

# A47/A11 Thickthorn Junction

**Scheme Number: TR010037**

## **Volume 6**

### **6.9 Environmental Statement**

#### **Report to inform Habitats Regulations Assessment**

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed  
Forms and Procedure) Regulations 2009

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Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms and  
Procedure) Regulations 2009**

The A47/A11 Thickthorn Junction  
Development Consent Order 202[x]

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**ENVIRONMENTAL STATEMENT**  
**Report to inform Habitats Regulations Assessment**

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## Table of contents

1.	Introduction	1
1.1.	Background	1
1.2.	The Habitats Directive	2
2.	Habitats Regulations Assessment methodology	5
2.2.	Guidance	6
2.3.	Assumptions	10
3.	Stage 1 screening results	11
3.1.	Background	11
3.2.	Study area	12
3.3.	Ecological baseline	18
3.4.	Stage 1 screening: in combination	20
3.5.	Limitations	21
3.6.	Consultation with Natural England (NE)	<del>22</del> 24
4.	Screening summary	23
5.	References	32

## Tables

Table 4.1	The Broads SAC conclusion table	24
Table 4.2	Broadlands SPA conclusion table	26
Table 4.3	Broadlands Ramsar conclusion table	29
Table A.1	The Broads SAC Screening Matrix	34
Table A.2	Broadlands SPA Screening Matrix	<del>41</del> 40
Table A.3	Broadlands Ramsar Screening Matrix	<del>47</del> 45

## Appendices

Appendix A.	DMRB screening matrices	34
Appendix B.	Potential effects	<del>56</del> 51
Appendix C.	Planning Inspectorate screening matrices	<del>64</del> 59
Appendix D.	Designated sites map	<del>78</del> 70
Appendix E.	Otter survey map	<del>79</del> 74
Appendix F.	Natural England Acceptance	<del>80</del> 72

## Figures

Figure 1 for Appendix D – Designated sites  
Figure 2 for Appendix E – Otter survey

# 1. Introduction

## 1.1. Background

- 1.1.1. The A47/A11 Thickthorn Junction (referred to as the Proposed Scheme) is designed to provide a new free-flowing link road connecting the A11 to the A47 along with a new link road connecting Cantley Lane South to the B1172 Norwich Road. Improvements will also be made to the existing Thickthorn interchange.
- 1.1.2. The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the south of the Proposed Scheme. Several residential properties are located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich to Peterborough and Cambridge.
- 1.1.3. In April 2020, the Department of Transport (DfT) published the Road Investment Strategy 2 (RIS2) for 2020-2025. The RIS2 sets out the list of schemes that are to be developed by Highways England over the period covered by the RIS.
- 1.1.4. Highways England, as the strategic highways company and appointed by the Secretary of State must, in exercising its functions and complying with its legal duties and other obligations, act in a manner which it considers best calculated to, among others:
- Minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment
  - Conform to the principles of sustainable development.
- 1.1.5. Key elements of the Proposed Scheme include:
- Construction of A11 to A47 link road, including the construction of two new underpasses
  - Provision of four lanes on the southern half of the existing Thickthorn interchange
  - Realignment of the existing A47 westbound exit slip road towards Thickthorn interchange
  - Removal of the existing left turn into Cantley Lane South
  - Construction of a new link road between Cantley Lane South and the B1172 Norwich Road to the north

- Construction of two new overbridges for the new Cantley Lane South link to cross the A47 to A11 link road, and the A11 main carriageway and finally the A11 to A47 link road
- The new Cantley Lane link road will require the existing Cantley Stream to be realigned by approximately 390m. The adjacent access track will also require to be diverted
- Construction of a new culvert to carry the diverted Cantley Stream beneath the existing Cantley Lane South carriageway. The size of this culvert is approximately 1.1m high by 6m wide
- Improvements to the access of residential properties are proposed along Cantley Lane South where the new Cantley Lane South link road is constructed
- Installation of boundary fencing, safety barriers and signage.

1.1.6. The consenting route for this Proposed Scheme is via a Development Consent Order (DCO) under the Planning Act 2008, with Highways England being the applicant. This report has been prepared in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) to present information to inform the Habitats Regulations Assessment that will be undertaken by the Secretary of State when determining the DCO application.

## 1.2. The Habitats Regulations

1.2.1. The Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna ('Habitats Directive') is transposed into English law by The Conservation of Habitats and Species Regulations 2017 (as amended) ('The Habitats Regulations').

1.2.2. Part II, Paragraph 12 of The Conservation of Habitat and Species Regulations 2017 (England and Wales) provides a definition of the term "European Site" which it identifies as including Special Areas of Conservation (SAC) and Special Protection Areas (SPA) as well as candidate / proposed sites (cSAC and pSPA) which are being consulted on or are pending a European Commission decision. However, the Habitats Regulations do not provide statutory protection for pSPAs or to cSACs before they are agreed with the European Commission.

1.2.3. The Habitats Regulations set out the process that must be followed where an application for development consent may have effect on a site of nature conservation importance if a 'European site', hereon referred to as a site within the National Site Network (NSN).

1.2.4. For the purpose of this assessment, NSN sites include: Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Community Importance (SCI), European Marine Sites (EMS) and Wetlands of International

Importance designated under the Ramsar Convention (known as Ramsar sites). These also include candidate and possible sites (e.g. cSACs and pSACs) as if they have already been classified or designated.

- 1.2.5. SACs are high-quality conservation sites that have been given strict protection under the Habitats Regulations to conserve rare and vulnerable animals, plants and habitats (excluding birds) that are listed in Annexes I and II of the Habitats Directive (as amended), which have since been written into the Habitats Regulations.
- 1.2.6. SPAs are strictly protected sites that have been implemented to protect rare and vulnerable bird species and their populations that are listed in Annexes I and II of the Birds Directive, which have since been written into the Habitats Regulations.
- 1.2.7. EMSs are marine areas protected as SACs or SPAs often managed through underlying Site of Special Scientific Interest (SSSI) or Areas of Special Scientific Interest (ASSI). These areas range from subtidal to intertidal and can comprise the entire SAC or SPA or only part of it.
- 1.2.8. Under Regulation 63 of the Habitats Regulations *'any plan or scheme not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or schemes, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or scheme only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public'*.
- 1.2.9. Ramsar sites are wetlands of international importance that have been designated under the Ramsar Convention (1971). Sites are selected for their international significance relating to all ecology, botany, zoology, limnology or hydrology wetland components. The designation recognises the importance of wetlands as economic, social and environmental entities and the need to conserve them. Any activity that may have significant effects on a Ramsar site requires an Appropriate Assessment. Therefore, they are also considered in this screening assessment.
- 1.2.10. It is UK Government policy that Ramsar sites are afforded the same level of protection as Natura 2000 site and so are referred to alongside SAC and SPA sites within this report as NSN sites.

- 1.2.11. Sites contained within the National Site Network are designated for both Annex I habitat features and Annex II species. Conservation objectives and targets relate to maintaining the integrity of these features.

## 2. Habitats Regulations Assessment methodology

- 2.1.1. The methodology for producing this Screening report follows guidance from Planning Inspectorate (PINS) Advice Note 10 for the Proposed Scheme of the A47/A11 Thickthorn Junction in order for a Habitats Regulations Assessment (HRA) to be undertaken. However, the DMRB LA 115 (Habitats Regulations Assessment) standards have also been adopted to aid the production of this Screening report.
- 2.1.2. Stage 1 Screening – determines whether a plan or scheme, either alone or in combination with other schemes or plans, is likely to have a significant effect upon a site within the NSN. If the screening process identifies effects to be significant, potentially significant or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2. The process should apply the precautionary principle to ascertain if significant effects are likely.
- 2.1.3. Stage 2 Appropriate Assessment – considers the impact on the integrity of sites within the NSN of the scheme or plan either alone or in combination with other plans or schemes with respect to the site’s structure and function and its conservation objectives. Additionally, where there are adverse impacts, it assesses the potential mitigation for those impacts.
- 2.1.4. Stage 3 Assessment - where no alternative solutions exist and where adverse impacts remain – assesses compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the scheme or plan should proceed.
- 2.1.5. Each stage determines whether the next stage in the process is required, if for example, it is concluded that at the end of Stage 1 there will be no significant impacts on sites within the NSN, there is no requirement to proceed to Stage 2.
- 2.1.6. On the 12 April 2018, a precedent was set by a decision made by the Court of Justice of the European Union (CJEU) in the case of People Over Wind and Sweetman v Coillte Teoranta (C-323/17). The CJEU issued a judgement which ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures (referred to in the judgment as measures which are intended to avoid or reduce effects) should be assessed within the framework of appropriate assessment (AA) (Ref. 5.1.3). As such it is now not permissible to take account of measures intended to avoid or reduce the harmful effects of the plan or project on a European site at the screening stage.



- 2.1.7. As a consequence, this Screening report does not take into account mitigation measures, including aspects such as timing restrictions.
- 2.1.8. This Screening report has been written to support the Environmental Statement (ES) Chapter 8 Biodiversity (TR010037/APP/6.1) (APP-045), which has been written as part of the Environmental Impact Assessment (EIA). EIA can be defined as an assessment of those consequences of a major project which affect the natural, built and social environment. The Infrastructure Planning (EIA) Regulations 2017 (the EIA Regulations) require an assessment of the effects of certain public and private projects, which are likely to have significant effects on the environment, before development is granted.
- 2.1.9. The ES is a key part of the application documents submitted by Highways England in support of the Development Consent Order (DCO) application for the Proposed Scheme. The overall purpose of the ES is to provide the Planning Inspectorate, members of the public, statutory consultees with information on the predicted effects of the Proposed Scheme and to provide stakeholders with an opportunity to provide additional information and comments. All of this is environmental information that the Secretary of State must then take into account before determining the application for the DCO.
- 2.1.10. The Planning Inspectorate has issued guidance to applicants for DCO in Advice Note 10: Habitats Regulations Assessment relevant to nationally significant infrastructure projects. Advice Note 10 states that when preparing applications for Nationally Significant Infrastructure Projects (NSIPs) under the Planning Act 2008 (as amended), the potential effects upon protected habitats must be considered.
- 2.1.11. If an NSIP, when taken alone or with existing and known future projects, is likely to affect a European Site, the applicant must provide a report with the application showing the sites that may be affected together with sufficient information to enable the competent authority to make an appropriate assessment, if required.

## 2.2. Guidance and standards

- 2.2.1. The screening assessment process which has been used for the production of this report is set out in PINS Advice Note 10, and the Screening matrices are provided in Appendix C.
- 2.2.2. In addition, to screening matrices to satisfy the standards set out in DMRB LA 115 are provided in tabular format in Appendix A.

## Determination of connection with site management

- 2.2.3. This Screening report will assess whether the works are connected with or necessary to the management of an NSN site.
- 2.2.4. Such works should include those that are:
- 1) for conservation purposes
  - 2) management which is 'directly connected with or necessary' to the site
  - 3) solely conceived for the conservation management of a site and not direct or indirect consequences of other activities
- 2.2.5. The A47/A11 Thickthorn Junction project does not fit any of the above criteria.

## Examination of the nature of proposed works

- 2.2.6. The HRA screening assessment shall include a full description of the proposed works including the programme of works.
- 2.2.7. The description of the project shall not include mitigation measures that are introduced to avoid harm to the NSN site or to avoid likely significant effects (LSE), but does include legally required elements of design and construction to comply with statutory standards set out by the Environment Agency and Water Framework Directive.

