

2016

B9075 Sandwater Road

Appendix 8.1: Baseline Bird Surveys Technical Report



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Executive Summary

1. This technical report describes the baseline surveys of breeding birds undertaken in 2013 and 2015 to inform the assessment of effects for the upgrade and realignment of the B9075 Sandwater Road. It also summarises the results of bird surveys undertaken in the same area between 2005 and 2012 as part of the baseline studies for the Viking Wind Farm.
2. The site and its immediate vicinity support a wide range of breeding moorland birds, such as wader, skua and wildfowl species. This includes several species that are considered as priority species for EIA assessment on account of their high nature conservation value. Of particular relevance is the regular occurrence of breeding whimbrel (up to 4 territories), dunlin (up to 3 territories), golden plover (up to 2 pairs) and Arctic skua (1 territory) within 500m of the proposed development. There are also relatively high numbers of some other breeding species of conservation value, namely curlew (up to 21 pairs), lapwing (up to 13 pairs) and common sandpiper (up to 1 pair), that are of local importance. Outside the bird breeding season the site and its immediate vicinity has relatively low ornithological sensitivity, but is irregularly used by wintering whooper swan and formerly by wintering hen harrier.
3. This report was prepared by Natural Research Projects Ltd (NRP) on behalf of Viking Energy Partnership (VEP). The bird surveys that inform this report were also undertaken by NRP.

Aims of bird surveys

4. The baseline surveys aimed to provide information on which bird species were present in the areas that could plausibly be affected by the proposed development. The baseline surveys undertaken aimed to update the information from previous studies to inform the Viking Wind Farm and that covered a wide area including the proposed development site. From the outset it was recognised that the proposed development could potentially affect several species of high conservation importance including breeding whimbrel, and surveys were designed to be appropriate for these species. Specifically the baseline surveys aimed to:
 - Determine the number of pairs of species breeding in a defined survey area;
 - Determine the location of the breeding territories;
 - Examine the extent of year to year differences in abundance and distribution of breeding birds;
 - Determine the use of the development site and its proximity by wintering whooper swans.

Study Area

5. In line with SNH survey guidance for wind farms (SNH, 2013) the area of interest for moorland breeding birds such as waders, skuas and wildfowl is defined by a 500m buffer drawn around the proposed development. This is hereafter referred to as the Sandwater Bird Survey Area (Figure 1). The Sandwater Bird Survey Area is considered to exceed the maximum plausible distance to which the bird species that occur locally might be experience adverse effects from the proposed development, in particular from disturbance and habitat change. For most bird species the choice of 500m is highly cautious. The occurrence of certain scarce bird species, namely breeding red-throated diver, whooper swan, merlin and (wintering) hen harrier, is examined up to a distance threshold of 1 km, on account of the high conservation value of these species and because some forage away from their breeding site.
6. The proposed development traverses three main areas of habitat along its length. The western most 400m is in the Kergord valley and goes through semi-improved acid grassland merging into wet heath pasture.
7. About a half of the entire length of the route (ca.1,100m) traverses the Mid Kame ridge and this area has moderate slopes with mostly heather dominated wet blanket bog moorland vegetation overlying peat.
8. The eastern third (ca. 800m) traverses the floor of the Petta Dale valley and this has the most valuable habitats for birds (Photo 1). To the north of the existing B9075 the valley floor habitat comprises lowland blanket bog habitat, the blanket bog in this area is developed on deep peat and is heavily broken in parts by erosion features. To the south, between the existing B9075 and Sand Water Loch, is a strip of acid grassland, in parts marshy, and loch shore habitats. There are also small areas of semi-improved acid and neutral grassland north of the existing B9075 at the eastern end of the Petta Dale section.
9. To the east of the proposed development (east of the A970), the land rises again up to Crookadale Hill (part of the East Kame ridge.) This area has mostly wet blanket bog moorland habitat on a moderate slope.
10. The western third of the Sandwater Road Survey Area overlaps with the southern part of the area surveyed for breeding birds for the separate Kergord Access Track planning application.

Photo 1. Eastern half of the section of existing B9075 that is proposed to be upgraded looking east. Petta Dale valley is to the left and Sand Water Loch to the right and the East Kame ridge in the background.



Methods

2013 and 2015 bird surveys

Moorland bird surveys

11. Moorland bird surveys (MBS) using the method devised by Brown and Shepherd (1993) were conducted over the whole of the Sandwater Bird Survey Area in 2013 and again in 2015 (Figure 1). In 2013 three visits were made during the breeding season, at approximately three-week intervals between mid May and mid-July. In 2015, four visits were made over the same period (Table 1). Surveys were not conducted in conditions exceeding wind force 4 or continuous rain (Table 1). The 2015 surveys were undertaken in conjunction with the bird breeding birds survey for the Kergord Access Track project.

Table 1: Dates of moorland bird survey visits of the Sandwater Bird Survey Area

Year	MBS visit number	Date	
2013	1	16 May	Wind E F2, fine,
	2	9 June	Wind NW F1, fine,
	3	14 July	Wind SW F3, fine, mostly fine, occ. light drizzle
2015	1	11 May	Wind S F2, fine,
	2	25 May	Wind NW F2, fine,
	3	3 June	Wind W F4, mostly fine, occ. light showers
	4	21 June	Wind E F3 > F1, mostly fine, occ. light drizzle

12. MBS survey results were interpreted as breeding territories with the location of nominal territory centres usually being placed centrally within the cluster of records identified as being likely to refer to the same pair. A slightly modified version of the Brown and Shepherd method (1993) for interpreting territories was followed; all birds were assumed to be on breeding territories unless they were feeding in unsuitable habitat for breeding (e.g. for most species this would include improved pasture and loch edges) or were part of a flock of apparently non-breeding birds (e.g. post-breeding aggregation of lapwing and greylag geese). In some circumstances additional information such as nest locations and behaviour was also factored in when determining nominal territory centres. For assessment purposes the core areas of moorland bird territories, (i.e. where pairs focus their activity) is assumed to be a 300m diameter circle (Figures 2 to 5). These circles are only representative of the focal area, the actual area used by some pairs is likely to extend more widely; indeed a few of the records are slightly outside the circles shown on the results maps (Figures 2 to 5).

Scarce breeding birds

13. As part Viking Wind Farm Habitat Management Plan (HMP) studies, the whole of Central Mainland was covered in the 2013 and 2014 breeding seasons by surveys to monitor the numbers and distribution of breeding red-throated divers and whooper swan. Similarly, Viking HMP studies monitored breeding merlin across the whole of Central Mainland in 2013, 2014 and 2015.

Over-wintering whooper swan

14. Between mid October 2013 and February 2014 approximately fortnightly visits were made to check for the presence of wintering whooper swan and hen harrier in the Sandwater Road Survey Area. These consisted of scanning the survey area, with the aid of binoculars, from regular vantage points (e.g., passing places and gateways) along the existing B9075.

15. The bird surveys were undertaken by Mark Chapman and Digger Jackson both of whom have over thirty years' experience undertaking bird surveys, including surveys undertaken from 2005 to 2015 in connection with the Viking Wind Farm.

Previous bird surveys

16. Large parts of the Sandwater Bird Survey Area and adjacent ground have been covered by MBS conducted in various years since 2003 undertaken to inform the assessment of effects of the Viking Wind Farm and the associated Habitat Management Plan (Viking ES Addendum Technical Appendix 11.1, 2010). This previous survey work has covered all parts of the Sandwater Bird Survey Area in at least one year as described below, with the most important parts for breeding birds (e.g. Petta Dale valley) surveyed in multiple years. The results from these previous surveys are valuable in showing the extent of annual variation in the numbers of birds breeding in the vicinity of the proposed development. The previous bird surveys were all undertaken by NRP.

