Appendix D2

Ornithological Assessment

A77 Maybole Bypass

Ornithological Assessment Report

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1.1. Project Overview

1.1.1. A Phase 1 habitat survey was undertaken between 23rd July and 20th September 2012, which identified good habitat for wintering and breeding birds throughout the scheme.

1.1.2. Therefore winter bird surveys were undertaken on the 11th, 12th and 17th of December 2012 and breeding bird surveys were undertaken on six occasions between March and May 2013. The study area extended 500m from the centreline of the proposed route. All surveys were conducted using methods of Bird Census Techniques (Bibby *et al*, 2000[1]).

1.1.3. The proposed bypass is located between National Grid Reference (NGR) NS 28848 09551 (south of Maybole) and NS 32137 12957(north of Maybole).

1.2. Site Description

1.2.1. Maybole is one of the five main Ayrshire towns which lie on the A77 trunk road. It is approximately 6km east of the coast and 11km south of Ayr. Residential areas of Maybole are located to the south of the western half of the study area. The landscape of the study area is dominated by open agricultural grassland with only minor areas of woodland present.

1.2.2. The proposed route is approximately 5.065km in length and ties into the existing A77 southwest of Maybole by means of a new 60m ICD (Inscribed Circular Diameter) roundabout, Broomknowes Roundabout. From here the route climbs steeply, maximum gradient 6 %, up the south flank of Gallow Hill, where it passes to the east of the summit close to the urban fringe of Maybole.

1.2.3. For details of the surrounding habitats reference should also be made to the Phase 1 Habitat Survey, Chapter 6 Ecology and Nature Conservation. In general there is broadleaved plantation woodland, coniferous woodland, improved grassland, marshy grassland, species-poor defunct hedgerows, scattered trees, amenity grassland and introduced shrub areas within the study area.

1.2.4. Figure 1 shows the location of the A77 Maybole bypass and Figure 2 shows the design of the new bypass.

[1] Bibby, C.J., Burgess, N.D., Hill, D.A., and Mustoe, S.H. (2000). *Bird Census Techniques*, 2nd.ed.Academic Press. London.

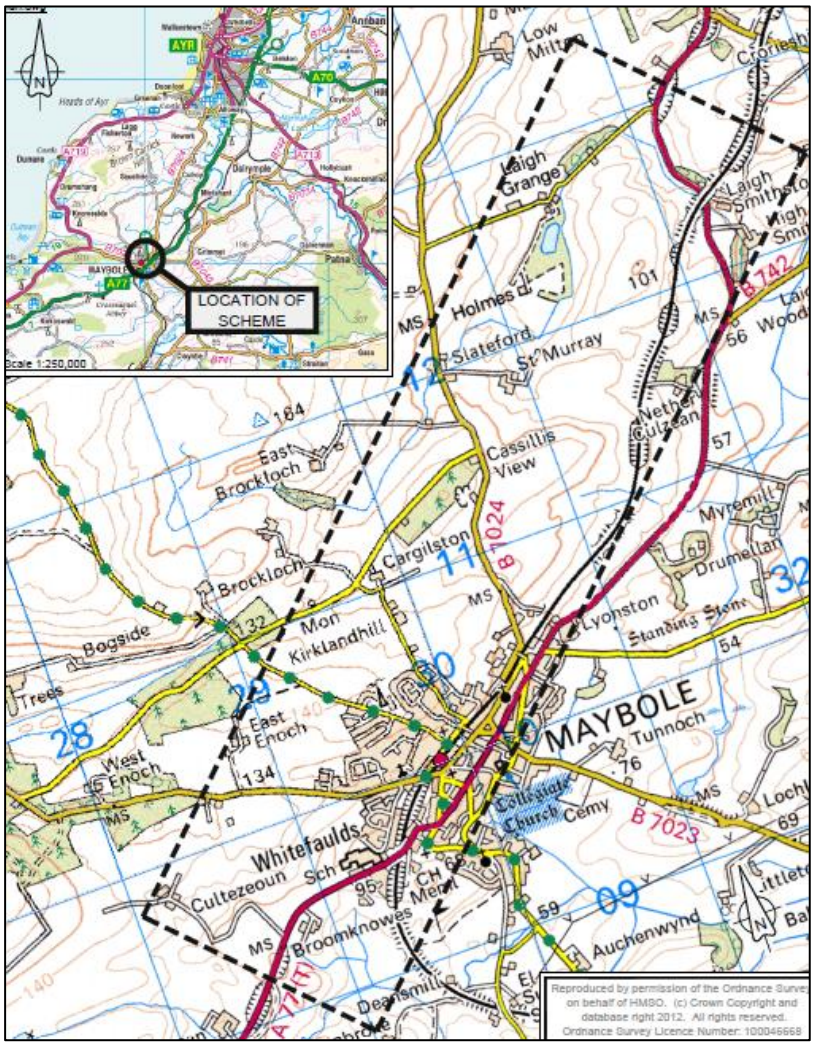


Figure 1: Site Location

Figure 2: Route of the new bypass

2. Conservation Status

2.1. Policies

The UK Biodiversity Action Plan (1994)

2.1.1. The world-wide aim of conserving biodiversity began at the 'Earth Summit' in Rio de Janeiro in 1992 where the Convention on Biological Diversity was one of the initiatives. At the Rio summit, the UK was one of 150 governments to sign up to the convention. To achieve its commitment the UK government published the UK Biodiversity Action Plan (UKBAP) in 1994.

The Scottish Biodiversity Strategy (2004)

2.1.2. In Scotland the Scottish Biodiversity Forum was set up to translate the UKBAP into specific action plans for Scotland. The forum has produced 'Scotland's Biodiversity – It's in Your Hands', a strategy for the conservation and enhancement of biodiversity in Scotland. The strategy maps out a 25 year framework for action to conserve and enhance biodiversity for the health, enjoyment and well-being of all the people of Scotland.

The Scottish Biodiversity List (2005)

2.1.3. The Scottish Biodiversity List is a list of animals, plants and habitats that are considered to be of principal importance for biodiversity conservation in Scotland. The list was published in 2005 to satisfy the requirement under the Nature Conservation (Scotland) Act 2004.

Ayrshire Biodiversity Action Plan (2007-2010)

2.1.4. The first Ayrshire Local Biodiversity Action Plan (LBAP) was completed in 2001 and covered an action plan for 2001-2005. The original Ayrshire LBAP included 26 Habitat Action Plans and 11 Species Action Plans. Since the original Ayrshire LBAP, The Scottish Biodiversity Strategy and Scottish Biodiversity List implementation has seen the need for the Ayrshire Plan to undergo a revision. The Ayrshire Biodiversity Action Plan was completed in 2007.

