylis glomerata* and *Deschampsia* spp.

Poor semi-improved grassland (B.6)

- 3.2.13 This habitat was located across the site in slightly lower abundance than improved grassland and was dominated by cocksfoot, false oat grass *Arrhenatherum elatius* and Yorkshire fog. Other species present included yarrow *Achillea millefolium*, common knapweed *Centaurea nigra*, hedge woundwort *Stachys sylvatica*, perennial rye grass, speedwell *Veronica* sp., white clover *Trifolium*

repens, dandelion *Taraxacum* sp., tufted vetch *Vicia cracca*, tormentil, spear thistle *Cirsium vulgare*, creeping bent *Agrostis stolonifera* and herb Robert *Geranium robertianum*.

Tall ruderals (C.3.1)

- 3.2.14 Areas of tall ruderals were found throughout the site, often associated with the edges of fields or buildings. Species present included spear thistle *Cirsium vulgare*, rosebay willowherb *Chamerion angustifolium*, hogweed *Heracleum sphondylium*, tansy *Tanacetum vulgare*, teasel *Dipsacus fullonum*, ragwort *Senecio jacobaea*, dock *Rumex* spp) and bramble.

Dry Dwarf Shrub Heath (D.1)

- 3.2.15 This habitat was located at the eastern end of the site, adjacent to the road and to the north of the road associated with the Newlyn Downs SSSI and SAC. This habitat was dominated by bell heather, European gorse and dwarf gorse *Ulex minor*, also present was heather *Calluna vulgaris*, cross leaved heather *Erica tetralix*, purple moor grass and sphagnum sp.

Standing water (G.1)

- 3.2.16 This habitat was located in a few locations across the site as ponds. It was thought to be present at the eastern end adjacent to the heath area within the scrub. Additionally ponds were present in the western end of the site. It is likely that ponds were present in gardens where access was not possible.

Running water (G.2)

- 3.2.17 A number of streams and rivers were present within the site, access was not possible during this survey to fully assess the nature of the water courses. The crossing points that were accessible were heavily vegetated with little or no visibility along the watercourses.

Arable land (J.1.1)

This habitat was dominant across the site, with large areas of crops such as barley *Hordeum vulgare* and wheat *Triticum* sp. being present. These fields were largely bisected by hedgerows.

Amenity grassland (J.1.2)

- 3.2.18 Amenity grassland was present primarily around junctions and houses across the site. Larger areas were present around the service stations at either end of the site. Species present included Yorkshire fog, common mouse ear *Cerastium fontanum*, ribwort plantain *Plantago lanceolata*, sheep sorrel *Rumex acetosella*, common knapweed, dandelion, daisy *Bellis perennis*, white clover, creeping buttercup *Ranunculus repens*, creeping cinquefoil *Potentilla reptans*, selfheal *Prunella vulgaris*, and hawkbeard sp. *Crepis* sp..

Introduced shrubs (J.1.4)

- 3.2.19 Small areas of introduced shrubs were located adjacent to houses and gardens, they were associated with species such as cotoneaster *Cotoneaster* sp., rhododendron *Rhododendron ponticum* and hydrangea *Hydrangea* sp..

Species-rich intact hedge (J.2.1.1)

- 3.2.20 This habitat was located across the site, and was often associated with Cornish hedges. Species present included hawthorn, wild privet, goat willow, sycamore, holly, oak, elder, honeysuckle *Lonicera periclymenum*, bramble, ivy *Hedera helix*, blackthorn and elm.

Species poor intact hedge (J.2.1.2)

- 3.2.21 As with the species-rich, intact hedgerows, this habitat was found across the site and was often associated with Cornish hedges. The species included varied selections of the species listed for species rich in tact hedges.

Species poor defunct hedge (J.2.2.2)

- 3.2.22 As with the other hedgerow types, this habitat was found across the site and was often associated with Cornish hedges. The species included varied selections of the species listed for species-rich intact hedges.

Species poor hedge with trees (J.2.3.2)

- 3.2.23 As with the other hedgerow types, this habitat was found across the site and was often associated with Cornish hedges. The species within the hedgerow and the trees included varied selections of the species listed for species-rich intact hedges.

Target Notes

- 3.2.24 Target notes were made in relation to areas of further interest; these are detailed in Table 3.3 and correspond to numbers on Figure 3.

Table 3.3: Target Notes

Target note	Description
1	This indicates the presence of the Wildlife and Countryside Act Schedule 9 listed plant Monbretia <i>Crocsmia x crocosmiiflora</i> which was located at numerous positions within the survey area.
2	This indicates the presence of the Wildlife and Countryside Act Schedule 9 listed plant Rhododendron which was located at numerous positions within the survey area.
3	This indicates the presence of the Wildlife and Countryside Act Schedule 9 listed plant Japanese knotweed <i>Fallopia japonica</i> which was located at numerous positions within the survey area.
4	This was an abandoned house which was assessed to have potential to support bats.

Target note	Description
5	This was a category 2 ⁴ tree for bat potential. The tree had dead limbs and large cracks.
6	This indicated that the woodland section had dormouse potential.
7	This indicated hedgerows that were considered to also be a Cornish hedge, stones were visible indicating the construction.
8	This indicated hedgerows that were considered to be a potential Cornish hedge due to shape and character, but where it was not possible to see the stones. This could indicate that these hedges were on earthen banks, or that the maintenance of the Cornish hedge had not been kept up and the wall sections had collapsed or been buried.
9	This indicated that the woodland section had potential to support dormice; a thick understory was present with connectivity to the wider landscape.
10	This was a standing dead tree with several woodpecker holes and flaking bark. It was positioned in a sheltered lane adjacent to a small water body and a farm. It was considered to be category 1 ⁴ for its bat potential.
11	This was a mammal trail that was likely to have been made by badgers due to its size and nature over a Cornish hedge but no evidence of badger use was observed.
12	This indicated a remnant beech woodland, whilst woodland offers dormouse potential, it was considered to be sub-optimal for dormice due to the presence of cattle within the woodland and therefore very little understory.
13	A building within the shooting range within the route of Option 1. This was a wooden structure with no roof and no bat potential.
14	A building within the shooting range within the route of Option 1. This was an asbestos corrugated shed with wooden fascia in a Nissan hut style. It was considered to have low/moderate ⁵ bat potential.
15	A building within the shooting range within one of the route of three of the route options. This was a wooden shelter with a corrugated roof and open front. It was considered to have no bat potential.
16	This was a residential house that was close to one of the proposed routes. A preliminary bat roost assessment was made and it was considered to have low bat potential due to no obvious features being present from the vantage point. A shed within the garden was considered to have moderate ⁴ bat potential due to the presence of asbestos corrugated roofing sheets and ivy covered walls.
17	This was a large Scots pine, considered to be unhealthy. It was densely covered in ivy and had little leaf growth. It was classed as category 2 ⁴ for bats.
18	This was a standing dead wood tree within a hedge. No access was possible to fully assess but was deemed to have potential to support bats.

⁴ Trees are assessed for the potential to support bat roosts as per the BCT guidelines. They are classified as known/confirmed roost (evidence of droppings/historic record), category 1* (trees with multiple highly suitable features such as cracks/missing limbs, capable of supporting larger roosts), category 1 (trees with definite bat potential with fewer features than 1* capable to support single bats), category 2 (no obvious potential although the tree is of a size and age that may support cracks/crevices suitable for bats), category 3 (no potential to support bats).

⁵ Buildings are assessed for bat potential using professional judgement to identify the presence of entry/exit points for bats that may indicate a roost within a cavity. They are classed as having high potential if multiple entry points (such as under roof tiles, under soffit boards, larger holes) are present and there is potential for larger roosts of multiple species or maternity roosts; moderate potential denotes entry points that may support a small number of bats; low potential is linked to a building with potential to support one or two bats of common species; negligible potential denotes a building with no entry points.

Target note	Description
19	This was a building along the current road and likely to be affected by some of the proposed routes. It was a stone building with a slate roof in good condition, no obvious features were present from the front but it was not possible to view the back of the house. It was considered that this building could have a precautionary low/moderate ⁵ potential to support bats.
20	This was a building along the current road and likely to be affected by some of the proposed routes. It was a stone building with a slate roof in good condition, no obvious features were present from the front but it was not possible to view the back of the house. It was considered that this building could have a precautionary low/moderate ⁵ potential to support bats.
21	This was a garage along the current road and likely to be affected by some of the proposed routes. Only the roof was visible, and it was composed of slate in good condition, however the visible apex was covered in ivy. It was therefore considered that this building could have a precautionary low/moderate ⁵ potential to support bats.
22	This was a building along the current road and likely to be affected by some of the proposed routes. It was a stone building with a slate roof in good condition, no obvious features were present from the front but it was not possible to view the back of the house. It was considered that this building could have a precautionary low/moderate ⁵ potential to support bats.

INCIDENTAL RECORDS / POTENTIAL FOR PROTECTED OR NOTABLE SPECIES

- 3.2.25 Very few areas containing direct evidence of protected or notable species were identified during the Phase 1 Habitat Assessment, however potential was noted for a number of species. The habitats on site were likely to support badger, otter, dormice, bats, birds, amphibians, reptiles invertebrates, and protected plant species such as Dorset heath.
- 3.2.26 A badger track was identified within the survey area on a side road near to Zelah, no other badger signs were noted during this survey, however due to the nature of the survey and access restrictions it is likely that many more were present.
- 3.2.27 A barn with a barn owl box was noted outside of the survey area at the eastern end of the site. It was located along a side road towards the Newlyn Downs SSSI. Pellets were identified to be approximately 6 months old. It is possible that barn owl use the area.