Survey coverage

17. To facilitate presentation of pre-existing survey results, the Sandwater Bird Survey Area is divided in to three sections for reporting purposes. These are the Kergord section (the western half), the Petta Dale section (the part passing though the Petta Dale valley) and the Crookadale Hill section (the small area of higher ground east of the A970). Survey coverage in these sections since 2006 is summarised below.
 - 2015 MBS surveys of whole of Sandwater Bird Survey Area;
 - 2013 MBS surveys of whole of Sandwater Bird Survey Area;
 - 2012 MBS surveys of Petta Dale section only;
 - 2011 MBS surveys of Petta Dale section only;
 - 2010 MBS surveys of Petta Dale section only (Viking ES Addendum Technical Appendix 11.1, 2010);
 - 2009 Single visit coverage for whimbrel and skua species whole of Sandwater Bird Survey Area except extreme western 90m (Viking ES Addendum Technical Appendix 11.1, 2010);
 - 2008 MBS surveys of proposed Viking Wind Farm access roads, including Kergord section (Viking ES Addendum Technical Appendix 11.1, 2010);
 - 2006/07 winter hen harrier roost survey, Petta Dale section. Undertaken in response to hen harriers overwintering in area that winter (Viking ES Addendum Technical Appendix 11.1, 2010);
 - 2005-2015, annual survey of merlin, all Central Mainland, (Viking ES Addendum Technical Appendix 11.1, 2010 and NRP/VEP unpublished data); and
 - 2005-2014, annual survey of red-throated diver, all Central Mainland, (Viking ES Addendum Technical Appendix 11.1, 2010 and NRP/VEP unpublished data).
18. Outside the breeding season (September to March) the area is known to generally have very low bird interest, indeed most breeding species are absent through the winter (Viking ES Addendum, 2010). However, overwintering hen harriers and whooper swan are notable exceptions to this.

Table 2: Species receiving special legislative protection or listed on the Birds of Conservation Concern (BoCC) Red List that regularly occur in the survey area. Species not listed below receive no special legislative protection and are not on the BoCC Red List.

Species (season of occurrence)	Wildlife and Countryside Act Schedule 1	EU Birds Directive Annex 1	BoCC4 Red List
Red-throated diver (breeding)	Yes	Yes	No
Whooper swan (breeding and wintering)	Yes	Yes	No
Merlin (breeding)	Yes	Yes	Yes
Hen Harrier (wintering)	Yes	Yes	Yes
Whimbrel (breeding)	Yes	No	Yes
Curlew (breeding)	No	No	Yes
Dunlin (breeding)	No	Yes	No
Golden plover (breeding)	No	Yes	No
Lapwing (breeding)	No	No	Yes
Ringed Plover (breeding)	No	No	Yes
Arctic skua (breeding)	No	No	Yes
Arctic tern (breeding)	No	Yes	No

Results

Scarce breeding bird species

19. Three scarce priority breeding species regularly breed in Central Mainland and could potentially be affected, namely red-throated diver, whooper swan and merlin. Annual surveys of these species undertaken since 2005 found that none of these species has breed sufficiently close (within 500 m) to the proposed development that they are likely to experience adverse disturbance (Table 3). The closest breeding red-throated divers and merlins nesting sites are both over 1km away, well beyond the distance that could plausibly lead to disturbance effects.
20. Non-breeding red-throated divers commonly occur on Sand Water loch though the spring and summer (April to September). Non-breeding divers are rated as having a medium susceptibility to disturbance (Table 3). In any case, the extensive eastern and central areas of Sand Water Loch would provide sanctuary for divers from any potentially disturbing construction activity close to the northern shore.

21. Whooper swan have regularly nested close to Sand Water Loch in recent years (Table 3). In 2009, 2010 and 2011 a pair nested in emergent vegetation in the southern lobe of Sand Water Loch, ca. 700m south of B9075. When whooper swans nested on Sand Water Loch (2009-2011) they were observed by NRP field staff to show no response to vehicle traffic using the B9075 or anglers fishing along the north shore of Sand Water Loch.
22. Since 2012, there has been no nesting at Sand Water Loch, but a pair has nested in a nearby wetland area. This is over 1km away from and out of sight of the proposed development.
23. Small numbers of whooper swans occasionally use Sand Water Loch and the improved pasture fields in the Kergord valley during the winter months (Viking ES Addendum Technical Appendix 11.1, 2010).

Table 3: Status of scarce breeding species within 1 km of the proposed development.

Species	Disturbance Risk Category	Comment
<i>Red-throated diver</i> (breeding)	Very High	No pairs breed within 1km of the proposed development, nor does the area lie on a regular flight route of breeding birds.
<i>Red-throated diver</i> (non-breeding)	Low	Non-breeding single or paired birds frequently use Sand Water Loch for loafing. Feeding behaviour not observed.
<i>Merlin</i>	Very High	No merlins breed within 1km of the proposed development. There is a regular nesting territory on the Mid Kame ridge approximately 2km north of the B9075 and the hunting range of this pair is likely to include the proposed development area.
<i>Whooper swan</i>	High	In 2009, 2010 and 2011, a pair nested in emergent vegetation in the southern lobe of Sand Water Loch, ca. 700m south of B9075. Since 2012, the pair has nested in a different place, in a wetland area over 1km away from and out of sight of the proposed development. In 2015 an adult accompanied by two small cygnets from the breeding site was present on Sand Water loch, approximately 400m south of the B9076 on the 21 June survey visit.

Moorland Bird Survey results

24. The MBS survey results give the estimated number of breeding territories in the survey area for wader, skua, gull, tern, geese and duck species. The estimated number of territories in each of the three survey sections for each species is shown in Tables 4 to 6 and the total numbers for the whole survey area are

shown in Table 7. The distribution of breeding territories is illustrated in Figures 2 to 9 for the species of greatest relevance to the assessment of effects (whimbrel, curlew, dunlin, golden plover, lapwing and skua species). The survey results maps show estimated nominal centre of breeding territories represented by 300m diameter circle and (with the exception of curlew and lapwing) the locations of records of individual birds seen during surveys.

25. For all species the total numbers of territories in the Sandwater Bird Survey Area (Table 7) form only a small proportion of the regional (Shetland) population (Table 8). The only species for which 1% or more of the assumed regional population breeds in the Sandwater Bird Survey Area is whimbrel and common sandpiper. There are three regular whimbrel territories within the survey area and these represent 1% of the assumed regional population of approximately 300 pairs. The results for the three survey sections are considered in more detail below. The single pair of common sandpiper represents 2.3% of the assumed, but possibly underestimated, Shetland population of 44 pairs.

Petta Dale survey section

26. This section includes the Petta Dale valley floor and the north shore of Sand Water Loch and is by far the most ornithologically important part of the Sandwater Bird Survey Area. This section received survey coverage every year from 2010 to 2013, and 2015. There are also some survey results for this section from earlier years (Viking ES Addendum Technical Appendix 11.1, 2010) but these are not presented because the more recent information in Table 4 has greater relevance. This section has received such a high survey effort because it lies within the Petta Dale breeding whimbrel hotspot (a regularly occurring concentration of breeding territories), a species of particularly high conservation value and a priority species to the Viking Wind Farm Habitat Management Plan.
27. The Petta Dale section supports a wide range of breeding wader, skua and wildfowl species (Table 4). Of greatest importance is the regular occurrence of up to three pairs of whimbrel, up to two pairs of golden plover, one pair of Arctic skua and up to three pairs of dunlin. There are also additional pairs of whimbrel nearby in the Petta Dale valley outside the area under consideration but within 1 km of the proposed development. Other breeding birds of note in this section are up to ten pairs of curlew, up to six pairs of lapwing and the irregular occurrence of a up to and one pair of Arctic tern and ringed plover and various breeding duck species.
28. An important feature of the Petta Dale section is the relatively large (by Shetland standards) common gull colony on blanket bog about 150m north of the road. Until 2012 this annually held about 30 pairs but number reduced to just five pairs in 2015.
29. The numbers of territories of most species in this section has been relatively constant since 2010. The main exceptions to this are common gull and greylag goose. The reason for the sharp decline in common

gull is unknown, but the birds involved are likely to have moved elsewhere, possibly to the large colony located about 2km to the south. The numbers of greylag geese has increased which concords with the observed large increase in the size of the Shetland population in recent years.