2.1.5. Under the Ayrshire Biodiversity Action Plan there is a Species Action Plan in place for farmland birds.

2.2. Birds of Conservation Concern (BoCC)

2.2.1. The leading governmental and non-governmental conservation organisations in the UK reviewed the population status of the birds that are regularly found here. 246 species of birds were assessed and each placed on one of three lists – red, amber or green. There are 52 species on the red list, 126 on the amber list and a further 68 species are green listed. The criteria used to assess the status reflect each species' global conservation status, European conservation status and the status within the UK. It also measures the importance of the UK population in international terms (Brown *et al*, 2009[2]).

[2] Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) *Birds of Conservation Concern 3*: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 102, pp296-341.

2.3. Legislation

2.3.1. In Scotland, all birds, their nests and eggs are protected under the Wildlife and Countryside Act 1981 (as amended). With certain exceptions it is an offence to intentionally or recklessly:

- kill, injure or take any wild bird
- take, damage, destroy or interfere with a nest of any wild bird whilst it is in use or being built (or at any time for a nest habitually used by any bird listed in Schedule A1);
- obstruct or prevent any wild bird from using its nest;
- take or destroy an egg of any wild bird;
- disturb any wild bird listed on Schedule 1 whilst it is building a nest or is in, on, or near a nest containing eggs or young, or whilst lekking;
- disturb the dependent young of any wild bird listed on Schedule 1;
- harass any wild bird listed on Schedule 1A

2.3.2. Certain birds listed on Schedules of the Wildlife and Countryside Act 1981 (as amended) are afforded extra protection.

3. Methodology

3.1. Desk Study

3.1.1. The DMRB Stage 2 Environmental Assessment previously undertaken by Atkins in 2007[3] was consulted for information gathered about bird activity within the area surrounding the proposed options.

3.1.2. The National Biodiversity Network (NBN) Gateway website[4] provides a collation of species records from a range of record centres and conservation organisations. A search was carried out on the NBN Gateway website to establish bird species likely to occur in the area. A search for species in the 10km grid squares of NS20, NS21, NS30 and NS31 was undertaken (NBN, 2012).

3.1.3. The following organisations were consulted in May 2013:

- Royal Society for the Protection of Birds (RSPB)
- British Trust for Ornithology (BTO)
- Scottish Ornithologist
- SNH/SWT

3.2. Field Survey

3.2.1. A Phase 1 habitat survey was undertaken between 23rd July and 20th September 2012, which identified good habitat for wintering and breeding birds within the survey area. The survey area extended 500m from the centreline of the proposed new route. The proposed route lies to the north of Maybole, South Ayrshire. Starting at the approximate co-ordinates: 228873, 609500 on the A77 south of Maybole, the centreline of the proposed route extends north east through arable fields and hedgerows. The proposed centreline of the route re-joins the A77, north of Maybole, at the approximate co-ordinates: 232147, 612962.

[3] Atkins (2007), A77 Maybole Transport Study – DMRB Stage 2 Report.

[4] National Biodiversity Network (2013), Species groups recorded in the 10km Grid Square NS20, NS21, NS30 and NS31, Available from: http://data.nbn.org.uk/ [Accessed21/05/13].

3.2.2. The survey area was divided into four sections for the winter and breeding bird surveys. Section 1 extended from where the proposed route joins the existing A77 at the south of Maybole at approximate co-ordinates: 228873, 609500 to where the proposed route crosses Garden Rose Path at approximate co-ordinates: 229429, 610510. Section 2 extended from where the proposed route crosses Garden Rose Path at approximate co-ordinates: 229429, 610510 to where the proposed route crosses the B7024 Alloway Road at approximate co-ordinates: 230461, 610853. Section 3 extended from where the proposed route crosses the B7024 Alloway Road at approximate co-ordinates: 230461, 610853 to where the route passes through a hedgerow at approximate co-ordinates: 231408, 611597. Section 4 extended from approximate co-ordinates: 231408, 611597 to where the proposed route joins the existing A77 north of Maybole at approximate co-ordinates: 232122, 612969.

Winter Bird Survey

3.2.3. The objectives of the study were to gain an understanding of the diversity of the bird species present within the survey area during winter months.

3.2.4. The winter bird surveys were carried out by Amey ecologist Gavin Boyd on 11th, 12th and 17th December 2012.

3.2.5. The surveys were conducted using walked transects of the proposed route adapted from methods of Bird Census Techniques (Bibby *et al*, 2000). The weather conditions during the surveys were good on the three days, with details of the weather conditions and survey timings shown in Table 1, below.

Table 1: Winter Bird Survey – Weather conditions and Survey Timings

Date	Time	Cloud Cover	Rain	Wind	Visibility
11/12/12	10:00 – 15:00	0-33%	None	No Wind	Excellent
12/12/12	10:00 – 15:00	33-66%	None	No Wind	Excellent
17/12/12	10:00 – 15:00	33-66%	None	No Wind	Good

Breeding Bird Survey

3.2.6. The objectives of the survey were to gain an understanding of the diversity of the bird species present in the habitats along the proposed route, provide estimates of breeding populations and the presence of Schedule 1 species within the survey area.

3.2.7. Breeding bird territories were mapped using standard methodologies (Bibby *et al* 2000). The survey area was walked slowly with all bird species seen and heard in the field recorded electronically using a 'Go-book', Global Positioning System (GPS) and Arc pad Geographic Information System (GIS) software. Details of the movements and activities of the birds were noted where appropriate.

3.2.8. Activities included displaying or singing, territorial disputes, alarm calling, adults carrying food and nest material, recently fledged young with adults and nests.

3.2.9. Bird species seen and heard during preceding and subsequent visits to the site for other ecological surveys were also noted.

3.2.10. Six visits to the site were undertaken. Early visits were carried out on 20th, 21st and 29th March 2013 for early nesting species. Later visits were undertaken on 13th, 15th and 16th May 2013 to take account of migrant species. The breeding bird surveys were carried out by Amey ecologist Gavin Boyd.

3.2.11. The surveys were conducted during varying weather conditions, with details of the weather conditions shown in Table 2, below.