4. Recommendations



4.1 Introduction

4.1.1 The proposed scheme of widening or relocating the A30 Carland Cross to Chiverton Cross trunk road is likely to have the following impacts:

- i Permanent habitat loss;
- i Increased habitat fragmentation/severance;
- i Increased animal road mortality/casualties;
- i Increased habitat degradation as a result of increased dust levels or pollution caused by diesel fuel run off.

4.1.2 It will therefore be necessary to carry out further surveys to assess the baseline conditions of the site as detailed below.

4.1.3 By considering the existing ecological conditions of the site and its surroundings, it is recommended that opportunities for mitigating any impacts on protected and / or notable species and habitats be incorporated into the proposed scheme design to avoid impacts in the first instance and mitigate or compensate as appropriate thereafter.

4.1.4 A net gain in biodiversity should be sought and there should be an emphasis on retaining a permeable landscape, minimising fragmentation and severance for the wildlife that is supported in the immediate surroundings.

4.2 Designated sites

Statutory

4.2.1 The final route option is not yet determined, however none of the options will involve any land take of a statutory site. Despite this, the Newlyn Downs SAC and SSSI is located 200 m to the north of the current route and may be within 50 m of one of the proposed route options. Due to the proximity of the site, there is potential for indirect impacts as a result for example, of changes in air quality or water quality.

Non-statutory

4.2.2 The final route option is not yet determined, however none of the options will involve any land take of a non-statutory site. It is likely that none of the CWS within the search area will be affected by the route options; however a number of them are within close proximity, including Callestick Vean CWS, Trenerry Wood CWS, Polvenna Wood CWS and Allet Bog CWS and will need further assessment regarding the potential for indirect impacts.

4.3 Habitats

4.3.1 The site contains a number of different habitats including some of value within the local area. A proposed option will result in the loss of some of these valued habitats such as heathland at the

Carland Cross end of the scheme. It is recommended that once the final route option has been determined, NVC surveys will be required for heathland, woodland, grassland sections and aquatic habitat surveys will also be necessary in locations that will be directly or potentially indirectly affected.

4.4 Protected and Notable Species

- 4.4.1 All surveys undertaken should be carried out in line with the DMRB guidelines for that species group.

Badger

- 4.4.2 The survey area contains habitats with potential to support this species and a number of desk study results indicate that the proposed scheme is likely to impact foraging areas of local badger populations. This could increase the chance of mortality of badgers through road traffic collisions.
- 4.4.3 It is recommended that a full presence / absence badger survey be completed to assess the use of the site up to 500 m from the final scheme alignment. This survey will be carried out in one visit and should be undertaken outside of the summer months when vegetation may limit the ability to find evidence. This level of survey will help to identify potential hot spots for road traffic incidents and will help to inform on need for further detailed studies and/or appropriate mitigation. In addition, there may be possibilities to provide enhancements for this species group through the retrofitting of mitigation to facilitate safe road crossings.
- 4.4.4 If the works fall within approximately 30 m of an active sett, it may be necessary to obtain a Natural England Licence to facilitate the works; however this will be dependent on the nature of the works and the proximity to the sett.

Otter

- 4.4.5 The survey area contains some suitable habitat, in the form of water courses and ponds that may be used for foraging. It is likely that the proposed scheme will have a limited impact on the otter population, however road traffic casualties have already been recorded in this area and this problem may be amplified by the new scheme. It is recognised that in any addition to the provision of appropriate mitigation to address negative effects arising from the Scheme; there may be possibilities to provide enhancements for this species group through the retrofitting of mitigation to facilitate safe road crossings.
- 4.4.6 It is recommended that otter surveys are carried out to assess the use of the surrounding habitats

Dormice

- 4.4.7 No known populations of dormice exist within the survey area; however there is habitat in the form of woodlands and hedgerows that has the potential to support dormice.
- 4.4.8 It is recommended that a dormouse survey is carried out in line with best practise guidelines within suitable habitat that is likely to be impacted by the scheme. Surveys will consist of setting up dormouse nest tubes along the suitable habitat and checking these monthly through May to November.

Bats

- 4.4.9 The survey area represents potential roosting, foraging and commuting habitat for bats within the woodlands, hedgerows, residential buildings and barns. The scheme is likely to impact upon bat foraging areas and locations that may already be used for crossing the road, in addition there will be some habitat loss. It is not currently known if potential roosts will be affected by the proposed scheme.
- 4.4.10 It is recommended that a full suite of bat surveys be carried out to assess the use of the scheme site by bats. These should include transect surveys, commuting/crossing point surveys and the use of static detectors. Any potential roost sites should also be surveyed and assessed accordingly on receipt of the final scheme alignment.

Birds

- 4.4.11 The survey area contains suitable habitat for breeding and wintering birds. The scheme may affect breeding birds through the loss of habitat. It is recommended that breeding bird surveys be carried out within suitable habitat along the length of the final scheme alignment route in accordance with best practice guidelines.
- 4.4.12 There is also the potential for barn owls to be using the area for foraging and potential roosting or nesting. It is recommended that the desk study is updated with data from the Barn Owl Trust for records of roosting / nesting to determine the use of the wider area. It is also recommended that barn owl surveys be carried out to assess local buildings as roost / nest sites within 1.5 km either side of the proposed route option.

Herpetofauna

- 4.4.13 The survey area has potential to support amphibians and reptiles and six species have already been identified within close proximity to the site within the desk study. There is very limited potential for species that are afforded the highest level of protection such as great crested newts due to an absence of this species within Cornwall.
- 4.4.14 It is recommended that a reptile survey be carried out along the length of the site, concentrating on the areas offering the best habitat and those that may be affected by the proposed scheme. Surveys will be carried out in line with the DMRB guidelines using artificial refugia at a minimum density of 10 refugia per hectare. A minimum of five checks will be carried out to assess presence / absence during the optimum time periods in April – May and August – September. No further survey is recommended regarding amphibians.

Fish

- 4.4.15 The watercourses adjacent to the site have the potential to support protected species and link into important rivers such as the River Allen. It is recommended that aquatic surveys are undertaken to assess the use of the watercourses by important fish species.

Invertebrates

- 4.4.16 The survey area contains a number of important invertebrate species within the butterfly group. In

particular is the silver studded blue butterfly which is protected under Schedule 5 of the Wildlife and Countryside Act. It is recommended that surveys be carried out to assess the use of the heathlands along the final route option, if required targeted species surveys will then need to be carried out.

Invasive flora

4.4.17 The survey identified a number of areas with the presence of Schedule 9 plants such as Monbretia and Japanese knotweed. It is recommended that a full survey be carried out to identify the presence of such species along the proposed route and the within any areas of proposed earth works. Controls would then need to be taken in order to avoid the spread of the species.

4.4.18 The following table provides a summary of the Scheme survey requirements.

Table 5.1: Survey Requirements and Timings

Species	Survey	Timing
Targeted Phase 1 Habitat Survey	To be carried out in areas where further detailed information is required, for example due to lack of access or other limitations encountered during the Phase 1 Habitat Verification Survey.	Optimal period April – September inclusive.
Badger	Sett / Activity Survey	Ideally spring and autumn avoiding the peak growing season when vegetation growth may obscure signs and during the winter when activity is reduced.
Otter	Presence/Absence and potential resting sites.	Optimal period April – August inclusive.
Dormouse	Presence/absence.	Optimal period April – November inclusive.
Bat	Activity survey and roost surveys.	Optimal Period April – October inclusive (with emergence and re-entry surveys for summer roosts in structures June – August). Hibernation roost inspections November – March.
Bird	Breeding / wintering / barn owl surveys.	Breeding bird surveys mid February – July. Wintering bird surveys November – March. Barn owl surveys July – August.
Reptiles	Presence / Absence and population surveys.	Optimal Period March – September avoiding July – August.
Fish	Presence/Absence of notable species.	May – August.
Invertebrates	Presence/Absence of notable species.	April – August.
National Vegetation Classification	Grassland, heathland and woodland surveys.	May – August.