30. The north shore of Sand Water loch has local importance as feeding and bathing location for some breeding bird species, in particular for dunlin and redshank.
31. In 2013, one of the curlew pairs nested just 4m from (Photo 2), and another nested about 20m from, the existing B9075 road (the exact nests sites of the great majority of wader pairs nesting in the survey area were unknown). Curlews nesting this close to a public road illustrate how this species is well able to tolerate disturbance from road traffic. In these cases, passing vehicles elicited no response from the incubating birds, but they flushed at distance in response to an approaching surveyor.
32. The habitats in the Petta Dale section of greatest value to birds are the valley-floor blanket bog north of the existing B9075 and the strip of wet marshy grassland between the existing B9075 and the north shore of Sand Water Loch (Photo 1). These habitats are currently mainly in good condition, though some parts of the blanket bog surface are affected by erosion. However, the value to priority birds of this whole area is potentially reduced by the existing overhead electricity cables passing across the floor of the Petta Dale valley and routed approximately 50m north of the existing B9075 (Photo 1). These provide elevated perches for hooded crows, an important predator of eggs of waders such as whimbrel and curlew, and pose a collision risks to flying birds. The overhead cables pass through the breeding territories of whimbrel, Arctic skua and dunlin, and are on the flight route wildfowl and divers using the Petta Dale valley to access Sand Water Loch.

Kergord section

33. The Kergord section also supports moderate numbers of breeding wader species, but lacks regular breeding by any priority species (Table 5). Of greatest interest in the Kergord section are up to nine pairs of curlew, seven pairs of lapwing and a single pair of common sandpiper.
34. The 2013 record of a whimbrel feeding on the pasture in this section is likely to have been a locally breeding bird from further up the Kergord valley. Two calling whimbrel were present on a survey visit in May 2008 in moorland habitat broadly suitable for breeding, however these birds were not present on the June or July visits that year, or in any subsequent years. It is concluded that there is little evidence that these birds were breeding, it is considered more likely they were a prospecting pair that moved on to breed elsewhere.

Crookadale Hill section

35. This small area is relatively steeply sloping and has rather uniform moorland vegetation with no features such as pools, marsh or streams. As a consequence this area is not particularly attractive for breeding bird species. The area supports up to two pairs of curlew and one pair of lapwing (Table 6)

Photo 2. Curlew nest in heather moorland 4 metres from B9075 in June 2013.



Over-wintering hen harrier

36. The Sandwater Area Survey Area was checked regularly for wintering hen harriers on eight dates between 23rd October 2013 and 15th February 2014. During this period no hen harriers were seen.
37. Hen harrier do not breed in Shetland, but small numbers (<5) overwinter in some years and they also occur on passage (Pennington *et al.*, 2004). The birds are likely to be part of the Scandinavian breeding population. In the winter of 2006/07 up to three individuals were regularly present on Mainland and these formed a communal roost on rough moorland close to the west shore of Sand Water Loch (Viking

ES Addendum Appendix 11.1, 2010). This is the only known communal roost site in Shetland. The birds have not been seen roosting at this location in subsequent winters despite checks by local ornithologists.

Over-wintering whooper swan

38. The Sandwater Area Survey Area was checked regularly for wintering whooper swans and geese on eight dates between 23rd October 2013 and 15th February 2014. During this period the only whooper swans seen were a party of eight birds present at the south end of Sand Water Loch on 16th January 2014. These birds were approximately 750m from the closest part of the proposed development.

Table 4: The estimated number of breeding territories of each species recorded by Moorland Bird Surveys in the Petta Dale section of the survey area each year from 2010 to 2013.

Species	2015	2013	2012	2011	2010	Comment
Great skua	1	1	1	1	1	Territory centre ca. 550m N of B9075
Arctic skua	1	1	1	1	1	Territory ca. 275m N of B9075 of road.
Common gull	5	6	28	35	30	Colony 150-250m N of B9075. Colony size much reduced in 2013.
Black-headed gull	0	0	1	0	0	One pair in common gull colony.
Arctic tern	0	1	0	0	0	Occasionally forages Sand Water. Possibly bred 2013.
Oystercatcher	4	8	5	7	7	Mainly on semi-improved pasture and verges of A970 trunk road.
Snipe	8	5	2	3	4	Evenly spread. Numbers seen likely to be an underestimate.
Redshank	5	4	3	3	4	Mainly occurs on semi-improved pasture.
Dunlin	1	3	0	1	1	Breed by bog pools, also feeds along Sand Water Loch shorelines.
Lapwing	4	5	4	5	6	Mainly on semi-improved pasture.
Ringed plover	1	1	0	0	0	Sand Water stony shores of eastern arm.
Golden plover	2	0	0	1	1	Blanket bog of valley floor, territories ca. 250m N of B9075.
Curlew	10	8	5	6	8	Territories evenly spread, also uses Sand Water shorelines.
Whimbrel	2	3	3	4	3	Territory centres ca.160m, 300m and 450m N of B9075. Also, centres at ca. 800m N and ca. 1000m to S of B9075 road in most years.
Common sandpiper	0	0	0	1	0	Sand Water shorelines.
Whooper swan	(1)	0	0	0	0	The 2015 breeding site on Sand Water is outside survey area boundary, but these birds occasionally seen inside survey area periphery.
Greylag goose	3	3	1	2	0	Pairs with goslings wander widely and often use Sand Water.
Teal		1	1	0	0	Blanket bog pools of valley floor.
Tufted duck	1	1	0	0	0	Sand Water
Mallard	0	1	0	0	0	Sand Water shores
Red-breasted merganser	0	1	0	0	0	Sand Water

Table 5: The estimated number of breeding territories of each species recorded by Moorland Bird Surveys in the Kergord section of the survey area in 2008 and 2013. This section was also surveyed for high priority species in 2009 but none were recorded.

Species	2015	2013	2008	Comment
Oystercatcher	9	15	7	Mainly occurs on semi-improved pasture.
Snipe	3	3	6	Evenly spread. Numbers of territories likely to be an underestimate.
Redshank	3	2	3	Mainly occurs on semi-improved pasture.
Common sandpiper	0	1	1	Burn of Wiesdale
Lapwing	1	7	8	Mainly on semi-improved pasture.
Curlew	9	8	7	Approximately evenly distributed.
<i>Whimbrel</i>	0	0 (1 bird feeding)	1 possible breeding attempt	Two calling birds present in May 2008 in moorland habitat broadly suitable for breeding ca. 70m S of B9075 present, but these birds but not present in June or July 2008, or in subsequent years.

Table 6: The estimated number of breeding territories of each species recorded by Moorland Birds Survey of Crookadale Hill section of the survey area. Based on survey work undertaken in 2006 and 2013. This section was also surveyed for high priority species in 2009 but none were recorded.

Species	2015	2013	2006	Comment
Lapwing	0	1	0	
Snipe	2	0	2	Numbers likely to be an underestimate.
Curlew	2	2	2	

Table 7: Summary of the total numbers of breeding territories estimated within the Sandwater Bird Survey Area. The values shown are the lowest and highest annual totals for each survey section for the years with data and these valued totalled. Values in parentheses indicate territories where core area is outside the survey area.