Table 2: Breeding Bird Survey – Weather conditions and Survey Timings

Date	Time	Cloud Cover	Rain	Wind	Visibility
20/03/13	06:00 – 11:00	33-66%	None	Slight Breeze	Moderate
21/03/13	06:00 – 11:00	0-33%	None	Slight Breeze	Good
29/03/13	06:00 – 11:00	33-66%	None	Slight Breeze	Good
13/05/13	04:45 – 10:00	66-100%	Drizzle	Moderate Wind	Good
15/05/13	04:45 – 10:00	0-33%	None	Slight Breeze	Good
16/05/13	04:45 – 10:00	0-33%	None	None	Excellent

3.3. Survey Limitations

3.3.1. Weather conditions were not optimal on all surveys, which may have impacted the activity of certain species.

3.3.2. Certain species may have been missed due to human error.

3.4. Ornithological Site Evaluation

3.4.1. The areas within the sections are evaluated for their ornithological importance using the criteria laid out in Table 3, below. The table was derived from the Institute of Ecology and Environmental Management (IEEM) guidance for ecological evaluation and impact assessment (IEEM, 2000) and IEEM Guidelines for Ecological Impact Assessment in the United Kingdom (IEEM, 2006).

Table 3: Site Evaluation	
Ornithological Value	**Examples of Evaluation Criteria**
International	A species which is part of the cited interest of an Special Protection Area (SPA) , Special Area of Conservation (SAC) or Ramsar site and which regularly occurs in internationally or nationally important numbers A species present in internationally important number (>1% of international population)
National	A species which is part of the cited interest of a Site of Special Scientific Interest (SSSI) and which regularly occurs in nationally or regionally important numbers A nationally important assemblage of breeding or over-wintering species A species present in nationally important numbers (>1% UK population). Rare breeding species (<300 pairs in the UK).
Regional	Species listed as priority species in the UKBAP, which are not covered above, and which regularly occurs in regionally important numbers. Species present in regionally important numbers (>1% of regional population). Sustainable populations of species which are rare or scarce within a region. Species on the BoCC Red list and which regularly occurs in regionally important numbers.
County	Species listed as priority species in the UKBAP, which are not covered above, and which regularly occur in county important numbers (>1% of county population). Species present in county important numbers (>1% of county population). Sustainable populations of species which are scarce within a county, or listed in a county BAP. A site designated for its county important assemblage of birds (e.g. a Site of Local Nature Conservation Importance (SLNCI)). Species on the BoCC Red list and which regularly occur in county important numbers.
District	Species listed as priority in UKBAP, which are not covered above, and are rare in the locality. Species present in numbers just short of county importance. Sustainable populations of species which are rare or scarce within the locality. A site whose designation falls just short for inclusion for its county important assemblage of birds (e.g. a SLNCI site). Other species on the BoCC Red list and which are considered to regularly occur in district important numbers.

Table 3: Site Evaluation	
Ornithological Value	**Examples of Evaluation Criteria**
Local	Other species of conservation interest (e.g. all other species on the BoCC Red and Amber list and UKBAP which are not covered above) regularly occurring in locally sustainable populations.
Site	All other common and widespread species.

4. Results

4.1. Desk Study

4.1.1. As part of the DMRB Stage 2 Environmental Assessment a Phase 1 habitat survey was undertaken in 2007. Bird species recorded during the Phase 1 habitat survey were: blackbird *Turdus merula,* blue tit *Cyanistes caeruleus,* bullfinch *Pyrrhula pyrrhula* ,buzzard *Buteo buteo,* carrion crow *Corvus corone*, chaffinch *Fringilla coelebs*, fieldfare *Turdus pilaris,* goldcrest *Regulus regulus*, goldfinch *Carduelis carduelis*, great spotted woodpecker *Dendrocopos major*, green woodpecker *Picus viridis*, grey heron *Ardea cinerea*, house martin *Delichon urbica*, house sparrow *Passer domesticus,* jay *Garrulus glandarius*, kestrel *Falco tinnunculus*, lapwing *Vanellus vanellus*, linnet *Carduelis cannabina*, meadow pipit *Anthus pratensis*, peregrine falcon *Falco peregrinus*, pheasant *Phasianus colchicus,* redwing *Turdus iliacus*, reed bunting *Emberiza schoeniclus*, robin *Erithacus rubecula*, sand martin *Riparia riparia*, sedge warbler *Acrocephalus schoenobaenus*, skylark *Alauda arvensis,* snipe *Gallinago gallinago*, song thrush *Turdus philomelos*, swallow *Hirundo rustica*, treecreeper *Certhia familiaris*, whitethroat *Sylvia communis*, willow warbler *Phylloscopus trochilus*, woodpigeon *Columba palumbus* and yellowhammer *Emberiza citronella.*

4.1.2. The search on the NBN Gateway website showed that the following notable bird species were recorded in the 10km grid squares NS20, NS21, NS30 and NS31: barn owl *Tyto alba*, waxwing *Bombycilla garrulus*, kingfisher *Alcedo atthis*, starling *Sturnus vulgaris*, linnet, tree sparrow, brambling *Fringilla montifringilla* and corncrake *Crex crex.*

4.1.3. The RSPB, BTO, SOC and Raptor Study Group were consulted in May 2013; however at the time of writing the report no feedback was received.

4.2. Field Survey

Winter Bird Survey

4.2.1. A list of the bird species recorded during the winter bird survey can be found in Appendix A. A total of 31 different bird species were recorded during the winter bird survey conducted in December 2012. Rook *Corvus frugilegus*, woodpigeon and the BoCC red listed and UKBAP species starling were the most abundant species recorded across the study area during the survey.

4.2.2. Two Wildlife and Countryside Act 1981 (as amended) Schedule 1 species were recorded during the survey in December 2012. These species were fieldfare and redwing. A total of 57 fieldfare and 34 redwing were recorded. Flocks of redwing, fieldfare, mistle thrush *Turdus viscivorus* and starling were recorded foraging on the fields and along the hedgerows throughout section 1 of the study area. These species were not recorded in the arable fields in the northern sections of the study area.

4.2.3. Flocks of finches including chaffinches, linnets, greenfinches and goldfinches were recorded in the study area. The hedgerows, arable fields and seed-providing areas of tall ruderal species around the field margins are an ideal foraging area for finches. Finch species were most abundant in sections 1 and 4 of the study area.

4.2.4. A solitary waxwing was recorded at co-ordinates: 229908, 610517, during the survey. The waxwing was observed foraging along a hawthorn hedgerow, south of the proposed route. Waxwing are occasional winter migrants to Scotland and their numbers can vary dramatically from year to year.

