MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Alternative Ornithology Mitigation Note - Temporary

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Glossary

Term	Meaning
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
Biodiversity benefit	An approach to development that leaves biodiversity in a better state than before. Where a development has an impact on biodiversity, developers are encouraged to provide an increase in appropriate natural habitat and ecological features over and above that being affected. For the Transmission Assets, biodiversity benefit will be delivered within identified biodiversity benefit areas within the Onshore Order Limits. Further qualitative benefits to biodiversity are proposed via potential collaboration with stakeholders and local groups, contributing to existing plans and programmes, both within and outside the Order Limits.
Code of Construction Practice	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the ES.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Intertidal area	The area between Mean High Water Springs and Mean Low Water Springs.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).

Term	Meaning
Maximum design scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Mitigation measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morecambe OWL	Morecambe Offshore Windfarm Limited is owned by Copenhagen Infrastructure Partners' (CIP) fifth flagship fund, Copenhagen Infrastructure V (CI V).
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore export cables, landfall, and onshore infrastructure for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between JERA Nex bp (JNbp) and Energie Baden-Württemberg AG (EnBW).
National Grid Penwortham substation	The existing National Grid substation at Penwortham, Lancashire.
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substations.
Onshore export cable corridor	The corridor within which the onshore export cables will be located.
Onshore substations	The onshore substations will include a substation for the Morgan Offshore Wind Project: Transmission Assets and a substation for the Morecambe Offshore Windfarm: Transmission Assets. These will each comprise a compound containing the electrical components for transforming the power supplied from the generation assets to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning

Acronyms

Acronym	Meaning
AEoI	Adverse Effects on Integrity
AOD	Above Ordnance Datum
CoCP	Code of Construction Practice
CoT	Project Commitment
CMS	Construction Method Statement
DCO	Development Consent Order
ES	Environmental Statement
ExA	Examining Authority
FLL	Functionally Linked Land
HAT	Highest Astronomical Tide
HRA	Habitats Regulations Assessment
HDD	Horizontal Directional Drilling
ISAA	Information to Support an Appropriate Assessment
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NNR	National Nature Reserve
NSIP	Nationally Significant Infrastructure Project
PRoW	Public Rights of Way
RIES	Report on the Implications for European Sites
SAC	Special Areas of Conservation
SPA	Special Protection Area
SNCBs	Statutory Nature Conservation Bodies
SSSI	Sit of Special Scientific Interest

Units

Unit	Description
%	Percentage
km	Kilometres
m	Metres
nm	Nautical mile

1 Alternative Temporary Mitigation for Ornithology Technical Note

1.1 Purpose of the Note

1.1.1.1 The purpose of this note is to address comments raised by Natural England in its Deadline 7 submission (REP7-049) in response to the Examining Authority's (ExA) Rule 17 request for further information (dated 24 October 2025). The comments relate to the further alternative mitigation measures proposed by the Applicants in Appendix H of the Outline Ecological Management Plan (OEMP) (REP6-115). The Applicants proposed the alternative temporary mitigation measures to ensure there are no Adverse Effects on Integrity (AEoI) on the Ribble and Alt Estuary SPA and Ramsar sites in the unlikely event that the environmental mitigation areas at Lytham Moss (Work No. 35A/35B) and south of Newton-with-Scales (Work No. 49A/49B) cannot be delivered due to objections from aviation stakeholders (as set out in BAE Systems' closing statement (REP7-055)). In its submission Natural England acknowledged that the alternative mitigation is '*relevant in principle and if developed further and assessed could provide relevant mitigation'*, however further detail was required to be able to confirm if the measures would be feasible and effective.

1.1.1.2 The alternative temporary mitigation measures, which are outlined within Appendix H of the OEMP (REP6-115), are summarised below and further detail can be **found in section 1.2.4:**

- Screening of construction works in the vicinity of sensitive areas (such as Lytham Moss and south of Newton-with-Scales) during the sensitive overwintering period (i.e. between October and March) to reduce visual and noise disturbance impacts.
- Seasonal working practices i.e. scheduling of works to reduce/avoid working during periods of particular sensitivity (i.e. overwintering period between October and March) in the vicinity of sensitive areas (e.g. Lytham Moss and south of Newton-with-Scales).

1.1.1.3 Natural England's Deadline 7 submission (REP7-049) also raised comments regarding the use of the onshore substation sites by SPA species, in particular golden plover. Alternative permanent mitigation is considered in a separate note (Alternative Permanent Mitigation for Ornithology Technical Note).

1.1.1.4 The Applicants have continued to engage with Natural England to resolve the comments raised in their Deadline 7 submission (REP7-049). Revision 1 of this note was submitted to Natural England in December 2025. The focus of the note was on alternative temporary mitigation measures. Natural England provided written feedback, which was discussed in a meeting held in January 2026. The Applicants have updated the technical note in response to Natural England's comments regarding the temporary reinstatement of the onshore export cable corridor during winter periods of restricted working (see **paragraph**

1.2.3.7). This technical note should be read alongside the OEMP (Rev F07).**1.2.3.7**

1.1.1.5 Following resubmission of this note (F02) to Natural England with the amended text regarding temporary subsoil reinstatement, the Applicants received written confirmation on 11 March 2026 that Natural England is now satisfied with the proposed temporary alternative mitigation measures. Details on engagement with Natural England can be found in more detail in the Applicants' response to Secretary of State's Letter Dated 12 March 2026 in relation to status of discussions with Natural England.

1.2 Alternative temporary mitigation

1.2.1 Background information

1.2.1.1 The Applicants' position remains that the delivery of the environmental mitigation areas at Lytham Moss and south of Newton-with-Scales is the preferred mechanism to ensure that there are no AEoI on the features of the Ribble and Alt Estuary SPA and Ramsar sites. This is because the Lytham Moss and Newton-with-Scales areas provide the necessary mitigations to avoid AEoI (and significant adverse residual effects) from temporary construction related impacts by providing alternative habitat for relevant species during the construction phase.

1.2.1.2 The Applicants' selection of the Lytham Moss and south of Newton-with-Scales mitigation areas have been informed by existing populations of the key bird species (listed in **paragraph 1.2.5.2** and the key locations that support higher densities of these species (as identified from the Applicants' site surveys Volume 3, Annex 4.1: Breeding birds technical report (APP-091) and Annex 4.2: Wintering and migratory birds technical report (APP-092)). Site selection was also informed by site-specific factors (e.g. existing habitat) and overarching guiding principles (set out in Site selection of the environmental mitigation and biodiversity benefit areas (REP2-046)). This approach was applied to increase the effectiveness of the environmental mitigation areas to provide alternative habitat for displaced birds. The potential wildlife habitat attractants associated with these mitigation areas and the adaptive management approach that will be implemented to avoid an unacceptable increase in the bird strike risk have also been considered (see Outline Wildlife Hazard Management Plan (REP7-034)) and agreed with Blackpool Airport in relation to Lytham Moss.

1.2.1.3 The type of measures that will be implemented at Lytham Moss and south of Newton-with-Scales environmental mitigation areas are described in Appendix B of the OEMP (REP6-115) and a summary is provided in **Table 1.1** below. The location of the Lytham Moss and south of Newton-with-Scales mitigation areas are shown on **Figure 1-1**.

Table 1.1: Summary of the measures to be implemented at the Lytham Moss and south of Newton-with-Scales mitigation areas

Mitigation Area	Summary of measures
Lytham Moss	**Species:** This mitigation area is specifically designed for: • Pink-footed goose • Whooper swan • Shelduck • Teal • Golden plover • Black-tailed godwit **Size:** this mitigation area would temporarily occupy approximately 25 ha of land at Lytham Moss. This would be the maximum area required for mitigation of effects on functionally linked land and would be refined. **Measures:** Supplementary feeding – Providing food for impacted pink-footed geese and whooper swan Water management – Adding sluices to existing ditches to control and raise the water table to suit waders and wildfowl Creation of scrapes – Creating temporary scrapes to suit waders and wildfowl Grassland management – Keeping the sward short enough to benefit geese, swans and waders
Land south of Newton-with-Scales	**Species:** This mitigation area is specifically designed for: • Golden plover • Teal • Black-tailed godwit **Size:** this mitigation area would permanently occupy approximately 30 ha of land south of Newton-with-Scales. **Measures:** Water management – Adding sluices to existing ditches to control and raise the water table to suit waders and wildfowl Enhancement of scrapes to suit waders and wildfowl Grassland management – Ensuring that there is a varied sward height to suit different waders and wildfowl Rush management- Ensuring that the rush cover is kept to no more than 30% of the area

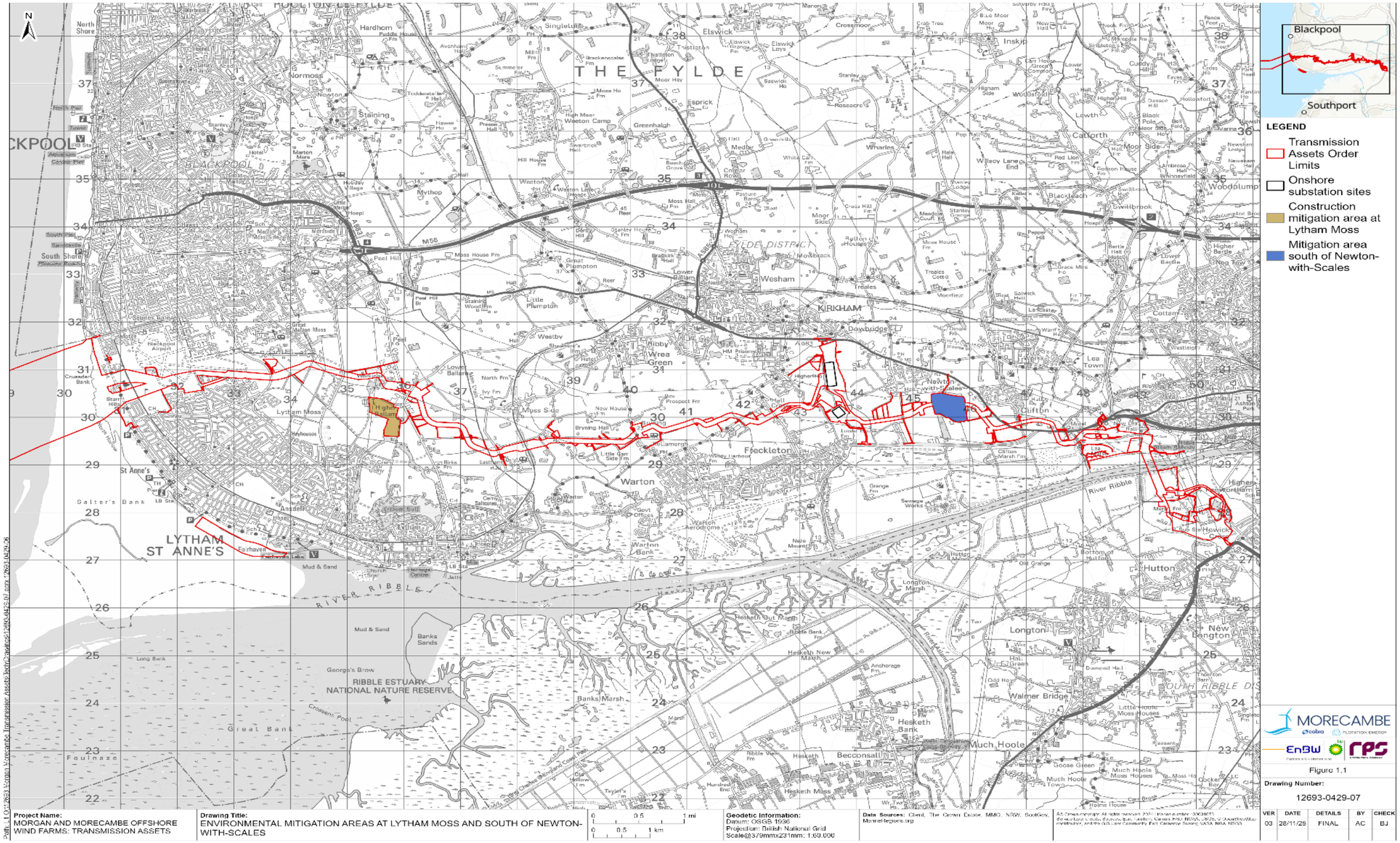

Figure 1-1: Environmental mitigation areas at Lytham Moss and south of Newton-with-Scales

1.2.1.4 In Question 14 of their RIES (PD-015) the ExA questioned the certainty and feasibility of delivering the environmental mitigation areas at Lytham Moss and south of Newton-with-Scales due to aviation concerns at Warton Aerodrome raised by aviation stakeholders regarding bird strike risk.

1.2.1.5 The Applicants can confirm that agreement has been reached with Blackpool Airport Operating Limited (BAOL) on all the proposed mitigation and biodiversity areas (including the mitigation required of the Ribble and Alt Estuaries SPA and Ramsar site) (REP6-175) and that the detailed Wildlife Hazard Management Plan would ensure there would be no unacceptable increase in bird strike risk. The Applicants note that the detailed Wildlife Hazard Management Plans will be prepared in accordance with the outline Wildlife Hazard Management Plan (REP7-034 and (following consultation with Natural England, MoD, BAE and BAOL) will be approved by the relevant planning authority prior to commencement of the construction, as secured under Requirement 27 of Schedules 2A and 2B of the draft Development Consent Order (DCO) (REP6-013).

1.2.1.6 The Applicants are continuing to pro-actively engage with BAE. However, in the unlikely event that agreement cannot be reached with BAE on the delivery of Lytham Moss and/or south of Newton-with-Scales mitigation areas, the Applicants have proposed alternative mitigation measures (see paragraph 1.1.1.2) to support the continued conclusion of no AEoI on the features of the Ribble and Alt Estuary SPA and Ramsar site. The Applicants note that the alternative measures are not the Applicants' preferred option however the measures are standard, recognised construction management practices and can be relied upon to ensure the avoidance of any AEoI by avoiding impacts on SPA species during sensitive periods.

1.2.1.7 Within this technical note the Applicants have provided further information on the alternative temporary mitigation measures and have assessed the implementation of these measures to demonstrate that there would be no AEoI on the SPA features as a result of the construction of the Transmission Assets Project.

1.2.2 Approach to assessment

1.2.2.1 To demonstrate that (with either environmental mitigation areas or alternative mitigation construction measures) the temporary impacts from construction activities (i.e. temporary loss of supporting habitat and/or resource availability and disturbance and displacement) will not lead to AEoI, the Applicants have considered different scenarios dependent upon which mitigation options are deliverable to calculate the number of birds that may be affected. The Applicants have then assessed how the environmental mitigation areas and alternative mitigation measures would reduce the number of birds affected to ensure there is no AEoI.

1.2.2.2 The environmental mitigation areas and alternative mitigation measures act to reduce the number of birds affected by either providing a safe alternative habitat for birds to use during construction or by removing the

source of construction impact in ornithologically sensitive locations within the Order Limits during sensitive times of the year.

1.2.2.3 The Applicants have used disturbance buffers, foraging ranges and current SPA populations to calculate and compare the number of birds predicted to be affected. An overview of the methodology is provided in section 1.2.6 with further detail provided in Appendix A.

1.2.3 Scenarios

1.2.3.1 The assessment within this technical note is based on scenarios that reflect how the mitigation areas and/or alternative mitigation measures may be implemented and demonstrates that each scenario would not lead to AEoI for the key SPA species. The scenarios are described below and are shown on **Figure 1-1**, **Figure 1-2** and **Figure 1-3.** A description of the alternative measures is provided in **section 1.2.4**.

1.2.3.2 The Applicants have not considered a scenario with the mitigation area at south Newton-with-Scales, plus alternative mitigation measures in the vicinity of Lytham Moss due to initial feedback received from BAE.

Scenario 1 – Lytham Moss and south of Newton-with Scales mitigation areas.

1.2.3.3 Scenario 1 is the delivery of the environmental mitigation areas at Lytham Moss and south of Newton with Scales (see **Figure 1-1**). It has been included within this technical note for completeness and for comparative purposes with Scenarios 2 and 3.

1.2.3.4 Scenario 1 was used in the Applicants' Habitats Regulations Assessment Stage 2 Information to Support an Appropriate Assessment (ISAA) Parts 1 to 3 (REP6-022, APP-016 and REP6-024). The scenario assumes that construction activity will take place throughout the Order Limits at the same time to represent the maximum temporary habitat loss and disturbance and displacement of the SPA species listed in section 1.2.5.

1.2.3.5 The Applicants have provided evidence in the Terrestrial Waterbird Note (Appendix F to the OEMP (REP6-115) demonstrating that the mitigation areas at Lytham Moss and south of Newton-with Scales are appropriate to mitigate the numbers of birds that would be affected in this scenario and justifies the conclusion of No AEoI.

Scenario 2 – Lytham Moss mitigation area only, plus alternative mitigation measures in vicinity of south of Newton-with-Scales and Lea Marsh

1.2.3.6 Scenario 2 is the delivery of the Lytham Moss mitigation area only (and NOT the area south of Newton-with-Scales) plus the implementation of seasonal working practices and screening of construction works within the areas shown on **Figure 1-2** in vicinity of south of Newton-with Scales to provide a disturbance free wintering refuge for displaced wildfowl and waders to move into.

1.2.3.7 There will be limited temporary habitat loss at land south of Newton-with-Scales as the sensitive habitats that are currently used by waterbirds are to be avoided by trenchless techniques (see F1.3.2 Environmental Statement Volume 1, Annex 3.2: Onshore Crossing Schedule (REP6-030)). Therefore, the majority of existing habitats will remain available for the birds. In addition, habitats adjacent to land south of Newton-with-Scales and land at Lytham Moss will be reinstated during construction prior to each winter period (October to March), to a condition that will support non-foraging birds (see the OEMP Rev F07). Note that topsoil and farmland habitats will be fully reinstated at the end of the construction process. The reinstatement of soils will be documented in the detailed Soil Management Plan (which forms part of the Code of Construction Practice (CoCP)) and is secured as a requirement of the DCO. The detailed Soil Management Plan will be prepared post-consent in accordance with Outline Soil Management Plan (REP6-091).

Scenario 3 – Alternative mitigation measures in vicinity of Lytham Moss and south of Newton-with-Scales and Lea Marsh

1.2.3.8 Scenario 3 assumes that the environmental mitigation areas at Lytham Moss and south of Newtown-with-Scales cannot be delivered. Alternative mitigation measures in the form of seasonal working practices and screening of construction works will be implemented within the areas shown on **Figure 1-3** in the vicinity of Lytham Moss and south of Newton-with-Scales.

1.2.3.9 Multiple underground utilities (including a Trans-Pennine Ethylene Pipeline) as well as several drains/ditches and a private access track are located within the south of Newton-with-Scales mitigation area. The construction of the onshore export cable will use trenchless techniques to cross these obstacles. The indicative location the trenchless crossing zone (as shown in Environmental Statement Volume 1, Annex 3.2: Onshore Crossing Schedule (REP6-030)) extends over 50% of the mitigation area's width. The use of trenchless techniques will, therefore, limit the temporary habitat loss and the majority of existing habitats will remain available for the birds. In addition, habitats adjacent to land south of Newton-with-Scales and land at Lytham Moss will be reinstated during and following the completion of construction (as described in **paragraph 1.2.3.7** and the OEMP Rev F07).

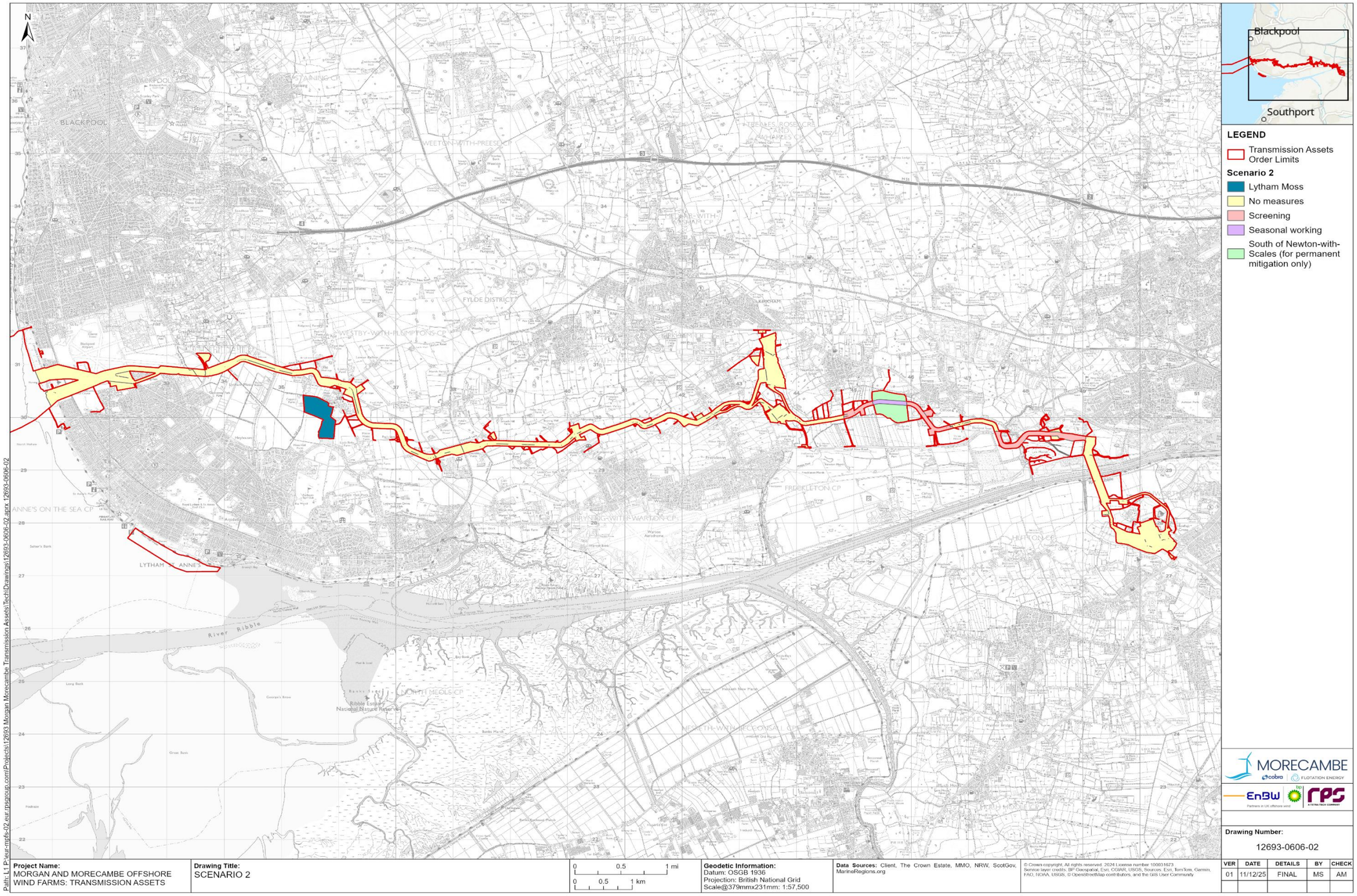

Figure 1-2: Scenario 2 - Lytham Moss mitigation area only, plus alternative mitigation measures in vicinity of south of Newton-with-Scales and Lea Marsh

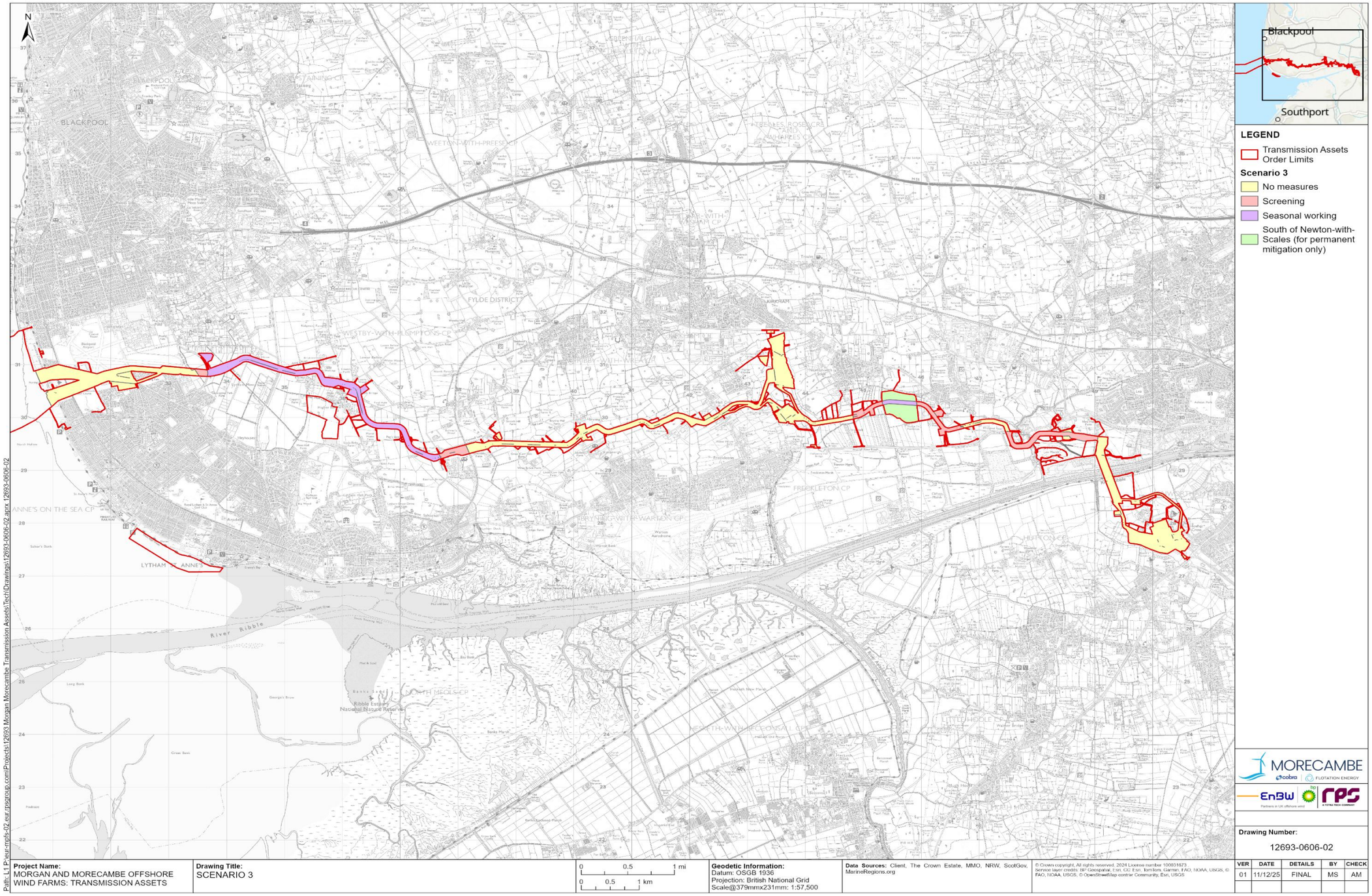

Figure 1-3: Scenario 3 - Alternative mitigation measures in vicinity of Lytham Moss and south of Newton-with-Scales and Lea Marsh

1.2.4 Alternative temporary mitigation measures

1.2.4.1 The alternative temporary mitigation measures are outlined in Appendix H of the OEMP (REP6-115) and summarised in paragraph 1.1.1.2. The purpose of the measures is to remove the potential impacts during construction within sensitive ornithological locations of the Transmission Assets Order Limits and at times of the year when the SPA features are in their greatest numbers. Desk-top data including the mapping of Functionally Linked Land (FLL) by Natural England (Bowland Ecology, 2021) (as shown on **Figure 1-4)** and the Applicants' survey data has been used to identify areas where seasonal working and screening of construction activities will have the greatest benefits for waterbirds(i.e. to ensure no AEoI for key SPA species). These areas are shown on **Figure 1-2** and **Figure 1-3**.