## Identification of potential effects on NSN sites

- 2.2.8. The HRA screening assessment shall include all NSN sites that meet any of the following screening criteria, namely that the development:
- 1) is within 2km of an NSN site or functionally linked land<sup>1</sup>
  - 2) is within 30km of a SACs, where bats are noted as one of the qualifying interests
  - 3) crosses or lies adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a NSN site

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<sup>1</sup> Effect pathways on qualifying interests that are mobile species can extend to land occupied outside of the designated site boundary this is defined as functionally linked land

4) has a potential hydrological or hydrogeological linkage to a NSN site containing a groundwater dependent terrestrial ecosystem (GWDTE) which triggers the assessment of NSN sites in accordance with LA 113<sup>2</sup>

5) has an affected road network (ARN) which triggers the criteria for the assessment of NSN sites HA 207 07<sup>3</sup>

2.2.9. Additional NSN sites should be subject to screening where the existence of ecological connectivity between the project and NSN sites is identified beyond the screening criteria above.

### ***Reporting the outcomes of screening***

2.2.10. The screening stage of HRA is reported within an this HRA screening report which will include completed screening matrices for all NSN sites which meet the screening criteria.

2.2.11. Screening matrices shall set out the conclusion that either:

- there is an absence of LSE or
- there are LSE

2.2.12. Where the screening assessment concludes that significant effects are likely (alone or in combination) or that sufficient uncertainty remains then further HRA shall be undertaken and reported in the form of a Statement to Inform Appropriate Assessment (SIAA).

2.2.13. Appendix C incorporates guidance set out in Planning Inspectorate Advice Note Ten (Ref: 5.1.1) and includes the Stage 1 screening matrices which sets out the findings of the DMRB process into the Planning Inspectorate format. As required in Planning Inspectorate Advice Note Ten, the Stage 1 screening assessment is undertaken to ascertain whether the Proposed Scheme is likely to have a significant effect on qualifying features of any NSN site either alone or in-combination with other plans and projects (hereafter referred to as 'cumulative' effects). If Stage 1 identifies significant effects that cannot be excluded on the basis of objective information, then a plan or scheme should be considered to have a likely significant effect and taken through to Stage 2 AA.

2.2.14. The Planning Inspectorate has issued guidance to applicants for Development Consent Orders in Advice Note Ten: Habitats Regulations Assessment (Ref 5.1.1) relevant to nationally significant infrastructure projects. Advice Note Ten

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<sup>2</sup> Highways England. LA 113, 'Road drainage and the water environment'

<sup>3</sup> Highways England. HA 207, 'Air Quality', 07

states that when preparing applications for NSIPs under the Planning Act 2008 (as amended), the potential effects upon protected habitats must be considered.

- 2.2.15. If an NSIP, when taken alone or with existing and known future projects, is likely to affect an internationally designated site within the NSN, which includes site such as SACs, SPAs and Ramsar sites, the applicant must provide a report with the application showing the sites that may be affected together with sufficient information to enable the competent authority to make an appropriate assessment, if required.
- 2.2.16. As explained in the Planning Inspectorate Advice Note Ten Habitats Regulations Assessment November 2017 Version 8, a set of matrices has been developed to assist the Secretary of State, as the Competent Authority in fulfilling the requirements of the Habitats Directive and the Habitats Regulations in the context of the 2008 Act process.
- 2.2.17. The matrices are intended to clearly present the outcomes at each stage of the process in a standardised tabular form for the benefit of all those involved in the application and examination. The matrices in Appendix C of this report contain the combined outcomes of the process for both the A47/A11 Thickthorn Junction works and other projects within the Zone of Influence anticipated to result in likely significant effects that would require additional mitigation in response to cumulative effects.
- 2.2.18. The matrices comprise:
- Screening Matrices (HRA Stage 1: Screening) - which summarise the screening exercise for Likely Significant Effects of the Scheme on the European Sites and qualifying features considered.
- 2.2.19. This assessment has been completed using the following additional guidance and standards:
- DMRB LA115 'Habitats Regulations assessment' Revision 1 (formerly DMRB Volume 11, section 4, part 1 HD44/09 Assessment of Implications (of Highways and/or Roads Schemes) on European Sites (including Appropriate Assessment))
  - The UK Government's guidance on the use of the Habitats Regulations Assessment
  - The Habitats Regulations Assessment Handbook (Ref 6.1.5)
  - The European Commission Managing Natura 2000 sites (the Provisions of Article 6 of the Habitats Directive 92/43/EEC (Ref 6.1.3)).

## 2.3. Assumptions

- 2.3.1. Otters are European protected species (EPS), and therefore any measures designed into the Proposed Scheme are done so to ensure that this EPS is not harmed due to the Proposed Scheme. These measures have not been specifically designed to mitigate any potential effects upon otters as part of a population in the Broads SAC.
- 2.3.2. Construction is likely to commence in January 2023 and occur for a duration of 23 months.

## 3. Stage 1 screening results

### 3.1. Background

- 3.1.1. In May 1992 European Union member states adopted legislation designed to protect the most seriously threatened habitats and species across Europe.
- 3.1.2. The legislation that protects these sites in the UK is the Conservation of Habitats and Species Regulations 2017 (as amended). SPAs are protected for rare and vulnerable bird species and SACs are designated for threatened habitats (and species). Sites that are approved by the Government and are in the process of being classified – known as candidate Special Areas of Conservation (cSAC) and potential Special Protection Areas (pSPA) are afforded the same level of protection.
- 3.1.3. Together, SPAs, pSPAs, SACs and cSACs make up the NSN.
- 3.1.4. It is UK Government policy that Ramsar sites are afforded the same level of protection as Natura 2000 site and so are referred to alongside SAC and SPA sites within this report as ‘international sites’. Ramsar sites are wetlands identified as being of International importance, under the Ramsar Convention (1975). The criteria for selection are that the site contains representative, rare or unique wetland types or supports species and ecological communities of international importance. Any activity that may have significant effects on a Ramsar site requires an AA. Therefore, they are also considered in this screening assessment. Broadland Ramsar lies within the study area of the Proposed Scheme.
- 3.1.5. In order to identify potential effects on sites within the NSN and to identify international sites for inclusion within the HRA screening, a study area was defined based on the route options under consideration. In addition, consideration was given to any SAC within 30km where bats are a qualifying feature.
- 3.1.6. Where a scheme will potentially cross or lie adjacent to, upstream of or downstream of a watercourse which is designated in part or wholly as an SAC or SPA, consideration will be given to potential effects on sites within the NSN within the same river, lake or reservoir catchment, or at a greater distance if an effect pathway exists. This is also relevant with respect to flight paths or feeding areas for birds outside of a SPA.

## 3.2. Stage 1 screening: alone

### Study area

- 3.2.1. Most of the Proposed Scheme is either online or south of the existing A47, and is shown in more detail on Figure 1.
- 3.2.2. A study area of 2km from the Proposed Scheme was used to identify international sites likely to be affected, and a study area of 30km from the Proposed Scheme was used to identify international sites designated for bats. These search areas for designated sites are defined as 2km from the Proposed Scheme in the DMRB LA115 (Habitats Regulations Assessment (formerly HG 44/09)) as stated: *'The screening stage of HRA shall be completed for all [international sites] where a route corridor or project meets any of the following screening criteria:*
- *Is within 2km of a European site or functionally linked land.*
  - *Is within 30km of a SACs, where bats are noted as one of the qualifying interests.*
  - *Crosses or lies adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a European site.*
  - *Has a potential hydrological or hydrogeological linkage to a European site containing a groundwater dependent terrestrial ecosystem (GWDTE) which triggers the assessment of European sites in accordance with LA 113.*
  - *Has an affected road network (ARN) which triggers the criteria for assessment of European sites LA 105.'*
- 3.2.3. One international site was included in the HRA screening in 2017 which does not fall within the above criteria, and this is the Norfolk Valley Fens SAC which is designated for its fenland, woodland, grassland and heath habitats and for snail species. This international site was also considered as part of the screening in 2017 but has been screened out of the assessment because it does not meet any of the criteria for inclusion. The closest part of the SAC – Flordon Meadow – is over 6km south of the Proposed Scheme and drains into the River Tas which meets the River Yare 4.5km to the east (downstream) of the Proposed Scheme. As such, the Proposed Scheme is not hydrologically or ecologically connected to the Norfolk Valley Fens SAC and this is not given further consideration in this report.
- 3.2.4. A desk top study was undertaken using MAGIC (Ref 5.1.6) maps to identify any sites within the NSN that potentially may be affected, according to the guidance in section 2.2 of this report. From this it was determined that there is potential for effects on the following sites:



- The Broads SAC
- Broadland SPA
- Broadland Ramsar

3.2.5. The location of these sites relative to the study area is shown in Figure 1. While none of these sites lie within the Proposed Scheme boundary, there is potential for effect pathways to exist between the Proposed Scheme and the Broads SAC and Broadland SPA and Ramsar sites through changes in drainage affecting watercourses that flow into the River Yare.

3.2.6. The Broadlands SPA and Ramsar site is a diffuse site which lies 11.5km east of the Proposed Scheme at its nearest point. This international site is hydrologically connected to the Proposed Scheme, first through Cantley Stream, which flows into Mill Stream and then the River Yare, before connecting to Broadlands SPA and Ramsar site. Therefore, there may be indirect effects on the qualifying bird species as they are likely to move through or utilise this hydrological corridor.

3.2.7. Further information on all the sites included in this HRA screening is given in the following sections. Baseline information on the sites was derived from the following sources:

- Joint Nature Conservation Committee (Ref 6.1.7)
- Natural England websites (Ref 6.1.8)
- Birdlife International (Ref 6.1.9)
- British Trust for Ornithology (Ref 6.1.10)

3.2.8. This updated report also uses the results from the ecological surveys undertaken during 2016, 2017, 2018, 2019 and 2020. This includes breeding and wintering bird surveys, aquatic invertebrate surveys and botanical surveys.

## The Broads SAC

### *Site description*

3.2.9. The Broads SAC is a diffuse site, covering an area of 5885ha and made up of a number of component Sites of Special Scientific Interest (SSSI). The SAC contains several examples of naturally nutrient-rich lakes, and although they are artificial having been created by past peat digging, the lakes and ditches support relict vegetation of the original fenland flora and collectively this site contains one of the richest assemblages of rare and local aquatic species in the UK. The ditches are a stronghold for the lesser whirlpool ramshorn snail and Desmoulin's whorl snail.



3.2.10. The site is also the richest area for stoneworts in Britain, with examples of *Chara* vegetation found within the fen and marsh ditch systems. The complex of sites contains large blocks of alder woodland and within the site occur complete successional sequences from open water to reedswamp to alder woodland on fen peat. The site also contains calcareous fens and transition mires.

#### *Baseline conditions*

3.2.11. The Broads SAC comprises a large number of SSSIs, some of which are in favourable condition for the qualifying features, with some features classified as unfavourable but recovering. Of the component SSSIs that make up the SAC, the closest one to the A47/A11 Thickthorn Junction is the Yare Broads and Marshes SSSI (approximately 11.5km east of the Proposed Scheme). According to the latest condition monitoring for these sites, Cantley Marshes is 100% favourable, Yare Broads and Marshes is 39.22% favourable, 11.3% unfavourable recovering, 47.27% unfavourable no change and 2.2% unfavourable declining, while Decoy Carr is 70.21% favourable and 29.79% unfavourable recovering (Ref 6.1.11).