Species	Petta Dale Section (all years)	Kergord Section (all years)	Crookadale Hill Section (all years)	Whole Survey Area (min-max)	2013/15 mean count	2013/15 max. count
Great skua	1	0	0	1	1	1
<i>Arctic skua</i>	1	0	0	1	1	1
Common gull	5-35	0	0	5-35	5.5	6
Black-headed gull	0-1	0	0	1	0	0
<i>Arctic tern</i>	0-1	0	0	0-1	0.5	1 (possibly bred)
Oystercatcher	4-8	7-15	0	12-23	16.5	23
Snipe	2-8	3-6	0-2	5-13	10.5	13
Redshank	3-4	2-3	0	5-7	7	8
Lapwing	4-6	1-8	0-1	11-14	9	13
<i>Dunlin</i>	0-3	0	0	0-3	2	3
<i>Golden plover</i>	0-2	0	0	0-1	1	2
Curlew	5-8	6-8	2	13-18	19.5	21
<i>Whimbrel</i>	2-3	0 - 1 (possibly bred)	0	3-4	2.5	3
Common sandpiper	0-1	1	0	0-1	0.5	1
Whooper swan	0-(1)	0	0	0-(1)	(0.5)	(1)
Greylag goose	0-3	0	0	0-3	3	3
Teal	0-1	0	0	0-1	1	1

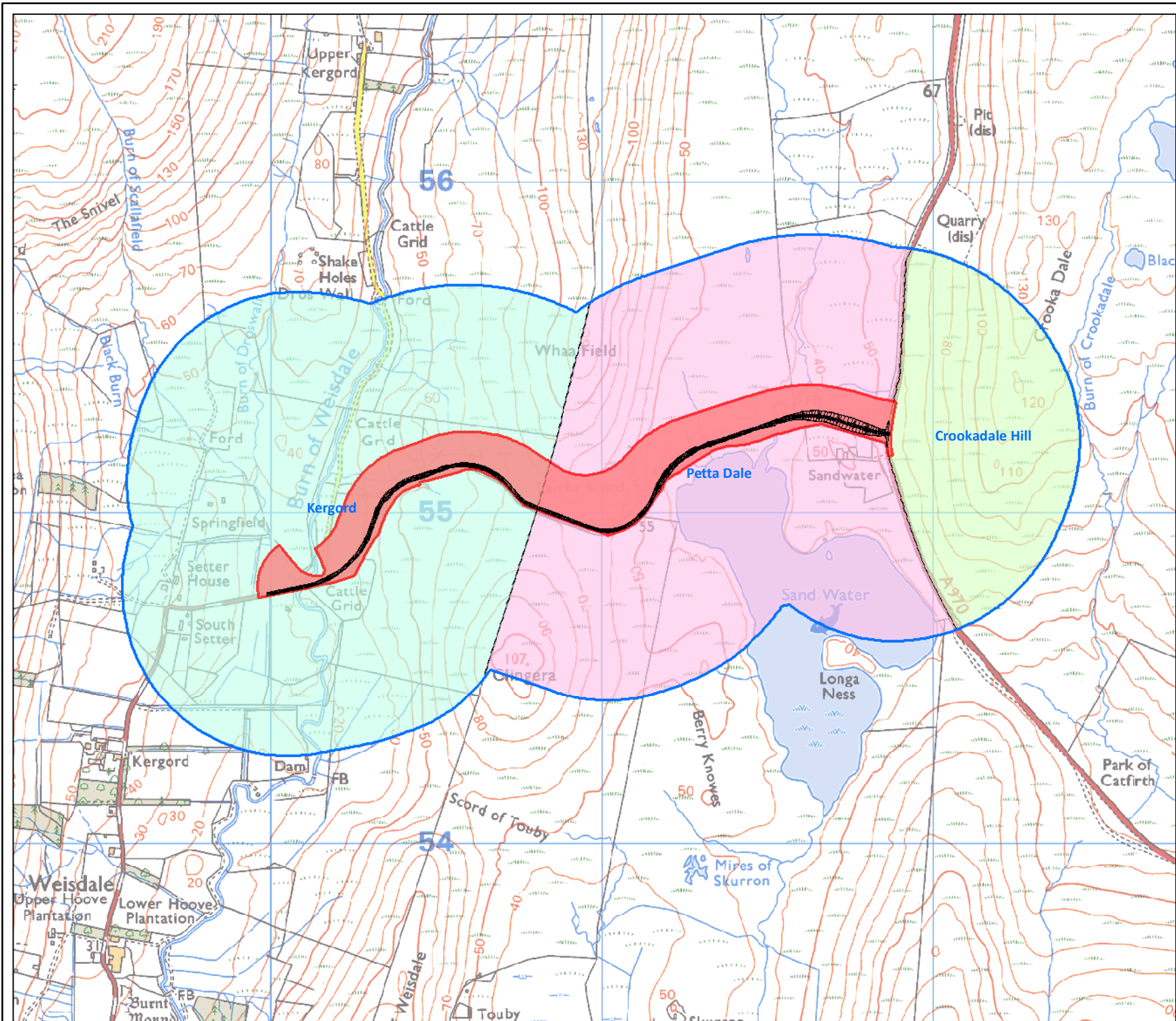
Table 8: The size of Shetland breeding bird populations (number of pairs) for species observed during surveys of the Sandwater Bird Survey Area. Where the information source indicates a range, the mean of the range is given.

Species	Shetland population estimate ¹ (pairs)	Source
Red-throated diver	407	Dillon <i>et al.</i> , 2009
Teal	113 (75 – 150)	Pennington <i>et al.</i> , 2004
Whooper Swan	ca. 8	Pennington <i>et al.</i> , 2004, Shetland Bird Reports
Greylag goose	At least 500 (increasing)	Pennington <i>et al.</i> , 2004
Oystercatcher	3,350	Pennington <i>et al.</i> , 2004
Ringed plover	900 (800 - 1,000)	Pennington <i>et al.</i> , 2004
Golden plover	1,450	Pennington <i>et al.</i> , 2004
Lapwing	1,740	Pennington <i>et al.</i> , 2004
Dunlin	1,700	Pennington <i>et al.</i> , 2004
Snipe	3,450	Pennington <i>et al.</i> , 2004
Whimbrel	ca. 290	Jackson, 2009
Curlew	3,100 (2,300 - 3,975)	Pennington <i>et al.</i> , 2004
Redshank	1,170	Pennington <i>et al.</i> , 2004
Common sandpiper	44	Pennington <i>et al.</i> , 2004
Arctic skua	Was ca. 500 in 2000 Declining rapidly and now probably <250 pairs (JNCC report 71% decline for UK for 2000-2014)	Pennington <i>et al.</i> , 2004 JNCC (2015)
Great skua	6,874	Pennington <i>et al.</i> , 2004
Black-headed gull	850	Pennington <i>et al.</i> , 2004
Common gull	3,000	Pennington <i>et al.</i> , 2004
Arctic tern	24,716	Pennington <i>et al.</i> , 2004
¹ Where the information source indicates a range, the mean of the range is given.		

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Figures



Key

- Proposed B9075 Sandwater Road alignment
- Sandwater Road Bird Survey Area
- Site boundary