4.2.5. It is considered that the hawthorn hedgerows throughout the study area are an essential food source for winter resident species such as chaffinch, great tit, blue tit, linnet, starling, mistle thrush and the song thrush. The hedgerows and open fields are ideal foraging areas for winter migrants such as fieldfare, redwing and waxwing. Although no brambling were recorded in the flocks of finches it is considered that the habitats present would be ideal for this Schedule 1 species during the winter months.

4.2.6. The arable stubble in the northern sections of the study area provide good habitat for grazing geese. Greylag geese were recorded flying over the site and patches of geese droppings were recorded within the arable stubble at a number of locations.

4.2.7. Corvids and woodpigeons are abundant throughout the study area.

Breeding Bird Survey

4.2.8. A list of the bird species recorded during the breeding bird survey can be found in Appendix A. A total of 42 different bird species were recorded during the breeding bird surveys conducted between March and May 2013. The herring gull, skylark, song thrush, starling, house sparrow, linnet, yellowhammer, fieldfare and tree sparrow are all on the BoCC red list. The sky lark, linnet, herring gull, yellowhammer, house sparrow, tree sparrow, starling and song thrush are UK BAP species.

4.2.9. The most abundant species recorded were the chaffinch, meadow pipit and yellowhammer. Moderate numbers of blackbird, robin, dunnock and wren were recorded. Other species were recorded in relatively low numbers. Areas of rough grassland provide a suitable habitat for ground nesting species such as the meadow pipit, with hedgerows and patches of woodland providing nesting sites for other species. A rookery was identified in section 4, at coordinates 231752, 611530.

4.2.10. The following migrant breeders were identified; wheatear, sedge warbler, willow warbler, house martin and the swallow. The house martin and swallow were present in the highest number, possibly due to the number of nesting opportunities on the surrounding buildings.

4.2.11. Nests of the following species were identified: wood pigeon, carrion crow and meadow pipit. Other breeding/territorial signs included species singing and male and females together. Figure 2 shows the meadow pipit's nest within rough grassland (coordinates 230514, 610878).

Figure 3: Meadow pipits nest

4.2.12. Owl nest boxes were identified at coordinates 230482, 610674. No owl pellets were identified beneath the owl boxes during the surveys; however a possible owl pellet was identified in a field at coordinates 231754, 611958. Although no activity was noted at the owl boxes, they may still be present in the area. See Figure 3 and 4 for details.

Figure 4: Owl nest box

Figure 5: Owl pellet

5. Site Evaluation

5.1.1. Using the criteria set out in Table 3: Site Evaluation, the site is considered to be of district importance as a total of 51 different bird species were recorded between the winter and breeding bird surveys. Of the recorded bird species 11 are BoCC red list species (10 are also UK BAP protected species). Two Wildlife and Countryside Act 1981 (as amended) Schedule 1 species were recorded during the winter bird survey.

5.1.2. The most abundant species recorded during the breeding bird survey were the chaffinch, meadow pipit and yellowhammer. The yellowhammer population is significant due to their red conservation status. A rookery was identified in section 4 highlighting a strong population of corvids. The most abundant species in the winter survey were rooks, starling, woodpigeon, skylark, greylag geese, fieldfare and chaffinch. The fieldfare population is significant due to their red conservation status.

5.1.3. The surrounding habitat is suitable for barn owls due to the presence of open grassland/arable land for feeding and only small areas of woodland. This suitability is confirmed by the Barn Owl Trust's website[5]. The presence of nest boxes and pellets suggests that they are present. Barn owls are a schedule 1 species and are BoCC amber listed.

5.1.4. Evaluation of ornithological value of the bird survey data was carried out using the criteria based on the legal protection status of bird species and bird habitats. Table 4 summarises the areas of ornithological importance within each section. Drawings of the four survey areas are located within Appendix B.

Table 4: Ornithological Importance

Section	Low	Medium	High
1	0.5	0	4
2	0.5	1.5	0
3	0	0.5	0
4	0	3	0

5.1.5. There is a diversity of habitats present which provide support for numerous species. Those habitats which are suitable for birds include arable land, buildings, woodland, scrub, species rich hedges and rough grassland.

[5] The Barn Owl Trust http://www.barnowltrust.org.uk/infopage.html?Id=146 [Accessed 21/06/13]

6. Potential Impacts

6.1.1. Numerous studies on birds have shown that the abundance, occurrence and species richness of breeding birds is reduced near roads, with larger reductions near high traffic roads (Fahrig *et al*, 2011[6]). This could be due to a variety of reasons (direct and indirect) such as disruption of territories, increase in noise levels, lighting, high traffic volume or direct mortality from collisions with traffic.

6.1.2. A large amount of hedgerows will be lost as a result of the proposed route. Hedgerows are very important habitats for a variety of species; mainly birds which will nest forage and use these for protection (Appendix C1). Due to the potential for nesting birds, measures should be taken to minimise disturbance near areas of mature woodland, as this could have a detrimental impact on nesting birds (Appendix C1). At the north east point of the urban fringe there is an area of rough grassland which provides nesting habitat for the meadow pipit, which will be disrupted by the bypass.

6.1.3. Site clearances during the bird nesting season (March to August inclusive) are likely to result in destruction and disturbance of bird nests, which could be considered an offence under the Wildlife and Countryside Act 1981 (as amended).

6.1.4. It is likely that territories immediately adjacent to the roadside will be lost. The bird species which are likely to lose nesting habitat directly as a result are blackbird, great tit, chaffinch, black cap, song thrush, and blue tit. There is similar habitat in the surrounding area that could accommodate displaced territories. However, this may have an indirect impact on populations in the wider area due to lack of resources and nesting habitat.

6.1.5. The loss of habitat could potentially create changes in the population dynamics of an area. The impact of habitat loss on a species can result in a reduction in population and the number of breeding pairs that can occupy an area. Furthermore, the loss of habitat will decrease the attractiveness of the area for nesting birds.

6.1.6. The proposed road could have a significant impact on any breeding barn owls within the area as they are particularly vulnerable to traffic mortality due to their foraging behaviour.

[6] Fahrig *et al* (2011) *Are the negative effects of roads on breeding birds caused by traffic noise?,* Canada. Journal of Applied Ecology 48, pp1527-1534.