4.5 Conclusion

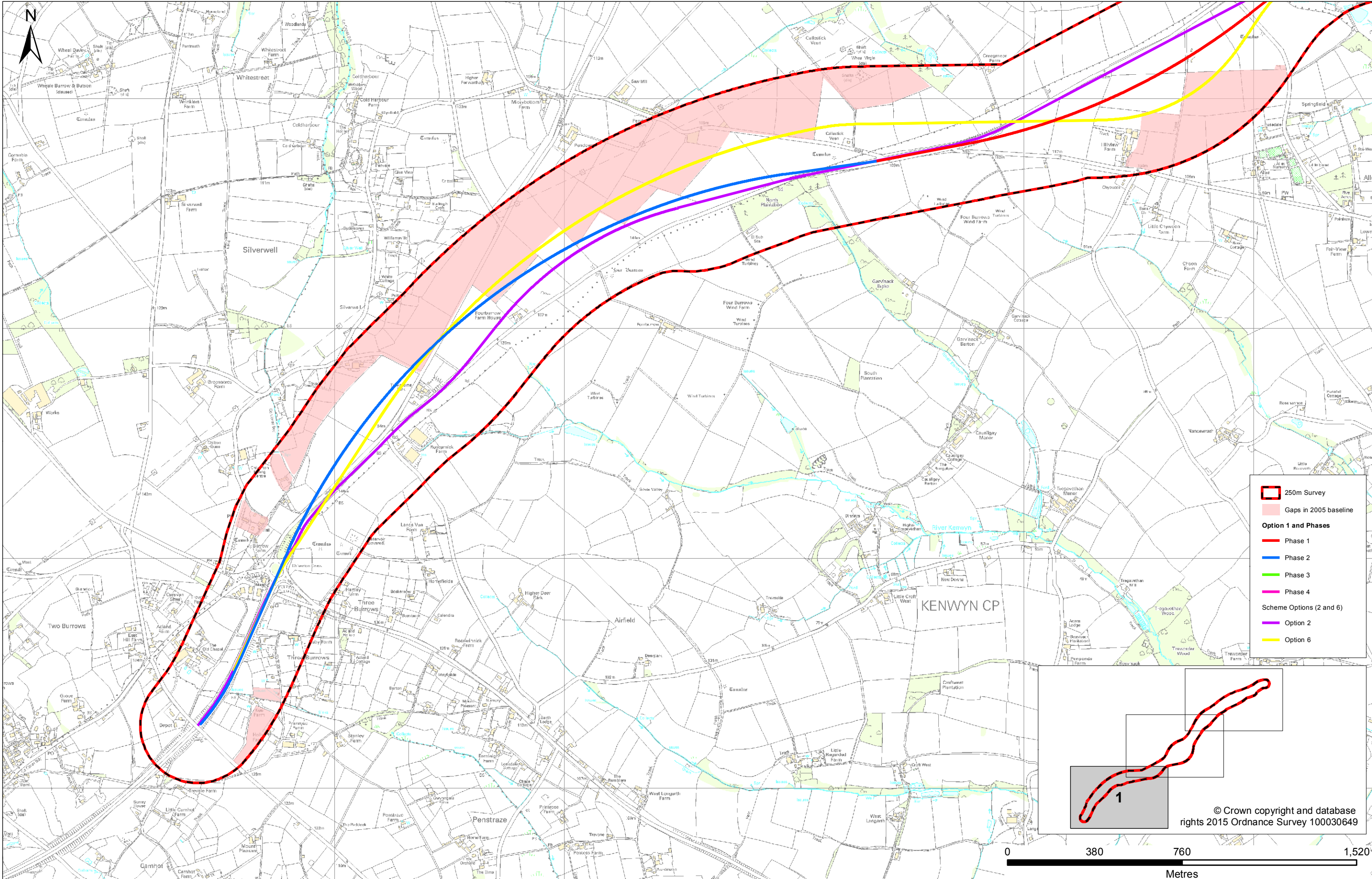
4.5.1 This report identified the area surrounding the proposed development as being suitable to support a wide range of habitats and fauna. A desk study and field survey was carried out to inform the

baseline conditions and update previous survey efforts.

- 4.5.2 The desk study identified one European designated site – the Newlyn Downs SAC, and four nationally designated SSSI sites. In addition 15 CWS and 4 CRVI were identified within the search area.
- 4.5.3 The desk study identified records for a number of species. Badger were recorded across the search area and included setts at Marazanvose and Carland Cross. Otter records identified road kill located on the A30 at Zelah and the Chybucca junction. A total of 12 bat species were identified, and roosts were noted at a variety of locations within the search area. Bird records identified 91 species and 16 Schedule 1 species, this included barn owl which was noted flying over the A30 at Marazanvose during previous surveys. All four common reptile species were identified along with amphibians such as common frog and common toad, and two fish species, the eel and bullhead. In addition numerous invertebrate and floral species were recorded.
- 4.5.4 The field survey identified numerous habitat types, however the area was predominantly arable farmland or pasture. The dominant habitat types were poor semi-improved grassland, improved grassland, arable, and hedgerows. Blocks of woodland were present, however were scattered in some areas.
- 4.5.5 The habitats present showed potential to support a variety of species such as badger, otter, bats, birds, dormice, reptiles and invertebrates.
- 4.5.6 The scheme design is not yet finalised but it is likely the widening scheme will cause.
- | Permanent habitat loss;
 - | Increased habitat fragmentation/severance;
 - | Increased animal road mortality/casualties;
 - | Increased habitat degradation as a result of increased dust levels or pollution caused by diesel fuel run off.
- 4.5.7 There is potential for the route to pass through a number of habitats of ecological value. The majority of habitat loss will be farmland and hedgerows with the potential for woodland, heathland and grassland to be affected.
- 4.5.8 It is recommended that further surveys are carried out for the following species groups to inform the scheme design including mitigation and compensation as necessary:
- | National Vegetation Classification;
 - | Badger;
 - | Otter;
 - | Dormice;
 - | Bats;
 - | Breeding birds;
 - | Reptiles;
 - | Fish;
 - | Invertebrates; and
 - | Invasive Flora.



- 4.5.9 A net gain in biodiversity should be sought in accordance with the Road Investment Strategy and there should be an emphasis on retaining a permeable landscape, minimising fragmentation and severance for the wildlife that is supported in the immediate surroundings.



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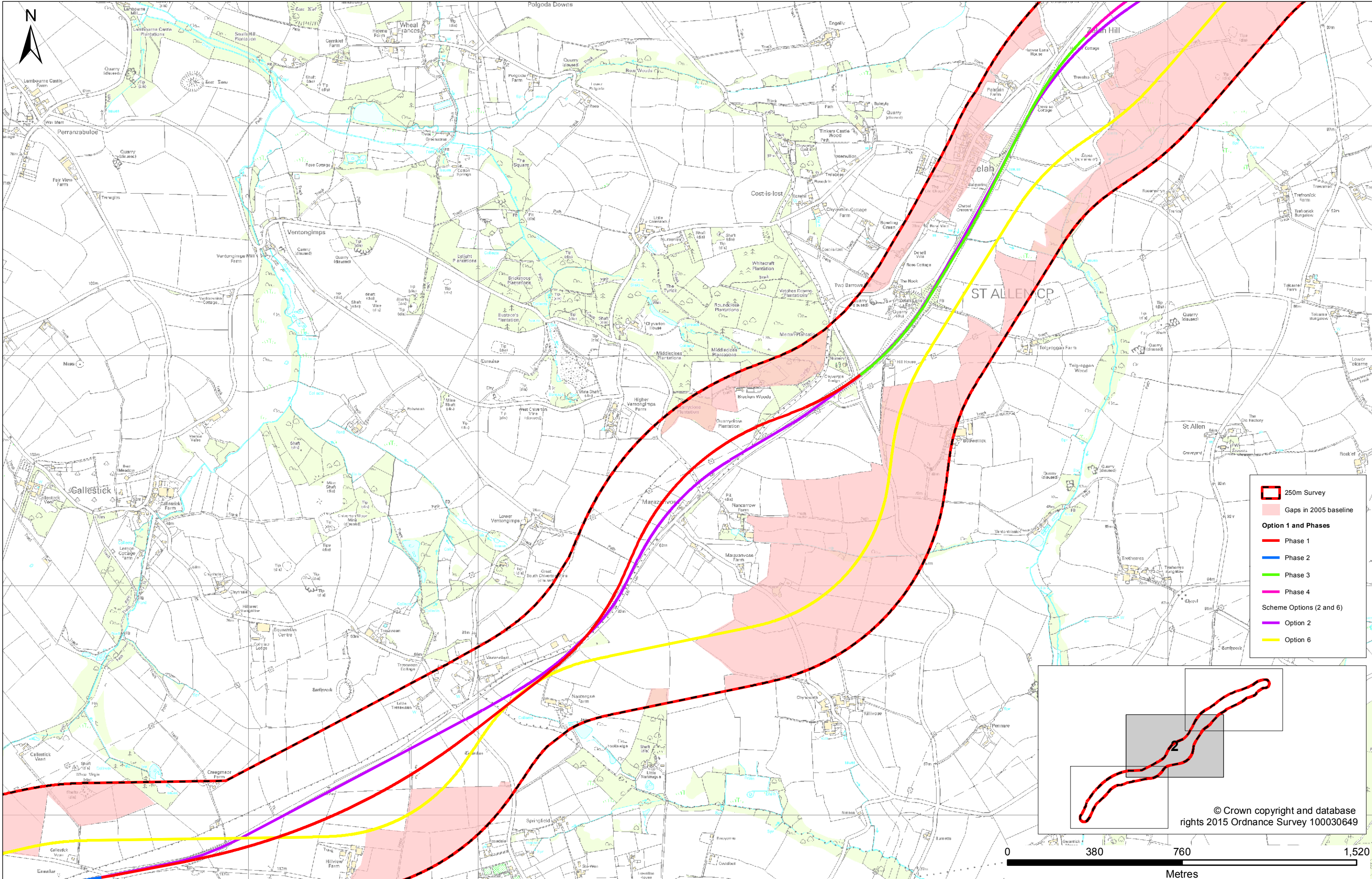
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SURVEY AREA AND
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PAGE 1 OF 3