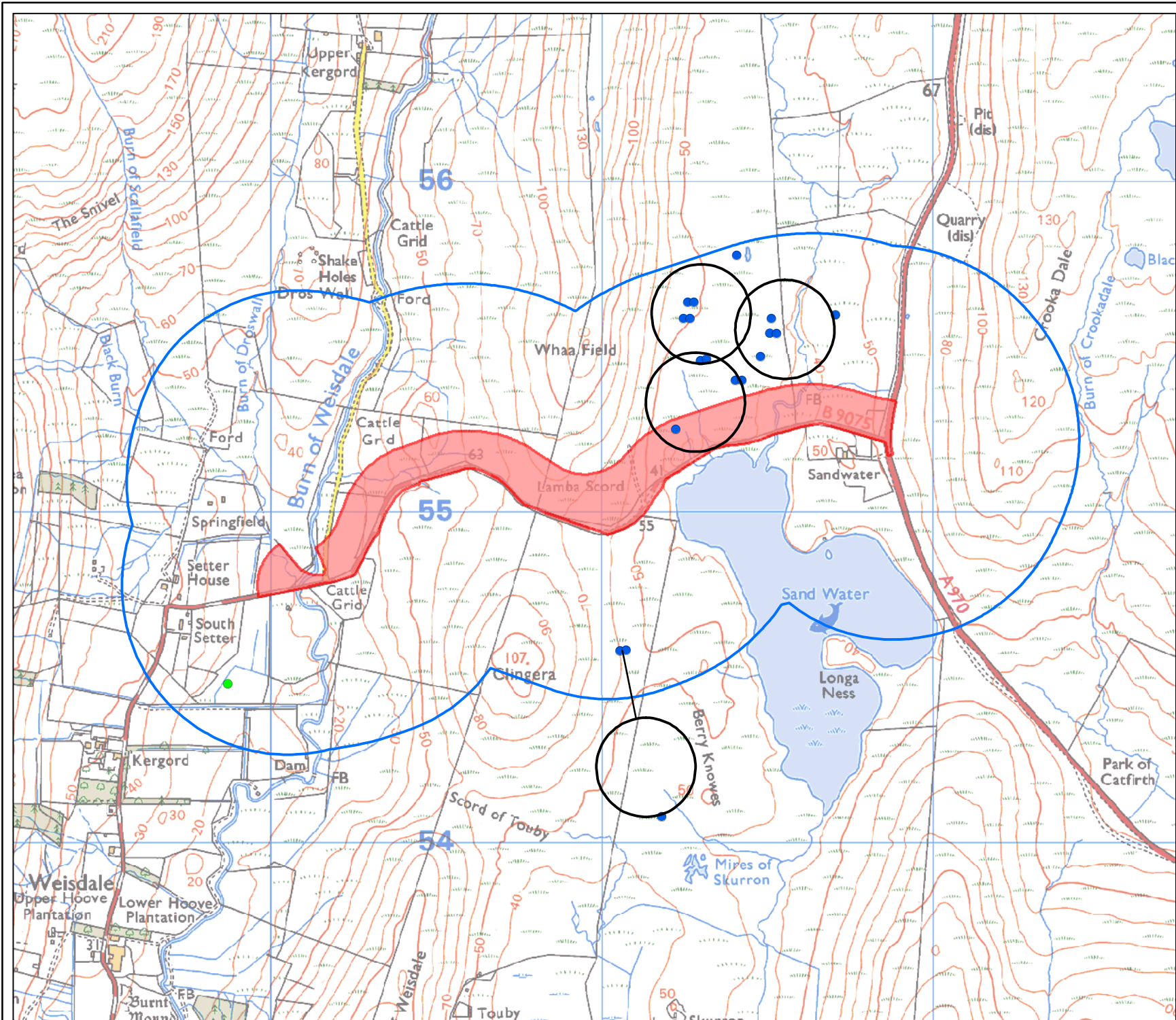
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0 0.25 0.5 km



Appendix 8.1, Figure 1
Sandwater Road Bird Survey Area and sub-areas

Sand Water Road (B9075)
Environmental Statement



Key

- Sandwater Road Bird Survey Area
- Site boundary
- Nominal territory centre
- Territorial bird
- Feeding bird

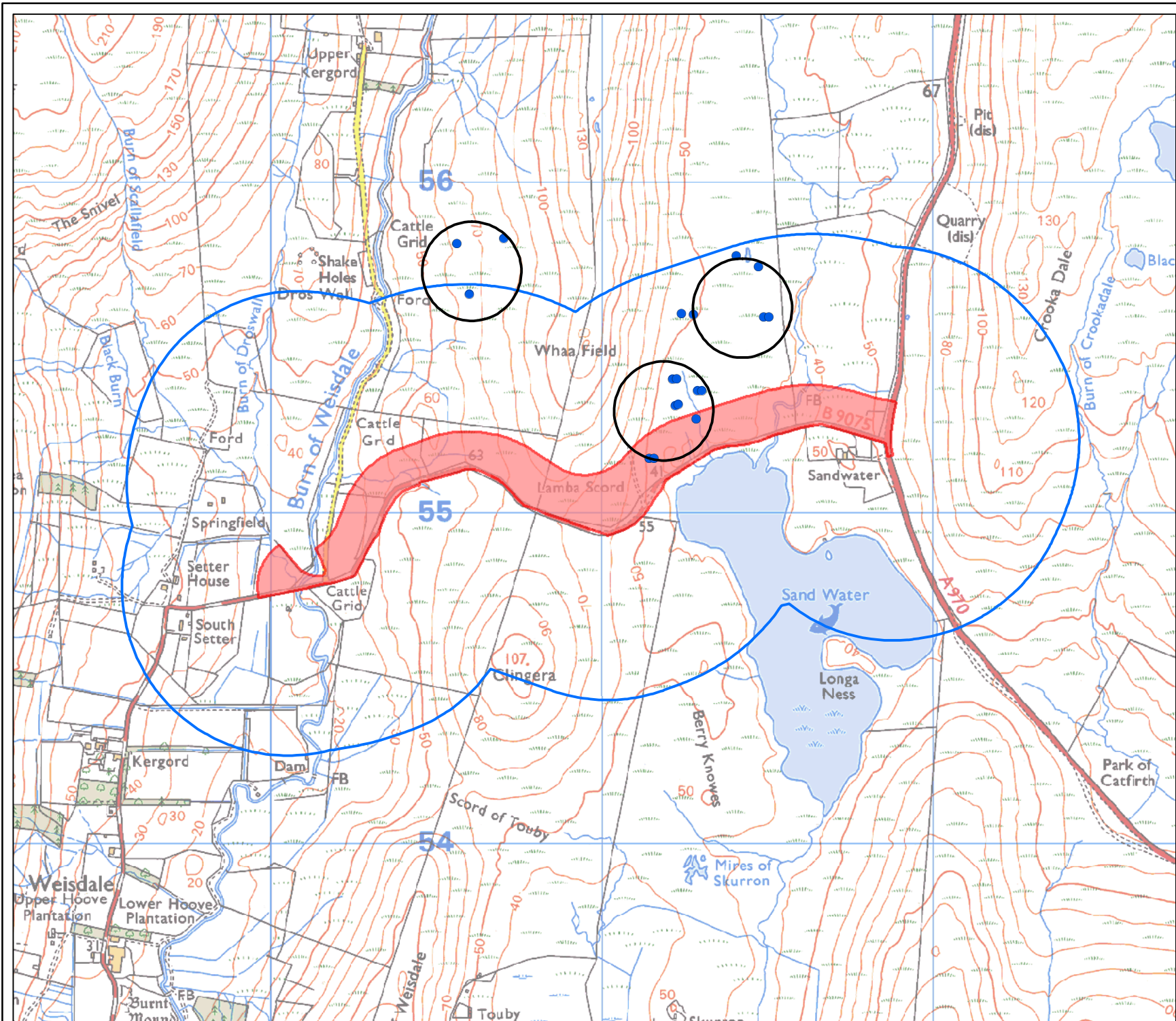
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Appendix 8.1, Figure 2. Whimbrel
The results of the 3-visit breeding bird survey undertaken in 2013