7. Mitigation Measures

7.1. Habitat Loss/fragmentation

7.1.1. The loss of nesting and foraging habitat should be minimised as much as possible to reduce the impact of the scheme on bird populations in the area. The verges should be replanted with similar species to the existing hedgerows and scrub, particularly hawthorn and gorse. All the species used should be native where possible.

7.1.2. New vegetation should be planted a certain distance from the road, providing a wide verge and lowering the risk of bird casualties.

7.1.3. Areas of rough grassland with a thick litter layer should be created to encourage small mammals and provide a rich foraging habitat for barn owls. Cereal field margins could also be created as they benefit species such as the grey partridge, as well as supporting invertebrate life (Buglife, 2010[7]).

7.2. Vegetation Clearance

7.2.1. Site clearances should be timed to be undertaken out with the main bird nesting season of March to August to avoid destruction of nests. If vegetation clearances are undertaken during the main nesting season then a bird nest checking survey must be undertaken by a qualified ecologist prior to any removal.

7.2.2. In the event that a bird nest is discovered on site, which may potentially be harmed or disturbed through site works, works in the area around the nest should cease and the project ecologist should be contacted to assess the nest to determine whether the nest is active. An exclusion zone around the nest may be required. The distance of the exclusion zone will be dependent on a number of factors including the species of bird.

7.3. Disturbance

7.3.1. If any night works are to take place, light must be directed into the work area and light splay into the surrounding area must be kept to a minimum, as this may cause disturbance to foraging owls.

7.3.2. Best practicable means of noise control, as described within BS 5228-1: 2009 'Code of Practice for noise and vibration control on construction and open sites', should be implemented in order to minimise the risk of disturbance to nesting birds. The British Standard provides specific detail on suitable measures for noise control in respect to construction operations.

[7] Buglife .2010. Scottish Invertebrate Habitat Management, Cereal Field Margins.
http://www.buglife.org.uk/resources/buglife/Cereal%20field%20margins.pdf

7.3.3. Low noise surfacing should be used if possible in order to reduce disturbance. Further noise mitigation measures can be found in Chapter 9: Noise and Vibration.

7.4. Traffic mortality

7.4.1. The owl nest boxes identified on site are within 200m of the new bypass. It is recommended that owl nest boxes should be at least 1km from a major road to avoid increased mortality from road traffic.

7.4.2. However as there were no signs of activity at the nest boxes they can be left in situ. Post construction surveys are recommended to check if there has been any impact on the barn owl population.

7.4.3. However mitigation should focus on improving the safety for barn owls hunting on road verges rather than deterring them (Barn Owls and Major Roads[8]). For example forcing them to fly higher by planting hedgerows or trees close to the road.

[8] Ramsden, David, J, Barn owls and Major Roads. *Results and recommendations from a 15 year research project*. The Barn Owl Trust.

8. Conclusions and Recommendations

8.1.1. Using the criteria set out in Table 3: Site Evaluation, the site is considered to be of district importance as a total of 51 different bird species were recorded between the winter and breeding bird surveys. Of the recorded bird species 11 are BoCC red list species (10 are UK BAP protected species). Two Wildlife and Countryside Act 1981 (as amended) Schedule 1 species were recorded during the winter bird survey.

8.1.2. Site clearances during the bird nesting season (March to August inclusive) are likely to result in destruction and disturbance of bird nests. The timing of vegetation clearances should avoid the main nesting season. However, if this is not possible bird nest checking surveys should be undertaken prior to any vegetation removal.

8.1.3. Noise and lighting associated with the works may result in disturbance to birds in the surrounding area. Any lighting used should be directed into the work area and any light splay into the surrounding area must be minimised. Noise levels must be kept to a minimum and BS 5228-1: 2009 'Code of Practice for noise and vibration control on construction and open sites' should be implemented.

8.1.4. Throughout the whole survey area four areas of high ornithological importance, five medium and one low were identified. Therefore the surrounding habitats are significant and support populations of wintering and breeding birds. The proposed bypass will result in fragmentation of habitats and territories.

8.1.5. The use of roadside habitats by animals that communicate using acoustic signals, such as birds, presents an interesting trade-off between the presence of suitable habitat and the potentially detrimental effects of traffic noise and passing vehicles (Parris and Schneider, 2008). However with the appropriate mitigation in place and the establishment of vegetation any impact should be minimised.

8.1.6. Post construction surveys should be undertaken in order to quantify any impact on the bird population. If any activity is found post construction it would be advisable to re-locate the owl nest boxes to a more suitable location. Any disturbance or translocation of the nest boxes will require a licence from Scottish Natural Heritage (SNH).

Appendix A

Recorded bird species

Winter Bird Survey - Recorded Species							
Common Name	Scientific Name	Conservation Status	Number Recorded				
			Survey Section				Total
			1	2	3	4	
Blackbird	*Turdus merula*		11	2	5	5	23
Blue tit	*Parus caeruleus*		4	0	2	0	6
Buzzard	*Bufo bufo*		0	0	0	3	3
Chaffinch	*Fringilla coelebs*		53	1	9	28	91
Common gull	*Larus canus*	Amber Status - BoCC	2	0	0	0	2
Dunnock	*Prunella modularis*	Amber Status - BoCC	0	0	0	1	1
Feral pigeon	*Columba livia*		18	0	2	0	20
Fieldfare	*Turdus pilaris*	Red Status - BoCC	57	0	0	0	57
Goldcrest	*Regulus regulus*		0	0	0	1	1
Goldfinch	*Carduelis carduelis*		5	0	0	0	5
Great tit	*Parus major*		5	0	4	0	9
Greenfinch	*Carduelis chloris*		9	0	2	0	11
Greylag goose	*Anser anser*	Amber Status - BoCC	3	30	43	0	76
Grey partridge	*Perdix perdix*	UKBAP Priority Species Red Status - BoCC	0	0	0	1	1
Lesser black-backed gull	*Larus fuscus*	Amber Status - BoCC	27	0	1	0	28
Linnet	*Carduelis cannabina*	UKBAP Priority Species Red Status - BoCC	15	0	4	0	19
Mallard	*Anas platyrhynchos*	Amber Status - BoCC	0	0	0	8	8