3.2.12. Annex I habitats that are a primary reason for selection:

- Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation
- Transition mires and quaking bogs
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- Alkaline fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

3.2.13. Annex I habitats present as a qualifying feature but not a primary reason for selection:

- Molinia meadows on calcareous, peaty or clayey silt laden soils (*Molinion caeruleae*)

3.2.14. Annex II species that are a primary reason for selection of this site:

- Desmoulin's whorl snail *Vertigo moulinsiana*
- Fen orchid *Liparis loeselii*
- Lesser whirlpool ramshorn snail *Anisus vorticulus*

- 3.2.15. Annex II species present as a qualifying feature, but not a primary reason for selection:
- Otter *Lutra lutra*
- 3.2.16. Desmoulin's whorl snail is restricted to calcareous wetlands, usually bordering lakes or rivers, or in fens. It normally lives on reed-grasses and sedges, such as reed sweet grass *Glyceria maxima* and tussocks of greater pond sedge *Carex riparia* and lesser pond sedge *C.acutiformis*, where it feeds on the microflora and in autumn it may ascend taller reeds and scrub. It is highly dependent on the maintenance of existing local hydrological conditions.
- 3.2.17. The lesser whirlpool ramshorn snail is a small aquatic snail which occurs in unpolluted, calcareous waters in marsh drains with dense aquatic flora and favours ditches with a diverse flora but little emergent vegetation. It often floats on the surface amongst duckweed. Ditches that are either completely cleared of vegetation or choked with weed and silt are unsuitable. This species is known to be present in the vicinity of the A47 east of Acle, along Acle Straight.
- 3.2.18. Fen orchid is a small green flowered orchid of fens and dune systems. In the fens the cessation of peat cutting is probably the most important contributory factor leading to its decline as here, the orchid is confined to tall herb fens that have experienced disturbance through peat cutting.
- 3.2.19. The full Stage 1 screening assessment for the Broads SAC is found in Appendix A in Table A.1

## Broadland SPA

### Site description

- 3.2.20. Broadland is a low-lying wetland complex straddling the boundaries between east Norfolk and northern Suffolk in eastern England. The Broads are a series of flooded medieval peat cuttings and they lie within the floodplains of five principal river systems, known as Broadland. The area includes the river valley systems of the Bure, Yare and Waveney and their principal tributaries. The open landscape comprises a complex and interlinked mosaic for wetland habitats including open water, reedbeds, carr woodland, grazing marsh and fen meadow. The differing types of management of the vegetation for reed, sedge and marsh hay, coupled with variations in hydrology and substrate support a diverse range of plant communities. The area is of international importance for a variety of wintering and breeding raptors and waterbirds associated with lowland marshes. The estuary at the mouth of Broadland is Breydon Water SPA, and the two sites adjoin each other at Halvergate Marshes. Breeding and wintering raptors, and

wintering waterbirds spend time on feeding areas outside the SPA boundary. The site is diffuse and comprises an area of 5508ha.

### *Baseline conditions*

- 3.2.21. Broadland SPA is made up of a number of SSSIs, many of which overlap with the Broads SAC.
- 3.2.22. The fens habitat provides foraging and nesting sites for bittern and marsh harrier. They are also an important habitat for the overwintering bird species for foraging.
- 3.2.23. Populations of overwintering ruff generally occupy muddy margins of brackish, saline and alkaline lakes, ponds, pools, rivers, marshes and floodplains, as well as freshly mown or grazed short sward grasslands. Prey species includes insects, small crustaceans, spiders, worms and seeds of cereals, grasses and aquatic plants.
- 3.2.24. Marsh harriers prefer habitats of dense marsh vegetation, in fresh or brackish water. It is a generalist predator feeding on small birds and mammals such as voles, rabbits and rats. They require extensive wetlands in its breeding range.
- 3.2.25. Hen harriers occur in a wide variety of habitats preferring fields, meadows, river valleys, reedbeds and open areas in the vicinity of water. They feed on small birds and mammals such as voles and rabbits, like the marsh harrier.
- 3.2.26. During the non-breeding season, wigeon prefer coastal salt marshes, freshwater, brackish and saline lagoons, flooded grasslands and estuaries. Its diet is vegetarian and consumes the leaves, seeds, stems and root bulbs of pond weeds, fine grasses from agricultural land, horsetails and algae.
- 3.2.27. Shoveler inhabits permanent shallow, freshwater wetlands, preferring sites surrounded by dense stands of reeds or other emergent vegetation. Its diet consists of small aquatic invertebrates, beetles, bugs, flies and the seeds and vegetative parts of aquatic plants. It is threatened by habitat loss and predation by mink.
- 3.2.28. Gadwall inhabits highly productive and eutrophic freshwater marsh or lake habitats in open lowland grassland. The diet is primarily herbivorous and consists of the seeds, leaves, roots and stems of aquatic plants as well as grasses and stoneworts.
- 3.2.29. During the breeding season, great bittern prefers quiet lowland marshes around lakes and rivers with extensive dense young reedbeds of *Phragmites* spp., that are flooded but fairly shallow with little fluctuation in water level. It has a varied

diet and will feed on fish, amphibians as well as terrestrial invertebrates, birds and small mammals.

- 3.2.30. Overwintering populations of Bewick's swan (mid October to March) will gather in large flocks, feeding on lakes, reservoirs, estuaries and freshwater marshes with adjacent grasslands or arable fields. The species is mainly herbivorous feeding on the seeds, leaves, rhizomes and stems of aquatic plants. During the winter they will supplement their diet with agricultural grain and vegetables. The species is vulnerable to disturbance during foraging.
- 3.2.31. During winter whooper swan will gather in flocks of up to 300-400 individuals. It roosts on areas of open water adjacent to its feeding areas. Like Bewick's swan, they will use agricultural areas to supplement their diet. They are predominantly herbivorous, eating aquatic plants, grasses, sedges and horsetails. They are vulnerable to habitat loss and degradation as well as vegetation cutting for winter livestock feed and the development of roads.
- 3.2.32. The full Stage 1 screening assessment for the Broadlands SPA is found in Appendix A in Table A.2.

## Broadland Ramsar

### *Site description*

- 3.2.33. The Ramsar designation is coincident with the boundary of the SPA and also overlaps in part with the Broads SAC.

### *Baseline conditions*

- 3.2.34. The populations of pink-footed goose overwinter on areas of saltmarsh, estuaries and flat agricultural land. Its diet is herbivorous feeding on grass, grain and vegetables on agricultural land. In the UK studies have found that the species prefers to forage on grasslands less than 10km from their roost sites (roosting on water), with an optimum distance of 2-5km (Ref 6.1.12). The species is vulnerable to disturbance during foraging.
- 3.2.35. During winter greylag geese inhabit lowland farmland in open country, swamps, lakes, reservoirs and estuaries. Its diet consists of grass, herbaceous marsh vegetation, aquatic plants and agricultural grain and potatoes. It is vulnerable to disturbance during foraging.
- 3.2.36. The full Stage 1 screening assessment for the Broadlands Ramsar is found in Appendix A in Table A.3.

### 3.3. Ecological baseline

#### General

- 3.3.1. The A47/A11 Thickthorn Junction Proposed Scheme is located to the south west of Norwich. The land classification is generally agricultural with large arable and livestock pasture fields.
- 3.3.2. The following surveys have been undertaken to develop the ecological baseline as part of the Proposed Scheme:
- Aquatic invertebrate surveys were undertaken in four locations over the study area in 2017 and in 2020
  - Breeding bird surveys were undertaken across the study area in 2017 and twice a month from March to June 2020
  - Wintering bird surveys were undertaken twice a month between January and March 2017, and then on four occasions throughout the wintering bird season of 2019, during January, February, November and December
  - Botanical surveys have been undertaken over the study area in 2016, 2017, and from June to July in 2020
  - Otter surveys were undertaken throughout the study area in 2016, 2018 and 2020.
- 3.3.3. Full results of these surveys undertaken are detailed in Chapter 8 of the ES (Biodiversity) (TR010037/APP/6.1) [\(APP-045\)](#).

#### Principal habitats

- 3.3.4. The Phase 1 habitat survey data detailed in the ES Chapter 8 (Biodiversity) (TR010037/APP/6.1) [\(APP-045\) Sections 8.7.10 – 8.7.14](#) indicates that the main habitat in the area is arable farmland. There are some areas of woodland to the west of the A11. Field boundaries are generally hedgerows.
- 3.3.5. None of the Annex I habitats for which the Broads SAC or Broadlands Ramsar sites are designated for were found within the Zone of Influence, and no evidence of fen orchid was found in the study area during any of the botanical surveys. In addition, there is a lack of suitable habitat to support this species in the study area. The study area is defined in ES Chapter 8 (Biodiversity) (TR010037/APP/6.1) [\(APP-045\) Section 8.6](#).

#### Protected species

- 3.3.6. Botanical surveys have been undertaken over the study area in 2016, 2017, and from June to July in 2020. None of the Annex I habitats which are qualifying features and primary reasons for designation are present in the study area. In

addition, fen orchid, which is part of Broadlands Ramsar, was not recorded in the study area during the surveys.

- 3.3.7. Otters are a qualifying feature for the Broads SAC and Broadlands Ramsar. Otter surveys were undertaken throughout the study area in 2016, 2018 and 2020. Signs of otter were recorded along Cantley Stream throughout the study area that suggest that Cantley Stream is used by commuting otters.
- 3.3.8. Because otters are also a European Protected Species, and have been assessed as part of the EIA process, full details of the assessment of the potential effects of Proposed Scheme upon otters are presented in the ES Chapter 8 (Biodiversity) (TR010037/APP/6.1) [\(APP-045\) Section 8.7.60 – 8.7.64](#).
- 3.3.9. The lesser whirlpool ram's horn snail and Desmoulin's whorl snail are two species that are qualifying feature for The Broads SAC. Desmoulin's whorl snail is a qualifying feature of Broadlands Ramsar, ~~as is the narrow-mouthed whorl snail~~. None of these species were recorded during the aquatic species surveys, and therefore all three of these species are not considered as features impacted by the Proposed Scheme and are therefore screened out of further assessment. Aquatic invertebrate surveys were undertaken in four locations over the study area in 2017 and in 2020. Neither the lesser whirlpool ram's horn snail nor the Desmoulin's whorl snail were found during the surveys.
- 3.3.10. Wintering bird surveys were undertaken during the following months for the Proposed Scheme:
- January, February and March 2017
  - January, February, November and December 2019
- 3.3.11. None of the qualifying bird species of any of these international sites were specifically recorded over the study area during the wintering bird surveys, which is detailed further in ES Chapter 8 (Biodiversity) (TR010037/APP/6.1) [\(APP-045\) Section 8.7.38 – 8.7.42](#).
- 3.3.12. Breeding bird surveys were undertaken over the study area in 2017 and twice a month from March to June 2020. None of the bird species which are qualifying features and primary reasons for designation were recorded as present in the study area in any of the surveys.
- 3.3.13. The results of all surveys were reviewed to see if any of the qualifying **species features** for The Broads SAC, Broadlands SPA and **Broadlands** Ramsar **site** use the habitats around the existing Thickthorn Interchange. A map showing the **presence-location** of **qualifying features from these** NSNS sites **that were**



~~recorded during all of the surveys over the study area~~ is shown in Figure 21, Appendix ED.

~~3.3.13.3.3.14. The only Otter is the only qualifying species of a feature for which any evidence was recorded on site during any of the surveys was otter. The locations of all otter field evidence was recorded is included shown on the map included as Figure 2, Appendix E.~~

### 3.4. Stage 1 screening: in combination

3.4.1. For the purposes of reporting the in-combination assessment, all proposed developments within 2km of the Proposed Scheme have been divided into two categories as follows:

- a single project (the Proposed Scheme), which considers numerous different effects impacting a single receptor
- different projects, in combination with the Proposed Scheme.