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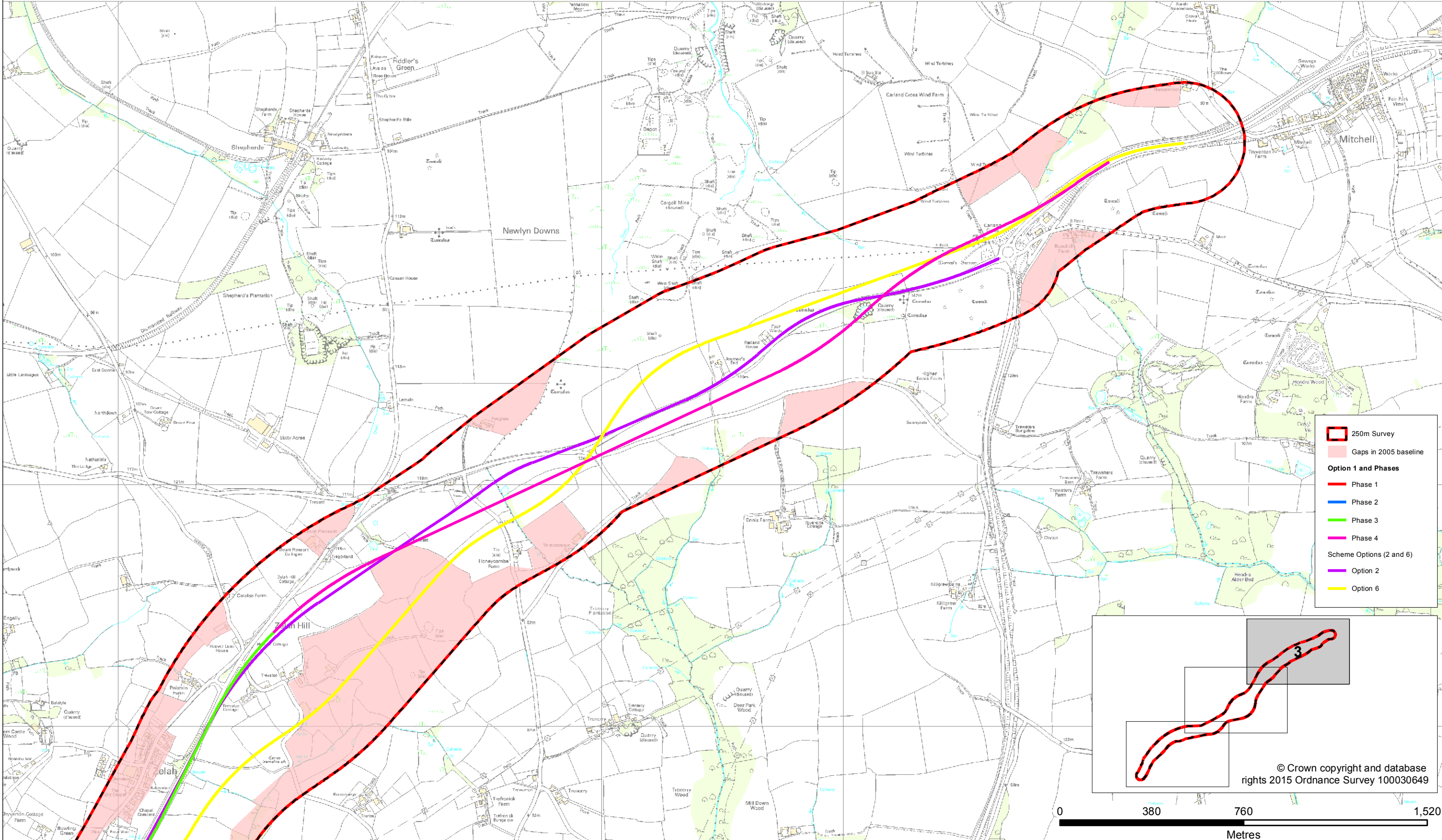
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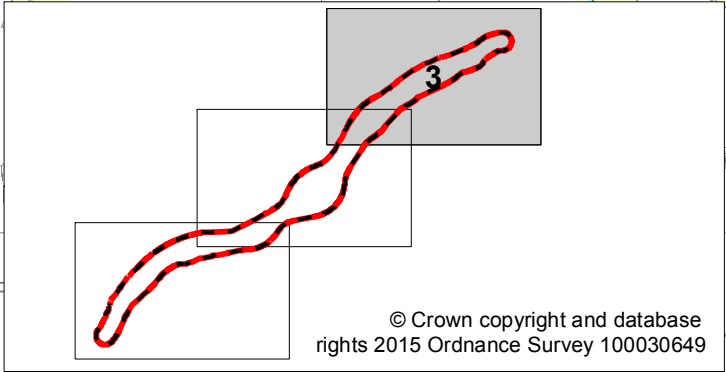
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SURVEY AREA AND
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- 250m Survey
- Gaps in 2005 baseline
- Option 1 and Phases
 - Phase 1
 - Phase 2
 - Phase 3
 - Phase 4
- Scheme Options (2 and 6)
 - Option 2
 - Option 6