1.2.4.2 **Figure 1-4** illustrates that the area surrounding Lytham Moss is an area with high waterbird use. Therefore, the Lytham Moss area has been identified as an area where seasonal working practices could be implemented

1.2.4.3 The primary objective of the mitigation area south of Newton-with-Scales is to provide permanent alternative habitat for non-breeding waders due to the permanent habitat loss at the onshore substations. However, the south of Newton-with-Scales area also mitigates temporary construction impacts within the onshore export cable corridor. **Figure 1-4** illustrates that this area contains numbers of teal, black-tailed godwit and shelduck and has habitats suitable to support other waders and wildfowl. Therefore, the Applicants consider that seasonal work practices could also be implemented at the south of Newton-with-Scales.

1.2.4.4 **Figure 1-4** also shows that Lea Marsh occasionally contains shelduck and teal. To mitigate the temporary construction impacts on these species, the Applicants consider screening of construction activities within this area is appropriate.

Scheduling of works - seasonal working practices

1.2.4.5 This measure involves the restriction of construction activities during periods where the SPA features occur in their highest densities in areas of the onshore export cable corridor. Restricting the timing of construction activities in areas with high densities of birds effectively removes the impact. This measure is regularly used to avoid disturbance impacts to both breeding and non-breeding birds including elsewhere on the Transmission Assets project. For example, the Transmission Assets Project has agreed with Natural England to implement seasonal restrictions in the Liverpool Bay SPA and for the intertidal works within the Ribble and Alt Estuaries SPA and Ramsar site to eliminate impacts on marine and intertidal ornithological features.

1.2.4.6 For the installation of the onshore export cable, the Applicants propose that **no** construction activities will be undertaken during the period of October to March (inclusive) within the areas highlighted for the

particular scenario (see **Figure 1-2** and **Figure 1-3**.) This timeframe corresponds to when terrestrial habitats are sufficiently wet to provide suitable conditions for the features of concern.

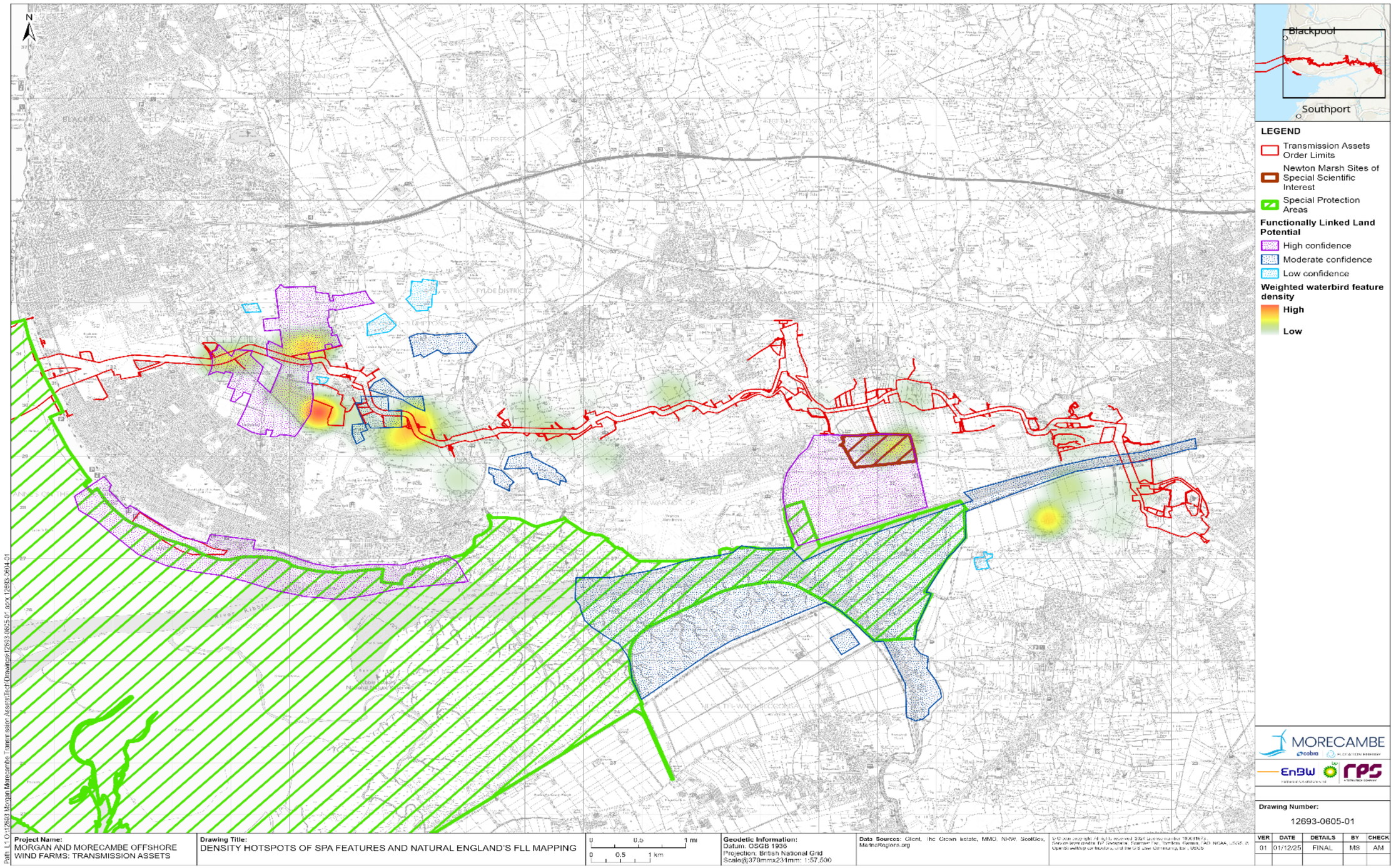

Figure 1-4: Density hotspots of SPA features and Natural England's FLL mapping

Screening

1.2.4.7 Screening of construction works/activities reduces disturbance from acoustic or visual impacts by introducing a barrier to the line of sight or that blocks the pathway of sound. This follows the same principle as natural features (e.g. hedgerows) to which birds are accustomed to.

1.2.4.8 During the sensitive period between October and March (inclusive), screening will be provided around activities associated with the installation of the onshore export cable in defined sections of the onshore cable corridor. Screening will also be required around temporary access tracks from the public highway leading to the onshore cable corridor. These sections of the onshore export cable corridor are identified on **Figure 1-2** and **Figure 1-3**.

1.2.4.9 Some of the construction activities where screening will be provided are:

- Surrounding trenchless technique compounds and entry or exit pits.
- Excavation and construction of joint bays.
- Trench excavation works.
- Movement of construction vehicles/equipment along temporary access tracks leading from the highway network to the onshore cable corridor.
- Screening of temporary construction compounds (see the Outline Onshore Construction Method Statement (REP7-036) for indicative locations).

1.2.4.10 Although visual screening can effectively reduce disturbance impacts on birds, loud noises, especially percussive noises, can also disturb birds at distance. The loudest equipment to be used during construction is likely to be up to 117dB(A) for a crusher used in the construction of the onshore substations, whereas within the onshore cable corridor maximum noise levels will be up to 109dB(A) for a vibratory piling rig which may be used at trenchless installation locations. These noise assumptions have been modelled within Volume 3, Annex 8.2: Construction noise and vibration (REP6-065).

1.2.4.11 Cutts *et al.* (2013) developed a tool based upon a standard sound decay rate overview table and using an acceptable noise level of 70dB (A) at which disturbance responses are considered to be acceptable **(Figure 1-5**). This highlights that for the majority of construction activities (e.g., up to 109dB(A)), the noise would have decayed to acceptable levels by approximately 70 m. Even the loudest of noise impacts at the onshore substations are likely to have little impact after 200 m from source.

Metres from Source	dB(A)										
0.67	120	110	100	95	90	85	80	75	70	65	60
1.33	114	104	94	89	84	79	74	69	64	59	54
2.67	108	98	88	83	78	73	68	63	58	53	48
5.33	102	92	82	77	72	67	62	57	52	47	42
10.67	96	86	76	71	66	61	56	51	46	41	36
20.67	90	80	70	65	60	55	50	45	40	35	30
42.67	84	74	64	59	54	49	44	39	34	29	24
85.33	78	68	58	53	48	43	38	33	28	23	
170.67	72	62	52	47	42	37	32	27	22		
341.33	66	56	46	41	36	31	26	21			
682.66	60	50	40	35	30	25	20				
1365.32	54	44	34	49	24						

Figure 1-5: Noise disturbance on waterbirds (from Cutts *et al.*, 2013). Red = high impact, yellow/amber = moderate and green = acceptable level.

1.2.4.12 Design of the screening, if required, will be confirmed during detailed design and will be informed by the specific site conditions at that location (e.g. topography), the type and duration of the construction activity and the proximity of other receptors. Acoustic screens will also be appropriate to the level of attenuation required to reduce noise levels to acceptable levels. Examples of screening measures include solid panel herras fencing and the placement of soil bunds along the onshore cable corridor from the construction of the haul road and installation of the onshore export cable. The design of the acoustic screening will be documented within the detailed Construction Noise and Vibration Management Plan (which forms part of the CoCP and is secured as a requirement of the DCO) and summarised in the detailed Ecological Management Plan.

1.2.5 Scope of this section

1.2.5.1 The scope of this section of the technical note focuses on the following sites:

- The Ribble and Alt Estuaries SPA; and
- The Ribble and Alt Estuaries Ramsar site.

SPA named features

1.2.5.2 This section of the technical note focuses on the six non-breeding species for which FFL was agreed with Natural England following the

submission of REP4-120 (updated to reflect Natural England's final position in Appendix F of REP6-115) and are listed below:

- Whooper swan
- Pink-footed goose
- Shelduck
- Teal
- Golden plover
- Black-tailed godwit.

Impacts

1.2.5.3 This section of the technical note assesses temporary impacts associated with construction activities. These impacts were evaluated in the Applicants' ISAA (REP6-022, APP-016 and REP6-024)) and are listed below:

- Temporary loss of supporting habitats and/or resource availability during the construction phase; and
- Disturbance and displacement from construction activities.

1.2.6 Methodology for the assessment

1.2.6.1 The methodology used to quantify and assess the impacts of habitat loss and disturbance on SPA features is described in Appendix A. The assessment in this technical note is based on data collected during site-specific surveys carried out between September and March 2022/2023 and 2023/2024. Fourteen monthly surveys were undertaken during this period and the data provides a robust baseline with good survey coverage. The methodologies and results of the surveys are reported in Volume 3, Annex 4.1: Breeding birds technical report (APP-091), Annex 4.2: Wintering and migratory birds technical report (APP-092 and APP-093), and Annex 4.3: Intertidal birds technical report (APP-093).

1.2.6.2 The survey data used within the assessment was compiled using the following steps:

1. The current population estimates, foraging ranges, and disturbance distances were compiled for each species.
2. The ES data were assigned to different disturbance buffers and different areas to calculate the number of birds affected under the different Scenarios (see Appendix A for full details).
3. The foraging ranges were clipped to a simple habitat envelope which identified suitable habitats based upon existing land use datasets (Corine Land Cover, 2018).
4. The proportions of foraging ranges and numbers of birds affected by habitat loss and displacement were quantified by disturbance buffer and by Scenario.

5. These results were then compared to existing SPA populations, known or likely areas of FLL and the current trends and species ecology where appropriate. The frequency of occurrence was used alongside peak counts to determine the importance of the terrestrial habitats for the waterbird features.

1.2.7 Results

1.2.7.1 For the complete detailed results please refer to Appendix A. However, **Table 1.2** below summarises the mean number of birds present (and potentially affected) under each Scenario.

- Scenario 1 has already been assessed. However, the results highlight that the original assessment was highly precautionary and there are a range of lesser impacts that represent a more realistic situation.
- Scenario 2 assumes that all whooper swan and pink-footed geese are mitigated for through the provision of food at Lytham Moss. It also assumes that numbers of shelduck, teal, golden plover and black-tailed godwit will be mitigated for through the creation of scrapes, muddy areas and wet grassland at Lytham Moss, and that there will be avoidance of working between October and March at land south of Newton-with-Scales with no habitat loss, this will provide a disturbance free wintering refuge for displaced wildfowl and waders to move into at the eastern end of the corridor.
- Scenario 3 assumes that there are no impacts where works are scheduled to avoid the October – March (inclusive) period. The potential impacts are greatly reduced for all species with only pink-footed goose present in mean numbers exceeding 1% of the current SPA population. In fact, impacts are reduced by 92% for black-tailed godwit, 87% for whooper swan, 81% for teal and 74% for pink-footed goose (see Appendix A for further detail). The reduction of impacts was lower on shelduck as these were well-distributed throughout the survey area, and golden plover as these were only recorded in significant numbers on one occasion and well-distributed.

Table 1.2: Summary of the mean percentage of the current SPA population potentially affected by temporary habitat loss and displacement through all three scenarios..

Species	Foraging range	Disturbance buffer	Mean % of the current SPA population					
			Temporary habitat loss	100m displacement	200m displacement	300m displacement	400m displacement	500m displacement
Scenario 1								
Whooper swan	5km	200 – 500m	0.5	0.9	**1.5**	**1.6**	**1.6**	**4.0**
Pink-footed goose	20km	200 – 500m	**1.4**	**2.7**	**5.2**	**6.1**	**7.0**	**8.9**
Shelduck	20km	100 – 400m	0.1	0.6	0.7	0.8	0.9	**1.2**
Teal	2km	200 – 500m	0.0	0.2	0.5	0.8	**1.3**	**2.0**
Golden plover	10km	200 – 500m	0.1	0.4	0.4	0.4	0.4	0.7
Black-tailed godwit	10km	100 – 200m	0.0	0.1	0.2	0.7	0.8	**1.5**
Scenario 2								
Whooper swan	5km	200 – 500m	Whooper swan will be fully mitigated for at Lytham Moss					
Pink-footed goose	20km	200 – 500m	Pink-footed goose will be fully mitigated for at Lytham Moss					
Shelduck	20km	100 – 400m	Shelduck will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales					
Teal	2km	200 – 500m	Teal will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales					
Golden plover	10km	200 – 500m	Golden plover will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales					
Black-tailed godwit	10km	100 – 200m	Black-tailed godwit will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales					
Scenario 3								
Whooper swan	5km	200 – 500m	0.5	0.5	0.5	0.5	0.5	0.6
Pink-footed goose	20km	200 – 500m	**1.4**	**1.4**	**1.6**	**1.8**	**2.2**	**2.3**
Shelduck	20km	100 – 400m	0.1	0.5	0.6	0.7	0.7	**Beyond disturbance buffer for this species**
Teal	2km	200 – 500m	0.0	0.1	0.2	0.4	0.4	0.4
Golden plover	10km	200 – 500m	0.1	0.3	0.3	0.3	0.3	0.3
Black-tailed godwit	10km	100 – 200m	0.0	0.1	0.1	**Beyond disturbance buffer for this species**		

The pale lime shaded cells indicate the lower end of a species disturbance range and the purple the upper. For Scenario 1 all species were assessed at the maximum disturbance so the blue cells show a more realistic upper values

1.2.8 Assessment conclusions

1.2.8.1 For the full assessment please refer to Appendix A, However, **Table 1.3** below summarises the conclusions and justifications.

- For Scenario 1 the potential impacts have already been assessed and agreement reached that this option avoids AEoI.
- For Scenario 2 most birds will be mitigated for through supplementary feeding and habitat creation at Lytham Moss as assessed under Scenario 1. For the remaining teal, golden plover and black-tailed godwit, the seasonal working practices (i.e., no working between October and March) in the vicinity of land south of Newton-with-Scales will provide a disturbance free waterbird refuge that the birds can continue to use during construction (see **Figure 1-2**). The Applicants therefore consider that Scenario 2 avoids AEoI.
- For Scenario 3 the impacts are hugely reduced through the seasonal working practices (i.e., no working between October and March) at Lytham Moss and land south of Newton-with-Scales and the screening of works bordering these areas and at Lea Marsh (see **Figure 1-3**). The Applicants therefore consider that Scenario 3 avoids AEoI.

1.2.8.2 It should however be noted that this assessment is highly precautionary as it is based upon the following unrealistic assumptions, namely:

- 100% of birds will be displaced – This is an unrealistic assumption as the Lancashire coastal farmland is situated in an area with a high human population density and many birds will be habituated to pedestrians, road traffic and farm machinery, and many more birds may habituate during construction activities as construction will take place within predictable boundaries (e.g., as found for whooper swan by Liu, et al. , 2018). Therefore, it is likely to be only a proportion of the reported bird numbers that may be impacted by construction works at any one time.
- Screening does not influence displacement – Natural and artificial screening is an unquantifiable factor that is likely to reduce displacement distances through reducing the line of sight between foraging birds and the construction activities. The existing presence of hedges, trees and roads will all help to reduce impacts on birds located in fields beyond the construction areas, as will the proposed visual and acoustic screening around the works.
- Construction is continuous and simultaneous in all areas – Although phasing for all of the work areas cannot be provided at this stage, it is highly unlikely that works would take place in all areas at the same time for both projects, with construction instead being localised, and generally in bursts of short duration in any one area and at any one time. Therefore, the number of birds impacted at any one time in any given winter will be much lower than those

reported, however, as the phasing details are not available the most precautionary example is presented in this assessment.

1.2.8.3 Therefore, these factors have been taken into consideration when interpreting the number of birds that might be impacted at any one time, and the use of the mean number of birds (i.e., taking into account abundance and frequency) gives a more realistic estimate of the impacts to the Ribble and Alt Estuaries SPA and Ramsar site than one off peak counts.

1.2.8.4 Additionally, the habitats that are predicted to be impacted are largely intensively farmed arable and pasture habitats. These habitats are generally of low ecological value, they are widespread and readily available throughout the region, and any impacts are quickly reversible. It should also be noted that the majority of these farmed fields are currently not protected or managed for bird interests, and land use and crop types/rotations can change from year-to-year dependent upon an individual farmers inclination.

Table 1.3: A summary of the Appropriate Assessment carried out for all three Scenarios

Scenario	Description	Mitigation	Potential impact	Relevant features	Conclusion	Justification
1.	The scenario that was originally assessed in APP-017. Assumes that mitigation for displaced birds is provided at Lytham Moss and land south of Newton-with-Scales.	**Lytham Moss** – Habitat creation and supplementary feeding provide mitigation for all impacted whooper swan, pink-footed goose and shelduck, whilst also providing some mitigation for teal, golden plover and black-tailed godwit. **Land south of Newton-with-Scales** – Habitat creation provides mitigation for all remaining teal, golden plover and black-tailed godwit.	Temporary loss of supporting habitats and/or resource availability during the construction phase. Disturbance and displacement from construction activities	Whooper swan Pink-footed goose Shelduck Teal Golden plover Black-tailed godwit	No adverse effect on the integrity of the site	Natural England has already agreed that, with the implementation of mitigation areas at Lytham Moss and land south of Newton-with-Scales, there would be No AEoI for the Ribble and Alt Estuaries SPA and Ramsar site.
2.	This scenario assumes that the Lytham Moss mitigation area is deliverable but that the mitigation area south of Newton-with-Scales is not. However, within the vicinity of Newton-with-Scales a seasonal restriction between October – March (inclusive) will be implemented and visual and acoustic screening used near the land south of Newton-with-Scales and at Lea Marsh.	**Lytham Moss** – Habitat creation and supplementary feeding provide mitigation for all whooper swan and pink-footed goose, whilst also providing some mitigation for shelduck, teal, golden plover and black-tailed godwit. **Land south of Newton-with-Scales** – Avoidance of working between October and March inclusive provides a disturbance free wintering refuge for teal, golden plover and black-tailed godwit. Screening in the area bordering this makes sure that disturbance is limited. **Lea Marsh** – Screening limits disturbance to shelduck and teal	Temporary loss of supporting habitats and/or resource availability during the construction phase	Whooper swan Pink-footed goose	No adverse effect on the integrity of the site	This Scenario assumes that all whooper swan and pink-footed goose are mitigated for by the supplementary feeding at Lytham Moss. Agreement was reached with Natural England during the DCO examination that, with the implementation of the Lytham Moss mitigation area, there would be No AEoI for the whooper swan and pink-footed geese of the Ribble and Alt Estuaries SPA and Ramsar site (see REP6-193 for Natural England's position).
				Shelduck Teal Golden plover Black-tailed godwit	No adverse effect on the integrity of the site	Less than 1% of the SPA population will be affected by temporary habitat loss (see Appendix A). In addition, there will be limited temporary habitat loss at the land south of Newton-with-Scales.
			Disturbance and displacement from construction activities	Whooper swan Pink-footed goose	No adverse effect on the integrity of the site	This scenario assumes that all whooper swan and pink-footed goose are mitigated for by the supplementary feeding at Lytham Moss and agreement was reached with Natural England that, with the implementation of mitigation area at Lytham Moss, there would be No AEoI for the Ribble and Alt Estuaries SPA and Ramsar site (see REP6-193 for Natural England's position).
				Shelduck Teal Golden plover Black-tailed godwit	No adverse effect on the integrity of the site	Mean numbers of these species were below 1% of the current SPA population with the area lost to displacement showing no sign of functional linkage (see Appendix A). In addition, the disturbance free refuge at land south of Newton-with-Scales will be available to displaced birds.

Scenario	Description	Mitigation	Potential impact	Relevant features	Conclusion	Justification
3.	This scenario assumes that neither mitigation areas are deliverable and that the project must rely upon avoiding working between October – March at Lytham Moss and land south of Newton-with-Scales. In addition, visual and acoustic screening will be used in areas bordering the seasonal working areas and at Lea Marsh.	**Lytham Moss** –Avoidance of working between October and March provides a disturbance free wintering refuge for whooper swan, pink-footed goose, shelduck, teal, golden plover and black-tailed godwit. Additional screening in the area bordering this makes sure that disturbance is limited. **Land south of Newton-with-Scales** – Avoidance of working between October and March inclusive provides a disturbance free wintering refuge for teal, golden plover and black-tailed godwit. Screening in the area bordering this makes sure that disturbance is limited. **Lea Marsh** – Screening limits disturbance to shelduck and teal	Temporary loss of supporting habitats and/or resource availability during the construction phase	Pink-footed goose	No adverse effect on the integrity of the site	Mean numbers of pink-footed goose in the area of temporary habitat loss are above 1% of the current SPA population (see Appendix A). However as, it is mostly intensively farmed arable and pasture habitats that will be impacted, there is an abundance of similar alternative habitats in the vicinity, the impact is temporary and reversible, and pink-footed geese are currently in very favourable condition and adaptable, it is concluded that temporary loss of habitat and/or resource availability would have a negligible impact on pink-footed goose within the Ribble and Alt Estuaries SPA and Ramsar site. Therefore, there are no predicted AEoI for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase. In addition, habitats at Lytham Moss will be restored to a state that supports non-foraging birds (i.e., roosting and loafing prior to winter periods throughout the construction process).
				Whooper swan Shelduck Teal Golden plover Black-tailed godwit	No adverse effect on the integrity of the site	Less than 1% of the SPA population will be affected by temporary habitat loss (see Appendix A). In addition, habitats at Lytham Moss will be restored to a state that supports non-foraging birds (i.e., roosting and loafing) prior to winter periods throughout the construction process
			Disturbance and displacement from construction activities	Pink-footed goose	No adverse effect on the integrity of the site	Mean numbers of pink-footed goose in the area of displacement are above 1% of the current SPA population (see Appendix A). However as, it is mostly intensively farmed arable and pasture habitats that will be impacted, there is an abundance of similar alternative habitats in the vicinity, the impact is temporary and reversible, and pink-footed geese are currently in very favourable condition and adaptable, it is concluded that temporary loss of habitat and/or resource availability would have a negligible impact on pink-footed goose within the Ribble and Alt Estuaries SPA and Ramsar site. Therefore, there are no predicted AEoI for the impact of disturbance and displacement during the construction phase.

Scenario	Description	Mitigation	**Potential impact**	**Relevant features**	**Conclusion**	**Justification**
				Whooper swan Shelduck Teal Golden plover Black-tailed godwit	No adverse effect on the integrity of the site	Mean numbers of these species were below 1% of the current SPA population (see Appendix A) with the area lost to displacement showing no sign of functional linkage. In addition, the disturbance free refuges at Lytham Moss and land south of Newton-with-Scales will be available to displaced birds.

1.2.9 Conclusion

- The Applicants have demonstrated that there are a number of options available that avoid AEoI on the Ribble and Alt Estuaries SPA and Ramsar site should their proposed mitigation areas not be deliverable due to objections from aviation stakeholders at Warton Aerodrome.
- The Applicants have provided data for a number of mitigation Scenarios and justified their conclusions based upon these site-specific data and using widely accepted foraging ranges and disturbance buffers.
- The Applicants have not relied solely upon peak count data nor habitat envelopes but have instead used frequency and compared the number of birds against the available area that they were recorded within to reach these conclusions.
- The Applicants have also drawn upon the known population dynamics and species' ecology where appropriate when reaching these conclusions.
- The Applicants note the numbers of birds predicted to be impacted within this assessment is overly precautionary as it includes the unrealistic assumptions that:
  - 100% of birds will be displaced.
  - Existing screening will not reduce displacement distances.
  - Works will be continuous and simultaneous throughout the entire infrastructure area for the duration of construction.
- There are No AEoI for any of the three assessed Scenarios. Therefore, there are three Appropriately Assessed construction methods available to the Applicants regardless of the outcome of discussions with the DIO/BAE that also provide flexibility on the mitigation options secured.

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Appendix A: Information to Support an Appropriate Assessment of the Alternative Temporary Mitigation Scenarios

MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Appendix A: Information to Support an Appropriate Assessment of the Alternative Temporary Mitigation Scenarios

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Morgan Offshore Wind Limited, Morecambe Offshore Windfarm Ltd

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Glossary

Term	Meaning
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
Biodiversity benefit	An approach to development that leaves biodiversity in a better state than before. Where a development has an impact on biodiversity, developers are encouraged to provide an increase in appropriate natural habitat and ecological features over and above that being affected. For the Transmission Assets, biodiversity benefit will be delivered within identified biodiversity benefit areas within the Onshore Order Limits. Further qualitative benefits to biodiversity are proposed via potential collaboration with stakeholders and local groups, contributing to existing plans and programmes, both within and outside the Order Limits.
Code of Construction Practice	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the ES.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Intertidal area	The area between Mean High Water Springs and Mean Low Water Springs.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.