3.4.2. The assessment of cumulative effects ~~and the list of the proposed developments~~ is fully detailed in ES Chapter 15 (Cumulative effects assessment) [Section 15.7 \(TR010037/APP/6.1\) \(APP-045\)](#) with the list of the proposed developments contained in [Appendices 15.1, Cumulative Effects Stage 2 Screening \(APP-117\) and 15.2 Cumulative Effects Development Type \(Short List\) \(APP-118\)](#). ~~Consideration of An assessment of the potential for likely significant effects to occur in relation to The Broads SAC and Broadlands SPA and Ramsar internationally designated sites is provided within Chapter 8 – Biodiversity of the Environmental Statement (APP-045) at Section 8.8.~~

#### *Single project effects*

3.4.3. No single receptors or resources were predicted to experience significant cumulative effects as a result of the Proposed Scheme. This is presented in the ES Chapter 15 (Cumulative effects assessment) [\(TR010037/APP/6.1\) \(APP-052\) Section 15.4.2 – 15.4.5](#).

#### *Construction*

3.4.4. During construction, additive cumulative effects are expected on some human receptors and heritage receptors. Effects are expected to residential properties on Cantley Lane notably 128 Cantley Lane, and properties on Cantley Lane South due to temporary visual intrusion, construction noise, and temporary increased journey length to access Thickthorn junction.

3.4.5. Additive cumulative effects are also expected at Two Tumuli scheduled monument, which may experience significant temporary cumulative effects due

to the alteration of its cultural heritage setting, visual effects, noise and vibration increase and light intrusion during construction of the Proposed Scheme.

### Operation

- 3.4.6. During operation, cumulative effects are expected on some ecological receptors.
- 3.4.7. Thickthorn Park may experience synergistic significant cumulative effects, due to the loss of trees at Cantley Lane South and Thickthorn Park (including two veteran trees), visual changes at Cantley Lane South including realignment of Cantley Stream, and the potential deterioration or loss of aquatic environment at the Cantley Stream.

### Different project effects

- 3.4.8. Consultation was undertaken with Norfolk County Council in January 2021. One comment was received suggesting the need to increase the zone of influence (ZOI) to 3km from the current 2km if any Bechstein's bats *Myotis bechsteinii* are found in the study area during the surveys. There are no designated sites within 30km of the Proposed Scheme designated for Bechstein's bat, or any species of bat and therefore the ZOI was not amended. The assessment of the shortlist of developments follows methodology detailed in the final ES submission and will be in line with the ES Chapter 15 (Cumulative effects assessment) **(TR010037/APP/6.1) (APP-052) Section 15.4.**

## 3.5. Limitations

- 3.5.1. There is potential for species to be missed or go unnoticed due to the nature of breeding bird and wintering bird surveys and possibilities of birds not vocalising or being in dense vegetation. There is also potential to miss crepuscular species (i.e. those that are most active at dawn or dusk). During various other ecological surveys being undertaken in the area, casual sightings of crepuscular species were observed, and these incidental sightings have been considered in the final assessment.
- 3.5.2. The wintering bird survey transects were accessed through private property after permission was granted and where possible access was taken along public rights of way surrounding the site. The transect route chosen targeted higher-value areas, rather than attempting to cover the entirety of the study area. This is not considered to represent a significant limitation to the survey.
- 3.5.3. The aquatic invertebrate surveys undertaken in 2020 were carried out in suboptimal conditions due to access issues, meaning that the surveys were carried out on predetermined days rather than optimal ones. This may have reduced the diversity recorded.



3.5.4. During the botanical surveys carried out in 2020, access was generally available across the survey area except for areas which were unsafe such as roundabouts on the A11 and private houses and gardens. All parts of the study area were accessible except for one unit which was surveyable from the north-eastern boundary fence. Apart from this there were no known limitations in areas where access was required. This is presented fully in the ES Chapter 8 (Biodiversity) **(TR010037/APP/6.1) (APP-045) Section 8.5.**

3.5.5. The limitations identified in section 3.5 are not considered to be significant enough to have any material impact on the integrity of the assessment of this Screening report.

### **3.6. Consultation with Natural England**

3.6.1. The conclusions of the screening exercise undertaken in February 2020 were discussed with the Natural England Lead Advisor for the Norfolk and Suffolk Team, in addition to those consultations which were carried out in 2019. It was agreed that as the Assessment of Implications on European Sites report produced in 2017 was preliminary and based on information available to date that the screening exercise will be updated and reviewed as the scheme progresses. This report, together with the HRA undertaken in 2017, demonstrates compliance with this advice.

3.6.2. In addition, in November 2020, consultation occurred with Natural England pertaining to the findings within this report to inform the HRA, which were reviewed and approved by Natural England (Appendix F).

## 4. Screening summary and conclusion

- 4.1.1. The screening assessment identified potential for likely significant effect pathways between the Proposed Scheme at A47/A11 Thickthorn Junction on the following international sites:
- The Broads SAC
  - Broadland SPA
  - Broadland Ramsar
- 4.1.2. Following a review of the potential hazards to the SAC, the works being undertaken, and evidence gathered as part of the EIA the Potential Effects screening matrices were developed in accordance with Planning Inspectorate Advice Note 10 (Tables C-1 to C-3).
- 4.1.3. As a result of this exercise, it is considered that there are no reasonably foreseeable significant effects on any of the international sites as a result of the Proposed Scheme during construction or operation.
- 4.1.4. As discussed in the DMRB screening matrices presented in Appendix A, the screening process highlighted the main causes of disturbance and changes in the key indicators of conservation value upon the identified international sites. The screening process assessed each potential affect to conclude whether they would cause a likely significant effect on the features associated with sites.
- 4.1.5. The Stage 1 Screening Assessment therefore concluded that there will be No Likely Significant Effect on any of the international sites identified in paragraph 4.1.1 from the Proposed Scheme, or their associated qualifying features. These findings are summarised in the LA 115 Matrix tables (Tables 4.1 to 4.3) below.

### The Broads SAC

- 4.1.6. None of the qualifying habitats for the Broads SAC are located where there is a direct hydrological link between the Proposed Scheme and these qualifying habitats. The nearest point of the Broads SAC lies 11.5 km from the Proposed Scheme. There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into the Broads SAC. However, **no likely significant effect** is expected due to the large distance of 11.5km from the SAC to the Proposed Scheme and the associated works.
- 4.1.7. It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of

the existing stretch of Cantley Steam. This maintains the existing commuting corridor for otters with no impact upon otters themselves throughout construction. **No likely significant effect** upon the population of otters in the Broads SAC is expected.

Table 4.1 The Broads SAC conclusion table

<b>Project Name</b>	<b>A47/A11 Thickthorn Junction</b>	
<b>European Site under consideration</b>	The Broads SAC	
<b>Date</b>	<b>Author (Name/Organisation)</b>	<b>Verified (Name/Organisation)</b>
November 2020	Ishbel Campbell, Sweco	Keith Ross, Sweco
Name and location of European Site:	The Broads SAC – Special Area of Conservation (Ref No. UK0013577) Location: 11.5km from the proposed works	
Description of the project:	<ul style="list-style-type: none"> <li>The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the east of the Proposed Scheme, and a number of houses on Cantley Lane South which lies to the west of the A47. Several residential properties located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich with Great Yarmouth to the east.</li> <li>This junction no longer meets the needs of its users.</li> <li>Traffic volume will remain unchanged.</li> <li>The Development Consent Order (DCO) boundary is provided in Appendix A (Figure 1).</li> <li>The Proposed Scheme is categorised as Nationally Significant Infrastructure and therefore requires DCO.</li> </ul>	
Is the project directly connected with or necessary to the management of the site (provide details)?	No	
Are there other projects or plans that together with the project being assessed could affect the site (provide details)?	<p>No proposed developments within 2km of the Proposed Scheme have been identified whereby any cumulative effects could affect the ecological integrity of the SAC.</p> <p>The assessment of cumulative effects <del>and the list of the proposed developments</del> is fully detailed in ES Chapter 15 (Cumulative effects assessment) <a href="#">(TR010037/APP/6.1)</a> Section 15.7 <a href="#">(TR010037/APP/6.1)</a> <a href="#">(APP-052)</a> <a href="#">(TR010037/APP/6.1)</a> with the list of the proposed developments contained in Appendices 15.1, Cumulative Effects Stage 2 Screening <a href="#">(APP-117)</a> and 15.2 Cumulative Effects Development Type (Short List) <a href="#">(APP-118)</a>.</p>	
<b>The assessment of significance of effects</b>		
Describe how the project (alone or in combination) is likely to affect the European Site.	<p>Pollution of watercourses</p> <p>Air pollution</p> <p>Noise disturbance of SAC features</p> <p>Light disturbance of SAC features</p>	
Explain why these effects are not considered significant.	<p><b>Water Pollution:</b></p> <p>Construction: During construction, legally required design and construction elements for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) <a href="#">(TR010037/APP/7.4)</a> <a href="#">(APP-128)</a>. Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba <i>et al.</i> 2017; Murnane <i>et al.</i>, 2006) and the Environment Agency’s approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b). Monitoring of local non-designated watercourses, drainage ditches, and groundwaters at risk from pollution will be carried out prior to and during the construction</p>	