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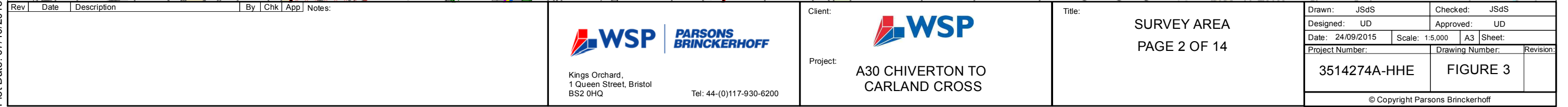
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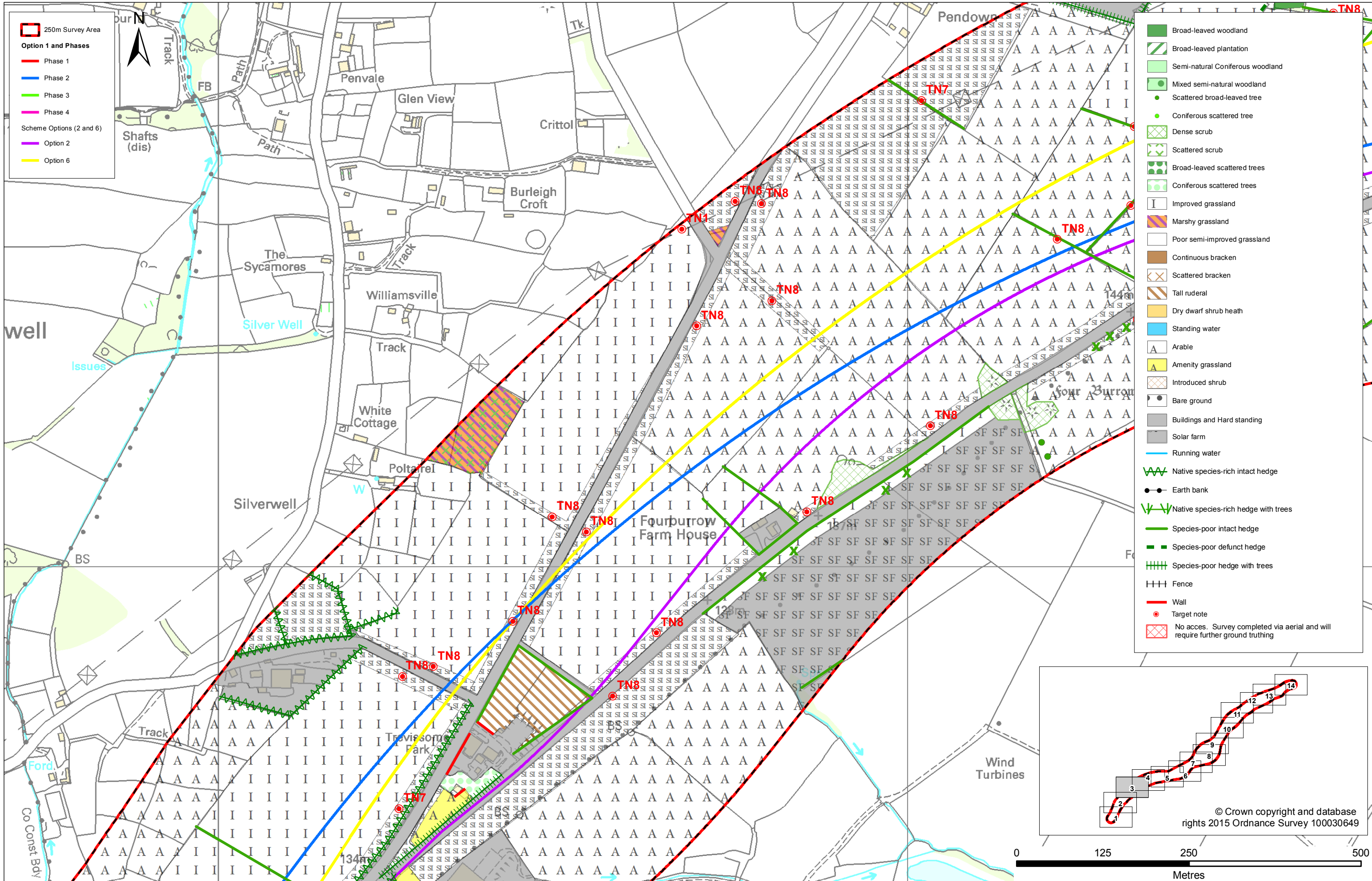
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**SURVEY AREA AND
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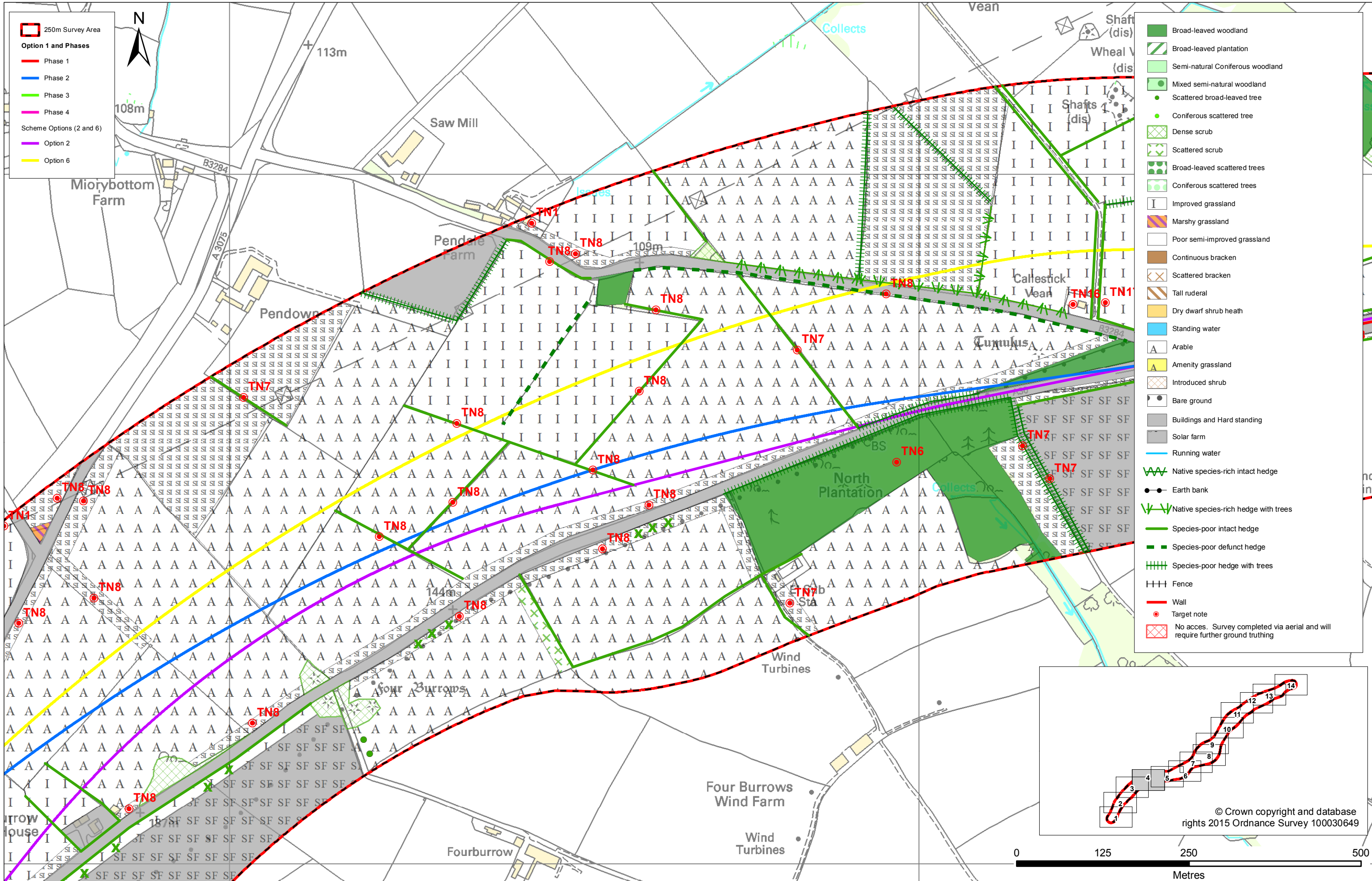
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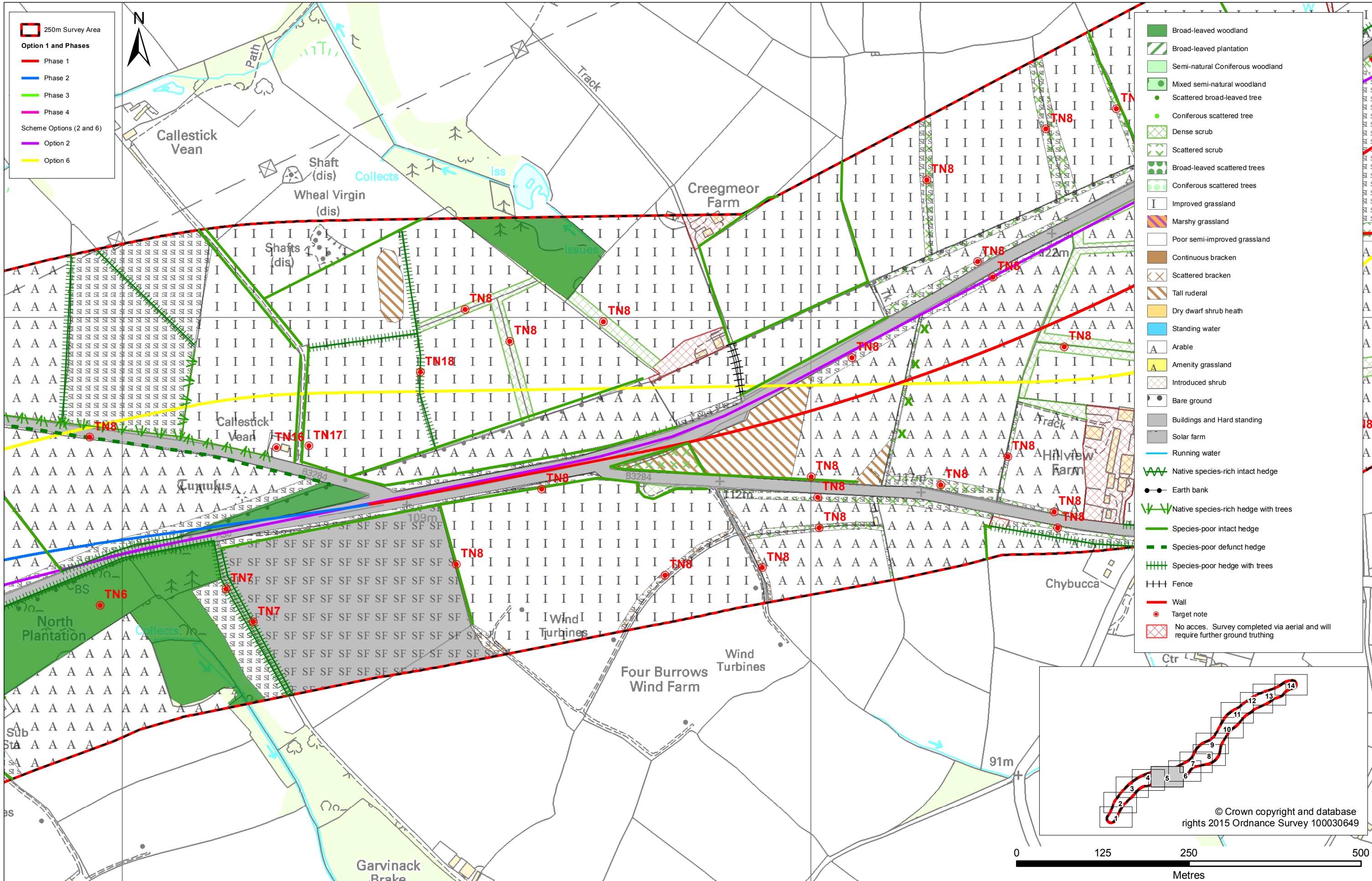
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SURVEY AREA
PAGE 4 OF 14