Term	Meaning
Maximum design scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Mitigation measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morecambe Offshore Windfarm: Generation Assets	The offshore generation assets and associated activities for the Morecambe Offshore Windfarm.
Morecambe Offshore Windfarm: Transmission Assets	The offshore export cables, landfall, and onshore infrastructure required to connect the Morecambe Offshore Windfarm to the National Grid.
Morecambe OWL	Morecambe Offshore Windfarm Limited is owned by Copenhagen Infrastructure Partners' (CIP) fifth flagship fund, Copenhagen Infrastructure V (CI V).
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore export cables, landfall, and onshore infrastructure for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Generation Assets	The offshore generation assets and associated activities for the Morgan Offshore Wind Project.
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between JERA Nex bp (JNbp) and Energie Baden-Württemberg AG (EnBW).
National Grid Penwortham substation	The existing National Grid substation at Penwortham, Lancashire.
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substations.
Onshore export cable corridor	The corridor within which the onshore export cables will be located.
Onshore Order Limits	See Transmission Assets Order Limits: Onshore (below).
Onshore substations	The onshore substations will include a substation for the Morgan Offshore Wind Project: Transmission Assets and a substation for the Morecambe Offshore Windfarm: Transmission Assets. These will each comprise a compound containing the electrical components for transforming the power supplied from the generation assets to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.

Acronyms

Acronym	Meaning
AEoI	Adverse Effects on Integrity
AOD	Above Ordnance Datum
CoCP	Code of Construction Practice
CoT	Project Commitment
CMS	Construction Method Statement
DCO	Development Consent Order
DESNZ	Department for Energy Security & Net Zero
EnBW	Energie Baden-Württemberg AG
EIA	Environmental Impact Assessment
ES	Environmental Statement
ExA	Examining Authority
EWG	Expert Working Group
FLL	Functionally Linked Land
HRA	Habitats Regulations Assessment
HDD	Horizontal Directional Drilling
ISAA	Information to Support an Appropriate Assessment
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
PRoW	Public rights of way
RIES	Report on the Implications for European Sites
SAC	Special Areas of Conservation
SPA	Special Protection Area
SNCBs	Statutory Nature Conservation Bodies
SSSI	Sit of Special Scientific Interest

Units

Unit	Description
%	Percentage
km	Kilometres
m	Metres

Unit	Description
nm	Nautical mile

1 Appendix A: Information to Support an Appropriate Assessment of the Alternative Temporary Mitigation Scenarios

1.1 Introduction

1.1.1.1 The information provided in this document is to support the appropriate assessment of the potential for adverse effects caused by the temporary impacts of the Morgan and Morecambe Offshore Wind Farms: Transmission Assets (referred to hereafter as 'Transmission Assets') during construction only. The potential impact of permanent loss of supporting habitat and/or resource availability is dealt with in a separate note (Alternative Permanent Mitigation for Ornithology Technical Note). This document provides information to assess the three alternative mitigation scenarios as described in Appendix H of J6 Outline Ecological Management Plan (Clean) - Rev F06 (REP6-115), and has been provided to demonstrate that the Transmission Assets has other available construction options to avoid Adverse Effects on Integrity (AEoI) of the Ribble and Alt Estuaries Special Protection Area (SPA) and Ramsar site should the preferred mitigation areas at Lytham Moss and land south of Newton-with-Scales be unviable due to conflict with the aviation interests of BAE and the DIO at Warton Aerodrome.

1.1.1.2 The Transmission Assets are required to deliver 2GW of offshore renewable energy to the grid from the Morgan Offshore Windfarm and the Morecambe Offshore Windfarm. The Generation Assets are already consented, and the Transmission Assets have already made considerable commitments to avoid impacts within the Liverpool Bay SPA and the Ribble and Alt Estuaries SPA and Ramsar site through the avoidance of works within the protected areas between November and March The remaining temporary impacts of construction are all on arable and pasture land outside of the SPA and these impacts on farmland are all temporary in nature and quickly reversible following the cessation of works.

1.1.1.3 The Applicants adopted an overly precautionary approach in the original application. This has led to an overestimation of predicted effects because it assumes that 100% of birds are displaced, that neither natural nor artificial screening reduces disturbance distances, and that construction occurs continuously and simultaneously across the entire infrastructure area for the whole construction period. These assumptions are unrealistic: construction is more likely to be localised, sporadic and short-term in any one location. Consequently, only a portion of the reported bird numbers is likely to be affected at any one time, and birds will be able to move freely between impacted and non-impacted areas.

1.1.1.4 This document is an appendix to the Alternative Mitigation for Ornithology Technical Note and provides full details and the data used to reach the conclusions on AEoI for the Ribble and Alt Estuaries SPA and Ramsar site. This document should be read in conjunction with the

technical note which presents details on the alternative mitigation scenarios that have been assessed, and with Habitats Regulations Assessment Stage 2 Information to Support an Appropriate Assessment Part Three – Special Protection Areas (SPA) and Ramsar Site assessments (REP6-024) which presents the full appropriate assessment for Scenario 1 for the Ribble and Alt Estuaries SPA and Ramsar sites features.

1.1.1.5 Numerical values within this assessment have been rounded to whole numbers where it represents the number of individuals, and one decimal place where it represents a percentage of a population or area. For species with small populations rounding artefacts may be noticed (e.g., with whooper swan). These are not numerical errors.

1.2 Methodology for the assessment

1.2.1 Bird parameters

1.2.1.1 To quantify habitat loss and disturbance on SPA features, existing knowledge of the birds present was collated, including the current population estimates, the foraging range (i.e., the typical distances birds travel on daily foraging trips), and the distances from which they are likely to be disturbed. These parameters are set out in **Table 1** below.

Table 1: The parameters used for the assessment

Species	Foraging range	Assumed disturbance buffer *	SPA citation population	WeBS recent population estimate **
Whooper swan	5 km[1]	200 – 500 m	182	759
Pink-footed goose	20 km[1]	200 – 500 m	11,764	31,474
Shelduck	20 km[2]	100 – 400 m	4,925	5,571
Teal	2 km[3]	200 – 500 m	7,157	7,427
Golden plover	10 km[4]	200 – 500 m	3,598	5,471
Black-tailed godwit	10 km[5]	100 – 200 m	1,273	5,154

[1] NatureScot (2016), [2] Cimiotti *et* al. (2022), [3] Stroud *et al*. (2016), [4] Natural England (2023), [5] Jourdan *et al*. (2022), * Goodship & Furness (2022), ** Calbrade, *et al*. (2025) for the Ribble and Alt WeBS sites combined

1.2.2 Data collection

1.2.2.1 The data used to inform the assessments were collected during baseline site-specific surveys carried out between September and March in the 2022/23 and 2023/24 winter periods and are the same data that were used to inform the ES (APP-090) and HRA (REP6-024) assessments. Fourteen monthly surveys were completed during these periods.

1.2.2.2 The primary method of data collection was through driven and walked transects that aimed to cover the entire survey area once a month over a one to two week period, the amount of time spent covering a monthly visit varied depending on the weather and ground conditions and the number of birds present but on average each monthly visit took approx. seven days (full details on the survey dates can be found in Volume 3, Annex 4.2: Wintering and migratory birds technical report – Part 1 of 2 (APP-092)).

1.2.2.3 The coverage of these surveys was good with **69%** of the survey area visited every month in 2022/23 and **83%** in 2023/24 (these estimates do not include urban areas as these were not surveyed). Full details on coverage can be found in F3.4.4 Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies (APP-095) and is shown in **Figure 1** and **Figure 2**.

1.2.2.4 Birds in flight were excluded from further analysis because no impacts are predicted to the airspace through which they transit. Golden plover recorded in the onshore substation area were also excluded, as these birds have already been assessed for permanent habitat loss, which is assumed to occur in addition to and concurrently with temporary habitat loss.

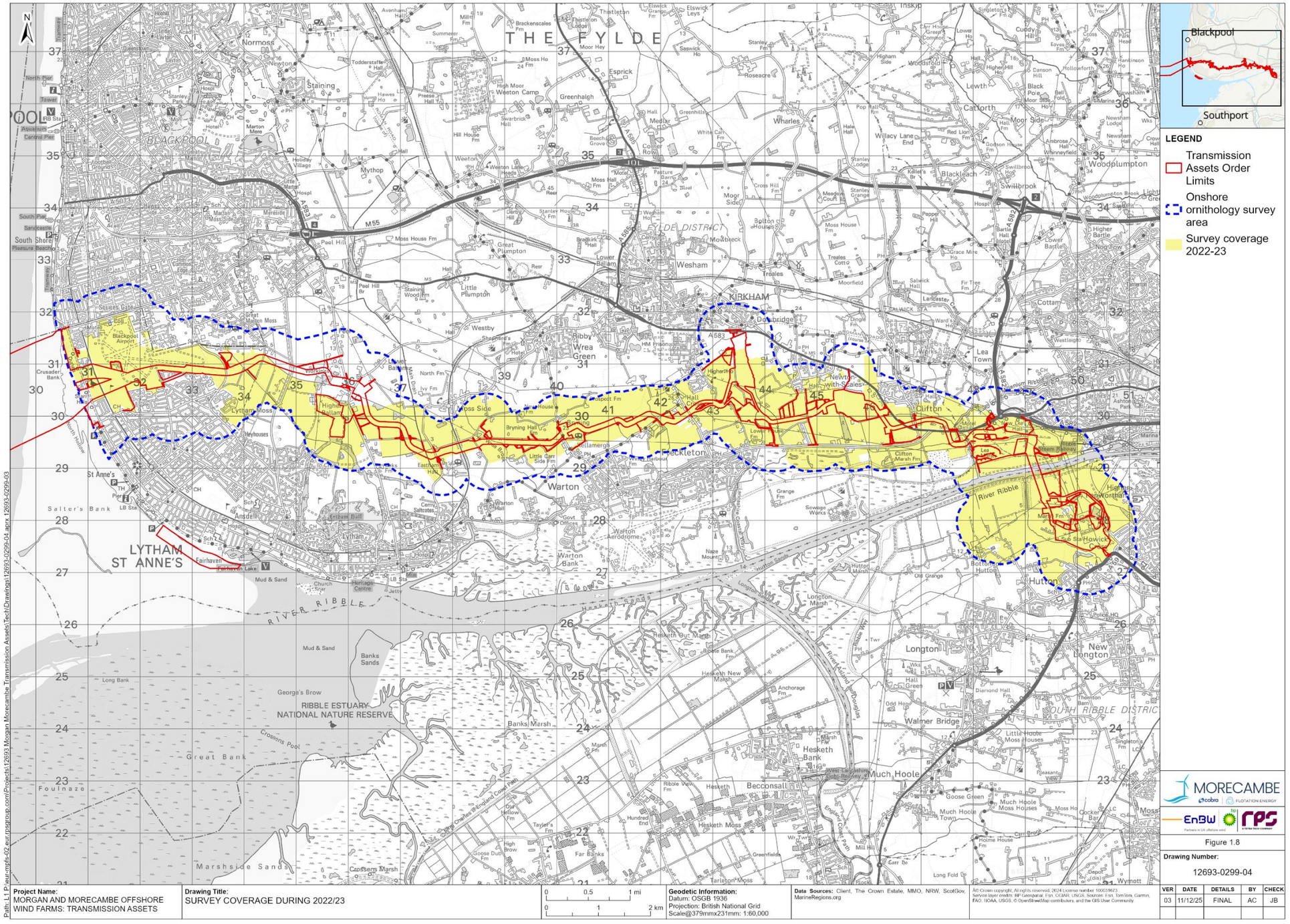

Figure 1: Monthly coverage of the Transmission Assets 2022/23 winter terrestrial waterbird surveys

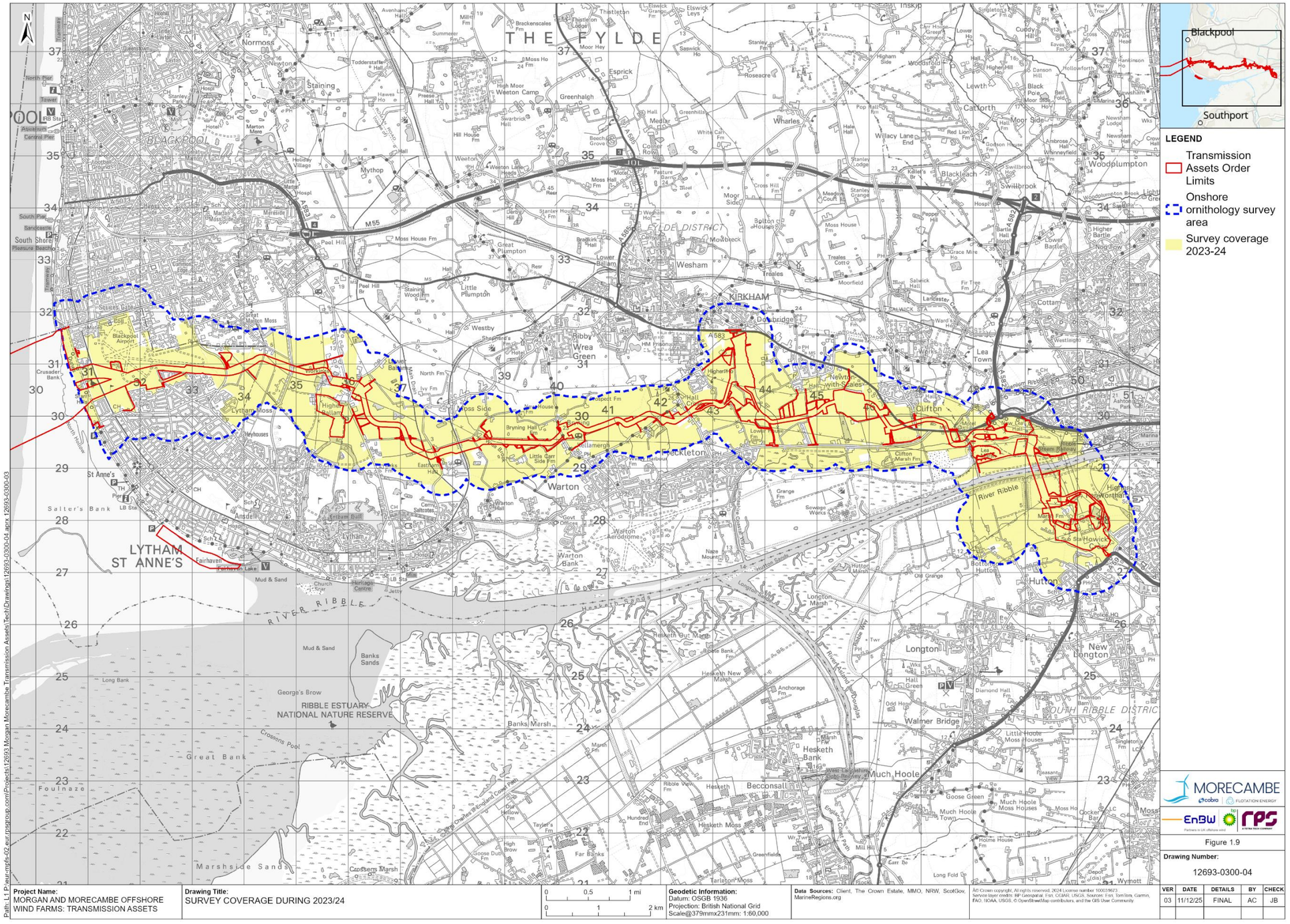

Figure 2: Monthly coverage of the Transmission Assets 2023/24 winter terrestrial waterbird surveys

1.2.3 Quantifying temporary loss of supporting habitats and/or resource availability from construction activities

1.2.3.1 For the purposes of the assessment, temporary loss of supporting habitats and/or resource availability is defined as **land directly lost to a receptor** (i.e., a change from the current land use). To calculate this, the entire footprint of the onshore infrastructure (i.e., the maximum footprint of the proposed works areas) was compared against the Copernicus Land Cover (CLC) dataset. The terrestrial species of concern associated with the SPA depend on both arable land and pasture surrounding the SPA. Therefore, the Applicants calculated the area of arable land and pasture that would be temporarily lost as a result of the Project (i.e., the footprint of the project that overlaps arable and pasture). In reality, this is precautionary, as many areas will be crossed with trenchless techniques such as Horizontal Directional Drilling (HDD), where there will be much lower amounts of habitat loss. The land south of Newton-with-Scales is one such area where trenchless techniques are being used to preserve the ecological integrity of the land, leaving it available for foraging waterbirds.

1.2.3.2 During their relevant representation, Natural England raised concerns regarding the Applicants habitat assumptions, RI_H6:
"*Natural England do not agree with the Applicant's HRA conclusions. We note that the current conclusions are based on modelled information on likely habitat availability. This is often based on out-of-date information and models that claim urban/infrastructure areas are available foraging habitat*."

1.2.3.3 Therefore, the Applicants have updated the assessment in this appendix in the light of the above comment to ensure that only suitable habitats are used and that out-of-date roost sites are removed. The Applicants consider that this approach is robust to assess potential impacts of loss of supporting habitats and/or resource availability to SPA features.

1.2.3.4 Whilst it is beyond the remit of this assessment to fully model habitat usage within the maximum 20 km foraging range of these species, it is noted that Natural England have attempted to define FLL in the wider area (Bowland Ecology, 2021), and the Applicants have used this data in conjunction with their own extensive survey data to identify areas where seasonal working and screening would have the greatest benefits for waterbirds.

1.2.3.5 The Applicants have calculated the area of suitable habitat (i.e., arable land and pasture) within species-specific foraging ranges measured from the boundary of the SPA/Ramsar site. This buffering approach follows the same method used in Natural England report NECR483 (Bowland Ecology, 2023) and does not rely on dated roost site knowledge. This is illustrated in **Figure 27**.

1.2.3.6 The Applicants note that, while these figures indicate the proportion of temporary habitat loss relative to the total available within the wider foraging range, the assessment also considers bird numbers and

frequency of use. In addition to the revised suitable-habitat calculations, the Applicants report the abundance and frequency of birds recorded within areas subject to loss of supporting habitats and/or resource availability of temporary habitat loss.

1.2.4 Quantifying disturbance and displacement from construction activities

1.2.4.1 Disturbance and consequent displacement may affect birds across a greater area than direct habitat loss. The Applicants have calculated disturbance as the area of habitat loss plus the species-specific buffer from areas which birds may be displaced from.

1.2.4.2 Birds may be displaced over varying distances from visual or acoustic disturbance stimuli, although due to sound disturbance being limited to a few hundred metres (Cutts *et al*., 2013), visual disturbance has the greatest potential to impact birds. A NatureScot review of disturbance distances (Goodship and Furness, 2022) provides displacement ranges for several species in both breeding and non-breeding periods. Those values have been used to inform this assessment. For each species, an upper and lower value were applied based on the published quantitative non-breeding disturbance distances.

1.2.4.3 It should be noted that the presence of hedgerows and/or other visual barriers is likely to significantly reduce the distance from which birds are displaced. In addition, as the Lancashire coastal farmland is a heavily modified agricultural landscape in an area with a high human population density, it is likely that many of the birds present will be habituated to pedestrians, road traffic and machinery (agricultural), and there is expected to be some degree of habituation during construction. Therefore, the quantified displacement ranges are highly precautionary.

1.2.4.4 The displacement ranges used are presented below in **Table 2**.

Table 2: Disturbance distances

Species	Displacement range	Reference
Whooper swan	200 – 500 m	Used pink-footed goose as a proxy as suggested in Goodship and Furness (2022)
Pink-footed goose	200 – 500 m	Korschgen and Dahlgren (1992)
Shelduck	100 – 400 m	Laursen *et al*. (2017)
Teal	200 – 500 m	Using wigeon as a proxy. Laursen *et al*. (2017)
Golden plover	200 – 500 m	Rounded to 500 m from 450 m Laursen *et al*. (2005)
Black-tailed godwit	100 – 200 m	Goodship and Furness (2022)

1.2.4.5 Both the area of habitat lost to displaced birds and the number of birds impacted were quantified. To calculate the area of habitat lost to displaced birds, disturbance buffers up to 500 m were added at 100 m

intervals to the onshore infrastructure area (**Figure 3**). These were then clipped to the available farmland habitats (taken from the pasture and arable in the CLC dataset).

1.2.4.6 To determine impacts throughout the full range of scenarios (see below) the entire survey area was also split into different areas (see **Figure 4**). However, the following areas were excluded from all assessments:

- **Newton Marsh SSSI** and additional land to the south of the A584 – Impacts at Newton Marsh SSSI were screened out during examination after a site visit with Natural England and the production of a technical note (S_D2_11 Technical note on Newton Marsh SSSI and River Ribble Crossing - Rev F01 (REP2-044)). The reason behind this is the presence of the A584 as a boundary. The A584 is a busy dual carriageway so there are no potential impact pathways for disturbance beyond this boundary.
- **River Ribble crossing** – Potential impacts at the River Ribble crossing were screened out during examination after a site visit with Natural England and the production of a technical note (S_D2_11 Technical note on Newton Marsh SSSI and River Ribble Crossing - Rev F01 (REP2-044)). The reason behind this is the use of trenchless techniques used in this location and the presence of high river embankments.
- **Saltcotes Marsh** – Potential impacts in this area have been screened out for this assessment. Teal are found at this location however, they are present at the 500 m limit from disturbance stimuli, and the marsh is bordered by a tree line on the east, a main road on the west, and a housing estate to the south. Therefore, there are no impact pathways for additional disturbance to this area.

1.2.4.7 The following assumptions on bird numbers and areas were taken for each scenario presented below:

1. For Scenario 1 birds in all other areas (excluding the areas above) were considered.
2. For Scenario 2 it was assumed that all birds within the Lytham Moss area would be mitigated for at Lytham Moss (including all whooper swan, pink-footed goose and shelduck), and that avoiding works between October and March at the land south of Newton-with-Scales would create a disturbance free refuge for impacted birds along the rest of the onshore export cable corridor.
3. For Scenario 3 only birds within the onshore export cable corridor in **Figure 4** were considered.

1.2.4.8 To quantify habitat loss caused by displacement, the area of farmland (pasture and arable as classified in the CLC database) was calculated for each disturbance buffer and assessment area, see **Figure 27** for a visualisation. To quantify the number of birds affected, the survey data were allocated to the appropriate disturbance buffers and areas, and the following statistics were used in the assessment:

- Peak – The maximum number of birds recorded throughout the survey area on one visit (one visit = approx. 7 days).
- Mean peak – The annual peak counts averaged (i.e., the peak from the 2022/23 winter and the peak from the 2023/24 winter divided by two).
- Mean – The average number of birds present (i.e., total birds recorded divided by 14 visits).
- Frequency – The percentage of survey visits when a species was present in numbers exceeding 1% of the current SPA population (taken as the five-year mean peak from the Ribble and Alt WeBS sites from Calbrade *et al*. (2025)).

1.2.4.9 The Applicants consider mean counts to provide a more realistic estimate of impacts to the Ribble and Alt Estuaries SPA and Ramsar site than single peak counts; conclusions are therefore based on mean values.

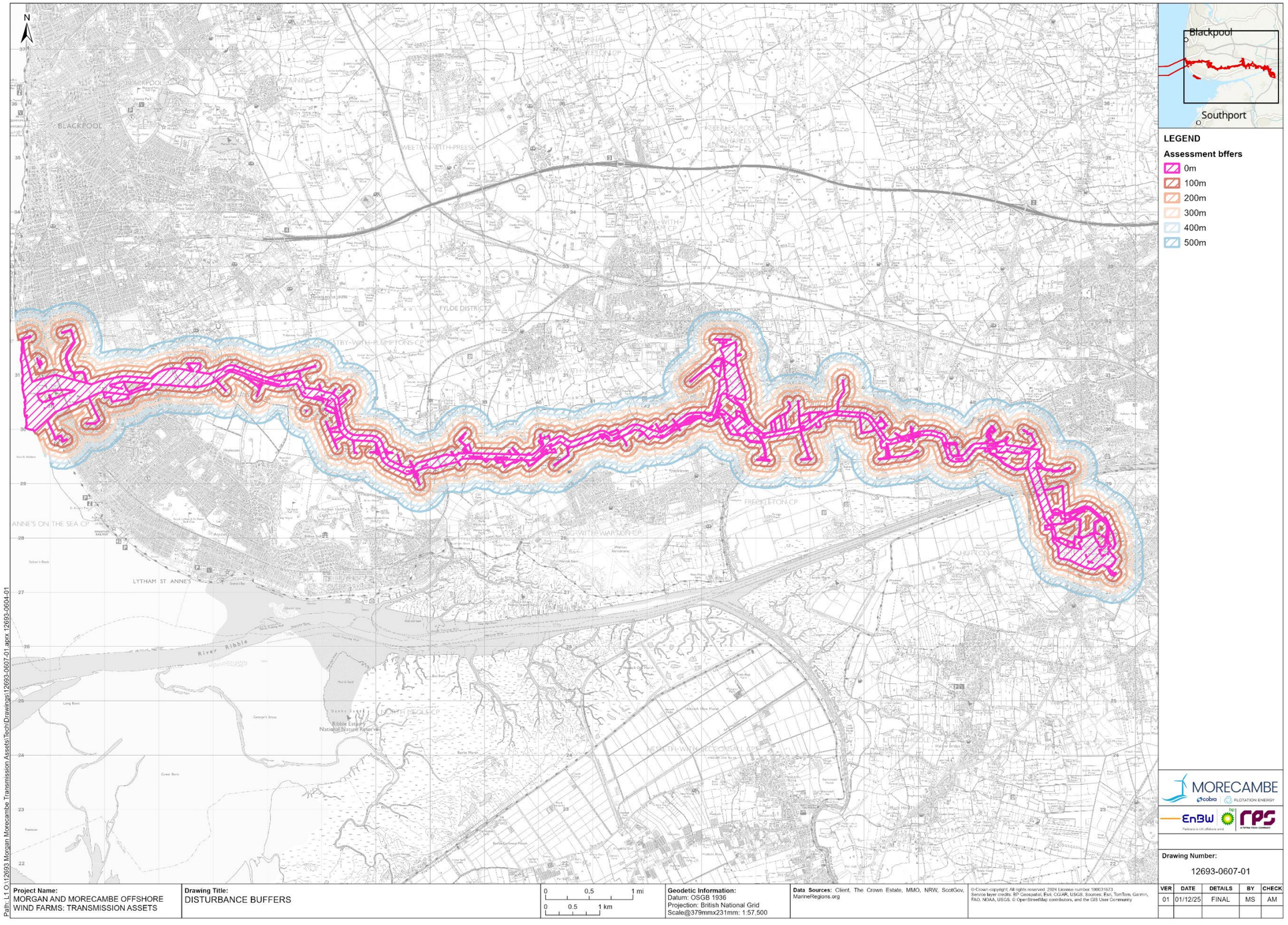

Figure 3: Disturbance buffers used to quantify disturbance and displacement from construction activities

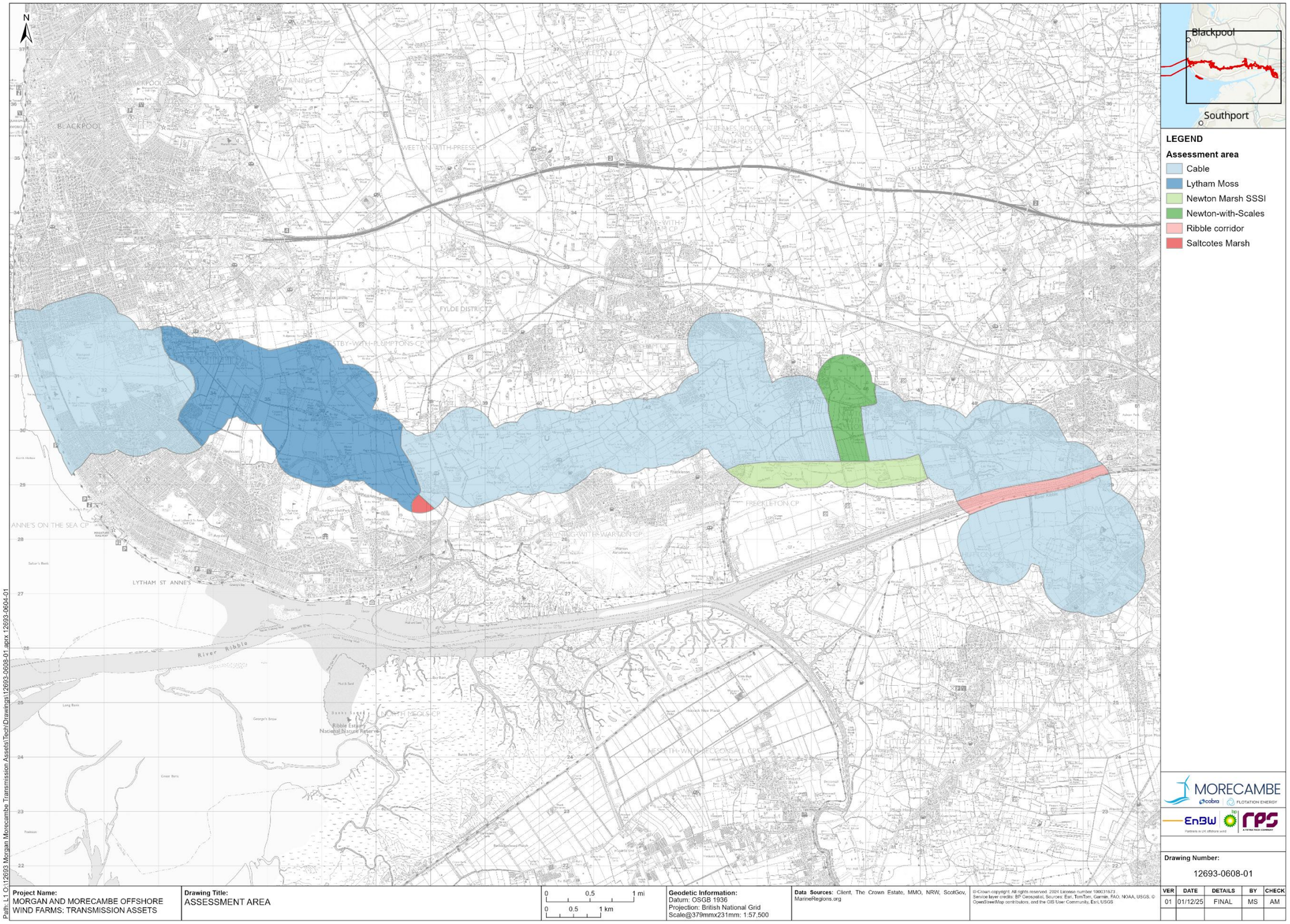

Figure 4: Areas used to assess the scenarios

1.3 Baseline Information

1.3.1 Introduction

1.3.1.1 The following section provides the baseline information needed to conduct a robust assessment of the temporary impacts of the Transmission Assets. Detail on the nature and magnitude of the impact are provided through the behaviour, the maximum amount of land potentially impacted, and the number of birds impacted for both temporary impacts and for all three scenarios.