	<p>phase. In addition, a temporary surface water drainage strategy shall be incorporated into the EMP. This is to prevent increased flood risk to people and property elsewhere, and to manage pollution risks most commonly associated with increased sediment loading. Despite these best practice construction measures, the large distance of 11.5km from the Proposed Scheme and the SAC means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during construction.</p> <p>Operation: During operation, it is intended that the proposed scheme would utilise the existing drainage network where applicable. On the new carriageways the road drainage network would include standard design features such as filter drains carrier drains, and kerb and gullies. Drainage channels and combined kerb drains will be used where continuous drainage is required in flatter gradients. These will lead to an infiltration basin, infiltration trenches or soakaways. In addition to the best practice design measures, the large distance of 11.5km from the Proposed Scheme and the SAC means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during operation.</p> <p><b>Air pollution:</b></p> <p>Construction: As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or such that the Proposed Scheme will affect the UK's ability to comply with the Air Quality Directive. In addition, best practice construction measures will be adopted and therefore it is considered that construction works are highly unlikely to trigger a likely significant air quality effect as stated in the ES chapter 5 (Air Quality) (TR010037/APP/6.1) (APP-042) Sections 5.10 and 5.12. In addition to the best practice construction measures, the large distance of 11.5km from the Proposed Scheme and the SAC means that any changes in air pollution would have sufficiently dissipated such that there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during construction.</p> <p>Operation: During operation, the change in deposition resulting from the Proposed Scheme is less than 1% of the lowest critical load value. The highest change as a percentage of the lower critical load value is 0.7%. In addition, the large distance of 11.5km from the Proposed Scheme and the SAC means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during operation.</p> <p><b>Noise disturbance:</b></p> <p>Construction: An assessment of construction vibration impacts has been undertaken and detailed in the ES chapter 11 (Noise and vibration) (TR010037/APP/6.1) (APP-048) Sections 11.10.8 – 11.10.12. It is concluded that, as the best practice construction measures will include early warning, pre-condition surveys, short work durations, and vibration monitoring, the Proposed Scheme is not predicted to give rise to any potential significant effects. A baseline noise survey was undertaken in June 2018 to gain an understanding of the existing noise climate within the vicinity of the Proposed Scheme. identified receptors of concern in the noise assessment detailed in the ES chapter 11 (Noise and vibration) (TR010037/APP/6.1) (APP-048) Sections 11.7.5 – 11.7.17 are those located within 600m of the construction works as detailed in Section 11.6.6 of ES Chapter 11 (APP-048). The findings of the survey have been reviewed against the noise modelling results and it is considered that <b>no likely significant effects</b> will occur on SAC or its qualifying features. In addition, it is approximately 11.5km away from the site and will not increase any noise disturbance already present from the City of Norwich, which lies in between the Proposed Scheme and the SAC.</p> <p>Operation: Modelling results show that effects for operation of the road are not due exceed the SOAEL, from the first year of opening and into the long-term. In addition, the large distance of 11.5km from the Proposed Scheme and the SAC means that any changes in air quality would have sufficiently dissipated such that there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during operation.</p> <p>Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.</p> <p><b>Light disturbance:</b></p> <p>Construction: Construction will take place mainly throughout the daytime, and night lighting will only take place in areas that have had vegetation cleared as part of best practice construction measures. In addition, the increase in night lighting over the proposed scheme is not considered to have any significant effects upon the international sites due to the presence of Norwich providing significant light at night.</p>
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	<p>Due to otters using Cantley Stream for commuting purposes, likely at night, no night lighting will be installed on the existing stretch of Cantley Stream, or on the realignment, during construction in order to avoid the potential for light disturbance above existing levels for commuting otters in the area. In addition, the large distance of 11.5km from the Proposed Scheme and the SAC means that any light pollution will not increase the current light disturbance imposed upon the SAC by the City of Norwich and therefore there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during construction.</p> <p>Operation: The increase in night lighting over the Proposed Scheme is not considered to have any significant effects upon the SAC due to the SAC being 11.5km from the Proposed Scheme, and the presence of the City of Norwich currently providing significant light at night. Therefore, it is considered that night lighting for the scheme will impose <b>no likely significant effects</b> will occur on the SAC or the qualifying features during operation.</p> <p><b>Protected Species:</b></p> <p>As otters are an EPS, design features with reference to best practice guidance for protecting the otter are included within the Proposed Scheme in order to minimise the risk of harming otters during construction. It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. In addition, an otter ledge will be installed on the A11 underpass. This design of the proposed scheme will maintain the existing commuting for otters to remain in situ with no impact upon otters themselves throughout construction.</p> <p>Neither species of lesser whirlpool ramshorn snails and Desmoulins whorl snails was found during the surveys in the study area. Therefore, both snail species has been screened out from further assessment as the proposed scheme does not affect any waterbodies that have suitable habitat for supporting this species therefore no effect pathways to populations of these species within the Broads SAC.</p>		
List of agencies consulted: provide contact name and telephone or e-mail address.	Natural England		
Response to consultation	None required		
<b>Data collected to carry out the assessment</b>			
Who carried out the assessment	Sources of data	Level of assessment completed	Where can the full results of the assessment be accessed and viewed?
All information on the assessment process and data used for the assessment is set out in the full assessment report.			

## Broadlands SPA and Ramsar

- 4.1.8. None of the qualifying features of the Broadlands SPA and Ramsar were recorded in the study area during the 2017, 2018 or 2019 wintering bird surveys. In addition, there is either no habitat available for the species that have specific habitat requirements, such as bittern, or there is more suitable foraging habitat within and closer to the boundary of the SPA. Therefore, no likely significant effect is expected for all qualifying features of the SPA as detailed in Table 4.2.

Table 4.2 Broadlands SPA conclusion table

<b>Project Name</b>	<b>A47/A11 Thickthorn Junction</b>	
<b>European Site under consideration</b>	Broadlands SPA	
<b>Date</b>	<b>Author (Name/Organisation)</b>	<b>Verified (Name/Organisation)</b>
November 2020	Ishbel Campbell, Sweco	Keith Ross, Sweco



Name and location of European Site:	Broadlands SPA – Special Protected Area (Ref No. UK9009253) Location: 11.5km from the proposed works
Description of the project:	<ul style="list-style-type: none"> <li>The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the east of the Proposed Scheme, and a number of houses on Cantley Lane South which lies to the west of the A47. Several residential properties located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich with Great Yarmouth to the east.</li> <li>This junction no longer meets the needs of its users.</li> <li>Traffic volume will remain unchanged.</li> <li>The Development Consent Order (DCO) boundary is provided in Appendix A (Figure 1).</li> <li>The Proposed Scheme is categorised as Nationally Significant Infrastructure and therefore requires DCO.</li> </ul>
Is the project directly connected with or necessary to the management of the site (provide details)?	No
Are there other projects or plans that together with the project being assessed could affect the site (provide details)?	<p>No proposed developments within 2km of the Proposed Scheme have been identified whereby any cumulative effects could affect the ecological integrity of the SPA.</p> <p>The assessment of cumulative effects <del>and the list of the proposed developments</del> is fully detailed in ES Chapter 15 (Cumulative effects assessment) (<a href="#">TR010037/APP/6.1</a>) <a href="#">Section 15.7 (TR010037/APP/6.1) (APP-052)</a> with the list of the proposed developments contained in <a href="#">Appendices 15.1, Cumulative Effects Stage 2 Screening (APP-117)</a> and <a href="#">15.2 Cumulative Effects Development Type (Short List) (APP-118)</a>.</p>
<b>The assessment of significance of effects</b>	
Describe how the project (alone or in combination) is likely to affect the European Site.	<p>Pollution of watercourses</p> <p>Air pollution</p> <p>Noise disturbance of SPA features</p> <p>Light disturbance of SPA features</p>
Explain why these effects are not considered significant.	<p>Although the vicinity of the Proposed Scheme does have habitat to support bird species such as gadwall, wigeon and ruff, and Bewick's and whooper swans, and marsh and hen harriers, none of these species were recorded in the area during the 2017, 2018 and 2019 bird surveys. Therefore, it is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the SPA.</p> <p><b>Water Pollution:</b></p> <p>Construction: During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (<a href="#">TR010037/APP/7.4</a>) (<a href="#">APP-128</a>). Despite these best practice measures, the large distance of 11.5km from the Proposed Scheme and the SPA means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the SAC or its qualifying features during construction.</p> <p>Operation: Best practice design measures regarding drainage attenuation have been described in Appendix B. Despite these best practice design measures, the large distance of 11.5km from the Proposed Scheme and the SAC means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the SPA or its qualifying features during operation.</p> <p><b>Air pollution:</b></p> <p>Construction: As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK's ability to comply with the Air Quality Directive. In addition, best practice construction measures to minimise construction dust will be adhered to and therefore it is considered highly unlikely to trigger a significant air quality effect as stated in the ES Environmental Statement, Chapter 5 (Air Quality) (<a href="#">TR010037/APP/6.1</a>) (<a href="#">APP-042</a>). In addition to the best practice construction</p>

	<p>measures, the large distance of 11.5km from the Proposed Scheme and the SPA means that any changes in air pollution would have sufficiently dissipated such that there will be <b>no likely significant effects</b> upon the SPA or its qualifying features during construction.</p> <p>Operation: Air quality modelling has been undertaken using the approach outlined in LA 105, and the operation of the Proposed Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality. In addition, the large distance of 11.5km from the Proposed Scheme and the SPA means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the SPA or its qualifying features during operation.</p> <p><b>Noise disturbance:</b></p> <p>Construction: An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and Vibration) (TR010037/APP/6.1) (APP-048). Best practice construction measures will be implemented which will include early warning, pre-condition surveys, short work durations that occur during daylight hours only, and vibration monitoring. In addition, despite these best practice construction measures, the Proposed Scheme is approximately 11.5km away from the SPA and will not increase any noise disturbance already present from the City of Norwich, which lies in between the Proposed Scheme and the SPA.</p> <p>Operation: During operation, as the ecological receptors are located further away then 30m from the Proposed Scheme, it can be concluded that these international sites will not be negatively affected by the operational noise of the Proposed Scheme. Therefore, the large distance of 11.5km from the Proposed Scheme and the SPA means that any changes in air quality would have sufficiently dissipated such that there will be <b>no likely significant effects</b> upon the SPA or its qualifying features during operation.</p> <p>Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.</p> <p><b>Light disturbance:</b></p> <p>Construction: The large distance of 11.5km from the Proposed Scheme and the SPA means that any light pollution will not increase the current light disturbance imposed upon the SPA by the City of Norwich and therefore there will be <b>no likely significant effects</b> upon the SPA or its qualifying features during construction.</p> <p>Operation: The increase in night lighting over the Proposed Scheme is not considered to have any significant effects upon the SPA due to the SPA being 11.5km from the Proposed Scheme, and the presence of the City of Norwich currently providing significant light at night. Therefore, it is considered that night lighting for the scheme will impose <b>no likely significant effects</b> will occur on the SPA or the qualifying features during operation.</p>		
List of agencies consulted: provide contact name and telephone or e-mail address.	Natural England		
Response to consultation	None required		
<b>Data collected to carry out the assessment</b>			
Who carried out the assessment	Sources of data	Level of assessment completed	Where can the full results of the assessment be accessed and viewed?
All information on the assessment process and data used for the assessment is set out in the full assessment report.			

4.1.9. None of the qualifying habitats for Broadlands Ramsar are located where there is a direct hydrological link between the Proposed Scheme and these qualifying habitats. No Desmoulin’s whorl snails were found during the aquatic invertebrate surveys in the EIA study area. Therefore, this species has been screened out from further assessment as the Proposed Scheme does not affect any waterbodies that have suitable habitat for supporting this species therefore no effect pathways to populations of these species within the Broadlands Ramsar.

- 4.1.10. The nearest point of the Broadlands Ramsar lies 11.5 km from the Proposed Scheme. There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into Broadlands Ramsar. However, **no likely significant effect** is expected.
- 4.1.11. It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. This maintains the existing commuting for otters to remain in situ with no impact upon otters themselves throughout construction. **No likely significant effect** upon the population of otters in the Broadlands Ramsar is expected, as detailed in Table 4.3.

Table 4.3 Broadlands Ramsar conclusion table

<b>Project Name</b>	<b>A47/A11 Thickthorn Junction</b>	
<b>European Site under consideration</b>	Broadlands Ramsar	
<b>Date</b>	<b>Author (Name/Organisation)</b>	<b>Verified (Name/Organisation)</b>
November 2020	Ishbel Campbell, Sweco	Keith Ross, Sweco
Name and location of European Site:	Broadlands Ramsar (Ref No. UK9009253) Location: 11.5km from the proposed works	
Description of the project:	<ul style="list-style-type: none"> <li>The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the east of the Proposed Scheme, and a number of houses on Cantley Lane South which lies to the west of the A47. Several residential properties located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich with Great Yarmouth to the east.</li> <li>This junction no longer meets the needs of its users.</li> <li>Traffic volume will remain unchanged.</li> <li>The Development Consent Order (DCO) boundary is provided in Appendix D (Figure 1).</li> <li>The Proposed Scheme is categorised as Nationally Significant Infrastructure and therefore requires DCO.</li> </ul>	
Is the project directly connected with or necessary to the management of the site (provide details)?	No	
Are there other projects or plans that together with the project being assessed could affect the site (provide details)?	<p>No proposed developments within 2km of the Proposed Scheme have been identified whereby any cumulative effects could affect the ecological integrity of the Ramsar.</p> <p>The assessment of cumulative effects <del>and the list of the proposed developments</del> is fully detailed in ES Chapter 15 (Cumulative effects assessment) (TR010037/APP/6.1), (APP-052) <a href="#">Section 15.7</a> with the list of the proposed developments contained in <a href="#">Appendices 15.1, Cumulative Effects Stage 2 Screening (APP-117)</a> and <a href="#">15.2 Cumulative Effects Development Type (Short List) (APP-118)</a>.</p>	
<b>The assessment of significance of effects</b>		
Describe how the project (alone or in combination) is	Pollution of watercourses	