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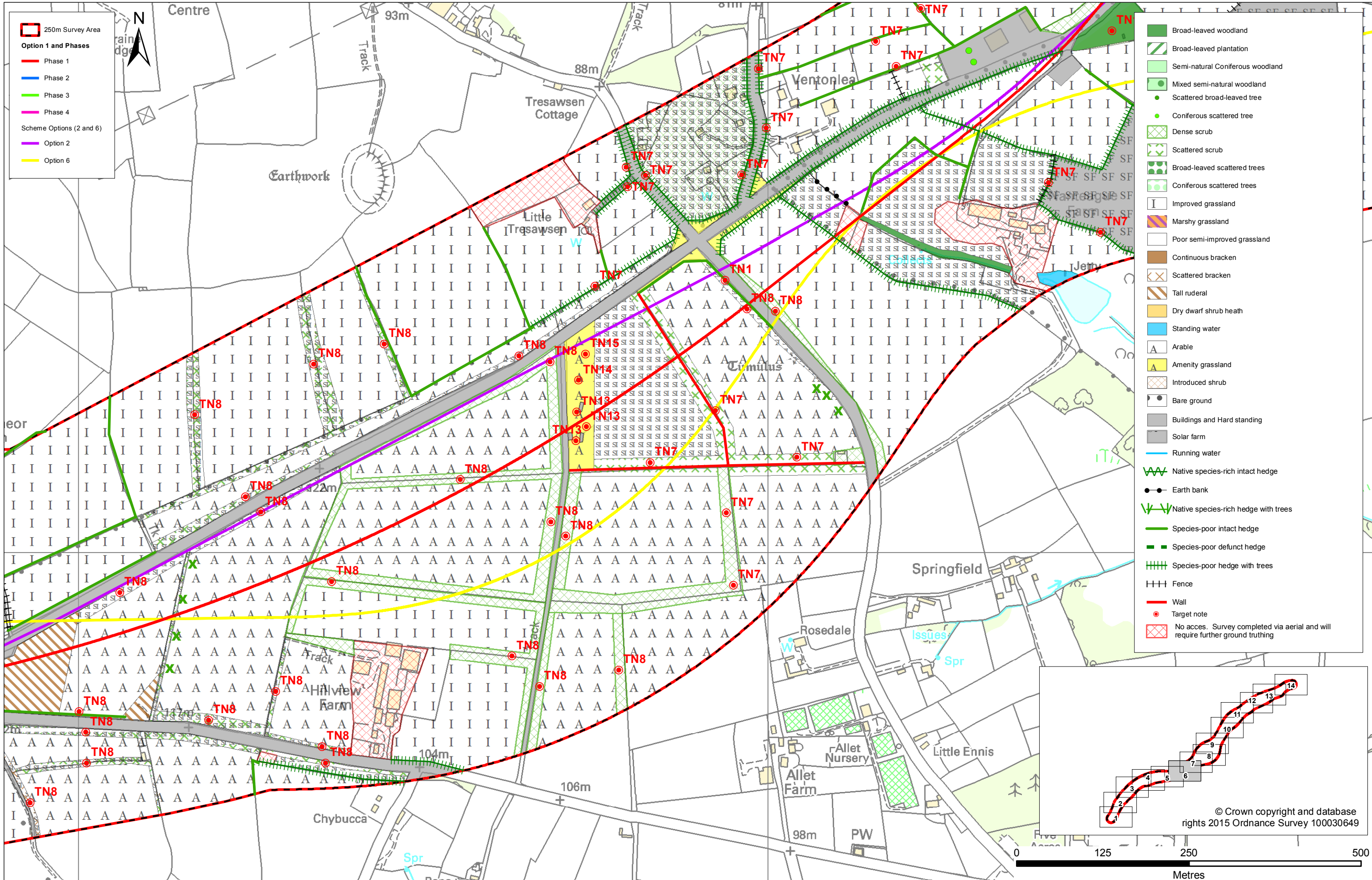
SURVEY AREA
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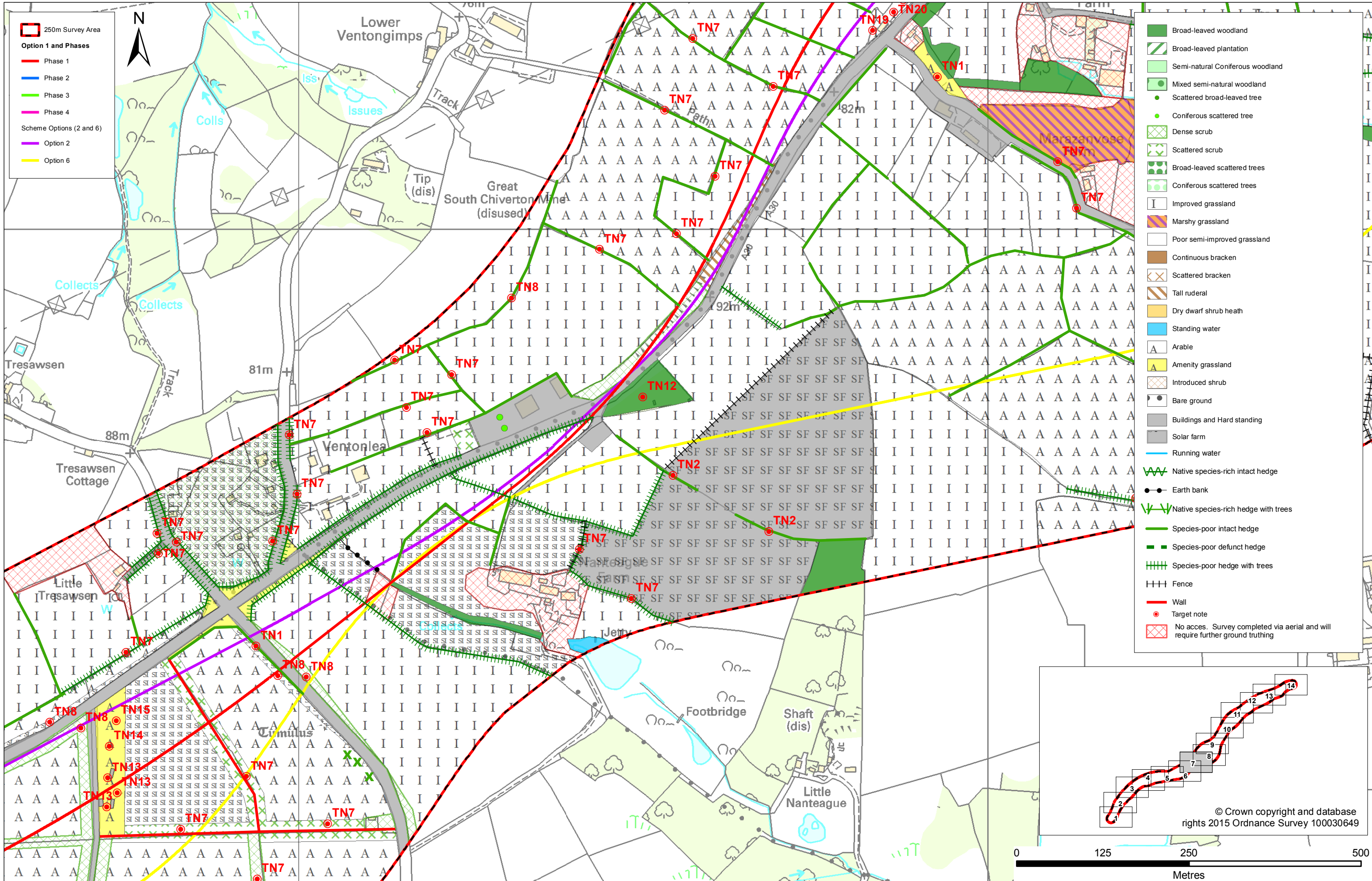
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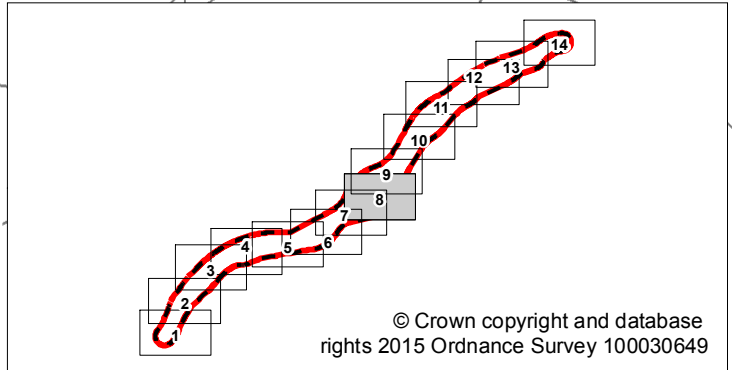
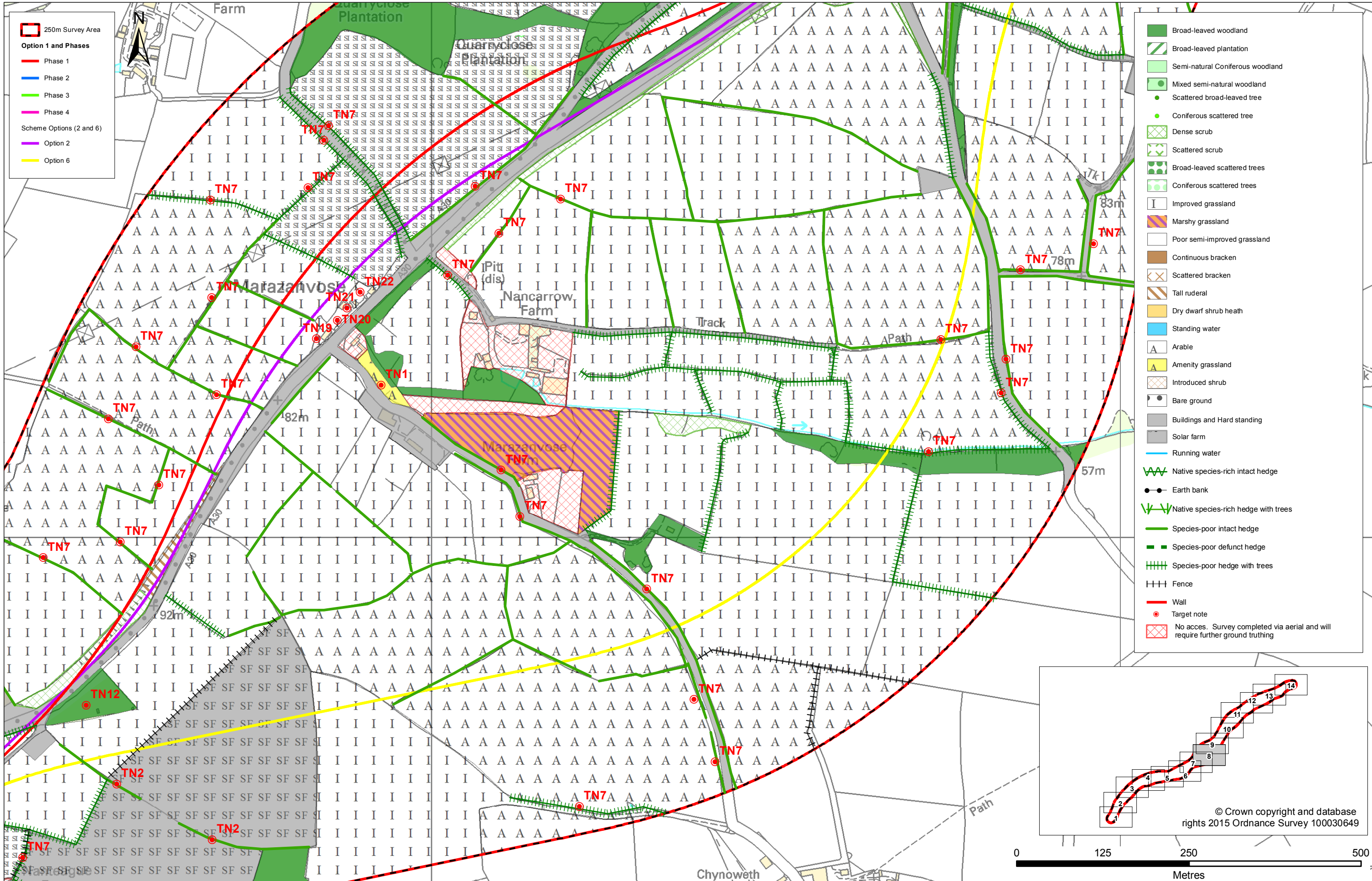