Winter Bird Survey - Recorded Species							
Common Name	**Scientific Name**	**Conservation Status**	**Number Recorded**				
Mistle thrush	*Turdus viscivorus*	Amber Status - BoCC	5	1	0	0	6
Pheasant	*Phasianus colchicus*		1	0	0	0	1
Raven	*Corvus corax*		0	0	2	0	2
Redwing	*Turdus Iliacus*	UKBAP Priority Species Red Status - BoCC	34	0	0	0	34
Robin	*Erithacus rubecula*		9	1	4	2	16
Rook	*Corvus frugilegus*		41	22	32	13	108
Song thrush	*Turdus philomelos*	UKBAP Priority Species Red Status - BoCC	8	0	0	0	8
Skylark	*Alauda arvensis*	Red Status - BoCC UKBAP Priority Species	0	0	60	1	61
Snipe	*Gallinago gallinago*	Amber Status - BoCC	1	0	0	0	1
Starling	*Sturnus vulgaris*	Red Status - BoCC UKBAP Priority Species	91	1	1	18	111
Woodpigeon	*Columba palumbus*		25	2	95	0	122
Wren	*Troglodytes troglodytes*		3	0	1	0	4
Waxwing	*Bombycilla garrulous*		0	1	0	0	1
Yellowhammer	*Emberiza citronella*	UKBAP Priority Species Red Status - BoCC	2	0	0	0	2

Breeding Bird Survey - Recorded Species							
Common Name	Scientific Name	Conservation Status	Number Recorded				
			Survey Section				Total
			1	2	3	4	
Canada goose	*Branta canadensis*		0	0	1	0	1
Greylag goose	*Anser anser*	Amber Status - BoCC	0	0	0	5	5
Mallard	*Anas platyrhynchos*	Amber Status - BoCC	2	2	0	2	6
Shelduck	*Tadorna tadorna*	Amber Status - BoCC	1	0	0	0	1
Teal	*Anas crecca*	Amber Status - BoCC	3	0	0	0	3
Common gull	*Larus canus*	Amber Status - BoCC		4	1	2	7
Herring gull	*Larus argentatus*	UKBAP Priority Species Red Status - BoCC	2	1	1	1	6
Lesser black backed gull	*Larus fuscus*	Amber Status - BoCC	2	2	0	2	6
Wood pigeon	*Columba palumbus*		6	4	1	0	11
Curlew	*Numenius arquata*	UKBAP Priority Species Amber Status - BoCC	1	1	0	0	2
Snipe	*Gallinago gallinago*	Amber Status - BoCC	0	0	0	1	1
House martin	*Delichon urbica*	Amber Status - BoCC	0	1	0	12	13
Swallow	*Hirundo rustica*	Amber Status - BoCC	3	0	1	10	14
Grey wagtail	*Motacilla cinerea*	Amber Status - BoCC	1	0	0	7	8
Meadow pipit	*Anthus pratensis*	Amber Status - BoCC	0	0	30	10	40

Breeding Bird Survey - Recorded Species							
Common Name	**Scientific Name**	**Conservation Status**	**Number Recorded**				
Pied wagtail	*Motacilla alba*		0	0	0	11	11
Blackbird	*Turdus merula*		7	10	1	7	25
Fieldfare	*Turdus pilaris*	Red Status - BoCC	1	0	0	0	1
Robin	*Erithacus rubecula*		3	2	4	16	25
Song thrush	*Turdus philomelos*	UKBAP Priority Species Red Status - BoCC	1	1	1	1	4
Wheatear	*Oenanthe oenanthe*		0	1	0	0	1
Chaffinch	*Fringilla coelebs*		43	3	4	34	84
Goldfinch	*Carduelis carduelis*		0	0	0	1	1
Greenfinch	*Carduelis chloris*		0	1	1	0	2
Linnet	*Carduelis cannabina*	UKBAP Priority Species Red Status - BoCC	0	2	1	0	3
Blue tit	*Cyanistes caeruleus*		2	2	0	9	13
Coal tit	*Periparus ater*		1	0	0	0	1
Great tit	*Parus major*		2	2	2	1	7
Yellowhammer	*Emberiza citronella*	UKBAP Priority Species Red Status - BoCC	23	0	3	12	38
Blackcap	*Sylvia atricapilla*		0	0	1	0	1
Sedge warbler	*Acrocephalus schoenobaenus*		0	0	0	2	2

Breeding Bird Survey - Recorded Species							
Common Name	**Scientific Name**	**Conservation Status**	**Number Recorded**				
Willow warbler	*Phylloscopus trochilus*		2	2	1	3	8
Carrion crow	*Corvus corone*		1	0	0	1	2
Jackdaw	*Corvus monedula*		2	5	0	1	8
Magpie	*Pica pica*		2	0	0	0	2
Rook	*Corvus frugilegus*		3	4	1	7	15
Starling	*Sturnus vulgaris*	UKBAP Priority Species Red Status - BoCC	9	5	0	2	16
Dunnock	*Prunella modularis*		12	1	0	6	18
House sparrow	*Passer domesticus*	UKBAP Priority Species Red Status - BoCC	4	5	0	0	9
Skylark	*Alauda arvensis*	UKBAP Priority Species Red Status - BoCC	0	1	2	1	4
Tree sparrow	*Passer montanus*	UKBAP Priority Species Red Status - BoCC	0	1	0	0	1
Wren	*Troglodytes troglodytes*		7	0	3	7	17

Appendix B

Ornithological Assessment Drawings 1-4

N

SECTION 1

Area 1

Area 2

Area 3

Area 4

Area 5

Area 6

0 50 100 200 300 400 500 Meters

Legend

Bypass

BIRD

Breeding

Wintering

Ornithological Importance

Low

Moderate

High

Rev	Revision Details	Chkd	Appd	Date

Drawn : VM	Preliminary
Design : GB	For Comment
Chkd : MW	For tender
Appd : GH	For construction
Date : 21/05/2013	As constructed
	Other

amey

Client : TRANSPORT SCOTLAND

Project Name :