1.3.2 Temporary loss of supporting habitats and/or resource availability during the construction phase

All scenarios

1.3.2.1 The temporary loss of supporting habitats and/or resource availability during the construction phase is predicted to be comparable across all three scenarios. Even with suspension of works during the sensitive October–March period and the backfilling of trenches to subsoil level prior to all winter periods during construction, habitats will not be restored to arable and pasture until farmers take back control of the land following the cessation of construction. Nonetheless, complete habitat restoration is not expected to be required for wader species that exploit soil invertebrates, and the affected areas will still provide space for alternative behaviours such as loafing, preening and roosting.

1.3.2.2 Trenchless techniques will also reduce the amount of temporary loss of supporting habitats and/or resource availability during the construction phase. This is particularly relevant at the land south of Newton-with-Scales where the sensitive habitats will be avoided (see F1.3.2 Environmental Statement Volume 1, Annex 3.2: Onshore Crossing Schedule (Clean) - Rev F04 (REP6-030)). Therefore, the calculations given for temporary loss of supporting habitats and/or resource availability are precautionary, with the real proportion of habitat loss and number birds affected in any given winter period likely to be much lower.

1.3.2.3 Additionally, the habitats that are predicted to be impacted are largely intensively farmed arable and pasture habitats. These habitats are generally of low ecological value, they are widespread and readily available throughout the region, and any impacts are quickly reversible. It should also be noted that most of these farmed fields are not protected or managed for bird interests (with the exception of Lytham Moss which has a local designation), and land use and crop types/rotations can change from year-to-year dependent upon an individual farmers inclination. In addition, all trenches within areas of proposed seasonal working will be backfilled to subsoil level prior to the winter restrictions to allow non-foraging birds to use them (see Appendix H of J6 Outline Ecological Management Plan).

1.3.2.4 Most of these farmland habitats do not represent areas of continuous use by waterbirds but instead support birds sporadically and for limited periods of time, for example waders will take advantage of fields at certain time of the year and conditions when the water table is high and invertebrates are pushed to the surface, and geese and swans will forage on arable to a greater extent immediately after crops have been harvested as there will be spilt grain and crop waste to feed on.

Bird behaviour in the potentially impacted area

1.3.2.5 For land to qualify as FLL it must be a necessary resource that maintains an SPA population. For the waterbirds that utilise terrestrial habitats (i.e., farmland) outside of the SPA this is normally a food resource as most SPA waterbird features will roost within the relative safety of the saltmarsh and tidal flats (i.e., within the SPA boundaries), as is the case in the Ribble Estuary. The threshold for FLL should be regular use that the species depends upon to maintain or restore its population within the SPA. Exploitation of habitats created by unpredictable events (for example, extreme weather) would not constitute FLL, nor would use of an area for activities that are not critical to the species' survival.

1.3.2.6 Whilst the area of temporary habitat loss undoubtedly provides food resources, not all birds recorded were using the area to feed and none were recorded roosting in the area. **Figure 5** shows that the terrestrial habitats that will be temporarily lost are of no value for roosting waterbirds and of low value for feeding waterbirds, with most birds recorded displaying other behaviours (e.g., loafing, resting or preening). The exception to this was golden plover.

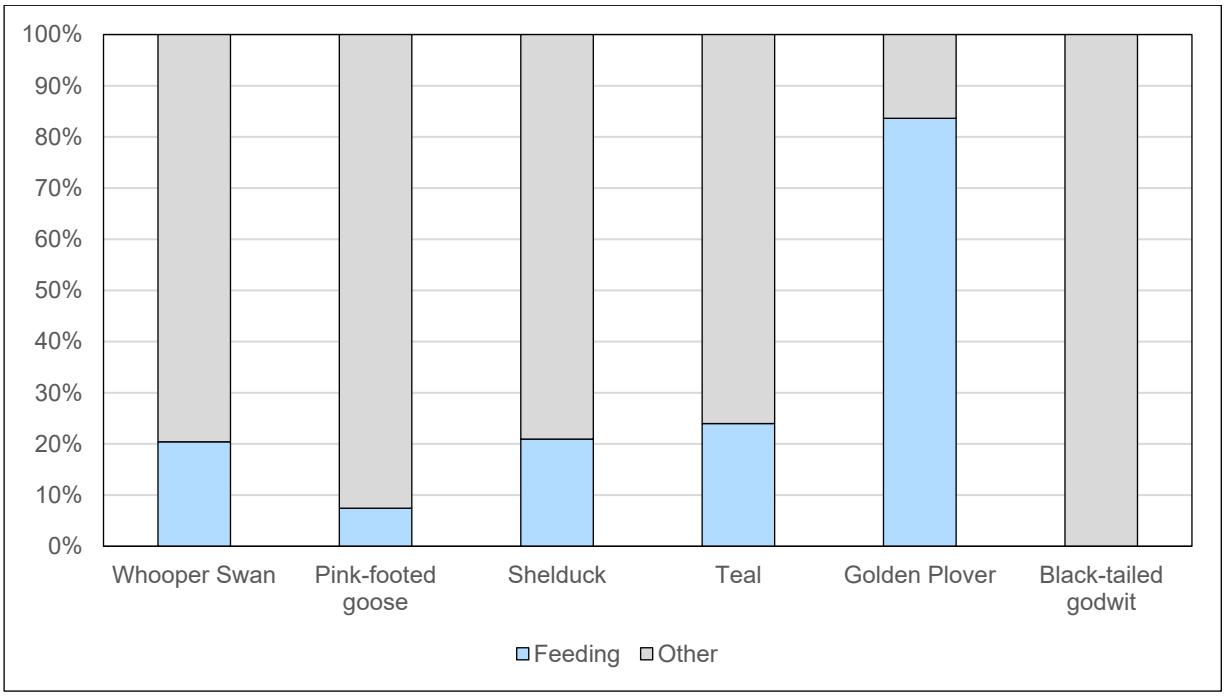

Figure 5: The recorded behaviours of the terrestrial waterbirds within the area of temporary loss of supporting habitats and/or resource availability during the construction phase

Maximum amount of land potentially impacted by the temporary loss of supporting habitats and/or resource availability

1.3.2.7 The proportion of habitat that will be temporarily lost during construction compared to the amount of available farmland (pasture and arable) within the species-specific foraging range is shown in Table 3. The area of farmland lost is generally very small compared with available arable and pasture habitat in the surrounding landscape — less than 1% for most species, except for whooper swan.

1.3.2.8 For teal this is unquantifiable as there is a lack of fine scale habitat data for the surrounding area to quantify suitable supporting habitats (i.e., drains, ponds and pools. The availability of pools and ponds is also highly dependent upon the amount of rainfall in any giver winter with greater areas of suitable habitat available in very wet years and less in dry years.

Table 3: Temporary habitat loss within species-specific foraging range

Species and foraging range	Temporary loss of farmland habitat (m^2)	Available farmland habitat (m^2) (based upon the species-specific foraging ranges)	Percentage of farmland habitat lost compared to that available within the wider area (%)
Whooper swan – 5km	3,175,086	195,133,912	1.6
Pink-footed goose – 20km	3,175,086	1,771,624,690	0.2
Shelduck – 20km	3,175,086	1,771,624,690	0.2
Teal – 2km	**Not applicable**		
Golden plover – 10km	3,175,086	445,555,820	0.7
Black-tailed godwit – 10km	3,175,086	445,555,820	0.7

Maximum number of birds potentially impacted by the temporary loss of supporting habitats and/or resource availability

1.3.2.9 Predicted temporary losses represent a small proportion of the available habitat. Accordingly, bird counts within the areas of temporary habitat loss are substantially lower than those recorded across the full survey area. Many species were observed only infrequently. **Table 5** summarises peak counts, frequencies of occurrence and mean counts, and compares these with citation counts and current population

estimates. Monthly peak-count graphs for the temporary-loss areas are provided in **Annex A**– Scenario 1 monthly count data **and Annex B** – Scenario 3 monthly count data with species distribution maps presented in **Annex C** – Distribution maps**.**

1.3.2.10 The only species that were present in peak numbers exceeding 1% of the current SPA population were whooper swan and pink-footed goose. Of these, only a mean of four whooper swan (or 0.5% of the population) were present, with pink-footed goose the only species present in mean numbers exceeding 1% of the current SPA population with an average of 447 birds present, 1.4% of the current SPA population.

1.3.3 Disturbance and displacement from construction activities

1.3.3.1 Disturbance and displacement represent a greater potential impact than temporary loss of supporting habitat/resource availability, because it includes birds displaced by direct habitat loss and those displaced from beyond the disturbance source.

1.3.3.2 As previously discussed, the assessment of disturbance and displacement is highly precautionary and assumes:

- 100% of birds will be displaced – This is an unrealistic assumption as the Lancashire coastal farmland is situated in an area with a high human population density and many birds will be habituated to pedestrians, road traffic and farm machinery, and many more birds may habituate during construction activities as construction will take place within predictable boundaries. Therefore, it is likely to be only a proportion of the reported bird numbers that will be impacted at any one time.
- Screening does not influence displacement – Natural and artificial screening is an unquantifiable mitigating factor that reduces displacement distances by reducing the line of sight between foraging birds and disturbing activities. The presence of hedges, trees and roads will all help to reduce the actual number of birds impacted, as will the proposed visual and acoustic screening.
- Construction is continuous and simultaneous in all areas – Although phasing for all of the work areas cannot be provided at this stage, it is highly unlikely that works would take place in all areas at the same time, with construction instead being localised, and generally in bursts of short duration in any one location and at any one time. Therefore, the number of birds impacted at any one time in a given winter will be much lower than those reported below, however, as the phasing details are not available the most precautionary example is presented in this assessment.

1.3.3.3 Therefore, this assessment is precautionary, and the above factors need taking into consideration when interpreting the number of birds that might be impacted at any one time.

1.3.3.4 The Applicants suggest that using the mean number of birds will give a more realistic estimate of the impacts to the Ribble and Alt Estuaries SPA and Ramsar site than one off peak counts.

Scenario 1

1.3.3.5 Scenario 1 is the scenario that has been assessed within the application documents and has been examined. Natural England have come to agreement with the Applicants that, with the use of the proposed mitigation areas at Lytham Moss and land south of Newton-with-Scales, there will be No AEoI from the impacts of habitat loss and disturbance and displacement during construction (see REP6-193 for Natural England's position).

1.3.3.6 Accordingly, reassessment of this scenario is not required. Nevertheless, refined figures for the areas and bird numbers potentially affected are presented here for completeness and comparative purposes with other scenarios.

Bird behaviour in the potentially impacted area

1.3.3.7 The behaviour of all birds predicted to be impacted under Scenario 1 shows that birds were engaged primarily between feeding and other behaviours (i.e., preening, loafing, etc) (**Figure 6**). Only small numbers of two species were recorded as roosting within the area; these were teal and black-tailed godwit.

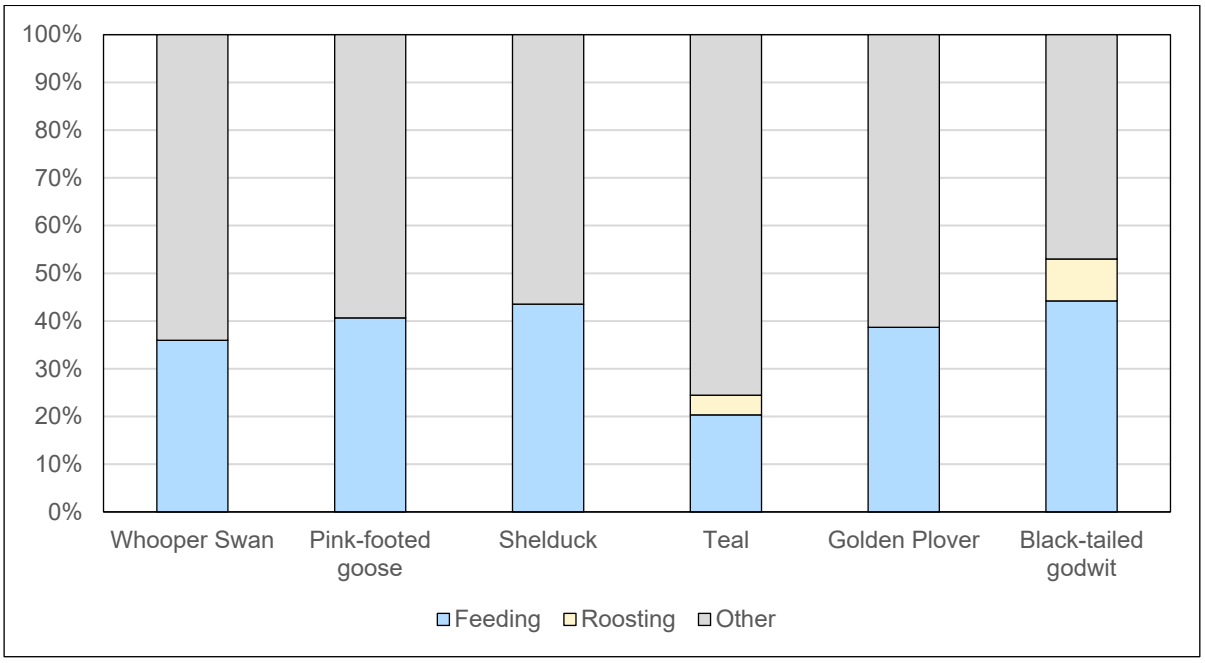

Figure 6: The recorded behaviours of the terrestrial waterbirds as was originally assessed

Maximum amount of land potentially impacted

1.3.3.8 The assessment assumes that all birds would be displaced by construction. This implies 100% displacement to the maximum disturbance distance, with no mitigation from hedgerows or screening, and continuous works across the entire infrastructure footprint.

1.3.3.9 The upper and lower ranges of amount of land potentially impacted with these assumptions are presented below in **Table 4.** The species-specific lower disturbance limit is highlighted in green, with the upper disturbance limit (the assessed impact) highlighted in purple, those cells highlighted in blue are a more realistic scenario for shelduck and black-tailed godwit as these species are displaced from maximum distances lower than 500 m.

Table 4: The area and proportion of farmland that will be unavailable to displaced birds under Scenario 1.

Species and foraging range	Available farmland within the species-specific foraging range (m^2)	Temporary habitat loss		100m		200m		300m		400m		As previously assessed	
		Loss of farmland (m^2)	Percentage lost	Loss of farmland (m^2)	Percentage lost	Loss of farmland (m^2)	Percentage lost	Loss of farmland (m^2)	Percentage lost	Loss of farmland (m^2)	Percentage lost	Loss of farmland (m^2)	Percentage lost
Whooper swan – 5km	195,133,912	3,175,086	1.6	10,954,558	5.6	16,230,110	8.3	20,813,499	10.7	24,925,194	12.8	32,095,053	16.4
Pink-footed goose – 20km	1,771,624,690	3,175,086	0.2	10,954,558	0.6	16,230,110	0.9	20,813,499	1.2	24,925,194	1.4	32,095,053	1.8
Shelduck – 20km	1,771,624,690	3,175,086	0.2	10,954,558	0.6	16,230,110	0.9	20,813,499	1.2	24,925,194	1.4	32,095,053	1.8
Teal – 2km	**N/A**												
Golden plover – 10km	445,555,820	3,175,086	0.7	10,954,558	2.5	16,230,110	3.6	20,813,499	4.7	24,925,194	5.6	32,095,053	7.2
Black-tailed godwit – 10km	445,555,820	3,175,086	0.7	10,954,558	2.5	16,230,110	3.6	20,813,499	4.7	24,925,194	5.6	32,095,053	7.2

The species-specific lower disturbance limit is highlighted in lime, with the upper disturbance limit (the assessed impact) highlighted in purple, those cells highlighted in blue are a more realistic scenario for shelduck and black-tailed godwit as these species are displaced at maximum distances of less than 500 m.

Maximum number of birds potentially impacted

1.3.3.10 The original assessment took into account only the most precautionary outcome and assumed that all birds would be displaced from the entire onshore ornithology survey area for the duration of construction. As already discussed, this is unrealistic. **Table 5** below, considers the displacement range and shows the full range of birds that may be impacted assuming 100% of the birds are displaced (which is itself an unrealistic and very precautionary, and assuming that works are taking place in all locations at one time (another unrealistic and precautionary assumption).

1.3.3.11 Therefore, the reported bird numbers in **Table 5** are highly precautionary. In reality a lower proportion of the birds reported below will be impacted by disturbance at any one time.

1.3.3.12 The addition of the updated analyses does not alter the initial assessment as it was based upon the most precautionary 500 m displacement buffer, however it does add important context. Graphs showing the monthly peak count data within each distance band assuming no seasonal working practices or screening are shown in **section 1.5** with distribution maps in **Annex C** – Distribution maps.

1.3.3.13 Providing the lower limit of disturbance also highlights that, although the most precautionary outcome has already been assessed and No AEoI agreed, the number of birds affected is likely to be lower, and for most species the mean number of birds predicted to be impacted is below 1% of the current SPA population.

Table 5: The full range of birds that could be impacted and mitigated in Scenario 1.

Species	Temporary habitat loss				100m				200m				300m				400m				As previously assessed			
	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency	Peak	Mean peak	Mean	Frequency (%)
Number of birds																								
[1]Whooper Swan (200 - 500m)	29	20	4	21	35	33	7	29	53	42	12	36	56	44	12	36	56	44	12	36	132	128	30	57
[1]Pink-footed goose (200 - 500m)	3,200	2,568	447	29	3,231	2,996	862	36	5,929	4,715	1,644	50	6,379	5,170	1,909	71	7,549	5,861	2,194	79	8,319	6,822	2,797	86
[1]Shelduck (100 - 400m)	32	17	4	0	234	126	31	14	271	148	36	14	308	169	42	21	334	195	50	29	374	225	69	36
[2]Teal (200 - 500m)	23	12	2	0	59	54	17	0	126	118	41	14	149	129	58	43	261	185	97	64	312	287	149	71
[2]Golden Plover (200 - 500m)	46	28	4	0	259	147	22	7	259	147	22	7	277	156	23	7	277	159	24	7	381	241	39	14
[2]Black-tailed godwit (100 - 200m)	9	5	1	0	56	28	4	7	70	35	10	14	329	209	37	21	347	218	40	21	423	407	77	29
% of citation																								
[1]Whooper Swan (200 - 500m)	15.9	10.7	1.9	21.4	19.2	18.1	3.9	28.6	29.1	23.1	6.4	35.7	30.8	23.9	6.6	35.7	30.8	23.9	6.6	35.7	72.5	70.1	16.7	57.1
[1]Pink-footed goose (200 - 500m)	27.2	21.8	3.8	28.6	27.5	25.5	7.3	35.7	50.4	40.1	14.0	50.0	54.2	43.9	16.2	71.4	64.2	49.8	18.7	78.6	70.7	58.0	23.8	85.7
[1]Shelduck (100 - 400m)	0.6	0.3	0.1	0.0	4.8	2.6	0.6	14.3	5.5	3.0	0.7	14.3	6.3	3.4	0.9	21.4	6.8	4.0	1.0	28.6	7.6	4.6	1.4	35.7
[2]Teal (200 - 500m)	0.3	0.2	0.0	0.0	0.8	0.7	0.2	0.0	1.8	1.6	0.6	14.3	2.1	1.8	0.8	42.9	3.6	2.6	1.3	64.3	4.4	4.0	2.1	71.4
[2]Golden Plover (200 - 500m)	1.3	0.8	0.1	0.0	7.2	4.1	0.6	7.1	7.2	4.1	0.6	7.1	7.7	4.3	0.6	7.1	7.7	4.4	0.7	7.1	10.6	6.7	1.1	14.3
[2]Black-tailed godwit (100 - 200m)	0.7	0.4	0.1	0.0	4.4	2.2	0.3	7.1	5.5	2.7	0.8	14.3	25.8	16.4	2.9	21.4	27.3	17.1	3.1	21.4	33.2	31.9	6.0	28.6
% of WeBS																								
[1]Whooper Swan (200 - 500m)	3.8	2.6	0.5	21.4	4.6	4.3	0.9	28.6	7.0	5.5	1.5	35.7	7.4	5.7	1.6	35.7	7.4	5.7	1.6	35.7	17.4	16.8	4.0	57.1
[1]Pink-footed goose (200 - 500m)	10.2	8.2	1.4	28.6	10.3	9.5	2.7	35.7	18.8	15.0	5.2	50.0	20.3	16.4	6.1	71.4	24.0	18.6	7.0	78.6	26.4	21.7	8.9	85.7
[1]Shelduck (100 - 400m)	0.6	0.3	0.1	0.0	4.2	2.3	0.6	14.3	4.9	2.6	0.7	14.3	5.5	3.0	0.8	21.4	6.0	3.5	0.9	28.6	6.7	4.0	1.2	35.7
[2]Teal (200 - 500m)	0.3	0.2	0.0	0.0	0.8	0.7	0.2	0.0	1.7	1.6	0.5	14.3	2.0	1.7	0.8	42.9	3.5	2.5	1.3	64.3	4.2	3.9	2.0	71.4
[2]Golden Plover (200 - 500m)	0.8	0.5	0.1	0.0	4.7	2.7	0.4	7.1	4.7	2.7	0.4	7.1	5.1	2.9	0.4	7.1	5.1	2.9	0.4	7.1	7.0	4.4	0.7	14.3
[2]Black-tailed godwit (100 - 200m)	0.2	0.1	0.0	0.0	1.1	0.5	0.1	7.1	1.4	0.7	0.2	14.3	6.4	4.0	0.7	21.4	6.7	4.2	0.8	21.4	8.2	7.9	1.5	28.6

[1] Species for which temporary impacts are being mitigated for solely at Lytham Moss. [2] Species for which temporary impacts are being mitigated for at Lytham Moss and land south of Newton-with-Scale

The species-specific lower disturbance limit is highlighted in lime, with the upper disturbance limit (the assessed impact) highlighted in purple, those cells highlighted in blue are a more realistic scenario for shelduck and black-tailed godwit as these species are displaced from maximum distances lower than 500 m. The peak is the peak count recorded over the entire period, the mean peak is the mean of the two annual peaks, the mean is the overall average (based upon 14 surveys over two winter periods) and the frequency is the number of occasions that birds were recorded in numbers exceeding 1% of the current population (as taken from the five-year mean of peak for the Ribble and Alt Estuaries from Calbrade *et al*., 2025).

Scenario 2

1.3.3.14 Scenario 2 assumes that the Applicants are able to deliver the mitigation at Lytham Moss but not at the mitigation area south of Newton-with-Scales.

1.3.3.15 It is therefore assumed that all birds within the Lytham Moss area would be provided for by the proposed supplementary feeding and scrape creation described in the upfront section, as per Scenario 1.

1.3.3.16 It also assumes that the seasonal working practices and screening around the land south of Newton-with-Scales area will continue to allow teal, golden plover and black-tailed godwit to use this area as a disturbance free wintering refuge as, even without habitat modifications, this area is currently used on a regular basis by many of these species (for details see Appendix F of Outline Ecological Management Plan (REP6-115).

1.3.3.17 The impacts for pink-footed goose, and whooper swan will therefore be fully mitigated for at the Lytham Moss mitigation area, as per Scenario 1. In the original assessment it was assumed that mitigation for these species was provided solely at Lytham Moss. The mitigation at Lytham Moss will also reduce the impacts for the shelduck, teal, golden plover and black-tailed godwit found within the wider Lytham Moss area.

1.3.3.18 The remaining lower numbers of shelduck, teal, golden plover, and black-tailed godwit will be able to relocate as needed into the land south of Newton-with-Scales as this will be left as a disturbance free refuge between October and March inclusive.

1.3.3.19 To further reduce impacts screening of works will be used in the area surrounding land south of Newton-with-Scales, and at Lea Marsh. The efficacy of this measure is unquantifiable but should be taken into consideration when drawing conclusions against AEoI.