Sand Water Road (B9075)
Environmental Statement



Key

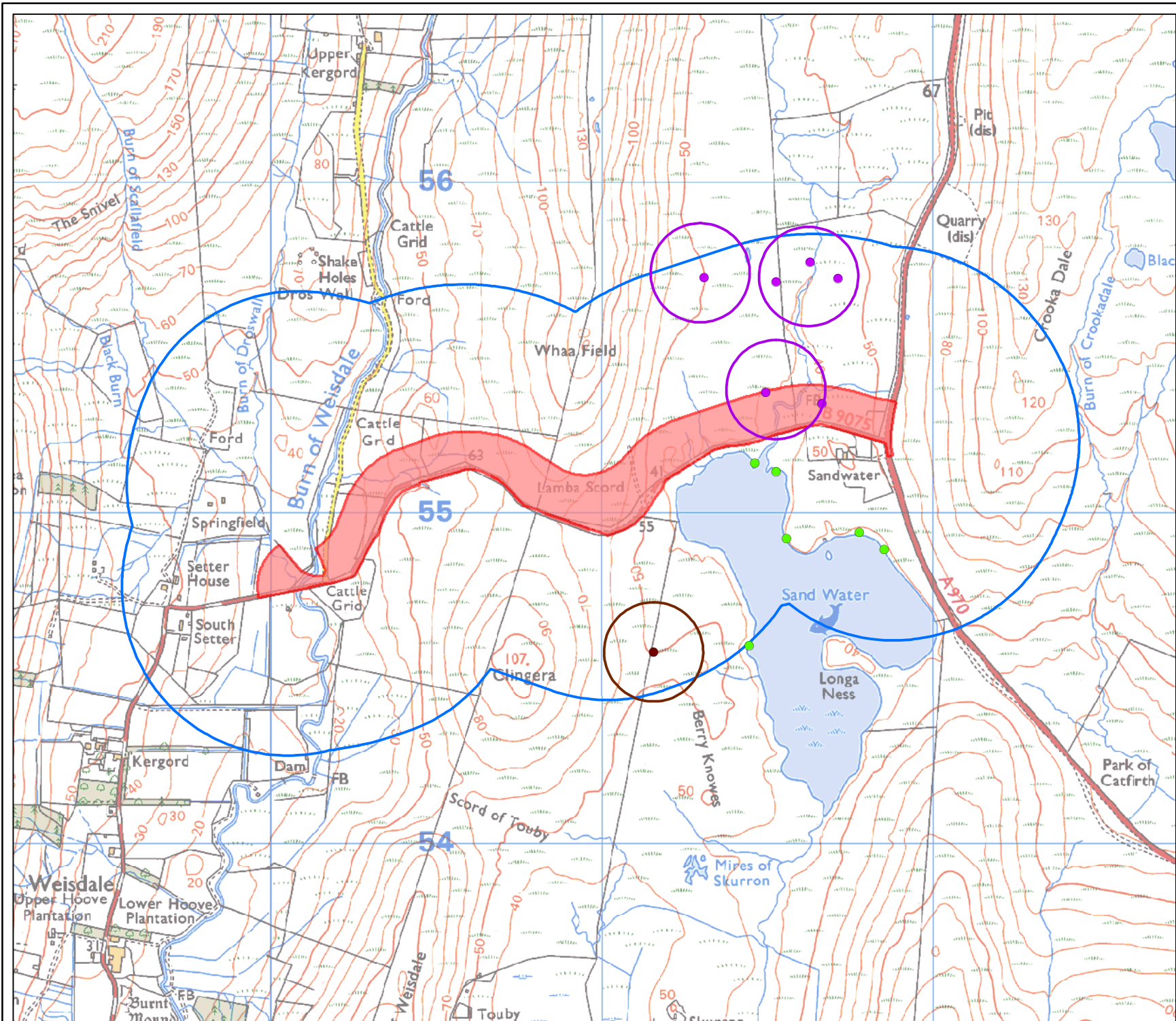
- Sandwater Road Bird Survey Area
- Site boundary
- Nominal territory centre
- Territorial bird

Scale 1:11,000 @ A4

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Appendix 8.1, Figure 3 Whimbrel
The results of the 4-visit breeding bird survey undertaken in 2015

Sand Water Road (B9075)
Environmental Statement



Key

Sandwater Road Bird Survey Area

Site boundary

Dunlin

Nominal territory centre

● Territorial bird

● Feeding bird(s)

Golden plover

Nominal territory centre

● Territorial bird

Scale 1:11,000 @ A4

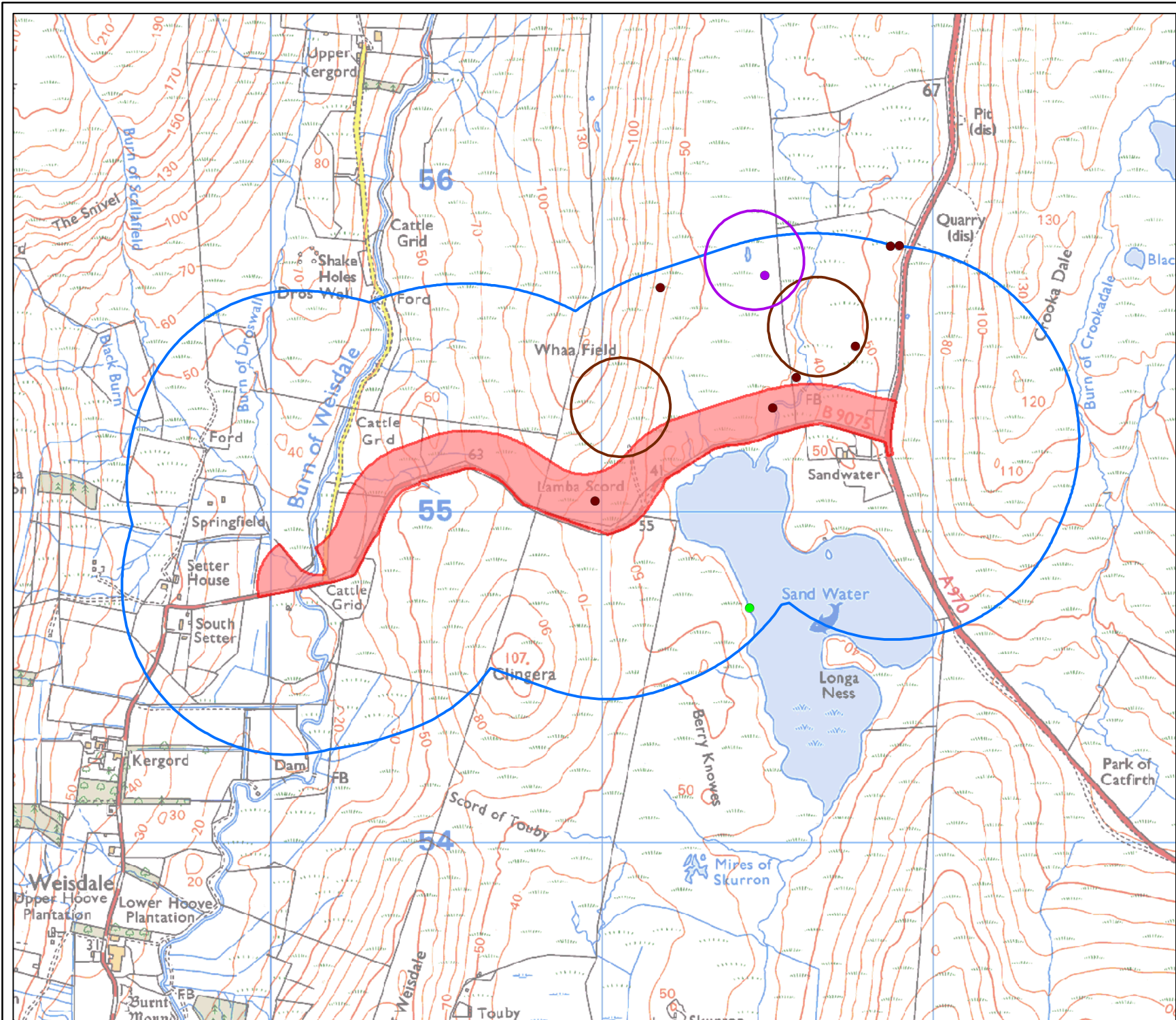
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Appendix 8.1, Figure 4 Dunlin and golden plover