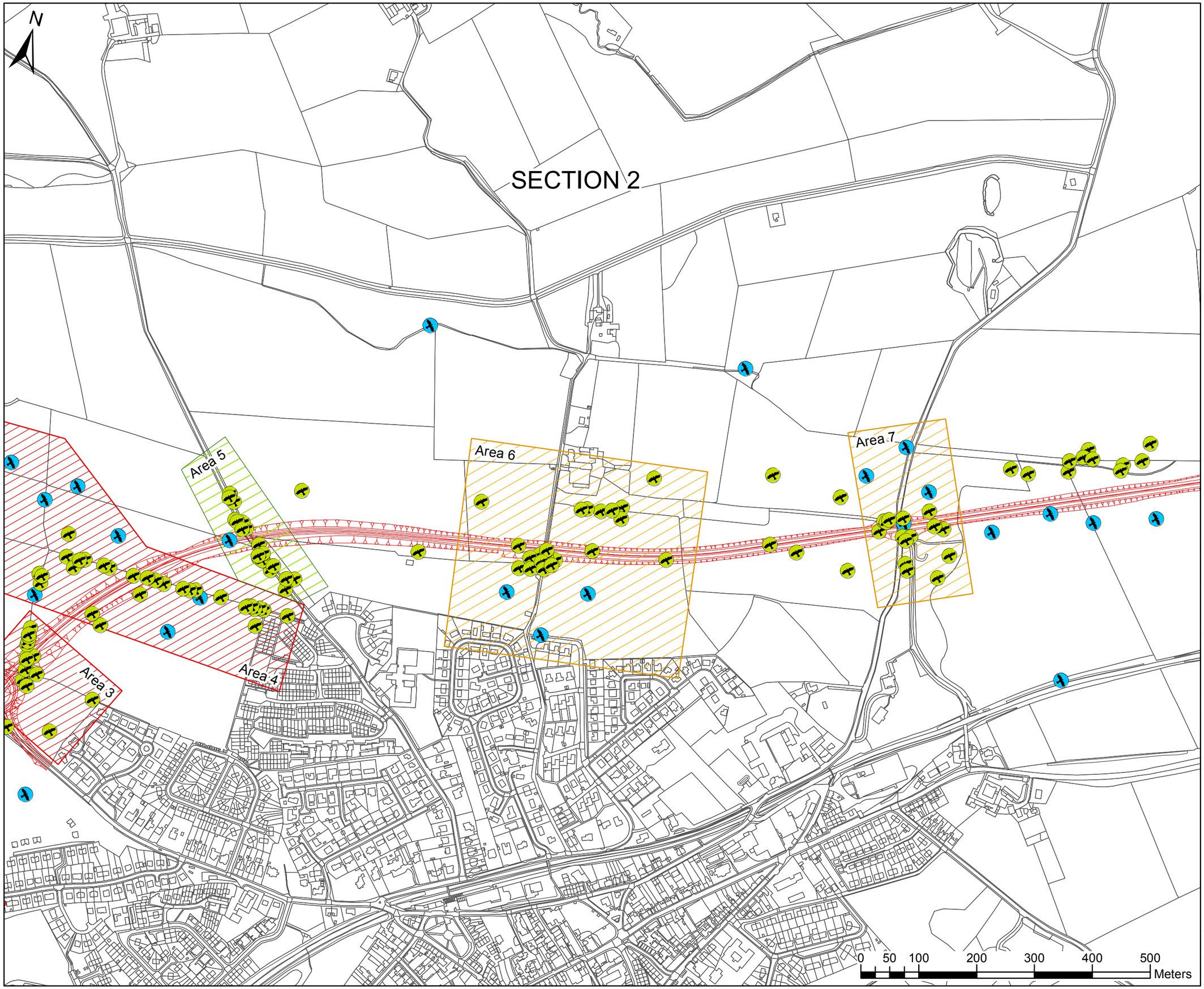
A77 Maybole Bypass

Drawing Title :

Ornithological Assessment Drawing Section 1

Original Drawing Size :	A3
Scale : 1:6,000	Dimensions :

Drawing No	Rev
25000182/OA/001	R0



Legend

Bypass

BIRD

Breeding

Wintering

Ornithological Importance

Low

Moderate

High

Rev	Revision Details	Chkd	Appd	Date

Drawn : VM	Preliminary
Design : GB	For Comment
Chkd : MW	For tender
Appd : GH	For construction
Date : 21/05/2013	As constructed
	Other

amey

Client : TRANSPORT SCOTLAND

Project Name :

A77 Maybole Bypass

Drawing Title :

Ornithological Assessment Drawing Section 2

Original Drawing Size :	A3
Scale : 1:6,000	Dimensions :

Drawing No	Rev
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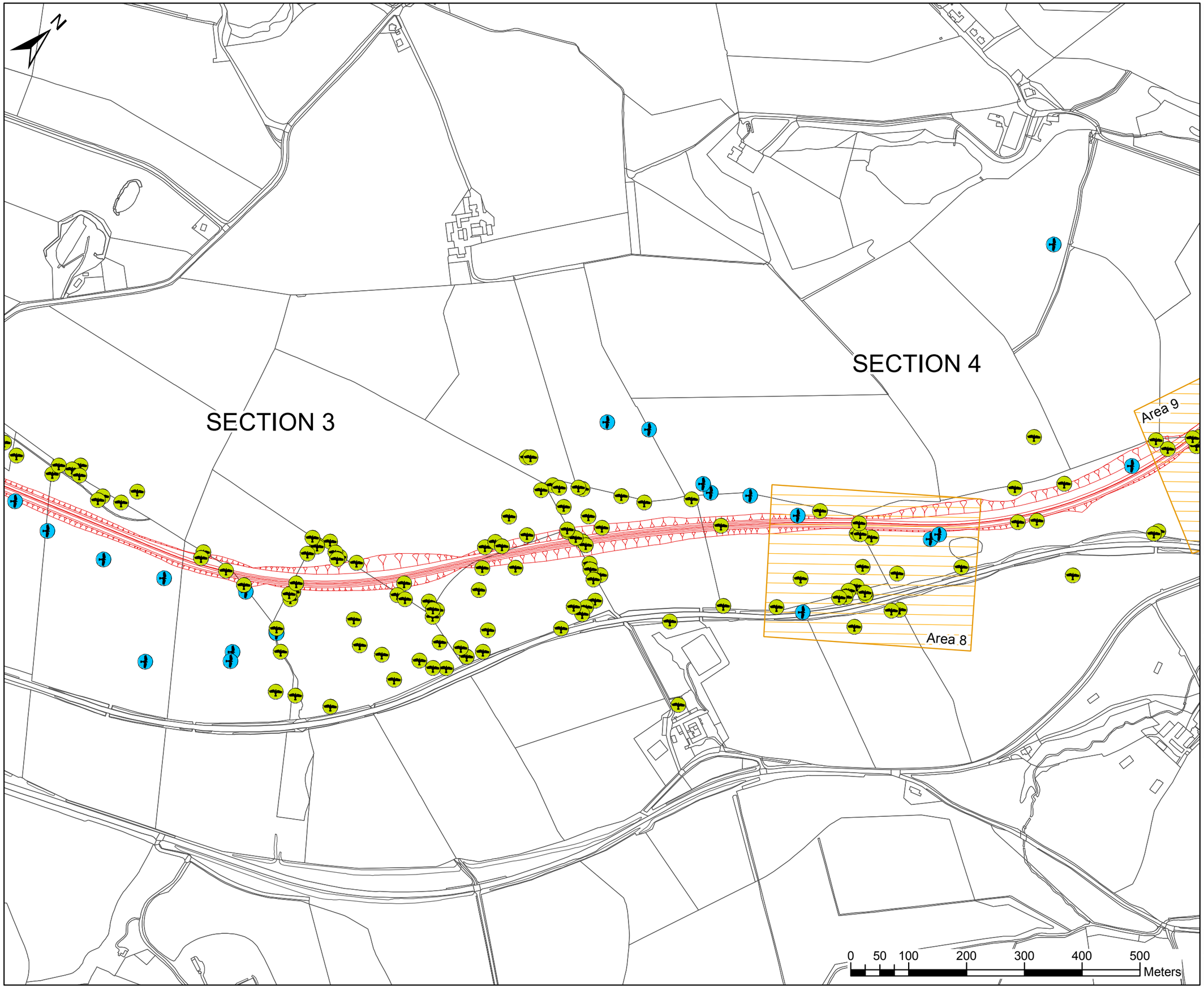