Bird behaviour in the potentially impacted area

1.3.3.20 The behaviour of birds in Scenario 2 are the same as those shown in **Figure 6**.

Maximum amount of land potentially impacted

1.3.3.21 The area temporarily lost through displacement will be similar (although slightly lower) than that shown in **Table 4**, and this Scenario assumes that all birds are mitigated for by either:

- Food provision and habitat creation at Lytham Moss.
- The provision of a disturbance free refuge created by avoidance of work between October and March at the land south of Newton-with-Scales

Maximum number of birds potentially impacted

1.3.3.22 Although the number of birds impacted in Scenario 2 will be similar to Scenario 1, most of these will be mitigated for at Lytham Moss leaving low numbers of shelduck, teal, golden plover and black-tailed godwit. The disturbance free area at land south of Newton-with-Scales will provide a safe winter refuge for the remaining impacted shelduck, teal, golden plover and black-tailed godwit.

Table 6: A summary of the mitigation strategy for the affected features under Scenario 2.

Species	Summary of assumptions
Whooper swan	Whooper swan will be mitigated for at Lytham Moss
Pink-footed goose	Pink-footed goose will be mitigated for at Lytham Moss
Shelduck	Shelduck will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales
Teal	Teal will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales
Golden plover	Golden plover will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales
Black-tailed godwit	Black-tailed godwit will be mitigated for at Lytham Moss and will be able to use the disturbance free refuge at land south of Newton-with-Scales

Scenario 3

1.3.3.23 Scenario 3 assumes that neither of the terrestrial mitigation areas can be delivered by the Applicants. In Scenario 3, mitigation measures are designed to eliminate impacts through the implementation of seasonal working practices at Lytham Moss and land south of Newton-with-Scales, and reduce impacts bordering these areas and at Lea Marsh through visual and acoustic screening.

Bird behaviour in the potentially impacted area

1.3.3.24 The behaviour of all birds predicted to be impacted under Scenario 3 shows that birds were engaged primarily between feeding and other behaviours (i.e., preening, loafing, etc) (**Figure 7)**. Only small numbers of two species were recorded as roosting within the area; these were teal and black-tailed godwit.

1.3.3.25 Loafing and preening are activities that can be carried out in any number of locations and FLL cannot exist for these activities alone, the loss of land that impacts birds ability to feed is of greatest importance. On average around a third of all sightings were of feeding birds.

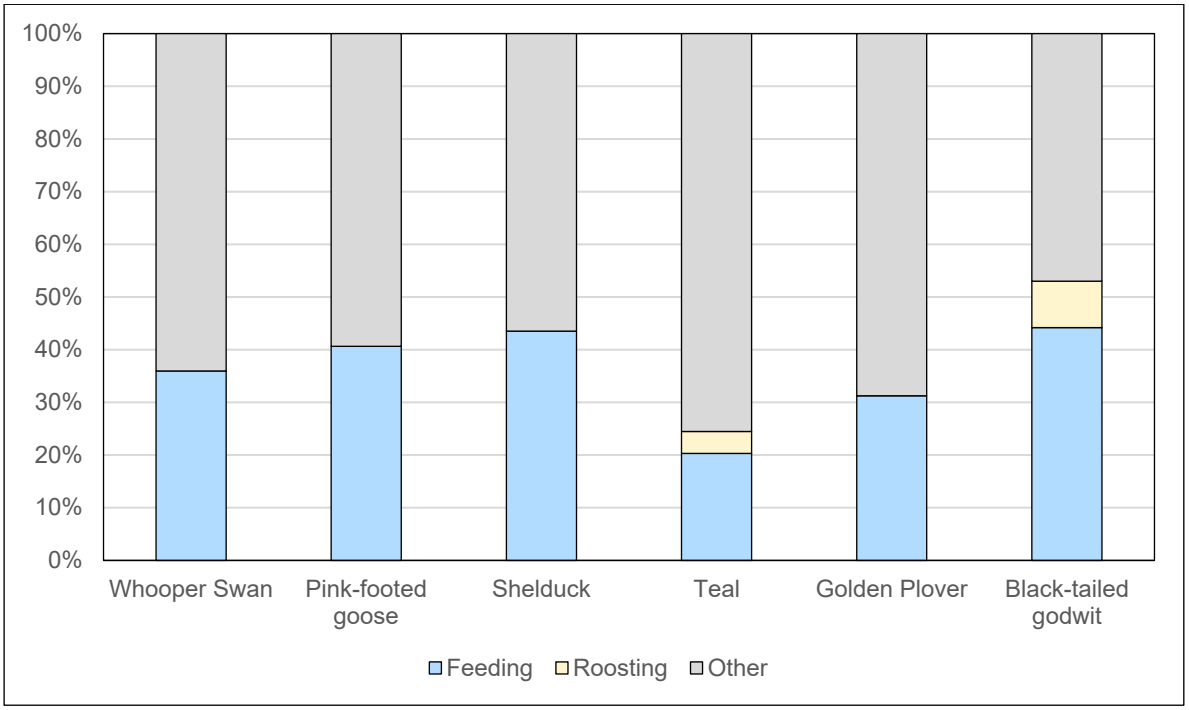

Figure 7: The recorded behaviours of the terrestrial waterbirds within 500m of the proposed works under Scenario 3.

Maximum amount of land potentially impacted

1.3.3.26 The proportion of available habitats that will be lost to birds displaced by construction activities under Scenario 3 will be highest for whooper swan with between 6.0 – 10.0% of available farmland becoming unusable. For other species this is lower, with golden plover the only other species for which a large proportion of habitat could be temporarily lost (between 2.6 – 4.4%), black-tailed godwit will also lose between 1.8 – 2.6%. Pink-footed goose and shelduck are likely to lose less than 1%, due to their larger foraging ranges.

1.3.3.27 However, the proportion lost is based upon the most precautionary outcome of 100% of birds being displaced from the source of disturbance, natural screening not reducing the impact, and works being continuous and simultaneous throughout the remaining work areas. In reality this is likely to be lower with birds habituating and many coming closer to construction due to screening, both natural and the screening mitigation measures employed near Lytham Moss, land south of Newton-with-Scales and Lea Marsh, and due to works being more localised and of short duration in many areas.

Table 7: The area and proportion of farmland that will be unavailable to displaced birds under Scenario 3.

Species and foraging range	Available farmland within the species-specific foraging range (m^2)	Temporary habitat loss		100m		200m		300m		400m		500m	
		Loss of farmland (m^2)	Percentage lost	Loss of farmland (m^2)	Percentage lost	Loss of farmland (m2)	Percentage lost	Loss of farmland (m2)	Percentage lost	Loss of farmland (m2)	Percentage lost	Loss of farmland (m2)	Percentage lost
Whooper swan – 5km	195,133,912	3,175,086	1.6	8,884,627	4.6	12,474,919	6.4	15,462,860	7.9	17,999,956	9.2	20,337,424	10.4
Pink-footed goose – 20km	1,771,624,690	3,175,086	0.2	8,884,627	0.5	12,474,919	0.7	15,462,860	0.9	17,999,956	1.0	20,337,424	1.1
Shelduck – 20km	1,771,624,690	3,175,086	0.2	8,884,627	0.5	12,474,919	0.7	15,462,860	0.9	17,999,956	1.0	20,337,424	1.1
Teal – 2km	**N/A**												
Golden plover – 10km	445,555,820	3,175,086	0.7	8,884,627	2.0	12,474,919	2.8	15,462,860	3.5	17,999,956	4.0	20,337,424	4.6
Black-tailed godwit – 10km	445,555,820	3,175,086	0.7	8,884,627	2.0	12,474,919	2.8	154,62,860	3.5	17,999,956	4.0	20,337,424	4.6

The lower species-specific disturbance limit is highlighted in lime, with the upper disturbance limit (i.e., the most precautionary outcome) highlighted in purple.

Maximum number of birds potentially impacted

1.3.3.28 By avoiding construction work at Lytham Moss and land south of Newton-with-Scales between October to March there is a large reduction in the number of birds predicted to be impacted by disturbance. Although the peak counts are still generally above 1% of the current SPA population, the frequency with which birds were recorded, and therefore the mean number of birds impacted is much lower was previously assessed in Scenario 1. Even if the maximum species-specific displacement buffer is assumed then most species were present in mean numbers below 1% of the current SPA population with the exception of pink-footed goose at 1.6%. Graphs showing the monthly peak counts of birds under Scenario 3 can be seen in **Annex B** – Scenario 3 monthly count data with distribution maps in **Annex C** – Distribution maps.

1.3.3.29 The full range of birds that could be impacted in Scenario 3, in combination with temporary habitat loss throughout the onshore export cable corridor, is shown in **Table 8.** The lower species-specific disturbance limit is highlighted in lime with the upper disturbance limit (i.e., the most precautionary outcome) highlighted in purple. The peak is the peak count recorded over the entire period, the mean peak is the mean of the two annual peaks, the mean is the overall average (based upon 14 surveys over two winter periods) and the frequency is the number of occasions that birds were recorded in numbers exceeding 1% of the current population (as taken from the five-year mean of peak for the Ribble and Alt Estuaries SPA and Ramsar site from Calbrade *et al*., 2025).

Table 8: The full range of birds that could be impacted in Scenario 3 in combination with temporary habitat loss throughout the onshore export cable corridor

Species	Temporary habitat loss				100m				200m				300m				400m				500m			
	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency (%)	Peak	Mean peak	Mean	Frequency	Peak	Mean peak	Mean	Frequency (%)
Number of birds																								
Whooper Swan (200 - 500m)	29	20	4	21	29	20	4	21	29	20	4	21	29	21	4	21	29	21	4	21	29	21	4	21
Pink-footed goose (200 - 500m)	3,200	2,568	447	29	3,200	2,568	447	29	3,200	2,611	499	36	3,200	2,611	574	50	3,200	3,196	683	57	3,200	3,196	716	57
Shelduck (100 - 400m)	32	17	4	0	228	122	30	14	229	123	32	14	254	137	37	21	270	152	40	21	270	152	40	21
Teal (200 - 500m)	23	12	2	0	39	31	7	0	95	66	15	7	102	70	27	14	102	71	28	14	102	73	28	14
Golden Plover (200 - 500m)	46	28	4	0	187	98	14	7	187	98	14	7	205	107	15	7	205	108	15	7	205	108	15	7
Black-tailed godwit (100 - 200m)	9	5	1	0	56	28	4	7	56	28	6	7	291	190	34	21	291	190	35	21	291	190	35	21
% of citation																								
Whooper Swan (200 - 500m)	15.9	10.7	1.9	21.4	15.9	10.7	1.9	21.4	15.9	10.7	1.9	21.4	15.9	11.5	2.1	21.4	15.9	11.5	2.1	21.4	15.9	11.5	2.3	21.4
Pink-footed goose (200 - 500m)	27.2	21.8	3.8	28.6	27.2	21.8	3.8	28.6	27.2	22.2	4.2	35.7	27.2	22.2	4.9	50.0	27.2	27.2	5.8	57.1	27.2	27.2	6.1	57.1
Shelduck (100 - 400m)	0.6	0.3	0.1	0.0	4.6	2.5	0.6	14.3	4.6	2.5	0.6	14.3	5.2	2.8	0.7	21.4	5.5	3.1	0.8	21.4	5.5	3.1	0.8	21.4
Teal (200 - 500m)	0.3	0.2	0.0	0.0	0.5	0.4	0.1	0.0	1.3	0.9	0.2	7.1	1.4	1.0	0.4	14.3	1.4	1.0	0.4	14.3	1.4	1.0	0.4	14.3
Golden Plover (200 - 500m)	1.3	0.8	0.1	0.0	5.2	2.7	0.4	7.1	5.2	2.7	0.4	7.1	5.7	3.0	0.4	7.1	5.7	3.0	0.4	7.1	5.7	3.0	0.4	7.1
Black-tailed godwit (100 - 200m)	0.7	0.4	0.1	0.0	4.4	2.2	0.3	7.1	4.4	2.2	0.5	7.1	22.9	14.9	2.6	21.4	22.9	14.9	2.7	21.4	22.9	14.9	2.7	21.4
% of WeBS																								
Whooper Swan (200 - 500m)	3.8	2.6	0.5	21.4	3.8	2.6	0.5	21.4	3.8	2.6	0.5	21.4	3.8	2.8	0.5	21.4	3.8	2.8	0.5	21.4	3.8	2.8	0.6	21.4
Pink-footed goose (200 - 500m)	10.2	8.2	1.4	28.6	10.2	8.2	1.4	28.6	10.2	8.3	1.6	35.7	10.2	8.3	1.8	50.0	10.2	10.2	2.2	57.1	10.2	10.2	2.3	57.1
Shelduck (100 - 400m)	0.6	0.3	0.1	0.0	4.1	2.2	0.5	14.3	4.1	2.2	0.6	14.3	4.6	2.5	0.7	21.4	4.8	2.7	0.7	21.4	4.8	2.7	0.7	21.4
Teal (200 - 500m)	0.3	0.2	0.0	0.0	0.5	0.4	0.1	0.0	1.3	0.9	0.2	7.1	1.4	0.9	0.4	14.3	1.4	1.0	0.4	14.3	1.4	1.0	0.4	14.3
Golden Plover (200 - 500m)	0.8	0.5	0.1	0.0	3.4	1.8	0.3	7.1	3.4	1.8	0.3	7.1	3.7	2.0	0.3	7.1	3.7	2.0	0.3	7.1	3.7	2.0	0.3	7.1
Black-tailed godwit (100 - 200m)	0.2	0.1	0.0	0.0	1.1	0.5	0.1	7.1	1.1	0.5	0.1	7.1	5.6	3.7	0.7	21.4	5.6	3.7	0.7	21.4	5.6	3.7	0.7	21.4

1.3.4 Relative importance of the areas affected by temporary loss of supporting habitats and/or resource availability and disturbance and displacement during the construction phase

1.3.4.1 The amount of potentially available habitats impacted is reduced by between 37% to 61% from Scenario 1 to Scenario 3 (**Table 9**).

Table 9: Differences between the amount of farmland habitats lost to waterbirds between Scenarios 1 and 3.

Species and foraging range	Maximum disturbance distances	Max area lost to displacement		
		Scenario 1 (m^2)	Scenario 3 (m^2)	Difference (%)
Whooper swan	500m	32,095,053[1]	20,337,424[2]	-36.6
Pink-footed goose	500m	32,095,053[1]	20,337,424[2]	-36.6
Shelduck	400m	32,095,053[1]	17,999,956[2]	-43.9
Teal	500m	Not applicable		
Golden plover	500m	32,095,053[1]	20,337,424[2]	-36.6
Black-tailed godwit	200m	32,095,053[1]	12,474,919[2]	-61.1

[1] Using the most precautionary outcome as previously assessed. [2] Using the disturbance distances of 500m, 400m and 200m respectively

1.3.4.2 **Table 10** presents a metric of the relative importance of habitat in context of the foraging range.

1.3.4.3 For land to be FLL, it should be regularly used (i.e., the mean number of birds using it should be at least equivalent to the proportion of available land). Lower values indicate that the birds are using the land in small numbers or sporadically, which in turn indicates that the land is of low importance in the context of the entire foraging range. High values indicate that the birds are using it more regularly than would be expected and it is therefore of higher importance.

1.3.4.4 If the relative importance in **Table 10** exceeds 1%, it indicates that the birds use the area more than would be explained assuming an even distribution of birds throughout their foraging range. Therefore, FLL is more likely because many birds regularly use the area. If it is below 1%, the area is used less frequently than expected under an even distribution, and therefore less important and unlikely to represent FLL. This cannot be calculated for teal as the proportion of habitat affected cannot be estimated. For most of the other species, it highlights that, due to irregular use, FLL is unlikely to exist. The exception to this is pink-footed goose for which FLL is widely accepted to exist at Lytham Moss. Scenario 3 reduces the impact greatly by reducing the mean number of birds impacted, however the highest numbers of pink-footed goose (3,200) impacted in this scenario are impacted by habitat loss within Lytham Moss.

Table 10: Relative importance of the area of land lost

Species and foraging range	Scenario 1			Scenario 3		
	Max % of foraging range lost	% of SPA population using the impacted area	Relative importance (i.e., % of birds per 1% of foraging range)	Max % of foraging range lost	% of SPA population using the impacted area	Relative importance (i.e., % of birds per 1% of foraging range)
Whooper swan – 5km	16.4	4.0	0.2	10.4	0.6	0.1
Pink-footed goose – 20km	1.8	8.9	**4.9**	1.1	2.3	**2.0**
Shelduck – 20km	1.8	0.9	0.5	1.0	0.7	0.7
Teal – 2km	**Not applicable**					
Golden plover – 10km	7.2	0.7	0.1	4.6	0.3	0.1
Black-tailed godwit – 10km	7.2	0.2	0.0	2.8	0.1	0.0

1.3.5 Quantifying the reduction of impacts through the adoption of seasonal avoidance in Scenario 2 and 3

1.3.5.1 Disturbance and displacement impact under Scenario 2 are largely mitigated by the mitigation area at Lytham Moss with residual impacts mitigated for through the disturbance free zone at land south of Newton-with-Scales.

1.3.5.2 However, for Scenario 3, the avoidance and reduction of impacts through screening and seasonal working will greatly reduce disturbance impacts (see **Table 11**). This shows that the reduction in the magnitude of impact from Scenario 1 and Scenario 3 leads to a, up to 92% reduction in the mean number of birds (or birds present per day) potentially impacted by disturbance. Whooper swan, pink-footed goose, teal and black-tailed godwit all show a substantial reduction in disturbance impacts through the adoption of seasonal working. Those species with a lower reduction in disturbance impacts are golden plover and shelduck.

1.3.5.3 Golden plover show a 62% reduction in the mean number of birds affected by disturbance. This smaller reduction compared with other species is partly explained by the low frequency with which golden plover occurred in significant numbers. They were observed in moderate numbers on only one survey visit, and during that visit the birds used both pasture and arable habitats across the survey area.

The infrequent occurrence (one of 14 visits) and lack of concentration in a single location indicate that the area does not represent FLL for golden plover.

1.3.5.4 Likewise, shelduck impacts are only reduced by 42%, this is again due to shelduck exploiting a wide range of fields primarily in late winter and especially during 2023/24 when there was an abundance of flooded fields in the area. As shelduck were widely distributed, regular FLL in one location is unlikely. It is likely that in very wet winters such as 2023/24 there is an abundance of flooded fields within 20 km for shelduck to exploit.

Table 11: A comparison between disturbance from Scenario 1 (no measures taken to reduce disturbance) and Scenario 3 (seasonal working at Lytham Moss and land south of Newton-with-Scales and screening at areas bordering these areas, plus screening at Lea Marsh).

Species	Temporary habitat loss			100m			200m			300m			400m			500m		
	Scenario 1 (mean no. of birds)	Scenario 3 (mean no. of birds)	Reduction in impact	Scenario 1 (mean no. of birds)	Scenario 3 (mean no. of birds)	Reduction in impact	Scenario 1 (mean no. of birds)	Scenario 3 (mean no. of birds)	Reduction in impact	Scenario 1 (mean no. of birds)	Scenario 3 (mean no. of birds)	Reduction in impact	Scenario 1 (mean no. of birds)	Scenario 3 (mean no. of birds)	Reduction in impact	Scenario 1 (mean no. of birds)	Scenario 3 (mean no. of birds)	Reduction in impact
Whooper swan – 5km	4	4	0.0	7	4	-43.4	12	4	-65.4	12	4	-66.5	12	4	-66.7	**30***	4	-86.8
Pink-footed goose – 20km	447	447	0.0	862	447	-48.2	1,644	499	-69.6	1,909	574	-69.9	2,194	683	-68.9	**2,797***	716	-74.4
Shelduck – 20km	4	4	0.0	31	30	-4.4	36	32	-11.8	42	37	-12.6	**69***	40	-41.6	N/A		
Teal – 2km	2	2	0.0	17	7	-57.8	41	15	-63.0	58	27	-53.4	97	28	-71.0	149*	28	-81.2
Golden plover – 10km	4	4	0.0	22	14	-35.3	22	14	-35.3	23	15	-34.6	24	15	-37.7	39*	15	-61.2
Black-tailed godwit – 10km	1	1	0.0	4	4	0.0	**77***	6	-92.2	N/A								

* The mean number of birds that were originally assessed in the ES application

1.4 Assessments of Adverse Effect on Site Integrity

1.4.1 Scenario 1

1.4.1.1 The assumptions regarding mitigation and construction remain unchanged from those examined.

Combined impacts: temporary loss of supporting habitats and/or resource availability during the construction phase and disturbance and displacement

All species

1.4.1.2 The impacts of Scenario 1 have already been assessed within the original application. This has gone through examination and agreement was reached with Natural England that, with the implementation of mitigation areas at Lytham Moss and land south of Newton-with-Scales, there would be **No AEoI** for the Ribble and Alt Estuaries SPA and Ramsar site.

1.4.1.3 However, reassessment of the full range of disturbance distances highlights that the original assessment was highly precautionary and that the actual impacts are likely to be much lower than those originally assessed. This assessment has also used the unrealistic assumptions that all birds will be displaced, screening will not reduce the impact, and that works will take place continuously throughout the entire footprint for the duration of the construction period. In reality, works will be localised and of short duration with not all birds displaced and many from a lower distance. Therefore, any predicted impacts are precautionary, and the number of birds that are predicted to be impacted and/or need to be mitigated for, will be lower than those reported here and elsewhere in the ES and HRA application.

Scenario 1 conclusion

1.4.1.4 The impacts of Scenario 1 have already been assessed and agreement with Natural England reached that there will be No AEoI if the mitigation areas at Lytham Moss and land south of Newton-with-Scales are used.

1.4.1.5 There continues to be **No AEoI** on the integrity of the Ribble and Alt Estuaries SPA and Ramsar site if the Applicants adopt Scenario 1 as their preferred construction method.

Table 12: Conclusions against the conservation objectives of the Ribble and Alt Estuaries SPA and Ramsar site for the impacts of temporary habitat loss and displacement during construction under Scenario 1

Conservation objective	Conclusion
Maintain or restore the extent and distribution of the habitats of the qualifying features.	

Conservation objective	Conclusion
Maintain or restore the structure and function of the habitats of the qualifying features.	There will be **no impact** on the habitats within the site and no long-term reduction or deterioration of the FLL habitats outside of the site.
Maintain or restore the supporting processes on which the habitats of the qualifying features rely.	
Maintain or restore the population of each of the qualifying features.	Through the provision of mitigation at Lytham Moss and land south of Newton-with-Scales there will be **negligible** impacts to the populations of the site features. Any negligible impacts will be temporary in nature and quickly and easily reversible following cessation of the works.
Maintain or restore the distribution of the qualifying features within the site.	There will be **no impact** on the distribution of features within the site.

1.4.2 Scenario 2

1.4.2.1 Assumes that the Lytham Moss mitigation is deliverable but that the mitigation area south of Newton-with-Scales is not. However, in the land south of Newton-with-Scales there will be seasonal working to avoid the October – March period and visual and acoustic screening used in areas bordering the land south of Newton-with-Scales and at Lea Marsh. In addition, there will be no habitat loss to the sensitive habitats on land south of Newton-with-Scales.

1.4.2.2 Therefore, this Scenario assumes that all birds within the vicinity of Lytham Moss will take advantage of the mitigation there (i.e., swan and goose feeding and the provision of muddy pools and wet grassland). It also assumes that the land south of Newton-with-Scales, where there will be no working between October and March, will act as a winter disturbance free refuge for displaced birds within the eastern end of the infrastructure area, as the area already has high quality habitats that will not be impacted and is currently used by a number of shelduck, teal and black-tailed godwit.

1.4.2.3 In addition to these assumptions regarding the redistribution of wintering waterbirds into the Lytham Moss mitigation area and the disturbance free refuge at land south of Newton-with-Scales, areas of screening will reduce the impact further at land south of Newton-with-Scales and Lea Marsh, and works will not take place throughout the entire infrastructure area continuously and for the duration of construction. In reality works will be localised and of short duration. Therefore, any predicted impacts are precautionary, and the number of birds that are predicted to be impacted and/or need to be mitigated for, will be lower than those reported in this assessment.

Temporary loss of supporting habitats and/or resource availability during the construction phase

Whooper swan

1.4.2.4 Scenario 2 assumes that all whooper swan will be mitigated for at Lytham Moss as per the original assessment, this has already been

examined and an agreement reached with Natural England. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for whooper swan under Scenario 2.

Pink-footed goose

1.4.2.5 Scenario 2 assumes that all pink-footed goose will be mitigated for at Lytham Moss as per the original assessment, this has already been examined and an agreement reached with Natural England. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for pink-footed goose under Scenario 2.

Shelduck

1.4.2.6 Habitat loss for shelduck is predicted to be **negligible** with lower than 1% of available habitats affected (**Table 3**) and lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count, they will also be mitigated for at Lytham Moss. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for shelduck under Scenario 2.

Teal

1.4.2.7 Habitat loss for teal is predicted to be **negligible** with lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for teal under Scenario 2.

Golden plover

1.4.2.8 Habitat loss for golden plover is predicted to be **negligible** with lower than 1% of available habitats affected (**Table 3**) and lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for golden plover under Scenario 2.

Black-tailed godwit

1.4.2.9 Habitat loss for black-tailed godwit is predicted to be **negligible** with lower than 1% of available habitats affected (**Table 3**) and lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for black-tailed godwit under Scenario 2.

Disturbance and displacement from construction activities

Whooper swan

1.4.2.1 Scenario 2 assumes that all whooper swan will be mitigated for at Lytham Moss, this has already been examined and an agreement reached with Natural England. Therefore, there are **No AEoI** for the impact of disturbance and displacement from construction activities for whooper swan under Scenario 2.

Pink-footed goose

1.4.2.2 Scenario 2 assumes that all pink-footed goose will be mitigated for at Lytham Moss, this has already been examined and an agreement reached with Natural England. Therefore, there are **No AEoI** for the impact of disturbance and displacement from construction activities for pink-footed goose under Scenario 2.

Shelduck

1.4.2.3 The impacts of disturbance and displacement on shelduck are predicted to be **negligible**. A peak of 240 shelduck were recorded, however the mean peak is much lower and shelduck were only recorded on three of 14 survey visits leading to the mean number of birds as 40 or 0.7% of the current SPA population (**Table 8**). Therefore, there are **No AEoI** for the impact of disturbance and displacement during the construction phase for shelduck under Scenario 2.

Teal

1.4.2.4 Teal were infrequently recorded and in relatively low numbers with the peak range of birds impacted between 1.3% to 1.4% of the current SPA population, however the mean peak recorded birds at 1% or lower, and the low frequency of occurrence reduces the mean number of birds to be impacted to 0.2% to 0.4% of the population, or 15 to 28 birds (Table 8). On this basis, it is concluded that disturbance and displacement during construction would have a **negligible** impact. Therefore, there are **No AEoI** for the impact of disturbance and displacement from construction activities for teal under Scenario 2.

Golden plover

1.4.2.1 Golden plover were only recorded in significant numbers on one of 14 survey visits, with the peak range of birds predicted to be impacted by disturbance between 187 and 205 (**Table 8**). Although this peak is between 3.4% to 3.7% of the current SPA population, the low frequency with which birds were present indicates that the area is not part of their regular usage and the mean number of birds impacted to 0.3%, or 14 to 15 birds. On this basis, it is concluded that disturbance and displacement during construction would have a **negligible** impact. Therefore, there are **No AEoI** for the impact of disturbance and

displacement from construction activities for golden plover under Scenario 2.

Black-tailed godwit

1.4.2.2 Although the peak of 56 black-tailed godwit is just above 1% of the SPA current population (**Table 8**), these birds were only recorded once with the mean peak and the mean (28 and 6 birds respectively) well below 1% of the current SPA population. On this basis, it is concluded that disturbance and displacement during construction would have a **negligible** impact. Therefore, there are **No AEoI** for the impact of disturbance and displacement from construction activities for black-tailed godwit under Scenario 2.