The results of the 3-visit breeding bird survey undertaken in 2013

**Sand Water Road (B9075)
Environmental Statement**



Key

Sandwater Road Bird Survey Area

Site boundary

Dunlin

Nominal territory centre

● Territorial bird

● Feeding bird

Golden plover

Nominal territory centre

● Territorial bird

Scale 1:11,000 @ A4

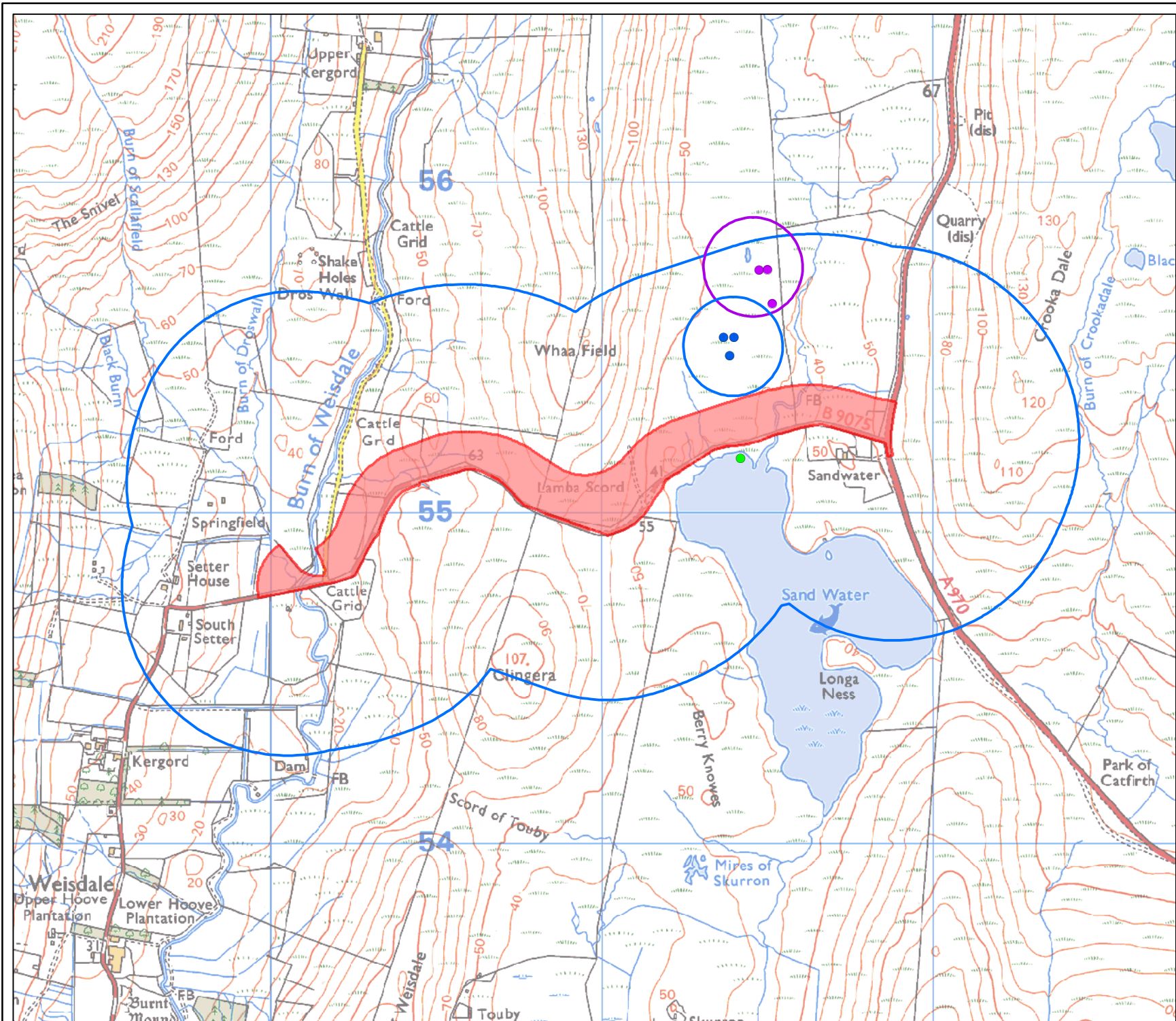
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Appendix 8.1, Figure 5 Dunlin and golden plover

The results of the 4-visit breeding bird survey undertaken in 2015

**Sand Water Road (B9075)
Environmental Statement**



Key

Sandwater Road Bird Survey Area

Site boundary

Arctic skua

Nominal territory centre

• Territorial bird

• Loading bird

Great skua

Nominal territory centre

• Territorial bird

Scale 1:11,000 @ A4

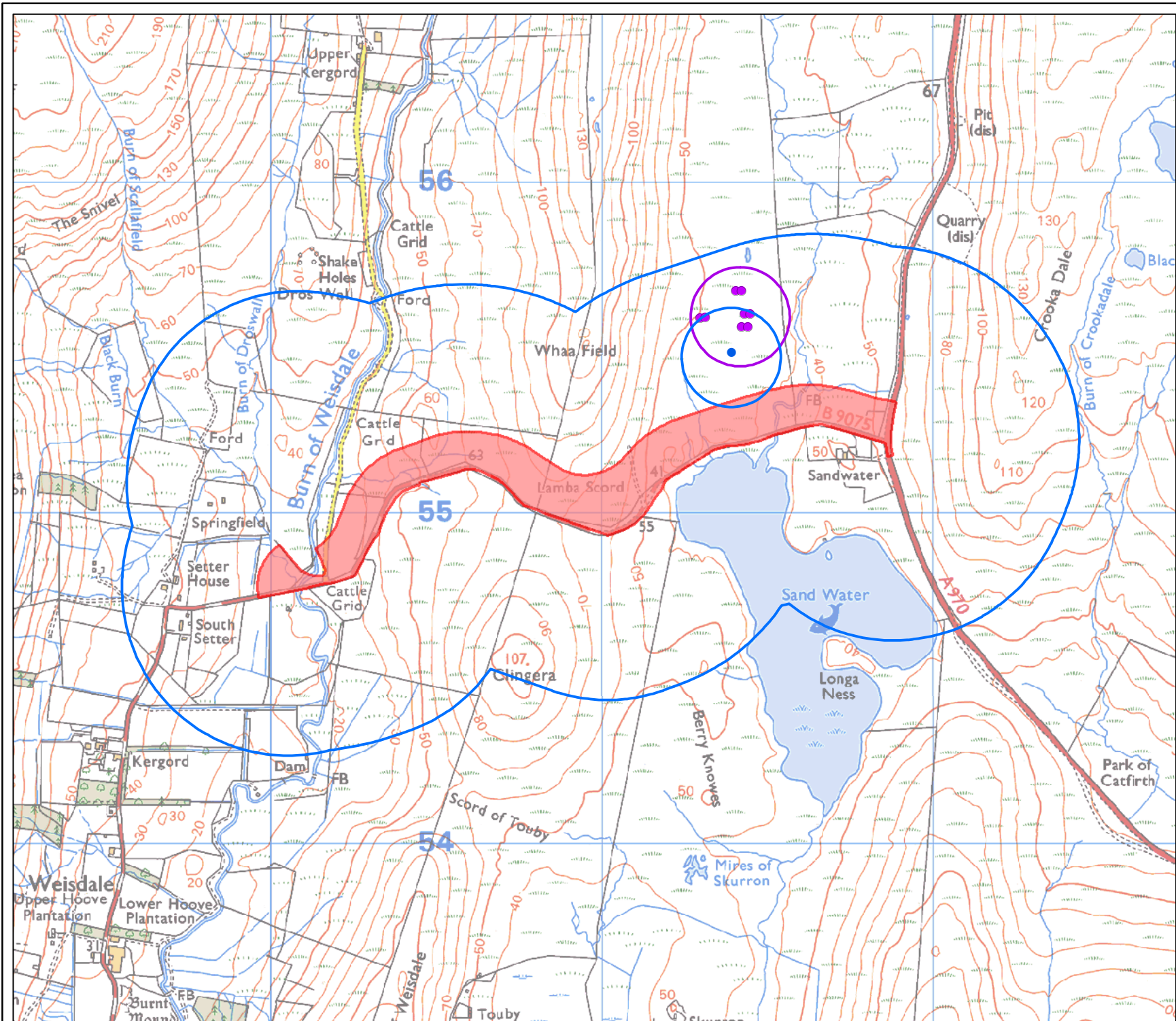
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Appendix 8.1, Figure 6 Arctic skua and great skua