<p>likely to affect the European Site.</p>	<p>Air pollution                  Noise disturbance of Ramsar features                  Light disturbance of Ramsar features</p>
<p>Explain why these effects are not considered significant.</p>	<p>Although the vicinity of the Proposed Scheme does have habitat to support bird species such as gadwall, wigeon, and Bewick's swans, none of these species were recorded in the area during the 2017, 2018 and 2019 bird surveys. Therefore, it is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the Ramsar.</p> <p>As otters are an EPS and a qualifying feature of the Broadlands Ramsar, the scheme has been designed in order to avoid or minimise the risk of harming otters during construction. It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Stream. In addition, an otter ledge will be installed on the A11 underpass. This Proposed Scheme design will maintain the existing commuting for otters to remain in situ with no impact upon otters themselves throughout construction</p> <p><b>Water Pollution:</b></p> <p>Construction: During construction, best practice construction measure for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128). These construction elements are detailed further in Appendix B. Despite these best practice construction measures, the large distance of 11.5km from the Proposed Scheme and the Ramsar means that any pollutions would have sufficiently diluted such that there will be no likely significant effects upon the Ramsar or its qualifying features during construction.</p> <p>Operation: Despite the best practice design measures described in Appendix B, the large distance of 11.5km from the Proposed Scheme and the Ramsar means that any pollutions would have sufficiently diluted such that there will be no likely significant effects upon the Ramsar or its qualifying features during operation.</p> <p>Appendix B (potential effects) gives further information regarding the Road Drainage and Water Environment discussion of the Proposed Scheme.</p> <p><b>Air pollution:</b></p> <p>Construction: As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK's ability to comply with the Air Quality Directive. In addition to the best practice construction measures, the large distance of 11.5km from the Proposed Scheme and the Ramsar means that any changes in air pollution would have sufficiently dissipated such that there will be <b>no likely significant effects</b> upon the Ramsar or its qualifying features during construction.</p> <p>Operation: The large distance of 11.5km from the Proposed Scheme and the SAC means that any pollutions would have sufficiently diluted such that there will be <b>no likely significant effects</b> upon the Ramsar or its qualifying features during operation.</p> <p><b>Noise disturbance:</b></p> <p>Construction: An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and Vibration) (TR010037/APP/6.1) (APP-048). In addition, it is approximately 11.5km away from the site and will not increase any noise disturbance already present from the City of Norwich, which lies in between the Proposed Scheme and the Ramsar.</p> <p>Operation: The large distance of 11.5km from the Proposed Scheme and the SAC means that any changes in air quality would have sufficiently dissipated such that there will be <b>no likely significant effects</b> upon the Ramsar or its qualifying features during operation.</p> <p>Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.</p> <p><b>Light disturbance:</b></p> <p>Construction: Due to otters using Cantley Stream for commuting purposes, likely at night, no night lighting will be installed on the existing stretch of Cantley Stream, or on the realignment, during construction as this would increase the light disturbance above existing levels for commuting otters in the area. In addition, the large distance of 11.5km from the Proposed Scheme and the Ramsar means that any light pollution will not increase the current light disturbance imposed upon the Ramsar by the City of Norwich and therefore there will be <b>no likely significant effects</b> upon the Ramsar or its qualifying features during construction.</p>

	Operation: The increase in night lighting over the Proposed Scheme is not considered to have any significant effects upon the Ramsar due to the Ramsar being 11.5km from the Proposed Scheme, and the presence of the City of Norwich currently providing significant light at night. Therefore, it is considered that night lighting for the scheme will impose <b>no likely significant effects</b> will occur on the Ramsar or the qualifying features during operation.		
List of agencies consulted: provide contact name and telephone or e-mail address.	Natural England		
Response to consultation	None required		
<b>Data collected to carry out the assessment</b>			
Who carried out the assessment	Sources of data	Level of assessment completed	Where can the full results of the assessment be accessed and viewed?
All information on the assessment process and data used for the assessment is set out in the full assessment report.			

## 5. References

- 5.1.1. PLANNING INSPECTORATE (2017). Advice Note Ten : Habitats Regulations Assessment relevant to nationally significant infrastructure projects. Available to view at [REDACTED]
- 5.1.2. PLANNING INSPECTORATE (2018). PINS NOTE 05/2018: Consideration of avoidance and reduction measures in Habitats Regulations Assessment: People over Wind, Peter Sweetman v Coillte. Available to view at [REDACTED]
- 5.1.3. Judgement of the Court (Grand Chamber) 30 May 2017 in Case C-323/17 Reference for a preliminary ruling — Environment — Directive 92/43/EEC — Conservation of natural habitats — Special areas of conservation — Article 6(3) — Screening in order to determine whether or not it is necessary to carry out an assessment of the implications, for a special area of conservation, of a plan or project — Measures that may be taken into account for that purpose. Made by decision of 10 May 2017, received at the Court on 30 May 2017, in the proceedings brought by Peter Sweetman and Coillte Teoranta.
- 5.1.4. DTA PUBLICATIONS (2014). The Habitats Regulations Assessment Handbook. [REDACTED]
- 5.1.5. EUROPEAN COMMISSION (2018). Managing Natura 2000 Sites. The Provisions of Article 6 of the Habitats Directive 92/43/EEC
- 5.1.6. DEPARTMENT OF ENVIRONMENT, FOOD AND RURAL AFFAIRS (defra). Multi Agency Geographic Information for the Countryside (MAGIC). Available to view at [REDACTED]
- 5.1.7. JOINT NATURE CONSERVATION COMMITTEE. UK Protected Sites. Available to view at [REDACTED]
- 5.1.8. NATURAL ENGLAND. Conservation Objectives for European Sites. Available to view at [REDACTED]
- 5.1.9. BIRDLIFE INTERNATIONAL. Birdlife Datazone. [REDACTED]
- 5.1.10. BRITISH TRUST FOR ORNITHOLOGY. Wetland Bird Survey information. Available to view at [REDACTED]

5.1.11. NATURAL ENGLAND. Designated Sites View, information on designated sites.  
Available to view at [REDACTED]

## Appendix A. DMRB screening matrices

Potential effects upon the designated sites which are considered in this assessment are provided below in Tables A.1 to A.3 to be in line with DMRB LA115 (Habitats Regulations Assessment).

The European sites included within the screening assessment are:

- The Broads SAC
- Broadland SPA
- Broadland Ramsar site

### The Broads SAC

Table A.1 The Broads SAC Screening Matrix

<b>Project:</b>	A47/A11 Thickthorn Junction	
<b>European site under consideration</b>	The Broads SAC	
<b>Date:</b>	<b>Author (name/organisation):</b>	<b>Verified (Name/Organisation):</b>
November 2020	Ishbel Campbell, Sweco	Keith Ross, Sweco
<b>Description of project</b> Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
<b>• Size and scale (road type and probable traffic volume)</b>	<ul style="list-style-type: none"> <li>• The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the east of the Proposed Scheme, and a number of houses on Cantley Lane South which lies to the west of the A47. Several residential properties located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich with Great Yarmouth to the east.</li> <li>• This junction no longer meets the needs of its users.</li> <li>• Traffic volume will remain unchanged.</li> <li>• The Development Consent Order (DCO) boundary is provided in Appendix D (Figure 1).</li> <li>• The Proposed Scheme is categorised as Nationally Significant Infrastructure and therefore requires DCO.</li> </ul>	
<b>• Land-take</b>	The DCO boundary is provided in Appendix D (Figure 1). No land-take is required in the SAC.	
<b>• Distance from the European Site or key features of the site (from edge of the project assessment corridor)</b>	Approximately 11.5km to the east of the Proposed Scheme.	
<b>• Resource requirements (from the European Site or from areas in proximity)</b>	Not applicable as no land-take or resource requirements from The Broads SAC are required.	

<b>to the site, where of relevance to consideration of impacts)</b>	
<b>• Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)</b>	<p>Construction: Nitrogen dioxide from diesel-powered plant during construction. Proposed works machinery will be diesel / petrol powered, and on-site generators will also be required. Potential for spills during refuelling and machine servicing. Air quality modelling shows that during construction, there is no anticipated change in air quality of The Broads SAC.</p> <p>Operation: Ongoing emissions from vehicles usage of the road (no increase in vehicle emissions concluded from air quality modelling). At operation, there is no anticipated change in air quality at The Broads SAC.</p> <p>The air quality assessment has been undertaken using standardised methodologies and data sets.</p>
<b>• Excavation requirements (e.g. impacts of local hydrogeology)</b>	<p>All excavations are located in the vicinity of the new and existing roads. Excavations will not be deep enough to impact local hydrogeology.</p> <p>All excavated material will be stored in a safe location to prevent rainwater leaching silts into Cantley Stream which is a legally required construction element, required by the Environment Agency and the Water Framework Directive.</p>
<b>• Transportation requirements</b>	Machinery will be transported to and from the site, this will be standard construction equipment of excavators, trucks etc..
<b>• Duration of construction, operation, etc.</b>	Construction is likely to commence in January 2023 and occur for a duration of 23 months.
<b>• Other.</b>	N/A
<b>Description of avoidance and/or mitigation measures</b> <i>Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:</i>	
<b>• Nature of proposals</b>	No mitigation measures required.
<b>• Location</b>	
<b>• Evidence for effectiveness</b>	
<b>• Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)</b>	
<b>Characteristics of European Site(s)</b> <b>A brief description of the European Site should be produced, including information on:</b>	
<b>Name of European Site and its EU code</b>	The Broads SAC – Special Area of Conservation (Ref No. UK0013577)
<b>Location and distance of the European Site from the proposed works</b>	The Broads SAC – 11.5km from the proposed works
<b>European Site size</b>	The Broads SAC – 5,885ha
<b>Key features of the European Site including the primary reasons for selection and any other qualifying interests</b>	<p>Annex I habitats that are a primary reason for selection:</p> <ul style="list-style-type: none"> <li>• Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i></li> <li>• Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation</li> <li>• Transition mires and quaking bogs</li> </ul>

	<ul style="list-style-type: none"> <li>• Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i></li> <li>• Alkaline fens</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)</li> </ul> <p>Annex I habitats present as a qualifying feature but not a primary reason for selection:</p> <ul style="list-style-type: none"> <li>• Molinia meadows on calcareous, peaty or clayey silt laden soils (<i>Molinion caeruleae</i>)</li> </ul> <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>• Desmoulin's whorl snail <i>Vertigo moulinsiana</i></li> <li>• Fen orchid <i>Liparis loeselii</i></li> <li>• Lesser whirlpool ramshorn snail <i>Anisus vorticulus</i></li> </ul> <p>Annex II species present as a qualifying feature, but not a primary reason for selection:</p> <ul style="list-style-type: none"> <li>• Otter <i>Lutra lutra</i></li> </ul>
<p><b>Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways</b></p>	<p><del>Threats to the site include water pollution, invasive species, siltation of waterbodies, changes in water levels, hydrological changes, water abstraction, changes in land use, inappropriate ditch management, air pollution, scrub succession and disturbance from recreational use.</del> The Site Improvement Plan lists the following Threats/Pressures relating to the Broads SAC: <u>water pollution, climate change, invasive species, siltation, inappropriate water levels, hydrological changes, water abstraction, change in land management, inappropriate ditch management, inappropriate scrub control, changes in species distributions, public access/disturbance, undergrazing, drainage, inappropriate coastal management, air pollution: impact of atmospheric nitrogen deposition.</u></p>
<p><b>European Site conservation objectives – where these are readily available</b></p>	<p>The conservation objectives for the site are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the favourable conservation status of its qualifying features, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>• The extent and distribution of qualifying natural habitats and habitats of qualifying species.</li> <li>• The structure and function (including typical species) of qualifying natural habitats.</li> <li>• The structure and function of the habitats of qualifying species.</li> <li>• The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely.</li> <li>• The populations of qualifying species.</li> <li>• The distribution of qualifying species within the site.</li> </ul>
<p><b>Assessment criteria</b>  <b>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.</b></p>	
<p><del>The vulnerabilities of each feature cited within the SAC are listed below. Full detailed descriptions can be found in Section 3.2.92.4.5 (which also pertains to Broadland Ramsar).</del></p> <p>Within the scope of the proposed works we have scoped out all the vulnerabilities except the following: <u>water pollution, public access/disturbance, invasive non-native species, human disturbance, air pollution.</u></p> <p><u>Water Pollution</u></p> <p><u>It is considered that pollution through spillages may have a negative effect on the water quality, thus having the potential to impact the SAC.</u></p> <p><u>The machinery used during the works require fuel and chemicals to perform the tasks and this may lead to accidental spillages.</u></p> <p><u>Public Access/Disturbance Minimising disturbance caused by human activity (Noise)</u></p> <p>The works will create noise <u>and increased lighting</u> during the construction activities and <u>have the</u> potential for increased noise <u>and lighting</u> during operation, <u>with the potential to affect otters.</u></p>	

Water Pollution

~~It is considered that pollution through spillages may have a negative effect on the water quality, thus having the potential to impact the SAC.~~

~~The machinery used during the works require fuel and chemicals to perform the tasks and this may lead to accidental spillages.~~

Air Quality Pollution

Effects from increases in air pollution due to increased traffic volume and/or traffic flow during operation may have an impact on SAC features.