Scenario 2 conclusion

1.4.2.3 Mitigation will be delivered through the following measure:

- Lytham Moss mitigation – All whooper swan, pink-footed goose and shelduck, and numbers of teal, golden plover and black-tailed godwit being mitigated for at Lytham Moss (as already agreed with Natural England).
- Land south of Newton-with-Scales being left as a disturbance free winter waterbird refuge to accommodate additional displaced birds.
- Visual and acoustic screening which aims to reduce disturbance at Lytham Moss, near the land south of Newton-with-Scales refuge, and at Lea Marsh.

It is concluded that there will be **No AEoI** on the integrity of the Ribble and Alt Estuaries SPA if the Applicants adopt Scenario 2 as their preferred construction method.

Table 13: Conclusions against the conservation objectives of the Ribble and Alt Estuaries SPA and Ramsar site for the impacts of temporary habitat loss and displacement during construction under Scenario 2

Conservation objective	Conclusion
Maintain or restore the extent and distribution of the habitats of the qualifying features.	There will be **no impact** on the habitats within the site and no long-term reduction or deterioration of the FLL habitats outside of the site.
Maintain or restore the structure and function of the habitats of the qualifying features.	
Maintain or restore the supporting processes on which the habitats of the qualifying features rely.	
Maintain or restore the population of each of the qualifying features.	Through a combination of mitigation, seasonal working and screening, there will be **negligible** impacts to the populations of the site features. Any negligible impacts will be temporary in nature and quickly and easily reversible following cessation of the works.
Maintain or restore the distribution of the qualifying features within the site.	There will be **no impact** on the distribution of features within the site.

1.4.3 Scenario 3

1.4.3.1 Assumes that neither mitigation areas are deliverable and that the project must rely upon avoiding working between October – March at Lytham Moss and land south of Newton-with-Scales. In addition, visual and acoustic screening will be used in areas bordering the seasonal working areas and at Lea Marsh. In addition, there will be no habitat loss to the sensitive habitats on land south of Newton-with-Scales due to trenchless crossings (see F1.3.2 Environmental Statement Volume 1, Annex 3.2: Onshore Crossing Schedule (Clean) - Rev F04 (REP6-030)), and the disturbed land at Lytham Moss and near land south of Newton-with-Scales will be reinstated to subsoil levels prior to each winter period during construction, and will therefore be capable of supporting non-foraging birds.

Temporary loss of supporting habitats and/or resource availability during the construction phase

Whooper swan

1.4.3.2 Twenty nine whooper swan, or 3.8% of the current SPA population, were recorded within the area of temporary habitat loss (**Table 8**). However, the mean peak and the mean number of birds impacted are lower at 20 and 4 birds respectively. The mean of 4 birds represents 0.5% of the current SPA population. On this basis, it is concluded that temporary loss of habitat and/or resource availability would have a **negligible** impact on whooper swan within the Ribble and Alt Estuaries SPA and Ramsar site.

1.4.3.3 Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for whooper swan under Scenario 3.

Pink-footed goose

1.4.3.4 A peak of 3,200 pink-footed geese were recorded within the area of temporary habitat loss (**Table 8**). This peak is 10.2% of the current population and, although pink-footed geese were normally present in lower numbers, the mean of 447 represents 1.4% of the current SPA population. The habitats at Lytham Moss will also be restored prior to the wintering restriction to support non-foraging birds.

1.4.3.5 Pink-footed geese have large foraging ranges with only 0.2% of available farmland within a 20km radius predicted to be impacted in the most precautionary outcome, they are also highly adaptable and often migrate to other parts of the country during the winter period to take advantage of crops in other areas.

1.4.3.1 This current Ribble and Alt Estuaries SPA and Ramsar site population is three times higher than at time of designation and the feature is therefore in very favourable status. This population increase is noted on

both a national and a regional scale by regular monitoring schemes such as the Goose and Swan Monitoring Programme and the WeBS (Calbrade *et al*., 2025).

1.4.3.2 Pink-footed geese have a large foraging range and are known to feed extensively on arable throughout autumn and early winter, switching to fresh grass shoots in late winter and early spring (Devenish, *et al*., 2015). There are extensive arable areas to the south of the Ribble and ample pasture throughout the rest of their 20 km foraging range, with the area temporarily lost making up only a small fraction of potential available habitats (**Table 5**). Similarly to whooper swan, pink-footed goose carrying capacity in any given year is controlled by human factors such as crop choice and harvest times with pink-footed geese making regular mid-winter movements to the east of the country to feed on sugar beet in north Norfolk (Devenish *et al*., 2015). They are therefore a highly adaptable and mobile species.

1.4.3.3 Due to the artificial nature of the habitats that will be impacted, the abundance of similar alternative habitats in the vicinity, the temporary and reversible nature of the impact, the partial restoration of the habitats prior to the wintering season, and the fact that pink-footed geese are currently in very favourable condition and adaptable, it is concluded that temporary loss of habitat and/or resource availability would have a **negligible impact** on pink-footed goose within the Ribble and Alt Estuaries SPA and Ramsar site. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for pink-footed goose under Scenario 3.

Shelduck

1.4.3.4 Habitat loss for shelduck is predicted to be **negligible** with lower than 1% of available habitats affected (**Table 3**) and lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for shelduck under Scenario 3.

Teal

1.4.3.5 Habitat loss for teal is predicted to be **negligible** with lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for teal under Scenario 3.

Golden plover

1.4.3.6 Habitat loss for golden plover is predicted to be **negligible** with lower than 1% of available habitats affected (**Table 3**) and lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource

availability during the construction phase for golden plover under Scenario 3.

Black-tailed godwit

1.4.3.7 Habitat loss for black-tailed godwit is predicted to be **negligible** with lower than 1% of available habitats affected (**Table 3**) and lower than 1% of the current SPA population present on the land to be lost (**Table 8**), either as a mean or as a peak count. Therefore, there are **No AEoI** for the impact of temporary loss of supporting habitats and/or resource availability during the construction phase for black-tailed godwit under Scenario 3.

Disturbance and displacement from construction activities

Whooper swan

1.4.3.8 Disturbance in combination with habitat loss increases the mean peak to 21 and the mean to 4, or 2.8% and 0.6% (a rounding artefact is noticeable for whooper swan) of the current SPA population respectively.

1.4.3.9 The addition of seasonal working practices at Lytham Moss and land south of Newton-with-Scales has reduced the overall disturbance impact on whooper swan by 87% from Scenario 1 to Scenario 3 (**Table 11**).

1.4.3.1 Whooper swan numbers have risen in recent years within England as a result of changing climate leading to birds 'short stopping' with recent increases within the Ribble and Alt Estuaries SPA and Ramsar site. Whooper swans are reliant upon arable land for foraging with approx. 80% of English sightings on this land use (Brides *et al*., 2021).

1.4.3.2 Therefore, carrying capacity in any given year is artificially controlled by crop choice and harvest times, **Figure 8** shows that in some years there are significant fluctuations. The Ribble and Alt Estuaries SPA whooper swan population has increased four-fold since designation and they are therefore in very favourable status. The large fluctuations point towards carrying capacity of the surrounding farmland being able to support significantly higher populations of whooper swan than are normally present. Therefore, farmland availability is unlikely to be a limiting factor for wintering whooper swan in the Ribble and Alt Estuaries SPA and Ramsar, or farming practices in any given winter are controlling the carrying capacity of wintering swans through provision of artificial food sources.

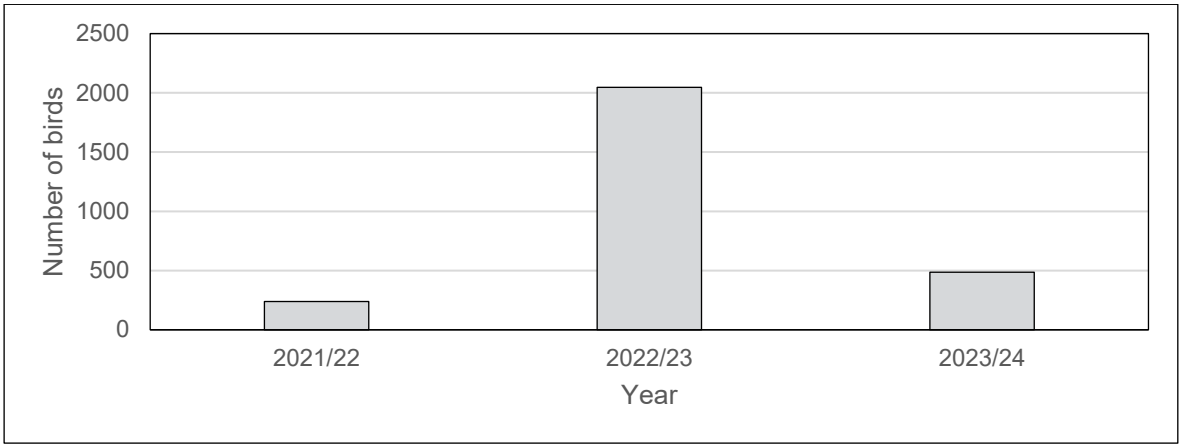

Figure 8: Whooper swan numbers for the last three years from the Ribble and Alt Estuaries SPA and Ramsar site as taken from Calbrade *et al.* (2025)

1.4.3.3 Impacts will be to heavily modified agricultural habitats and will be temporary in nature and quickly reversible. Large inter-annual fluctuations in bird numbers point towards whooper swan either, not being limited by the amount of available farmland, or farming practices in any given winter artificially controlling numbers of swans. Population level impacts may occur regularly with or without the project as crops are rotated, fields left fallow, crops harvested, and fields ploughed. In addition, a lower-than-expected number of birds were found to be using the impacted area, suggesting that this are does not represent FLL for whooper swan (**Table 10**).

1.4.3.4 On this basis, it is concluded that disturbance and displacement from construction activities would have a **negligible** impact on whooper swan within the Ribble and Alt Estuaries SPA and Ramsar site, either as an impact on its own, or in combination with temporary habitat loss. Therefore, there are **No AEoI** for the impact of disturbance and displacement during the construction phase for whooper swan under Scenario 3.

Pink-footed goose

1.4.3.5 A peak of 3,600 pink-footed geese were present (although this peak is unchanged from that for habitat loss), pink-footed geese were the only species present in significant numbers on more than half of all surveys, they are also the only species with a mean number of birds above 1% of the current SPA population and the only species which seem to actively favour the area indicating FLL (**Table 10**).

1.4.3.6 However, context within which this must be taken in is:

- The population trends on a regional and national scale which have seen increases in pink-footed geese populations throughout England and put the species in very favourable condition in the Ribble and Alt Estuaries SPA and Ramsar site.
- The fact that this is a species which is benefitting from intensive arable farming practices, many of which are associated with other

species' declines, and is reliant upon wholly artificial food sources in the affected area.

- This is a species which regularly makes large winter movements between SPAs to take advantage of food sources in other areas.

As habitats will be unavailable on a temporary basis, it is predicted that pink-footed geese will find other temporary food sources, either nearby, elsewhere in the northwest, or further afield in the UK. However, when work finishes, the habitats will be quickly restored, and geese will return to the area. It should also be noted that the numbers of birds reported in this assessment are highly precautionary and that works will be localised and of short duration, many geese may also habituate to disturbance and use areas closer to the works than are presented in this assessment.

1.4.3.7 On this basis, it is concluded that disturbance and displacement from construction activities would have a **negligible** impact on pink-footed goose within the Ribble and Alt Estuaries SPA and Ramsar site, either as an impact on its own, or in combination with temporary habitat loss. Therefore, there are no predicted AEoI for the impact of disturbance and displacement during the construction phase for pink-footed goose under Scenario 3.

Shelduck

1.4.3.8 The impacts of disturbance and displacement on shelduck are predicted to be **negligible**. A peak of 240 shelduck were recorded, however the mean peak is much lower and shelduck were only recorded on three of 14 survey visits leading to the mean number of birds as 40 or 0.7% of the current SPA population (**Table 8**). Therefore, there are **No AEoI** for the impact of disturbance and displacement during the construction phase for shelduck under Scenario 3.

Teal

1.4.3.9 The impacts of disturbance and displacement on golden teal are predicted to be **negligible**. Although the peak of 102 teal is just above 1% of the current SPA population, the mean peak and mean number of birds is at 1% or lower. In addition, the frequency with which teal were recorded in significant numbers was low at two of 14 survey visits (**Table 8**). This was because, away from Newton Marsh and land south of Newton-with-Scales, teal were generally recorded at low densities using the many seasonal pools and ponds throughout the area. Therefore, there are **No AEoI** for the impact of disturbance and displacement during the construction phase for teal under Scenario 3.

Golden plover

1.4.3.10 The impacts of disturbance and displacement on golden plover are predicted to be **negligible**. Golden plover were recorded in significant numbers on only one of 14 survey visits, although this peak count represented a relatively high percentage of the current SPA population,

the low frequency of use means that the average number of birds impacted is well below 1% of the SPA population (**Table 8**). Therefore, there are no predicted AEoI for the impact of disturbance and displacement during the construction phase for golden plover under Scenario 3.

Black-tailed godwit

1.4.3.11 The impacts of disturbance and displacement on black-tailed godwit are predicted to be **negligible**, although the peak number of 56 birds recorded was just above 1% of the current SPA population (**Table 8**), both the mean peak and peak were well below Therefore, there are **No AEoI** for the impact of disturbance and displacement during the construction phase for black-tailed godwit under Scenario 3.

Scenario 3 conclusion

1.4.3.12 Mitigation will be delivered through the following measure:

- Lytham Moss – seasonal working will massively reduce impacts on all species to below 1% of the current SPA population with the exception of pink-footed goose. However, pink-footed goose are adaptable and quick to exploit resources in other areas with the impact of habitat loss at Lytham Moss being to arable land of low ecological value, temporary in nature, and quickly reversible after cessation of works.
- Land south of Newton-with-Scales – left as a disturbance free refuge to accommodate additional displaced birds.
- Visual and acoustic screening which aims to reduce disturbance near Lytham Moss, near the land south of Newton-with-Scales refuge, and at Lea Marsh.

It is concluded that there will be **No AEoI** on the integrity of the Ribble and Alt Estuaries SPA if the Applicants adopt Scenario 3 as their preferred construction method.

Table 14: Conclusions against the conservation objectives of the Ribble and Alt Estuaries SPA and Ramsar site for the impacts of temporary habitat loss and displacement during construction under Scenario 3

Conservation objective	Conclusion
Maintain or restore the extent and distribution of the habitats of the qualifying features.	There will be **no impact** on the habitats within the site and no long-term reduction or deterioration of the FLL habitats outside of the site.
Maintain or restore the structure and function of the habitats of the qualifying features.	
Maintain or restore the supporting processes on which the habitats of the qualifying features rely.	

Conservation objective	Conclusion
Maintain or restore the population of each of the qualifying features.	Through a combination of seasonal working and screening, there will be **negligible** impacts to the populations of the site features. Any negligible impacts will be temporary in nature and quickly and easily reversible following cessation of the works.
Maintain or restore the distribution of the qualifying features within the site.	There will be **no impact** on the distribution of features within the site.

1.5 Conclusion

- The assessed impacts of temporary loss of supporting habitats and/or resource availability and disturbance and displacement during the construction phase are temporary impacts that will occur on farmland habitats beyond the boundary of the Ribble and Alt Estuaries SPA and Ramsar site. These impacts are temporary in nature and quickly reversible following the cessation of works.
- The Applicants have demonstrated that there are a number of mitigation options available that avoid AEoI on the Ribble and Alt Estuaries SPA and Ramsar site should it not be possible to reach agreement with aviation stakeholders in respect of the preferred mitigation option (i.e. Scenario 1).
- The Applicants have provided data for all three Scenarios considered and justified their conclusions based upon these site-specific data and using widely accepted foraging ranges and disturbance buffers.
- The Applicants have quantified the amount of land that may become temporarily unavailable to birds, and the number of birds that may be impacted to draw conclusions with respect to AEoI.
- The Applicants have also drawn upon known population dynamics and ecology where appropriate when reaching these conclusions.
- The Applicants note the numbers of birds predicted to be impacted within this assessment is precautionary as it assumes the unrealistic assumptions that:
  - 100% of birds will be displaced.
  - Screening will not reduce displacement distances.
  - Works will be continuous and simultaneous throughout the entire infrastructure area for the duration of construction.
- There are **No AEoI** for any of the three Scenarios assessed. Therefore, there are three appropriately assessed construction Scenarios available to the Applicants for construction of the onshore export cable corridor dependent upon the outcome of discussions with the DIO/BAE.
- The Applicants have provided a detailed in-combination assessment in E2.3 Habitats Regulations Assessment Stage 2

Information to Support an Appropriate Assessment Part Three – Special Protection Areas (SPA) and Ramsar Site assessments (REP6-024), as the project alone conclusions are unchanged, the conclusions drawn in the original in-combination assessment are still valid.