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							Kings Orchard, 1 Queen Street, Bristol BS2 0HQ		Project Number:		Date: 24/09/2015	Scale: 1:5,000
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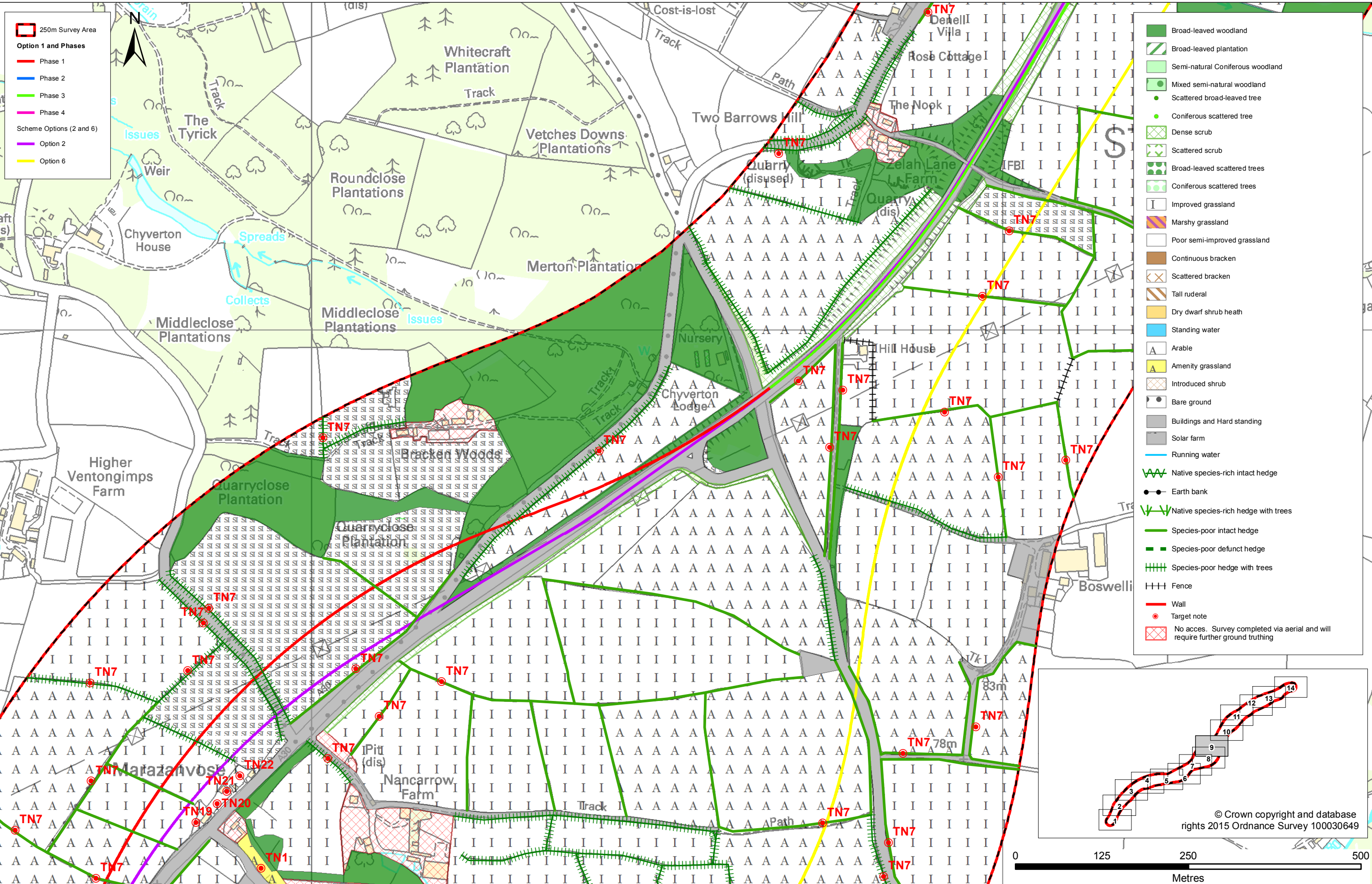
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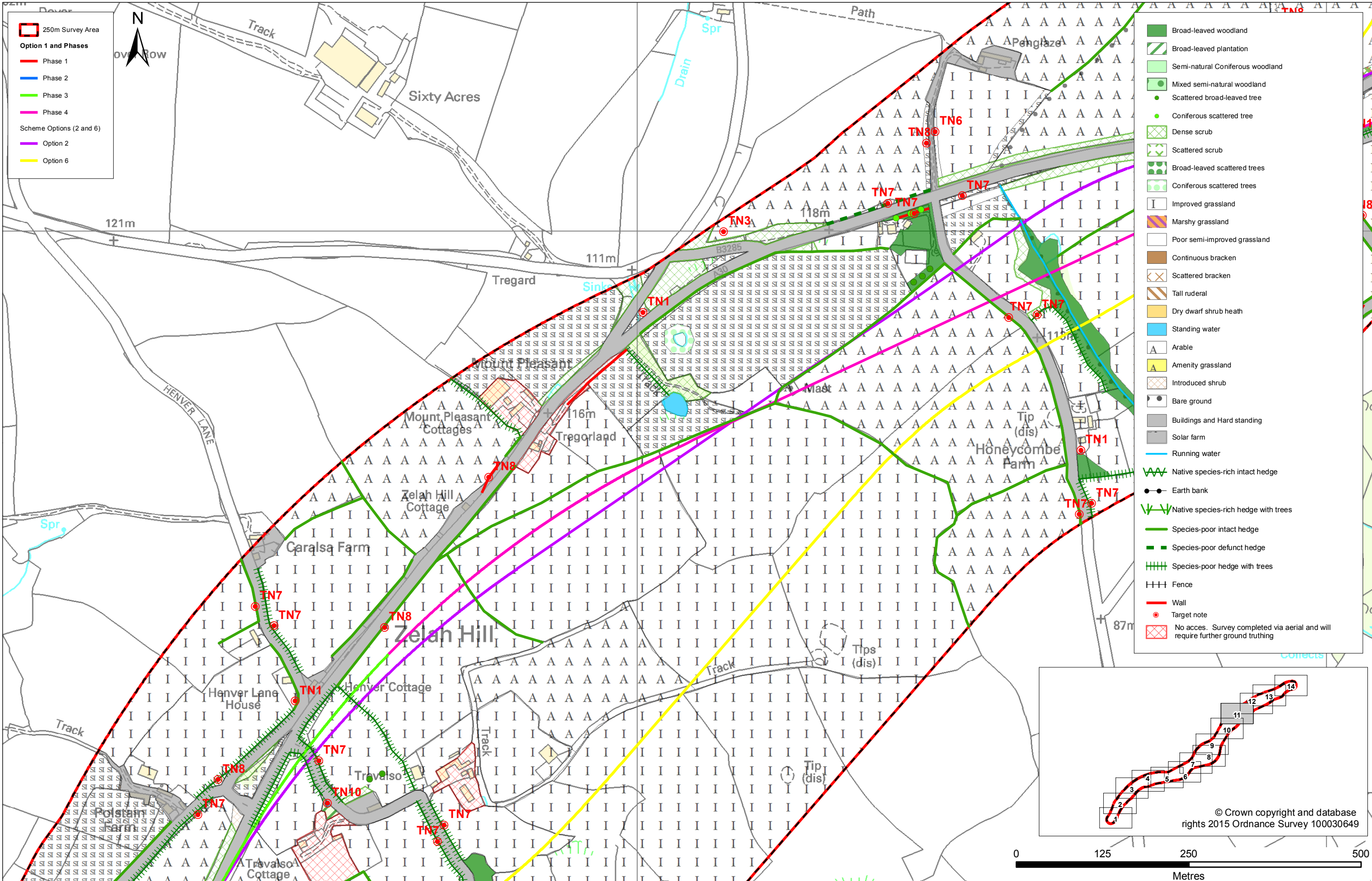
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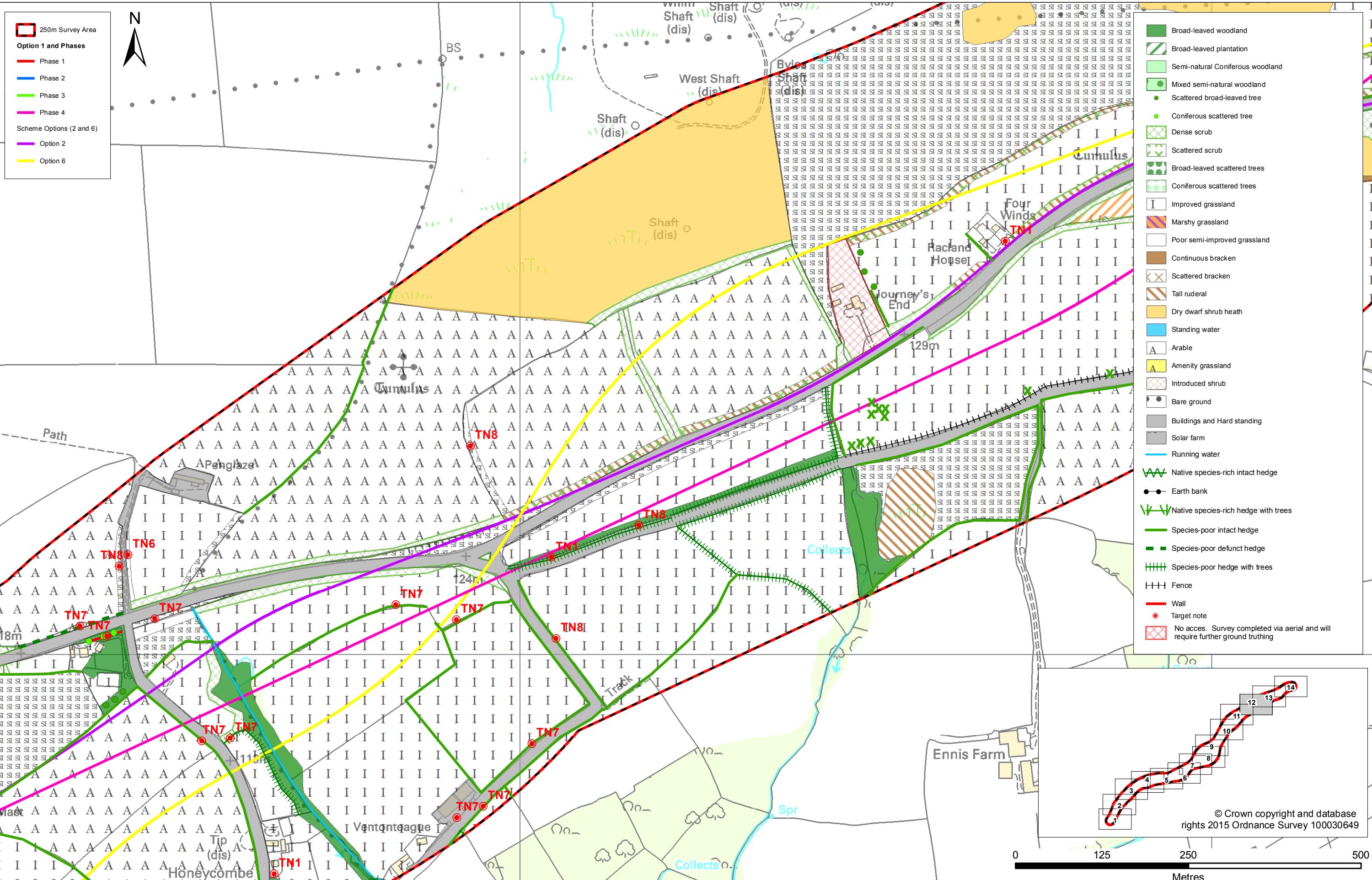