Legend

- Bypass

BIRD

- Breeding
- Wintering

Ornithological Importance

- Low
- Moderate
- High

Rev	Revision Details	Chkd	Appd	Date

Drawn :	VM
Design :	GB
Chkd :	MW
Appd :	GH
Date :	21/05/2013

Preliminary	
For Comment	
For tender	
For construction	
As constructed	
Other	

amey

Client : TRANSPORT SCOTLAND

Project Name :

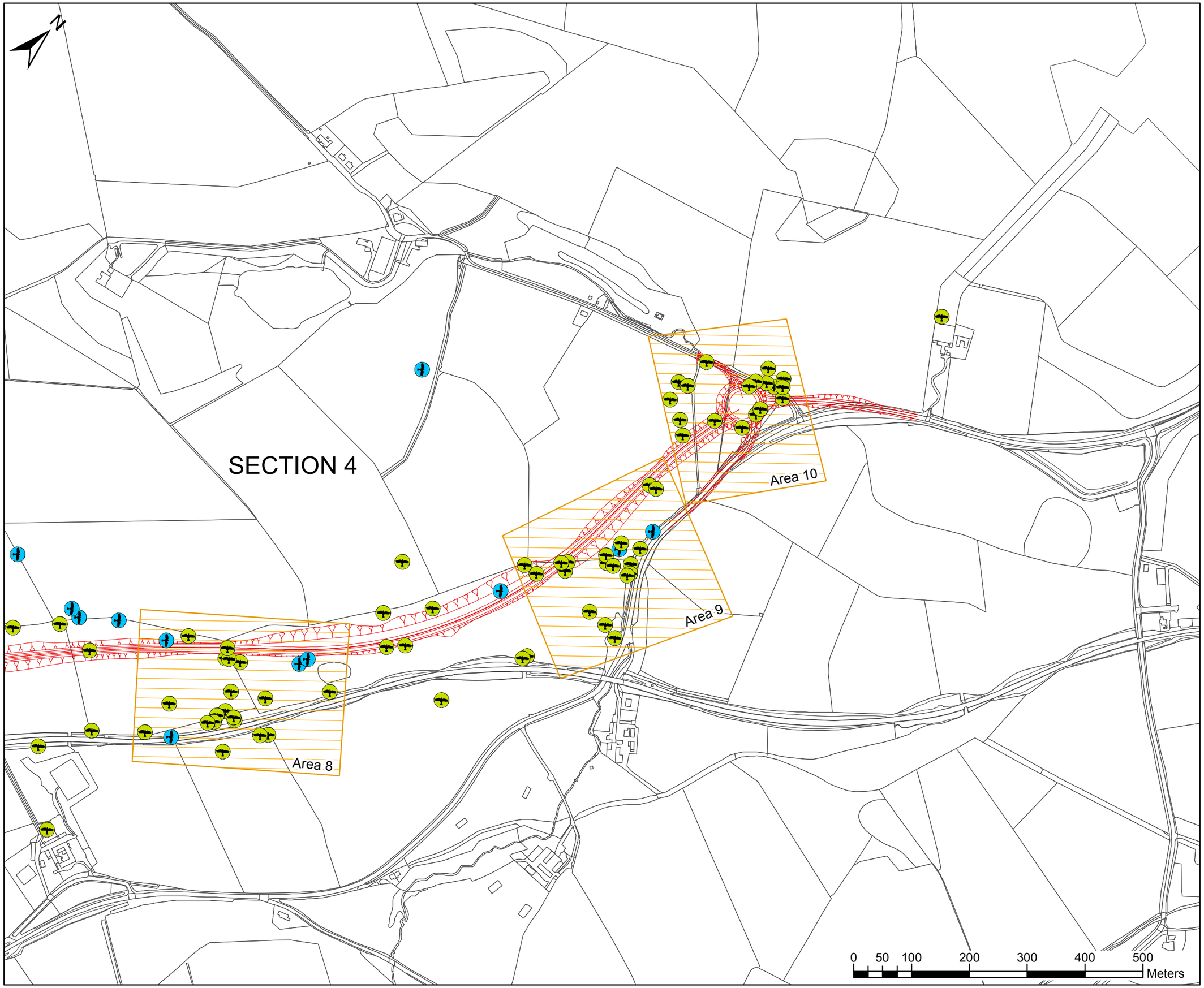
A77 Maybole Bypass

Drawing Title :

Ornithological Assessment Drawing
Section 3 & Section 4

Original Drawing Size :	A3
Scale : 1:6,000	Dimensions :

Drawing No	Rev
25000182/OA/003	R0



Legend

Bypass

BIRD

Breeding

Wintering

Ornithological Importance

Low

Moderate

High

Rev	Revision Details	Chkd	Appd	Date

Drawn : VM	Preliminary
Design : GB	For Comment
Chkd : MW	For tender
Appd : GH	For construction
Date : 21/05/2013	As constructed
	Other

amey

Client : TRANSPORT SCOTLAND

Project Name :

A77 Maybole Bypass

Drawing Title :

Ornithological Assessment Drawing Section 4

Original Drawing Size :	A3
Scale : 1:6,000	Dimensions :

Drawing No	Rev
25000182/OA/004	R0