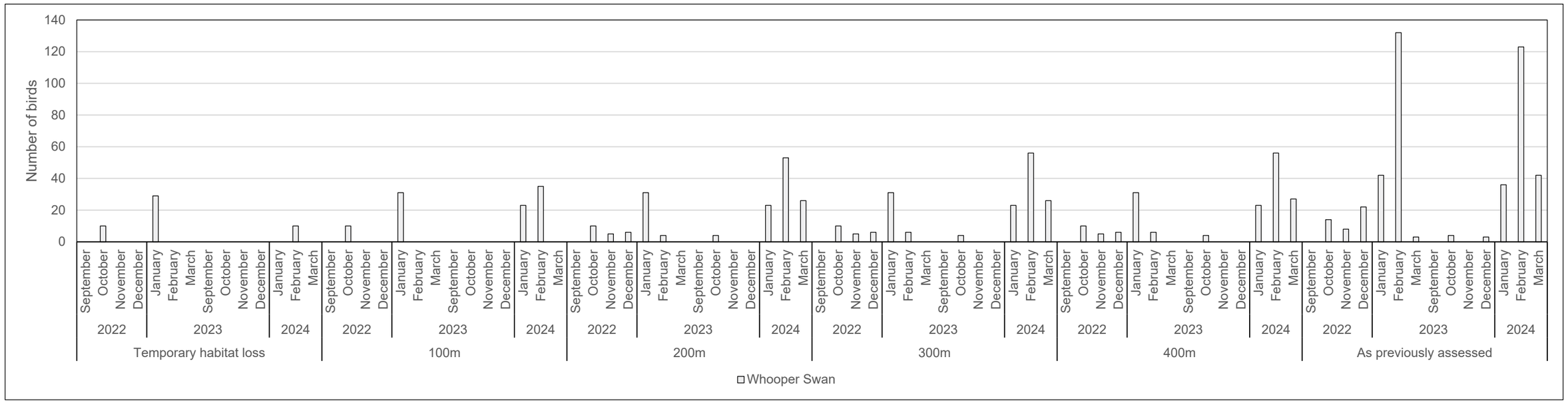

Figure 9: Whooper swan numbers – Scenario 1

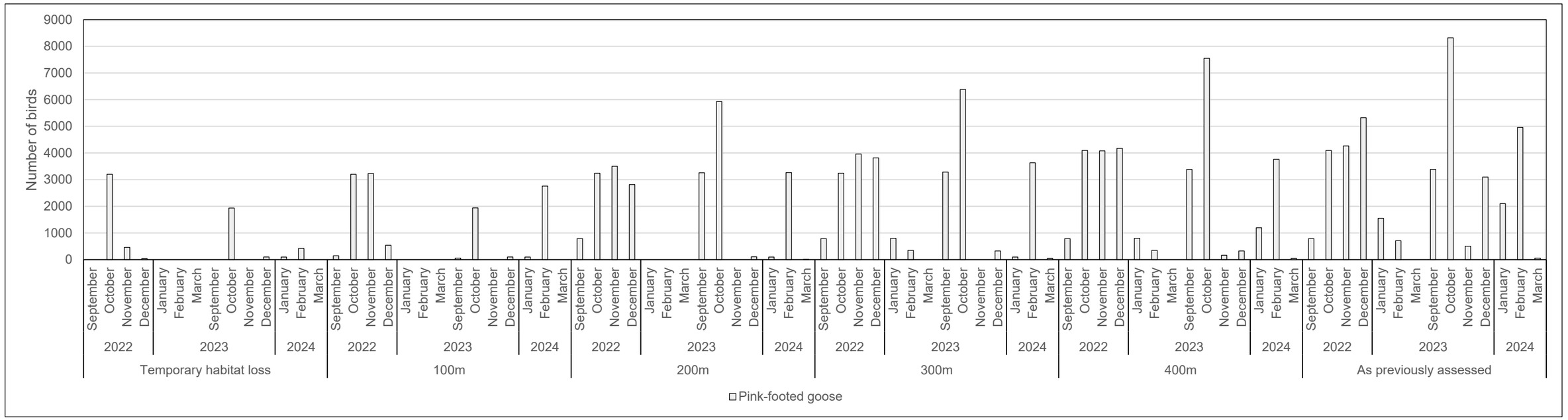

Figure 10: Pink-footed goose numbers – Scenario 1

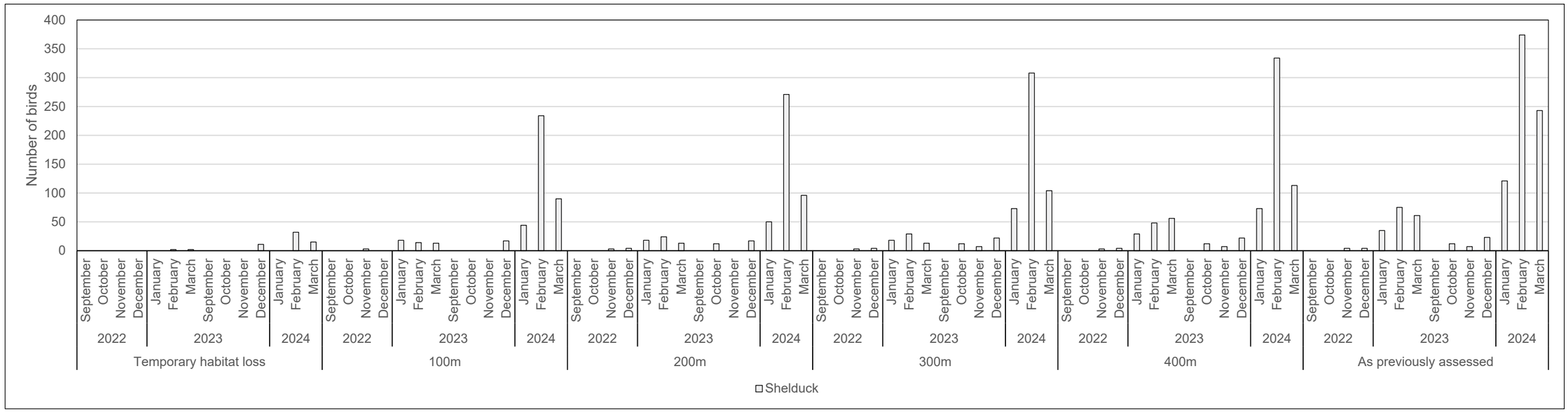

Figure 11: Shelduck numbers – Scenario 1

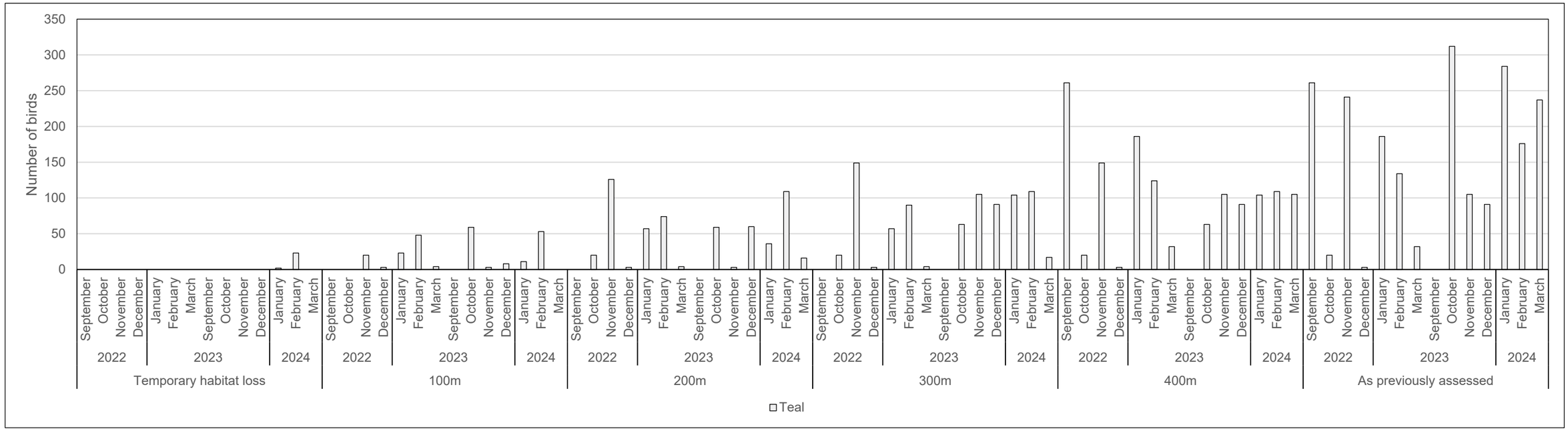

Figure 12: Teal numbers – Scenario 1

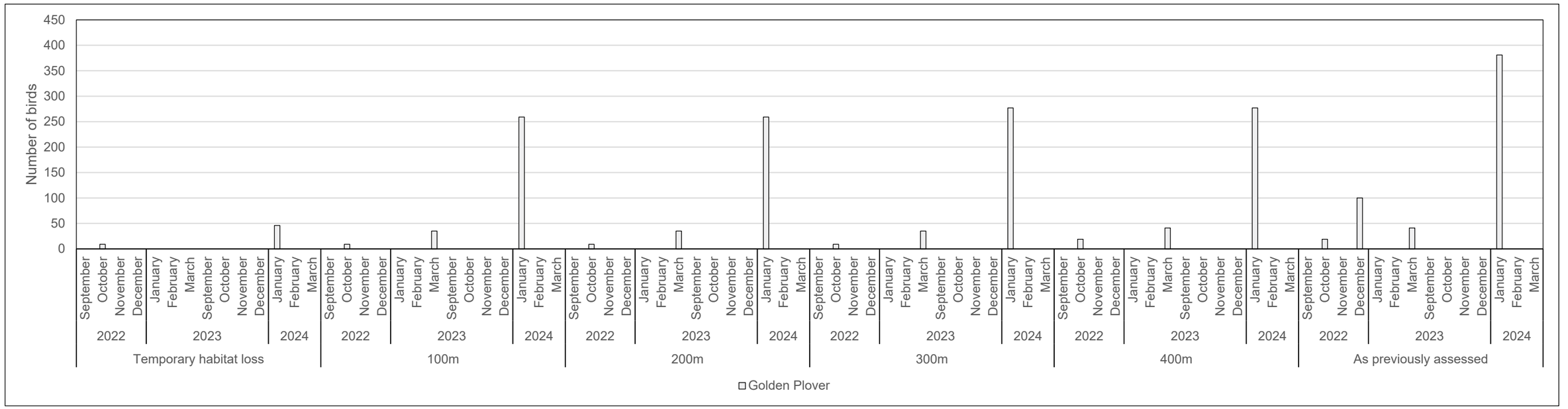

Figure 13: Golden plover numbers – Scenario 1

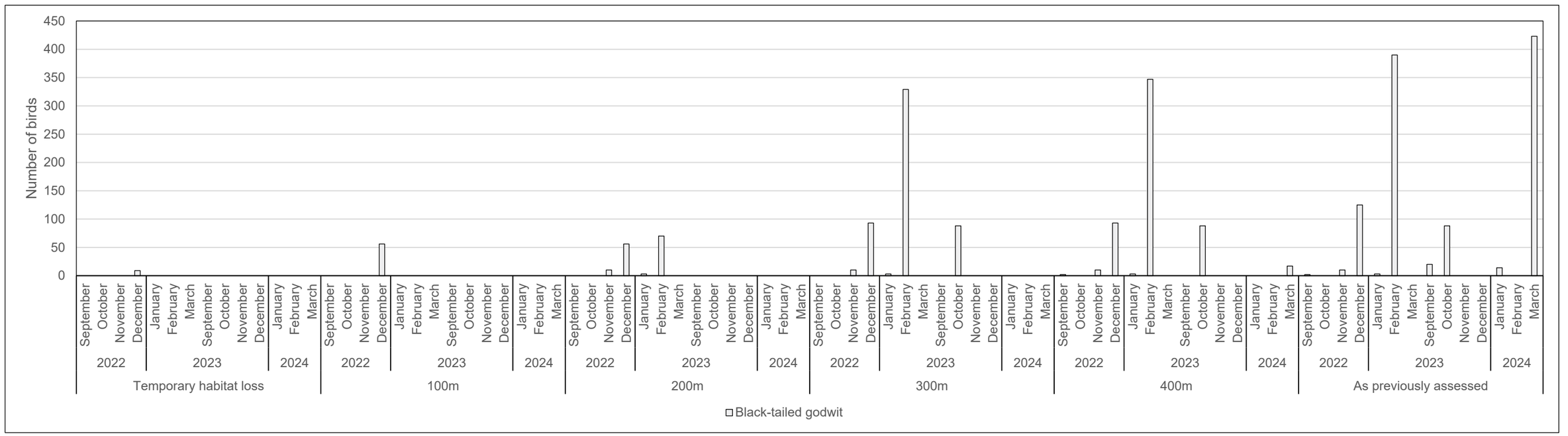

Figure 14: Black-tailed godwit numbers – Scenario 1

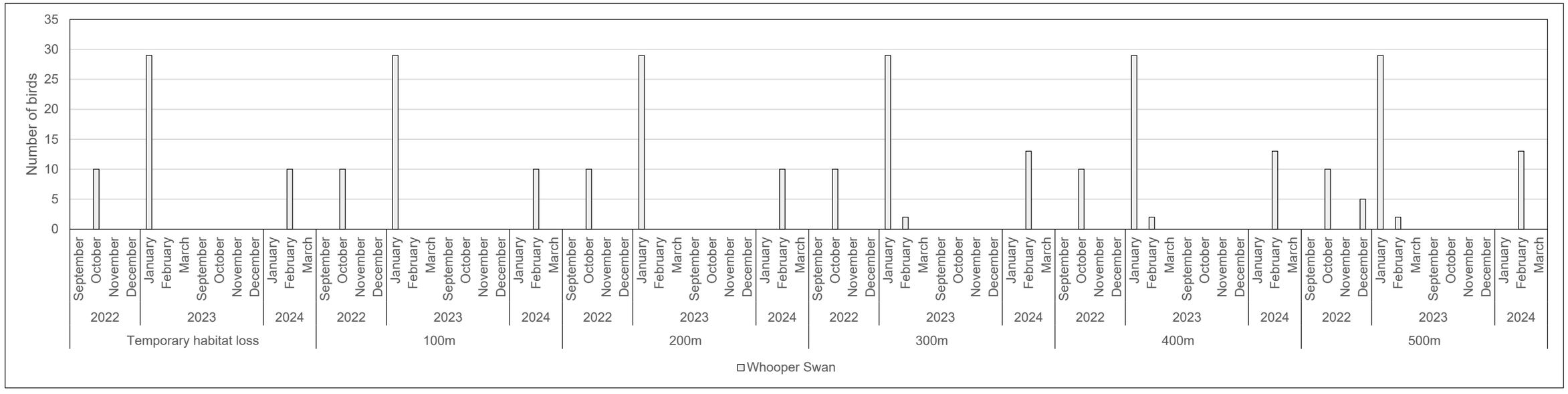

Figure 15: Whooper swan numbers – Scenario 3

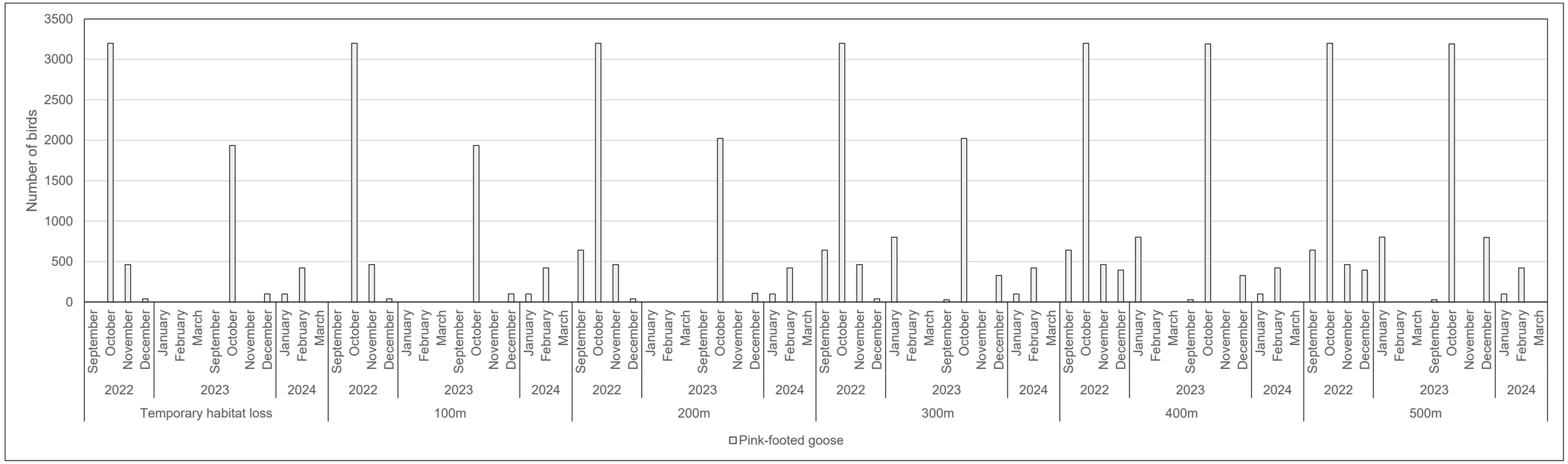

Figure 16: Pink-footed goose numbers – Scenario 3

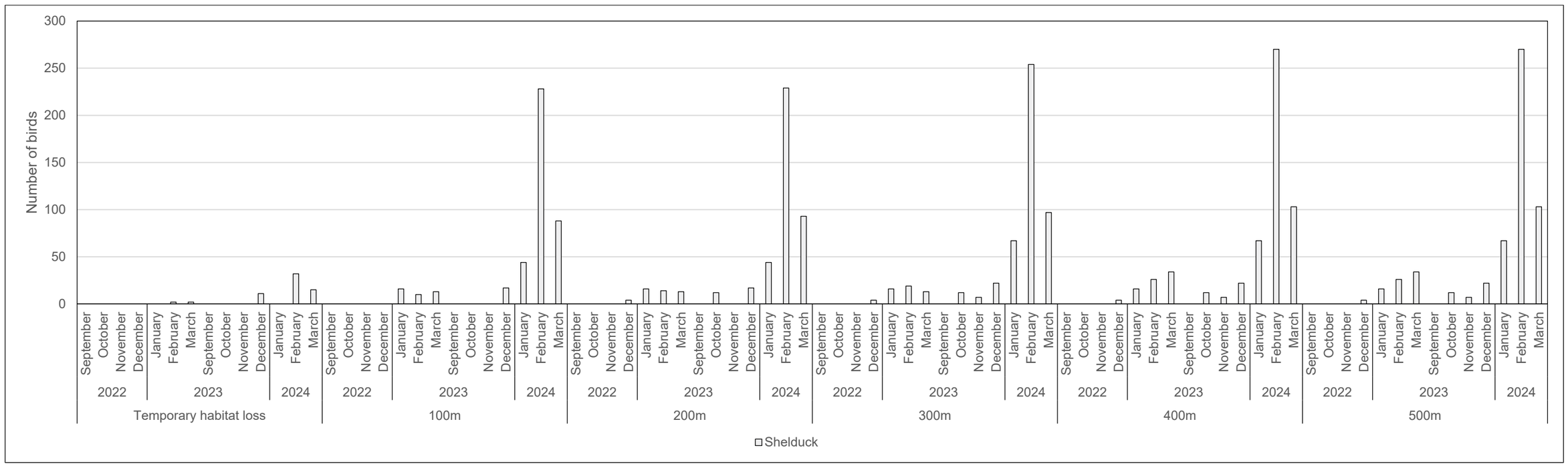

Figure 17: Shelduck numbers – Scenario 3

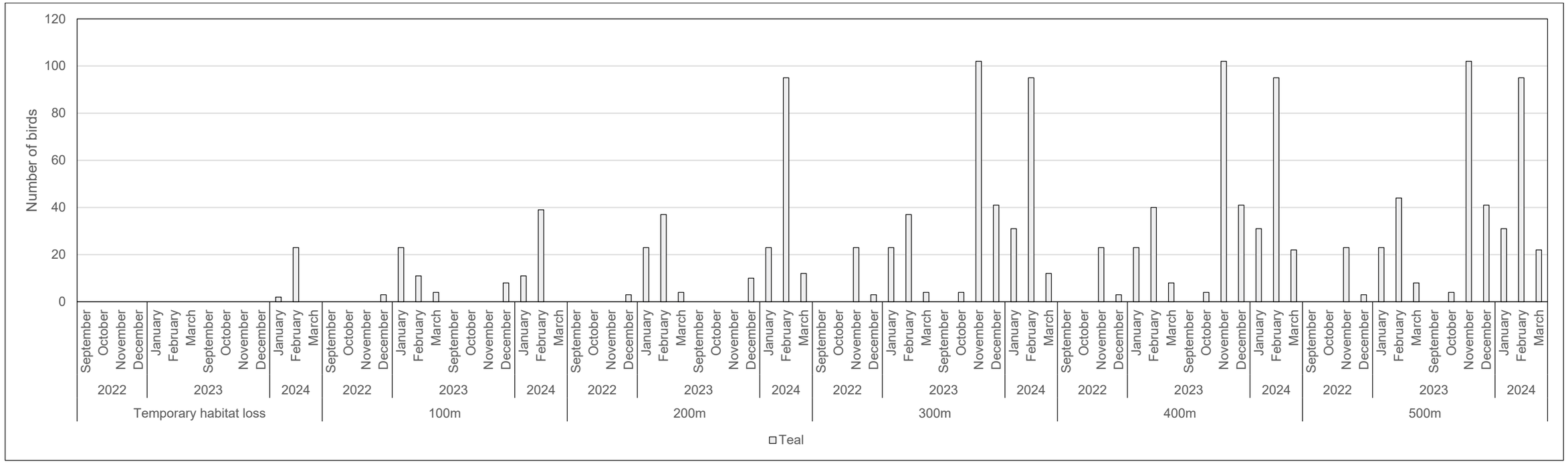

Figure 18: Teal numbers – Scenario 3

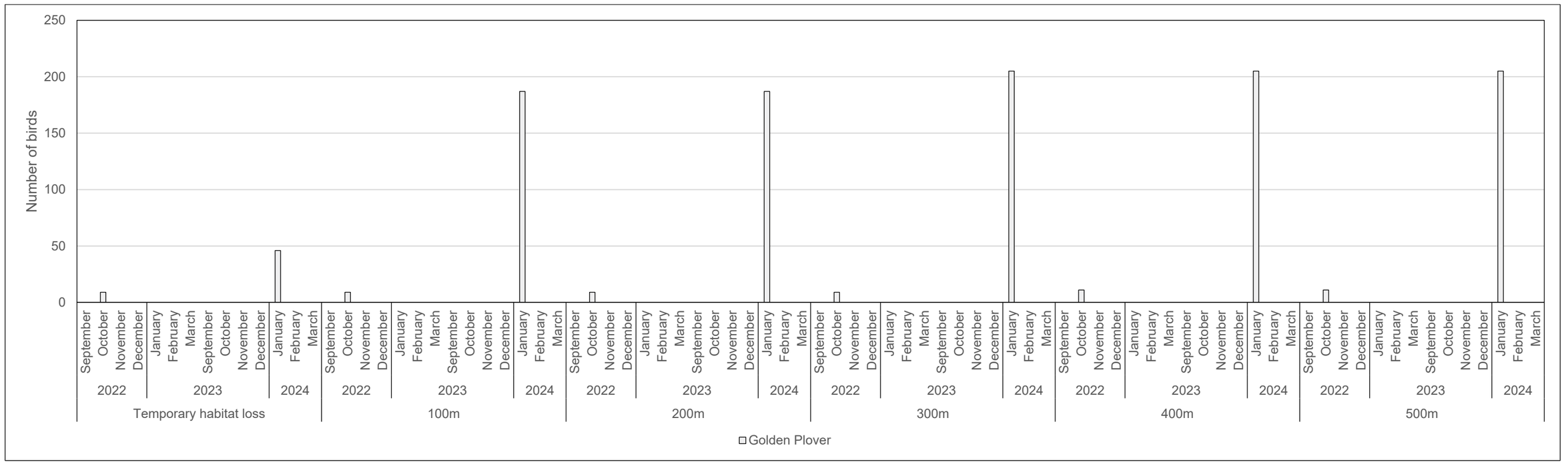

Figure 19: Golden plover numbers – Scenario 3

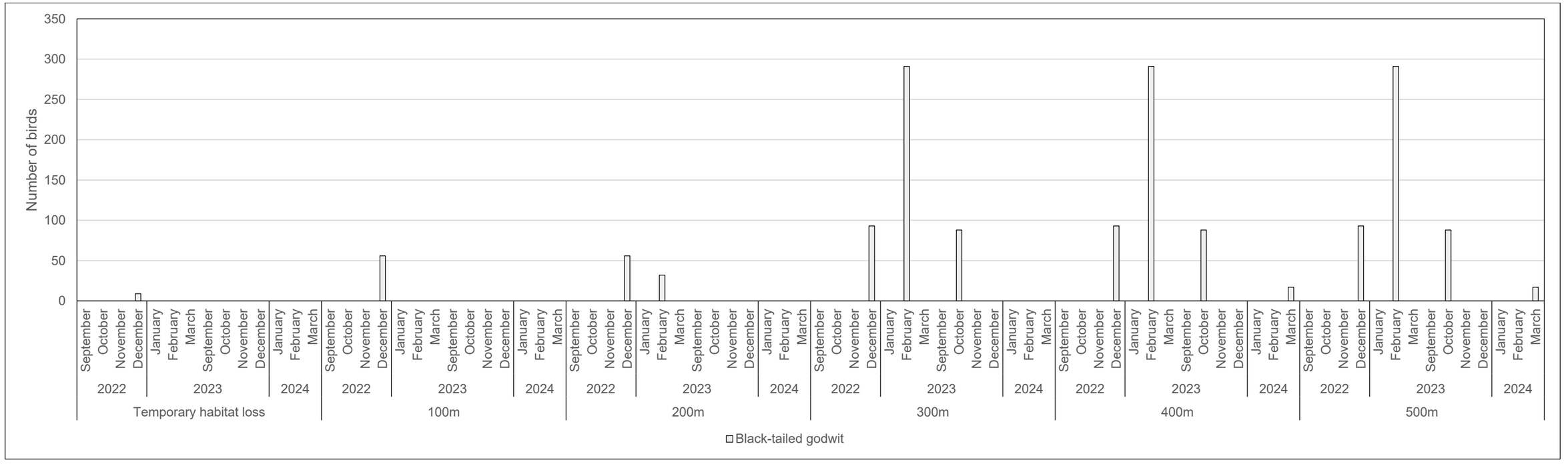

Figure 20: Black-tailed godwit numbers – Scenario 3