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Title: **SURVEY AREA**
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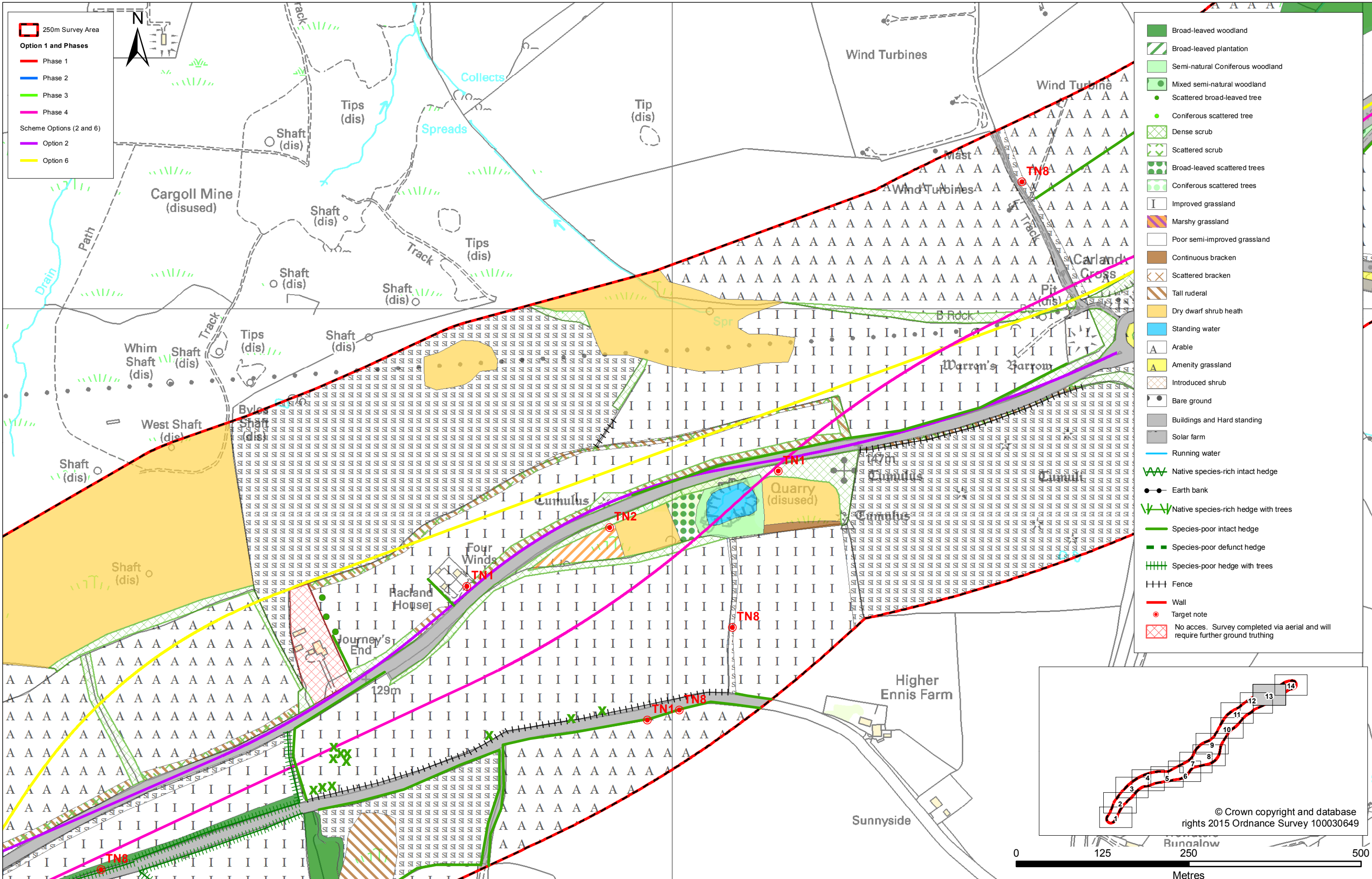
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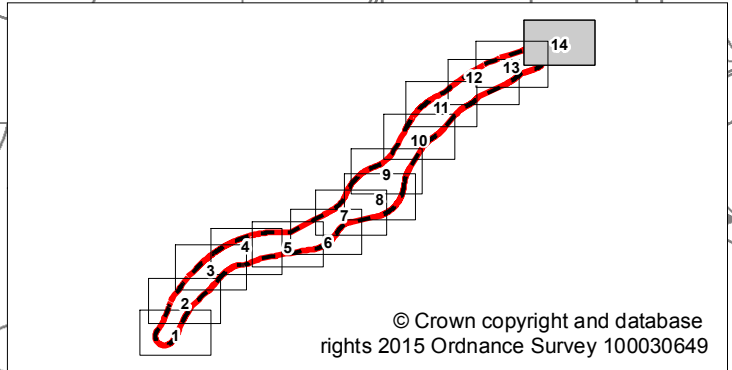
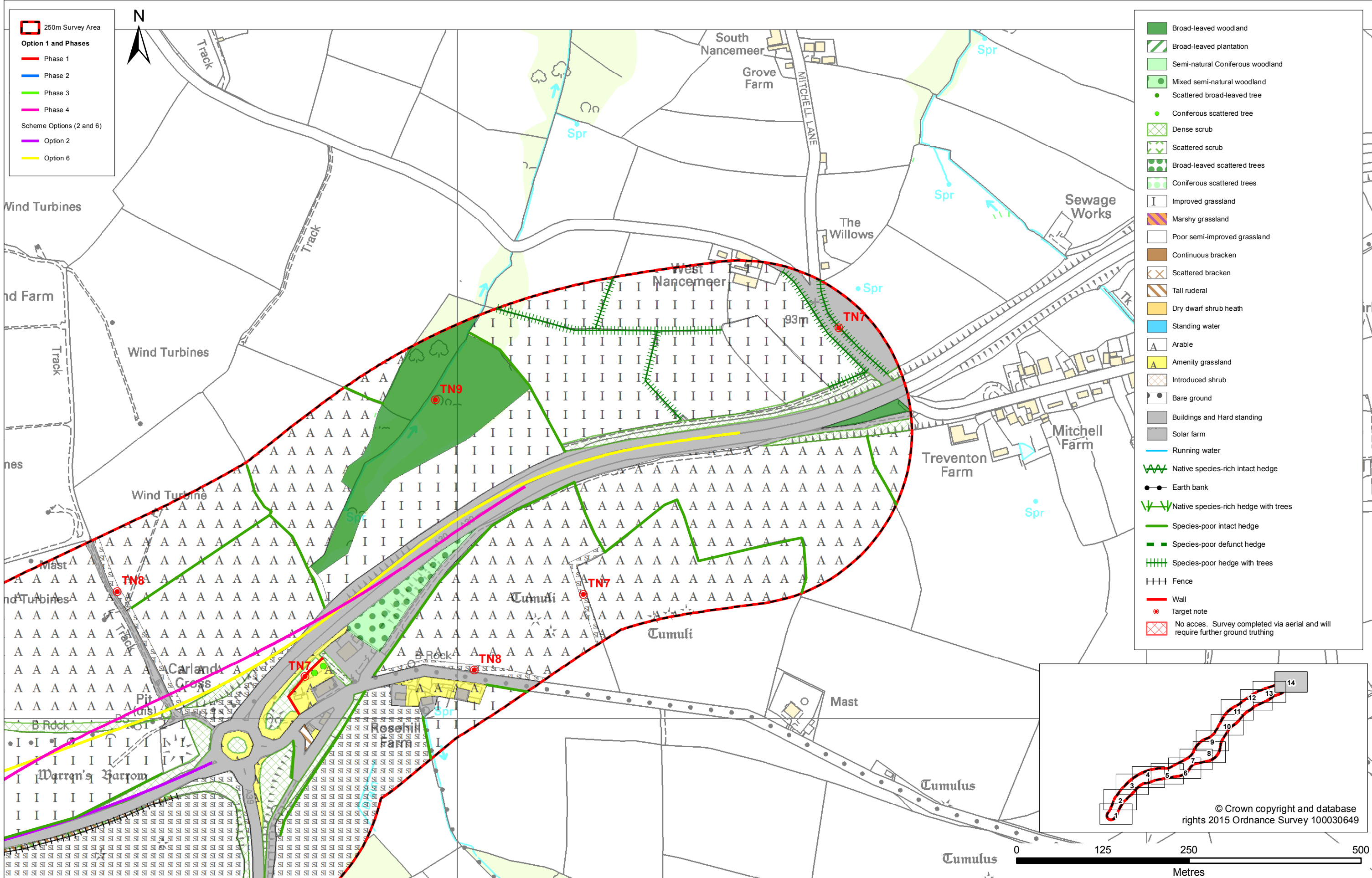
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