**Initial assessment**

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:

**Reduction of habitat area**

There is to be no reduction in habitat area within the SAC boundary.

**Disturbance to key features**



### Water Pollution

During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128). Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba *et al.* 2017; Murnane *et al.*, 2006) and the Environment Agency's approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).

No likely significant adverse effects are predicted during construction of the Proposed Scheme due to the distance of the SAC from the Proposed Scheme. With the legally required construction and design elements detailed in Appendix B, it is considered that road drainage works will impose **no likely significant effects** will occur on the Broads SAC or their qualifying interests during construction.

The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100-year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance. With the above legal required elements, detailed further in Appendix B, **no likely significant adverse effects** are predicted during operation of the Proposed Scheme.

### Public Access/Disturbance

#### Noise and Vibration Disturbance

An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and Vibration) (TR010037/APP/6.1) (APP-048). From the modelling results, it is concluded that, with programmed short work durations that occur during daylight hours only, there will be **no likely significant effects** that will occur on the SAC as this is approximately 11.5km away from the site and therefore outside of the noise assessment zone.

During operation, as the ecological receptors are located further away than 30m from the Proposed Scheme, it can be concluded that these international sites will not be negatively affected by the operational noise of the Proposed Scheme. Therefore, the assessment concludes that mitigation is not necessary and that there are **no likely significant effects** of the Proposed Scheme on the designated sites.

Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.

#### Lighting Disturbance

Construction will take place mainly throughout the daytime, and night lighting will only take place in areas that have had vegetation cleared as part of best practice construction measures. In addition, the increase in night lighting over the proposed scheme is not considered to have any significant effects upon the international sites due to the presence of Norwich providing significant light at night.

Due to otters using Cantley Stream for commuting purposes, likely at night, no night lighting will be installed on the existing stretch of Cantley Stream, or on the realignment, during construction as this would increase the light disturbance above existing levels for commuting otters in the area. Therefore, it is considered that night lighting for the scheme will impose **no likely significant effects** will occur on the SAC or the qualifying features.

The lighting design is ongoing and therefore only outline information is known at present. The existing columns around the A47/A11 Thickthorn Junction are 12 metres in height. It is proposed that most of these existing columns will remain in situ with new lanterns installed. This assessment will be updated when final information about the lighting design is provided. In addition, the increase in night lighting over the Proposed Scheme is not considered to have any significant effects upon the international sites due to the presence of the city of Norwich providing significant light at night.

Therefore, it is considered that night lighting for the scheme will impose **no likely significant effects** will occur on the NSN network and Ramsar sites or their qualifying features.

### Air Pollution

As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK's ability to comply with the Air Quality Directive.

In addition, with the implementation of best practice construction measures, the impact of construction dust is considered highly unlikely to trigger a significant air quality effect as stated in the ES Chapter 5 (Air Quality) (TR010037/APP/6.1) (APP-042) Sections 5.10 and 5.12. Relevant sections of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128) will be appended to this report once they have been produced.

Therefore, it is considered that any changes in air quality during construction will impose **no likely significant effects** on the qualifying interests of the NSN network and Ramsar sites during construction as the nearest international site lies 11.3km from the Proposed Scheme.

Air quality modelling has been undertaken using the approach outlined in LA 105, and the operation of the Proposed Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality. The assessment has therefore concluded that there will be no significant air quality effects as a result from the operation of

<p>the Proposed Scheme and that no likely significant effects will occur on the NSN network and Ramsar sites or their qualifying features during operation.</p> <p>Appendix B (potential effects) gives further information regarding air quality modelling pertaining to the Proposed Scheme.</p> <p><b>Cumulative Effects<del>Water Pollution</del></b></p> <p><del>During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (TR010037/APP/7.4). Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba et al. 2017; Murnane et al., 2006) and the Environment Agency's approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).</del></p> <p><del>No likely significant adverse effects are predicted during construction of the Proposed Scheme due to the distance of the SAC from the Proposed Scheme. With the legally required construction and design elements detailed in Appendix B, it is considered that road drainage works will impose no likely significant effects will occur on the Broads SAC or their qualifying interests during construction.</del></p> <p><del>The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100-year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance. With the above legal required elements, detailed further in Appendix B, no likely significant adverse effects are predicted during operation of the Proposed Scheme.</del></p> <p>There are no identified projects within the ZOI anticipated to result in significant effects that would require additional mitigation in response to cumulative effects. The assessment of cumulative effects <del>and the list of the proposed developments</del> is fully detailed in ES Chapter 15 (Cumulative effects assessment) (<del>TR010037/APP/6.1</del>) <del>Section 15.7 (TR010037/APP/6.1) (APP-052) with the list of the proposed developments contained in Appendices 15.1, Cumulative Effects Stage 2 Screening (APP-117) and 15.2 Cumulative Effects Development Type (Short List) (APP-118).</del></p>	
<b>Habitat or species fragmentation</b>	There is to be no habitat loss within the SAC boundary.
<b>Reduction in species density</b>	<p>In addition, as otters are also an EPS, best practice construction measures will be implemented in order to minimise the risk of harming otters during construction. It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. In addition, an otter ledge will be installed on the A11 underpass. Maintaining the existing commuting corridor for otters with no impact upon otters themselves throughout construction is a legal requirement as the otter is a European protected species, protected under the Wildlife and Countryside Act 1981 (as amended).</p> <p>Neither species of lesser whirlpool ramshorn snails and Desmoulins whorl snails was found during the surveys. Therefore, both snail species have been screened out from further assessment as the proposed scheme does not affect any waterbodies that have suitable habitat for supporting this species therefore no effect pathways to populations of these species within the Broads SAC.</p> <p>No Likely Significant Effect</p>
<b>Changes in key indicators of conservation value (water quality, etc)</b>	<p>Road traffic emissions at selected sensitive human and ecological receptors have been assessed by modelling the change in air quality pollutant concentrations. The model has been compared against local air quality monitoring data and has been used to predict the air quality impacts caused by changes in traffic flows and road alignments as a result of the Proposed Scheme.</p> <p>No Likely Significant Effect</p>
<b>Climate change</b>	<p>An assessment was undertaken which considered the Proposed Scheme's effect on climate (i.e. increases in carbon emissions) as well as the potential vulnerability of the Proposed Scheme to climate change.</p> <p>The construction, operation and use of the Proposed Scheme is predicted to increase carbon emissions by approximately 163,109 tonnes carbon dioxide equivalent (tCO<sub>2</sub>e) over the appraisal period of 60 years (up to 2085). As per DMRB LA 114, Proposed Scheme carbon emissions have been compared with the Government's published UK carbon budgets. These budgets currently extend until 2032 and can be</p>

	<p>compared with 23% of the emissions increase associated with the Proposed Scheme. The remaining 77% of the increase in carbon emissions will occur after 2032 (the end of the last currently published UK carbon budget). Further information on the assessment of materiality can be found in Chapter 146: Climate of the EIA (TR010037/APP/6.1) (APP-051).</p> <p>The vulnerability of Proposed Scheme assets to projected changes in climate during operation has been assessed, and the Proposed Scheme has been deemed resilient. Therefore, no significant effects as a result of climate change are anticipated.</p>
<b>Describe any likely impacts on the European Site as a whole in terms of:</b>	
<b>Interference with the key relationships that define the structure of the site</b>	There will be no impacts on The Broads SAC through the interference with the key relationships which define the structure of the site.
<b>Indicate the significance as a result of the identification of impacts set out above in terms of:</b>	
<b>Reduction of habitat area</b>	As there will be no reduction in the habitat within the SAC it has been concluded that there will be No Likely Significant Effect
<b>Disturbance to key species</b>	No qualifying species of The Broads SAC will be impacted and therefore No likely Significant Effect is anticipated
<b>Habitat or species fragmentation</b>	No habitat or species fragmentation will occur as part of the works and therefore it has been concluded there will be no Likely Significant Effect
<b>Loss</b>	There will be no habitat loss from the proposed works and therefore it was concluded there will be No Likely Significant Effect
<b>Fragmentation</b>	There will be no fragmentation across the site from the proposed works and therefore it is concluded that there will be No Likely Significant Effect
<b>Disruption</b>	No Likely Significant Effect
<b>Disturbance</b>	No Likely Significant Effect
<b>Change to key elements of the site (e.g. water quality, hydrological regime etc)</b>	No Likely Significant Effect
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
The impacts upon the key habitat and species features from both noise disturbance, pollution and air quality and lighting have been assessed in detail. Evidence from both noise and air quality modelling and the surveys undertaken on site since 2017 in combination with strict DMRB stated guidance on drainage and air quality assessments have concluded that there will be No Likely Significant Effect on SAC features both during construction and operation.	
<b>Outcome of screening stage (delete as appropriate).</b>	<b>No Likely Significant Effect</b>
<b>Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attached relevant correspondence).</b>	Natural England (NE) have been consulted regarding this screening report and confirmed that they are satisfied with the conclusions that there will be no likely significant effects upon The Broads SAC as a result of the proposed scheme.