The results of the 3-visit breeding bird survey undertaken in 2013

**Sand Water Road (B9075)
Environmental Statement**



Key

Sandwater Road Bird Survey Area

Site boundary

Arctic skua

Nominal territory centre

• Territorial bird

Great skua

Nominal territory centre

• Territorial bird

Scale 1:11,000 @ A4

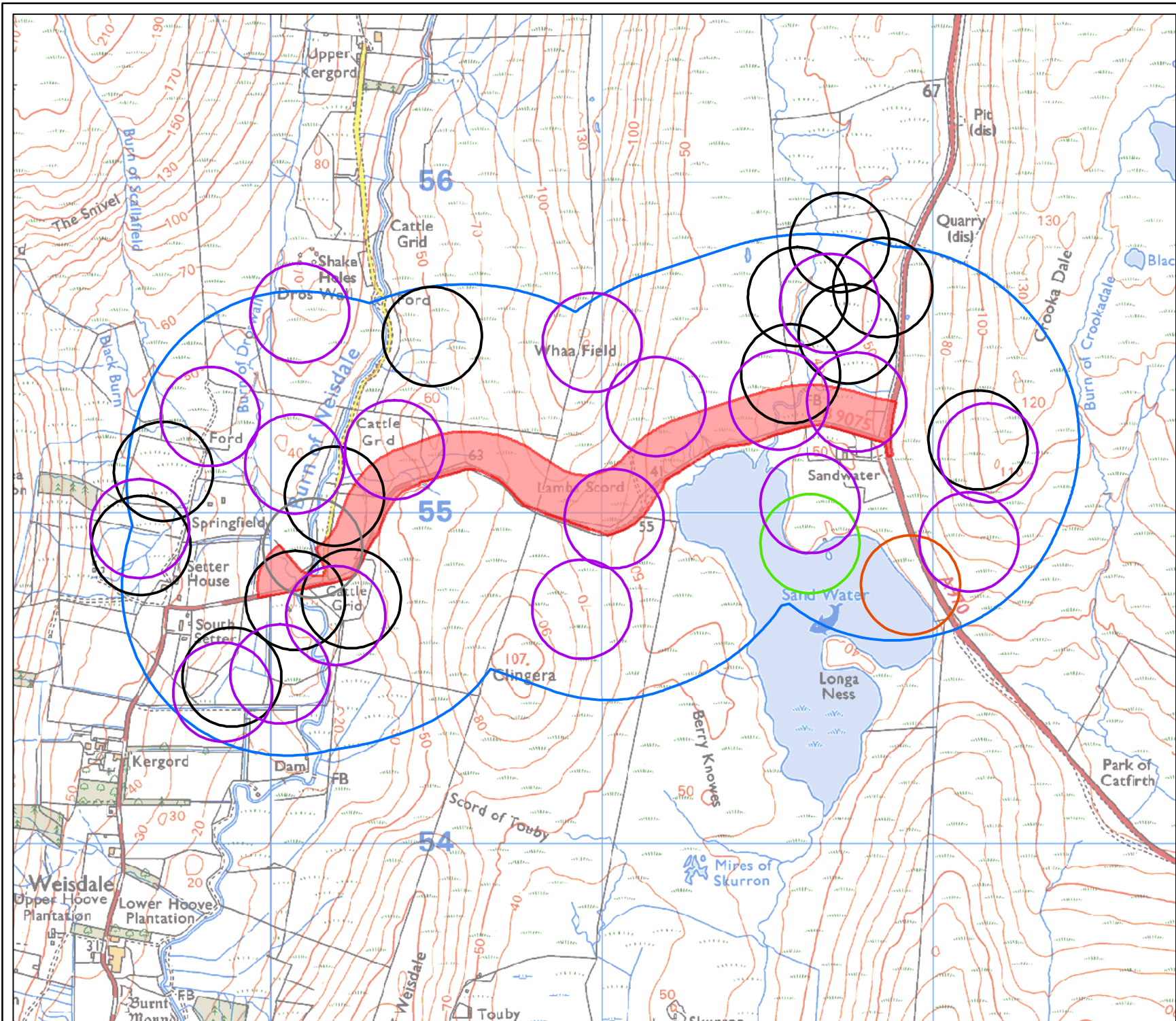
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Appendix 8.1, Figure 7 Arctic skua and great skua

The results of the 4-visit breeding bird survey undertaken in 2015

**Sand Water Road (B9075)
Environmental Statement**



Key

Sandwater Road Bird Survey Area

Site boundary

Nominal territory centre

Curlew

Lapwing

Ringed plover

Common sandpiper

Arctic tern (possible breeding)

Scale 1:11,000 @ A4

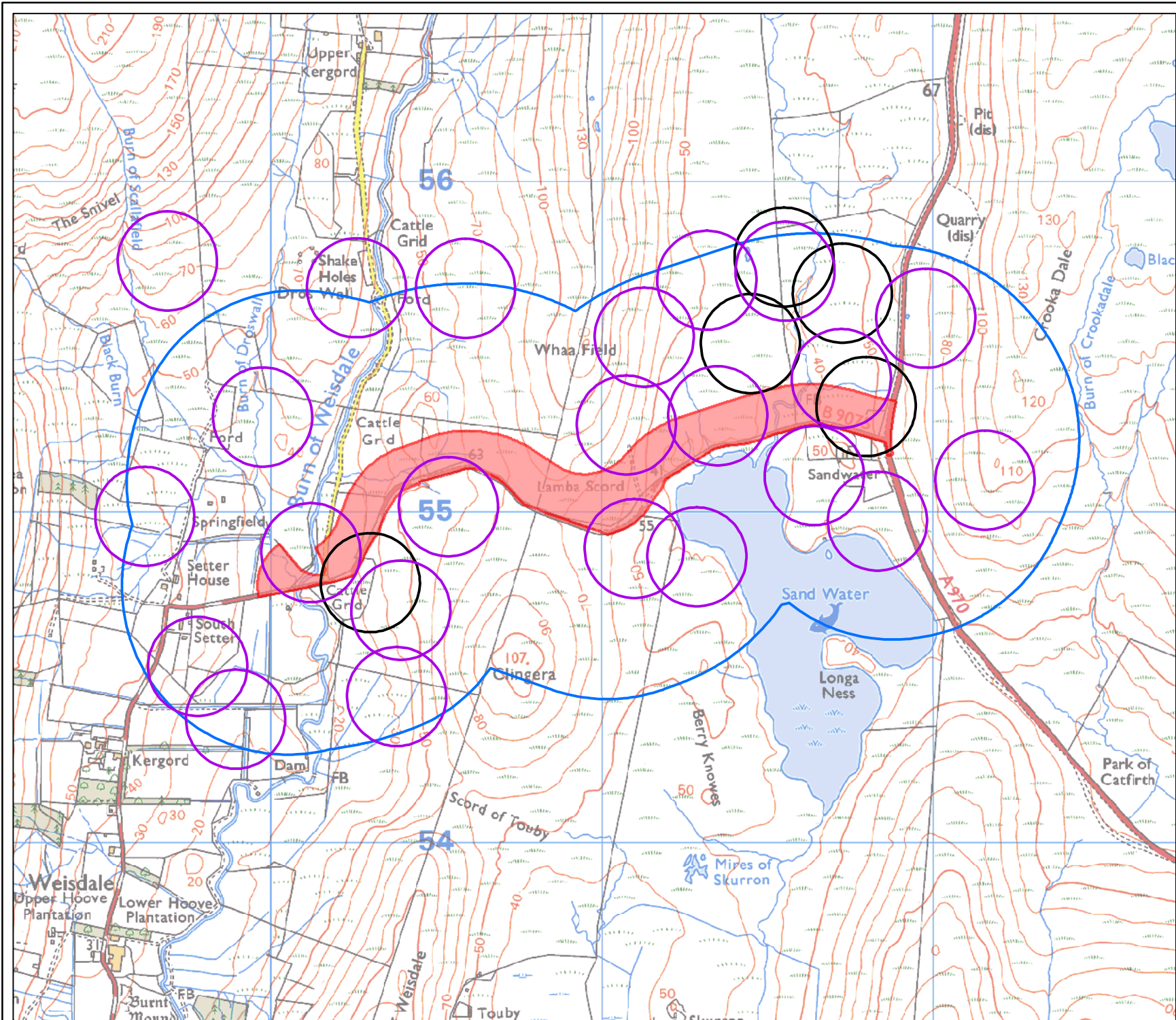
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Appendix 8.1, Figure 8 Curlew, lapwing, ringed plover, common sandpiper and Arctic tern.

The results of the 3-visit breeding bird survey undertaken in 2013

**Sand Water Road (B9075)
Environmental Statement**




Key

 Sandwater Road Bird Survey Area

 Site boundary

Nominal territory centre

 Curlew

 Lapwing

Scale 1:11,000 @ A4

0 0.25 0.5 km



Appendix 8.1, Figure 9 Curlew and lapwing

The results of the 4-visit breeding bird survey undertaken in 2015

**Sand Water Road (B9075)
Environmental Statement**