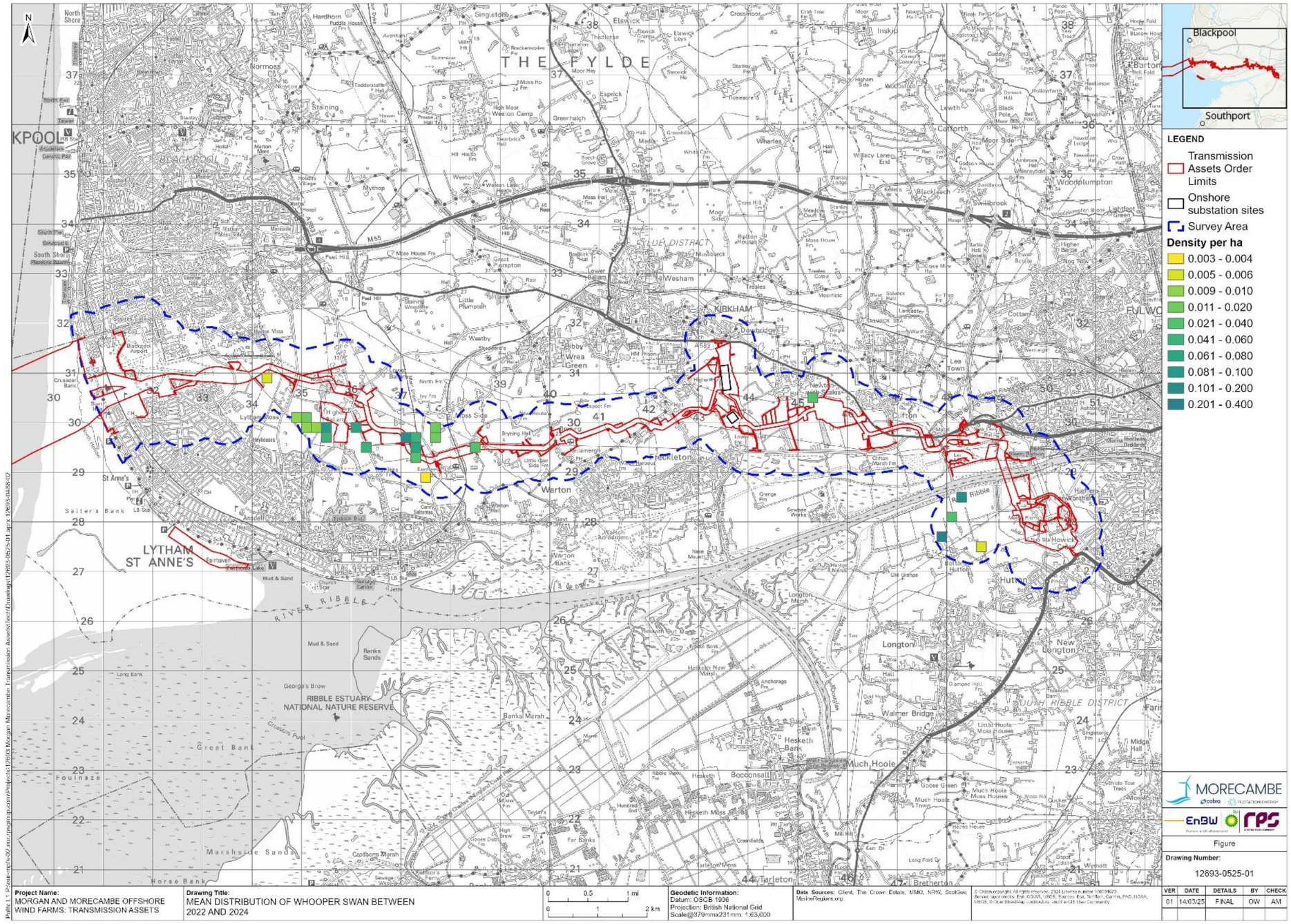

Figure 21: Whooper swan distribution

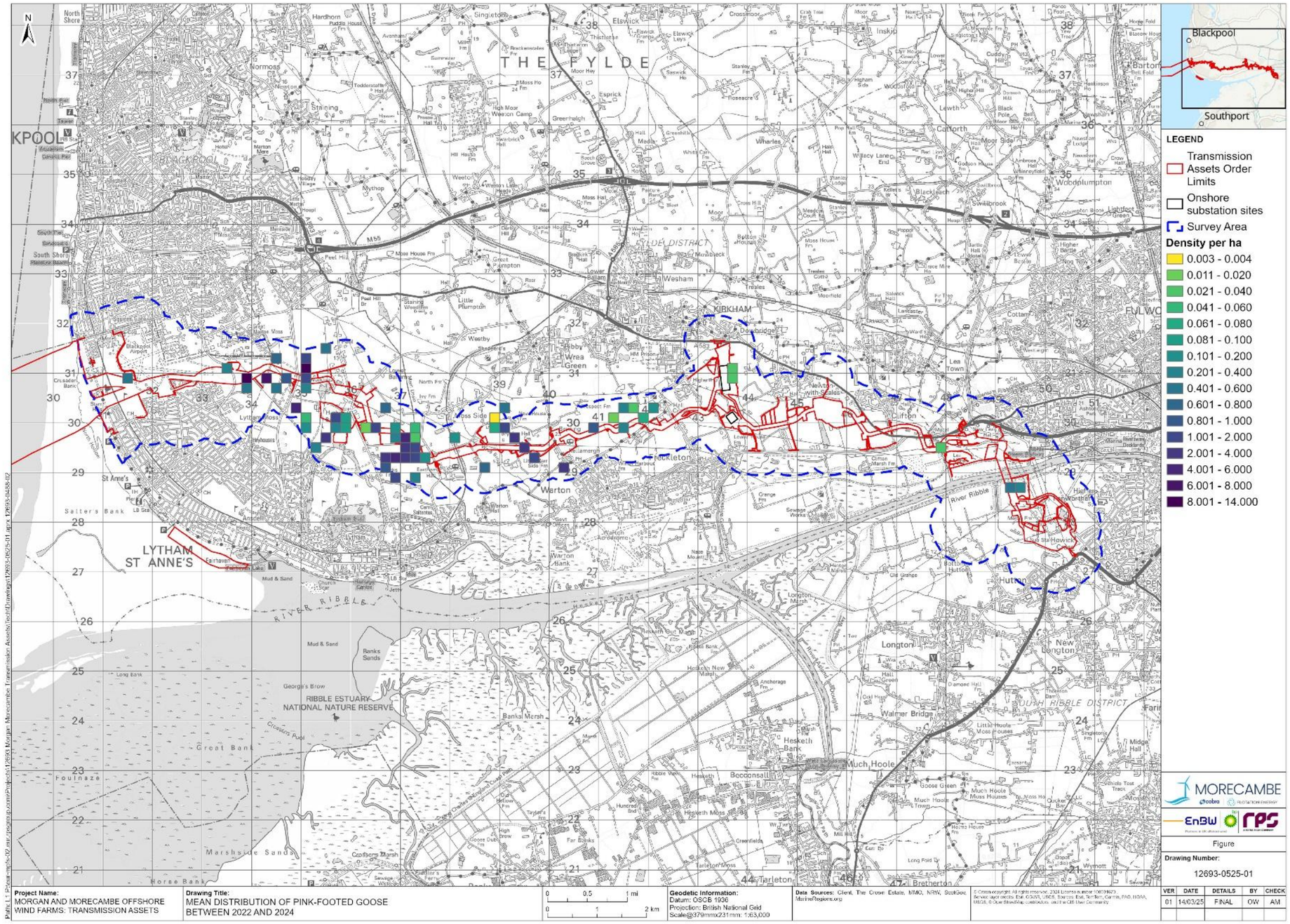

Figure 22: Pink-footed goose distribution

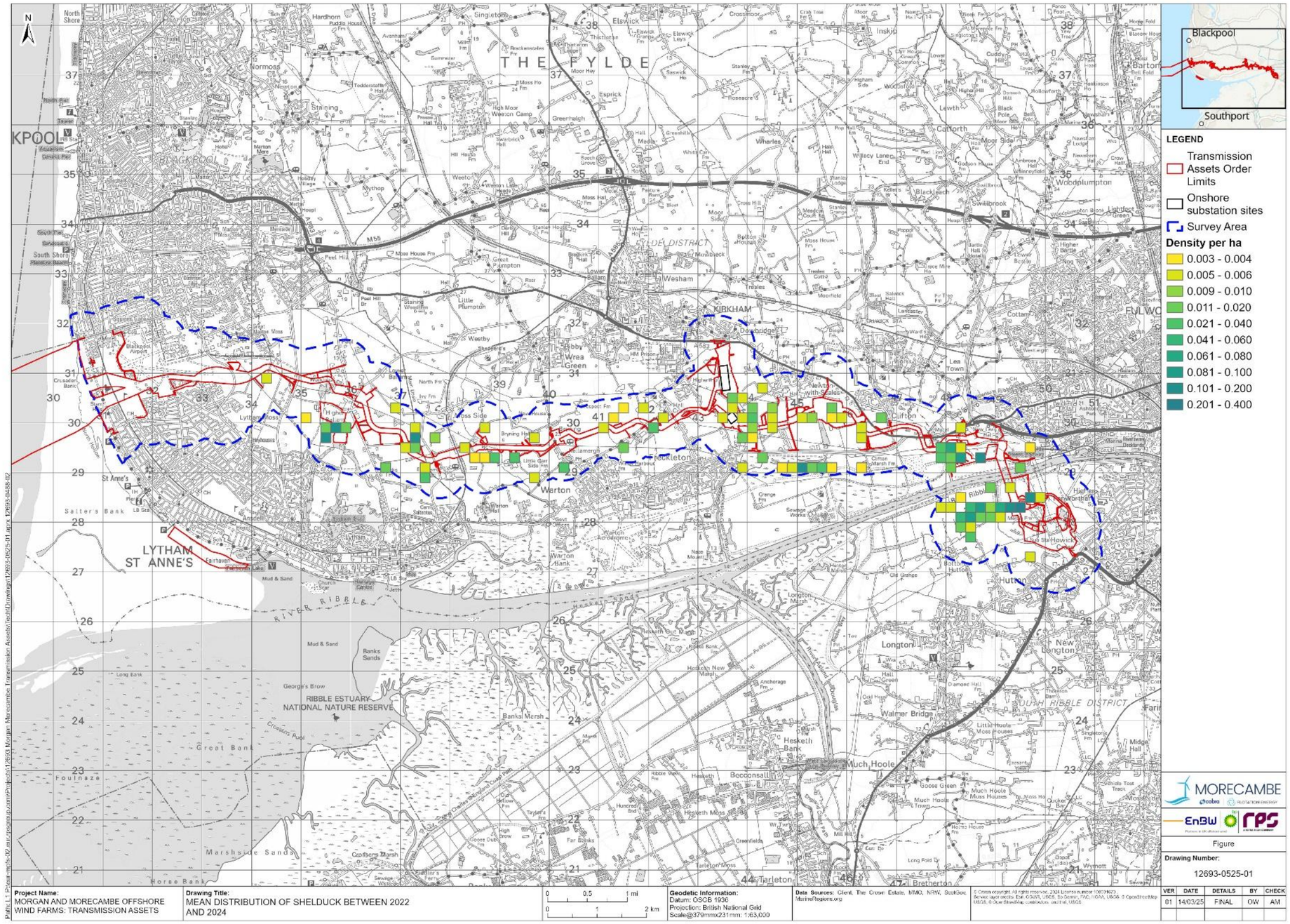

Figure 23: Shelduck distribution

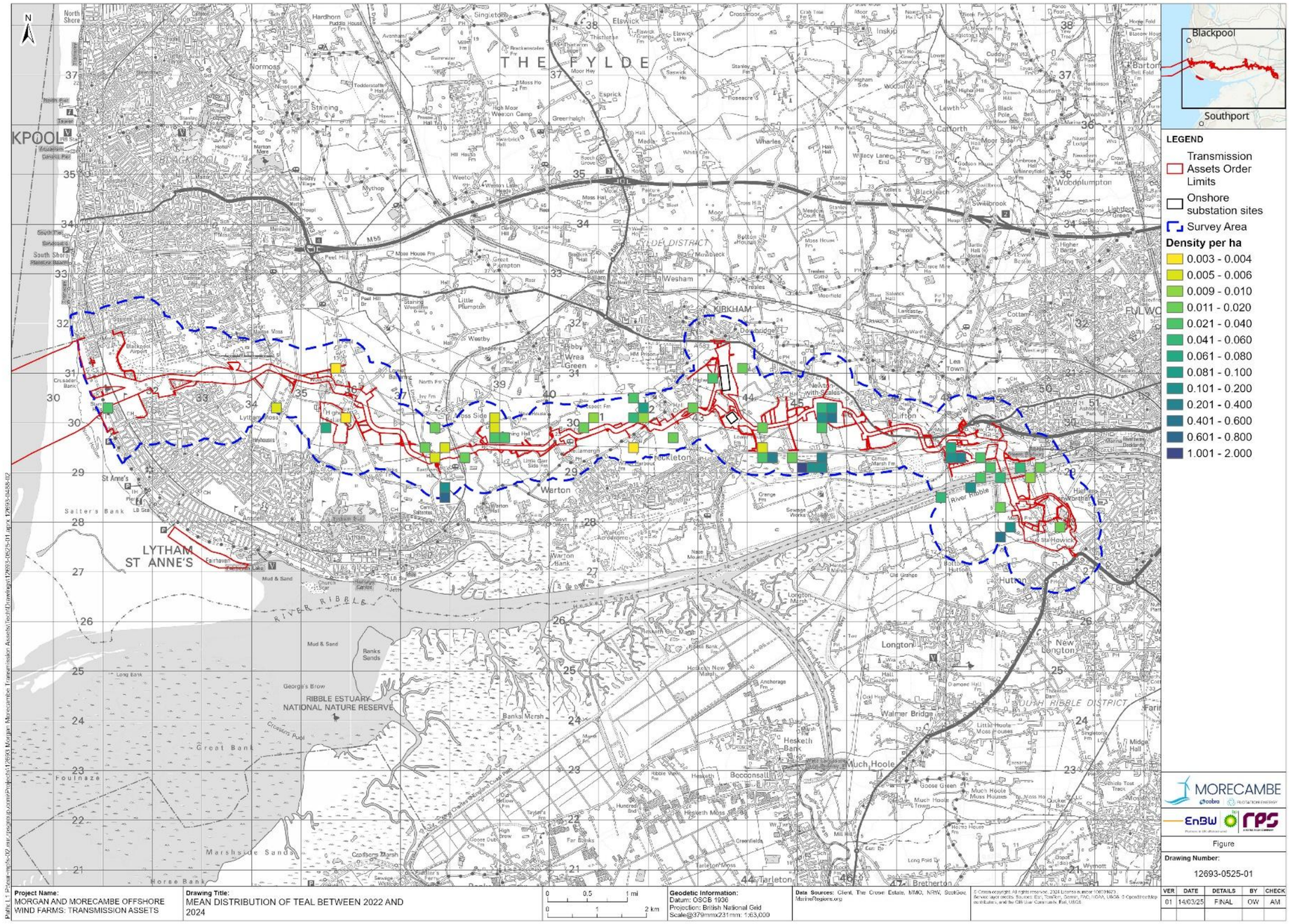

Figure 24: Teal distribution

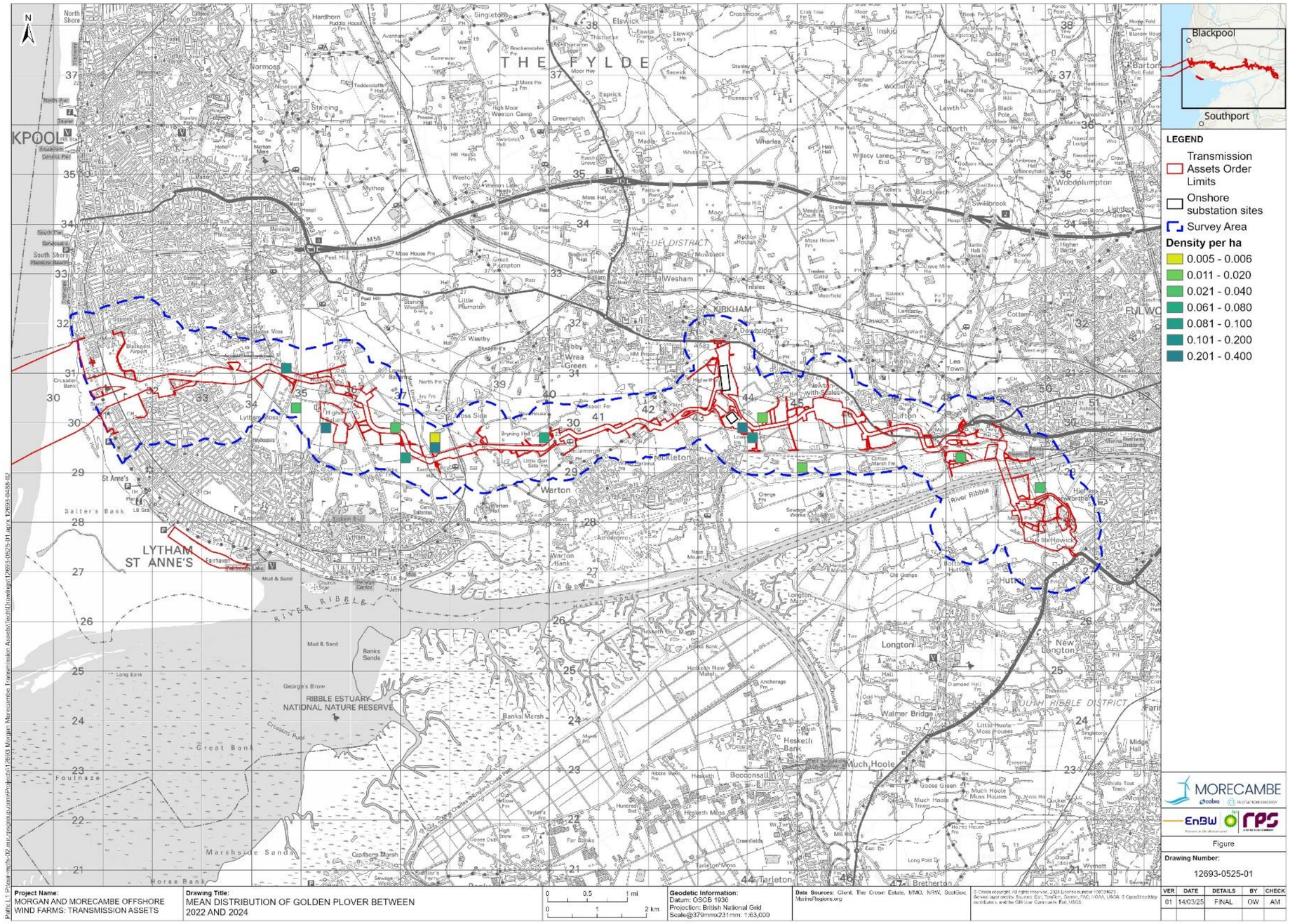

Figure 25: Golden plover distribution

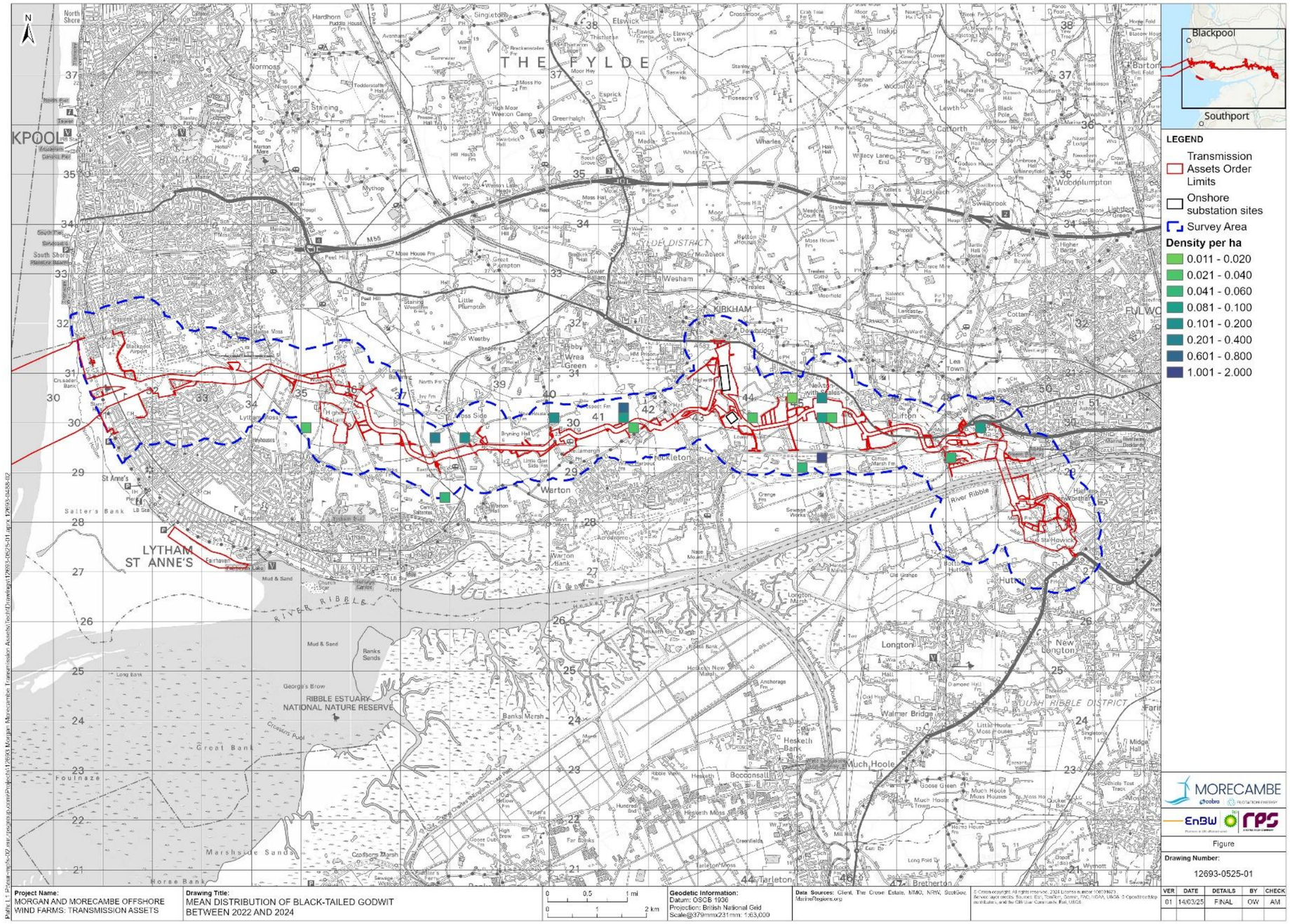

Figure 26: Black-tailed godwit distribution

Annex D: Assumptions and areas used to calculate habitat loss and numbers of birds

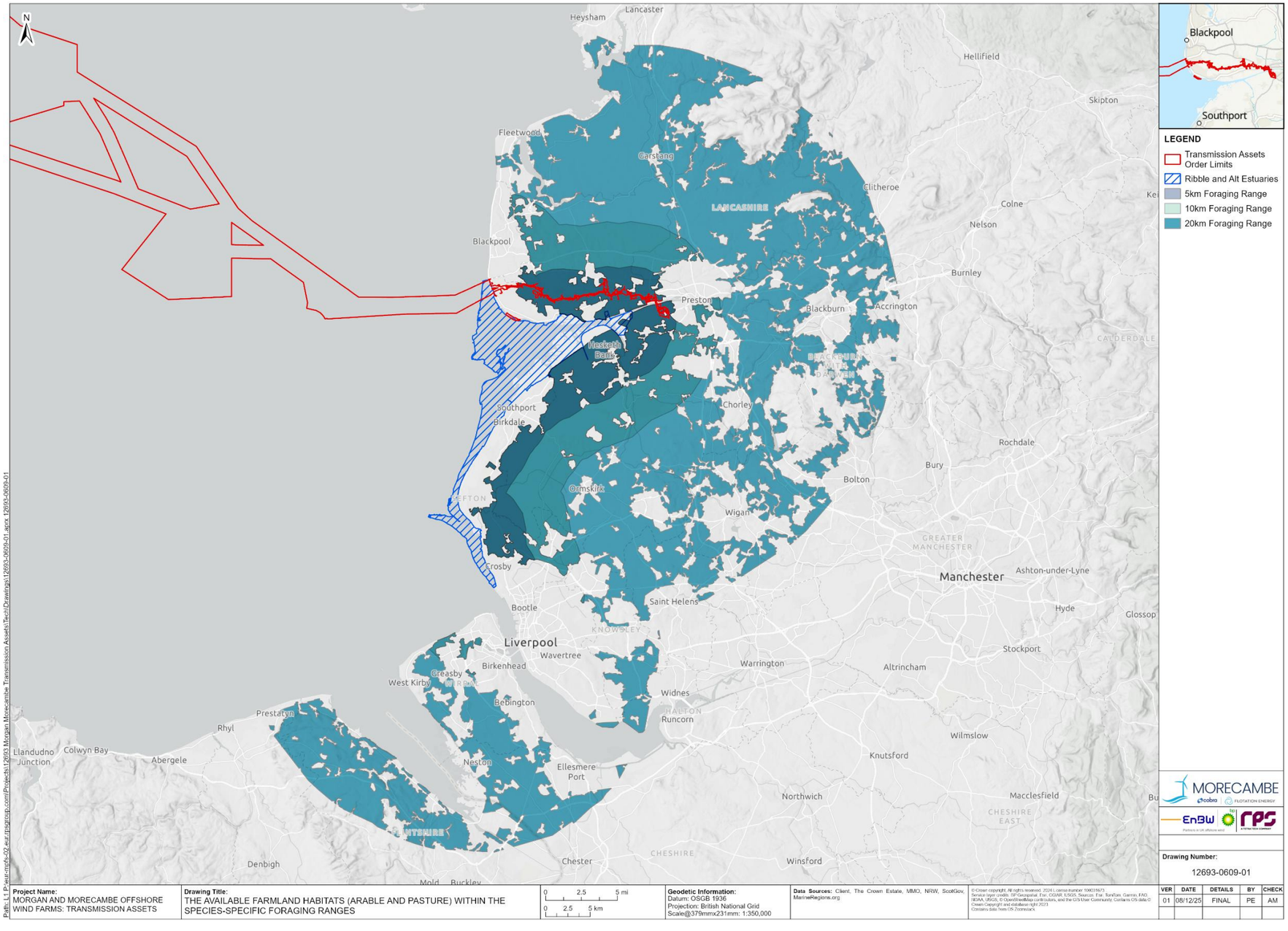

Figure 27: The available farmland habitats (arable and pasture) within the species-specific foraging ranges

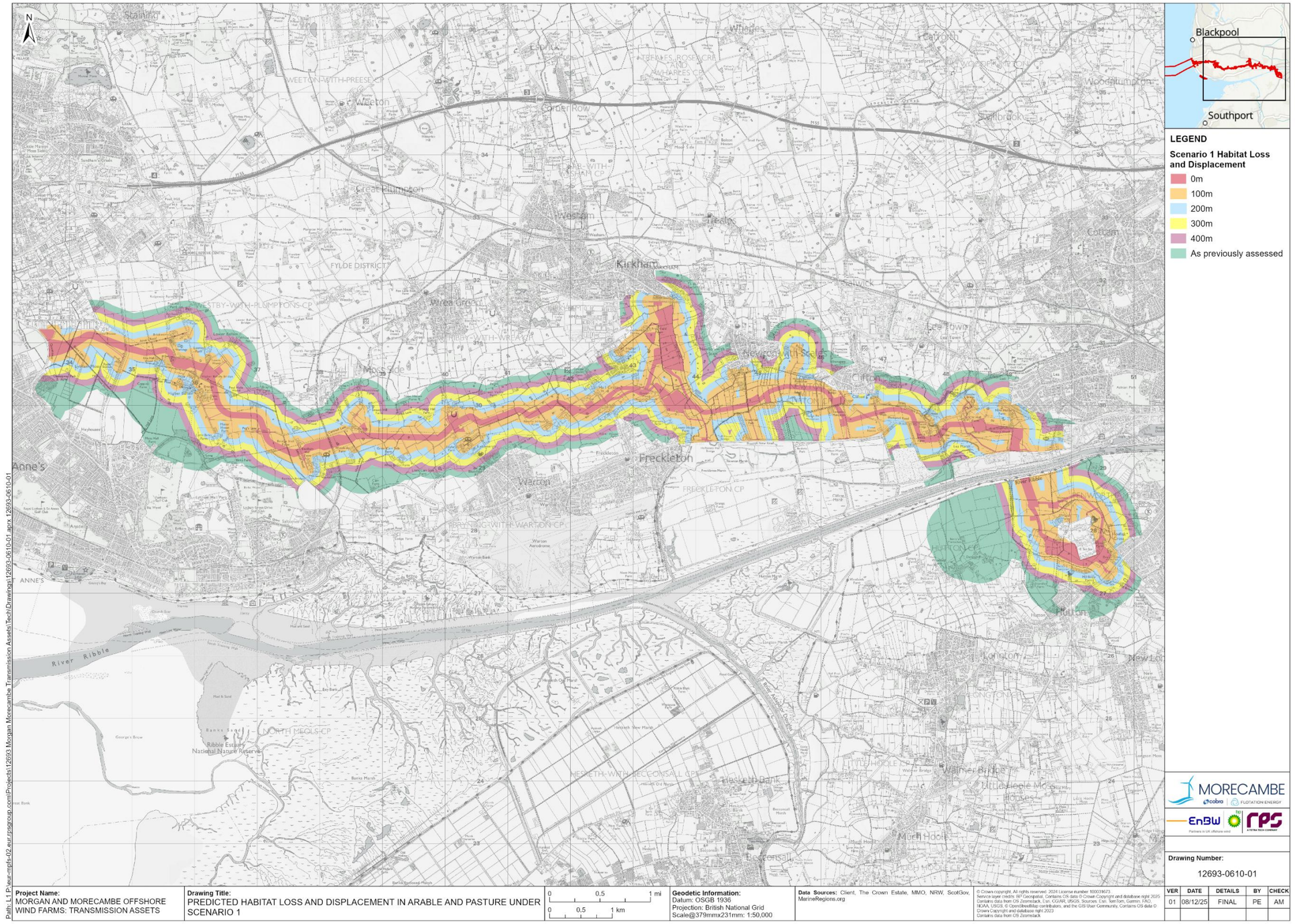

Figure 28: Predicted displacement in arable and pasture under Scenario 1

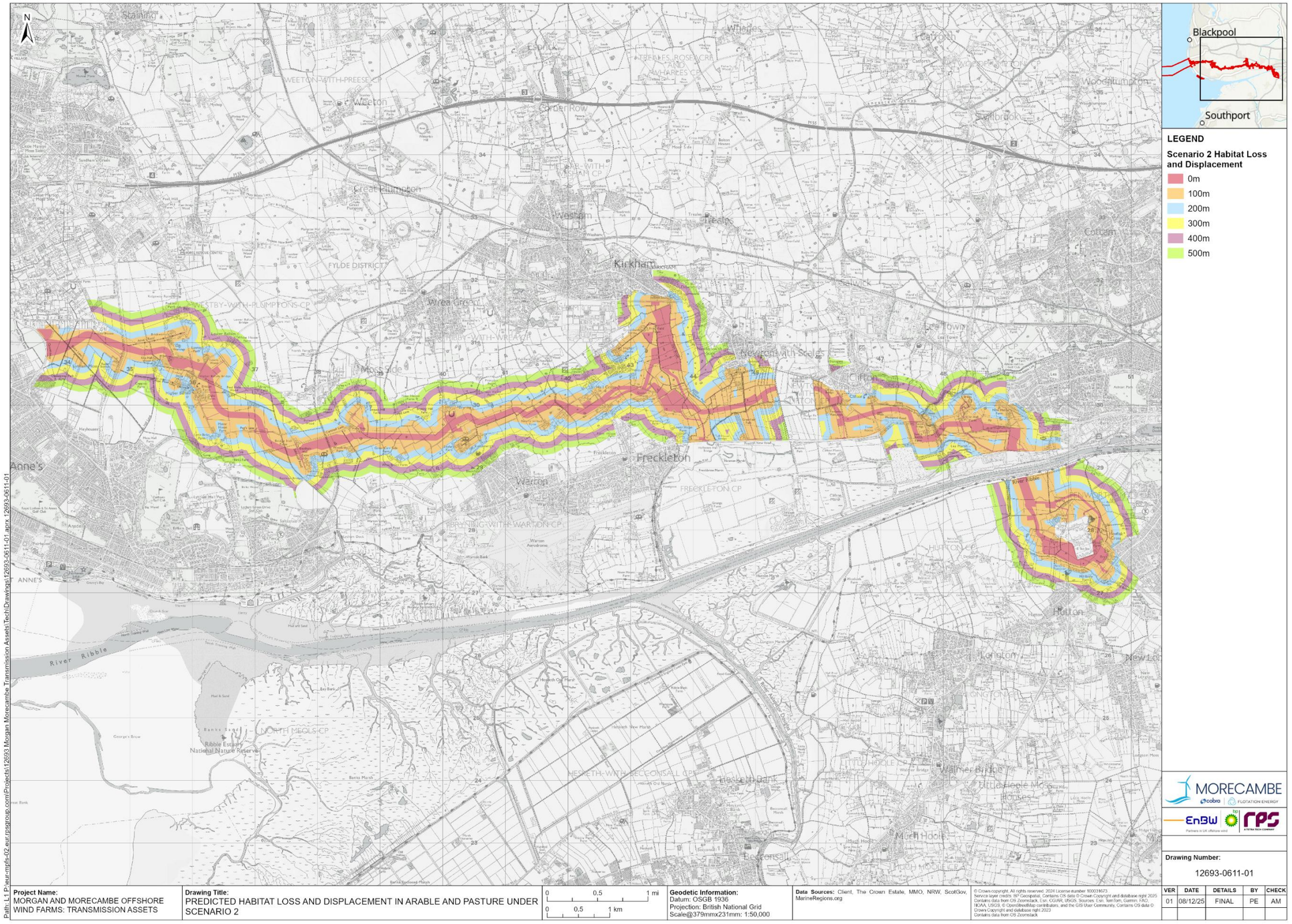

Figure 29: Predicted displacement in arable and pasture under Scenario 2

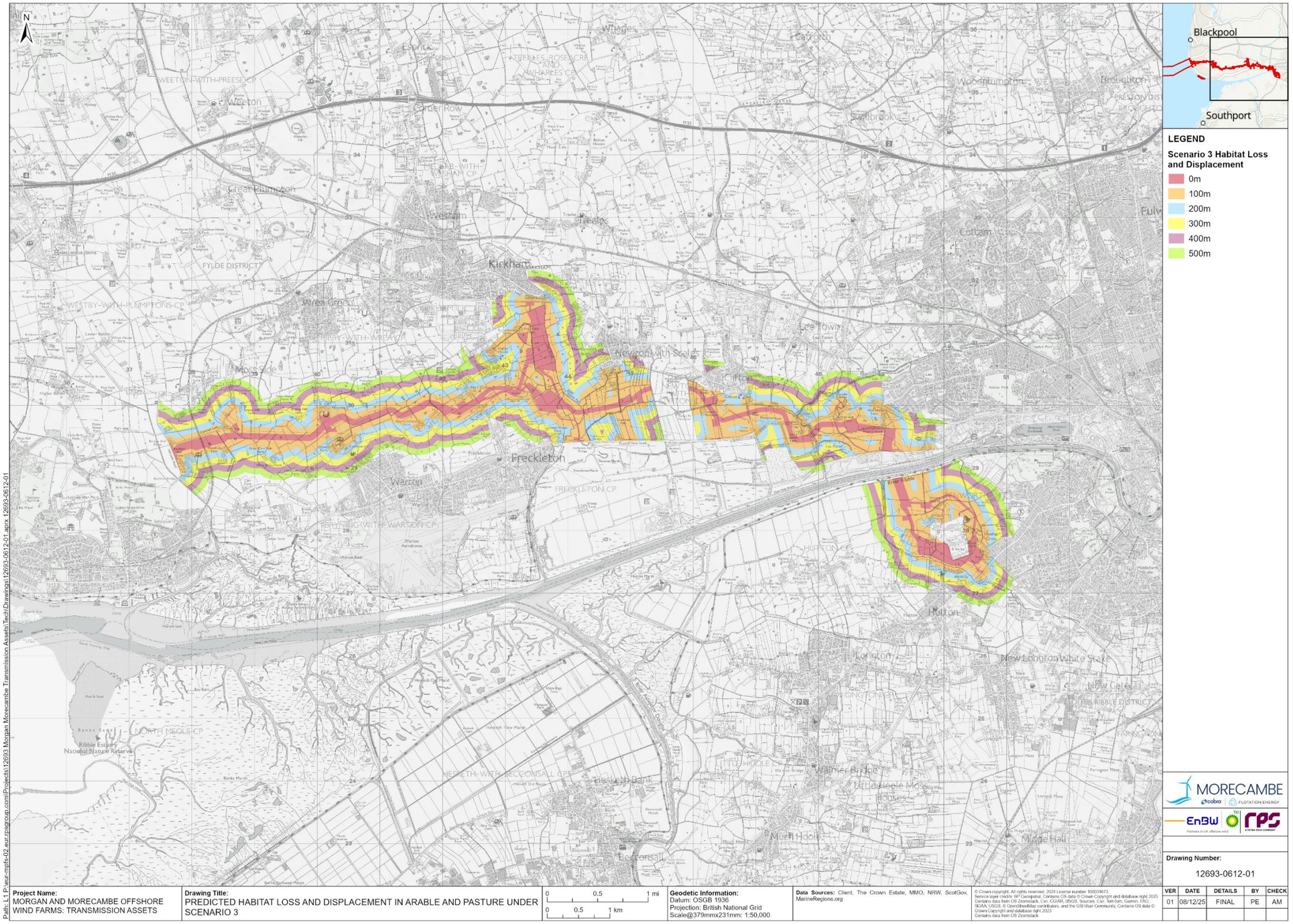

Figure 30: Predicted displacement in arable and pasture under Scenario 3