## Broadlands SPA

Table A.2 Broadlands SPA Screening Matrix

<b>Project:</b>	A47/A11 Thickthorn Junction	
<b>European site under consideration</b>	Broadlands SPA	
<b>Date:</b>	<b>Author (name/organisation):</b>	<b>Verified (Name/Organisation):</b>
November 2020	Ishbel Campbell, Sweco	Keith Ross, Sweco
<b>Description of project</b> Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
<ul style="list-style-type: none"> <li>• <b>Size and scale (road type and probable traffic volume)</b></li> </ul>	<ul style="list-style-type: none"> <li>• The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the east of the Proposed Scheme, and a number of houses on Cantley Lane South which lies to the west of the A47. Several residential properties located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich with Great Yarmouth to the east.</li> <li>• This junction no longer meets the needs of its users.</li> <li>• Traffic volume will remain unchanged.</li> <li>• The Development Consent Order (DCO) boundary is provided in Appendix D (Figure 1).</li> <li>• The Proposed Scheme is categorised as Nationally Significant Infrastructure and therefore requires DCO.</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>Land-take</b></li> </ul>	The DCO boundary is provided in Appendix D (Figure 1). No land-take is required in the SPA.	
<ul style="list-style-type: none"> <li>• <b>Distance from the European Site or key features of the site (from edge of the project assessment corridor)</b></li> </ul>	Approximately 11.5km to the east of the Proposed Scheme.	
<ul style="list-style-type: none"> <li>• <b>Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)</b></li> </ul>	Not applicable as no land-take from Broadlands SPA is required.	
<ul style="list-style-type: none"> <li>• <b>Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)</b></li> </ul>	<p>Construction: Nitrogen dioxide from diesel-powered plant during construction. Proposed works machinery will be diesel / petrol powered, and on-site generators will also be required. Potential for spills during refuelling and machine servicing. Air quality modelling shows that during construction, there is no anticipated change in air quality of Broadlands SPA.</p> <p>Operation: Ongoing emissions from vehicles usage of the road (no increase in vehicle emissions concluded from air quality modelling). At operation, there is no anticipated change in air quality at Broadlands SPA.</p> <p>The air quality assessment has been undertaken using standardised methodologies and data sets.</p>	
<ul style="list-style-type: none"> <li>• <b>Excavation requirements (e.g.</b></li> </ul>	All excavations are located in the vicinity of the new and existing roads. Excavations will not be deep enough to impact local hydrogeology.	

<b>impacts of local hydrogeology)</b>	All excavated material will be stored in a safe location to prevent rainwater leaching silts into the waterbodies. Locations for storage of material will be set out in the Construction Environmental Management Plan.
<b>• Transportation requirements</b>	Machinery will be transported to and from the site, this will be standard construction equipment of excavators, trucks etc.
<b>• Duration of construction, operation, etc.</b>	Construction is likely to commence in January 2023 and occur for a duration of 23 months.
<b>• Other.</b>	N/A
<b>Description of avoidance and/or mitigation measures</b> <i>Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:</i>	
<b>• Nature of proposals</b>	No mitigation measures included.
<b>• Location</b>	
<b>• Evidence for effectiveness</b>	
<b>• Mechanism for delivery (legal conditions, restrictions or other legally enforceable obligations)</b>	
<b>Characteristics of European Site(s)</b> <b>A brief description of the European Site should be produced, including information on:</b>	
<b>Name of European Site and its EU code</b>	Broadlands SPA – Special Protected Area (Ref No. UK9009253)
<b>Location and distance of the European Site from the proposed works</b>	Broadlands SPA – 11.5km from the proposed works
<b>European Site size</b>	Broadlands SPA – 5,508ha
<b>Key features of the European Site including the primary reasons for selection and any other qualifying interests</b>	Broadlands SPA Ruff <i>Philomachus pugnax</i> Eurasian marsh harrier <i>Circus aeruginosus</i> (breeding population) Hen harrier <i>Circus cyaneus</i> Eurasian wigeon <i>Anas penelope</i> Northern shoveler <i>Anas clypeata</i> Gadwall <i>Anas strepera</i> Great bittern <i>Botaurus stellaris</i> (breeding population) Bewick's swan <i>Cygnus columbianus bewickii</i> Whooper swan <i>Cygnus cygnus</i>
<b>Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways</b>	<del>The Site Improvement Plan lists the following Threats/Pressures relating to the Broads SAC: water pollution, climate change, siltation, hydrological changes, change in land management, inappropriate ditch management, direct impact from third party, inappropriate coastal management, air pollution: impact of atmospheric nitrogen deposition. Pressures on the site include modification of cultivation practices, grazing, changes in land use such as annual and perennial non-timber crops, forest plantation, pollution to groundwater, invasive species and changes in abiotic conditions. Additional pressures include those to wintering birds, which are vulnerable to disturbance, especially from recreational activities such as boating.</del>  Those that pertain to the Proposed Scheme are:



	<p><u>The European Site Conservation Objectives: Supplementary advice on conserving and restoring site features for Broadland SPA suggests that disturbance associated with human activity in the form of noise, light, sound, vibration, trampling and presence of people, animals and structures, should be considered, pollution to groundwater, invasive species and human disturbance to the bird species.</u></p>
<p><b>European Site conservation objectives – where these are readily available</b></p>	<p>The conservation objectives are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>• The extent and distribution of the habitats of the qualifying features.</li> <li>• The structure and function of the habitats of the qualifying features.</li> <li>• The supporting processes on which the habitats of the qualifying features rely.</li> <li>• The population of each of the qualifying features.</li> <li>• The distribution of the qualifying features within the site.</li> </ul>
<p><b>Assessment criteria</b>  <b>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.</b></p>	
<p>Within the scope of the proposed works we have scoped out all the vulnerabilities except the following: <u>water pollution, hydrological changes, changes in water levels, hydrological changes, air pollution: impact of atmospheric nitrogen deposition, human disturbance, spread of invasive non-native species, and disturbance associated with human activity in the form of noise and light.</u></p> <p><u>Water Pollution</u>          It is considered that pollution through spillages may have a negative effect on the water quality thus having the potential to impact the SPA.          The machinery used during the works require fuel and chemicals to perform the tasks and this may lead to accidental spillages.</p> <p><u>Hydrological Changes</u>          Road design may affect natural flow pathways which may induce hydrological changes of local waterbodies connected to the proposed scheme.</p> <p><u>Air Pollution</u>          Effects from increases in air pollution due to increased traffic volume and/or traffic flow during operation may have an impact on the SPA site features.</p> <p><u>Minimising Disturbance caused by Associated with Human Activity (Noise and light)</u>          The works will create noise and increased lighting during the construction activities and have the potential for increased noise and lighting during operation, with the potential to affect qualifying features. The works will create noise during the construction activities and potential for increased noise during operation.</p> <p><u>Hydrological Changes</u>          Road design may affect natural flow pathways which may induce hydrological changes of local waterbodies connected to the proposed scheme.</p> <p><u>Water Pollution</u>          It is considered that pollution through spillages may have a negative effect on the water quality thus having the potential to impact the SPA.          The machinery used during the works require fuel and chemicals to perform the tasks and this may lead to accidental spillages.</p> <p><u>Air Quality</u>          Effects from increases in air pollution due to increased traffic volume and/or traffic flow during operation may have an impact on the SPA site features.</p> <p><u>Minimising disturbance caused by human activity (Mortality)</u>          The works will increase volume of traffic thereby increasing the risk of mortality of any barbastelles on site.</p>	



<b>Initial assessment</b>	
The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
<b>Reduction of habitat area</b>	There is to be no reduction in habitat area within the SPA site boundary.
<b>Disturbance to key features</b>	
<p><u>Water Pollution</u></p> <p><u>During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128). Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba et al. 2017; Murnane et al., 2006) and the Environment Agency’s approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).</u></p> <p><u>No likely significant adverse effects are predicted during construction of the Proposed Scheme, with the legally required construction and design elements detailed in Appendix B, it is considered that road drainage works will impose no likely significant effects will occur on Broadlands SPA or the qualifying interests during construction.</u></p> <p><u>Hydrological Changes</u></p> <p><u>The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100-year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of ‘dry culverts’ or cross-drains designed to 1 in 100-year plus 65% climate change allowance. With these reasons further detailed in Appendix B, no likely significant adverse effects are predicted during operation of the Proposed Scheme.</u></p> <p><u>Air Pollution</u></p> <p><u>As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK’s ability to comply with the Air Quality Directive.</u></p> <p><u>In addition, with the implementation of best practice construction measures, the impact of construction dust is considered highly unlikely to trigger a significant air quality effect as stated in the ES Chapter 5 (Air Quality) (TR010037/APP/6.1) (APP-042) Sections 5.10 and 5.12. Relevant sections of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128) will be appended to this report once they have been produced.</u></p> <p><u>Therefore, it is considered that any changes in air quality during construction will impose no likely significant effects on the qualifying interests of the NSN network and Ramsar sites during construction as the nearest international site lies 11.3km from the Proposed Scheme.</u></p> <p><u>Air quality modelling has been undertaken using the approach outlined in LA 105, and the operation of the Proposed Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality. The assessment has therefore concluded that there will be no significant air quality effects as a result from the operation of the Proposed Scheme and that no likely significant effects will occur on the NSN network and Ramsar sites or their qualifying features during operation.</u></p> <p><u>Appendix B (potential effects) gives further information regarding air quality modelling pertaining to the Proposed Scheme.</u></p>	
<p><b><u>Disturbance Associated with Human Activity (Noise and Light)</u></b></p> <p><b><u>Noise and Vibration Disturbance</u></b></p> <p>An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and vibration) (TR010037/APP/6.1) (APP-048). It is concluded that, due to short work durations that occur during daylight hours only, and the large distance of the SPA, <b>no likely significant effects</b> will occur on the SPA as <b>they are it is</b> approximately 11.5km away from the site and therefore outside of the noise assessment zone.</p>	

During operation, as the ecological receptors are located further away than 30m from the Proposed Scheme, it can be concluded that these international sites will not be negatively affected by the operational noise of the Proposed Scheme. Therefore, the assessment concludes that mitigation is not necessary and that there are **no likely significant effects** of the Proposed Scheme on the designated sites.

Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.

#### Lighting Disturbance

Construction will take place mainly throughout the daytime, and night lighting will only take place in areas that have had vegetation cleared as part of best practice construction measures. In addition, the increase in night lighting over the proposed scheme is not considered to have any significant effects upon the international sites due to the presence of Norwich providing significant light at night.

The lighting design is ongoing and therefore only outline information is known at present. The existing columns around the A47/A11 Thickthorn Junction are 12 metres in height. It is proposed that most of these existing columns will remain in situ with new lanterns installed. This assessment will be updated when final information about the lighting design is provided. In addition, the increase in night lighting over the Proposed Scheme is not considered to have any significant effects upon the international sites due to the presence of the city of Norwich providing significant light at night. Therefore, it is considered that night lighting for the scheme will impose **no likely significant effects** will occur on the NSN network and Ramsar sites or their qualifying features.

#### **Air Pollution**

~~As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK's ability to comply with the Air Quality Directive.~~

~~In addition, with the implementation of best practice construction measures, the impact of construction dust is considered highly unlikely to trigger a significant air quality effect as stated in the ES Chapter 5 (Air Quality) (TR010037/APP/6.1) Sections 5.10 and 5.12. Relevant sections of the Environmental Management Plan (EMP) (TR010037/APP/7.4) will be appended to this report once they have been produced.~~

~~Therefore, it is considered that any changes in air quality during construction will impose **no likely significant effects** on the qualifying interests of the NSN network and Ramsar sites during construction as the nearest international site lies 11.3km from the Proposed Scheme.~~

~~Air quality modelling has been undertaken using the approach outlined in LA 105, and the operation of the Proposed Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality. The assessment has therefore concluded that there will be no significant air quality effects as a result from the operation of the Proposed Scheme and that no likely significant effects will occur on the NSN network and Ramsar sites or their qualifying features during operation.~~

~~Appendix B (potential effects) gives further information regarding air quality modelling pertaining to the Proposed Scheme.~~

#### **Water Pollution**

~~During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (TR010037/APP/7.4). Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba et al. 2017; Murnane et al., 2006) and the Environment Agency's approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).~~

~~No likely significant adverse effects are predicted during construction of the Proposed Scheme, with the legally required construction and design elements detailed in Appendix B, it is considered that road drainage works will impose **no likely significant effects** will occur on Broadlands SPA or the qualifying interests during construction.~~

~~The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100-year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance. With these reasons further detailed in Appendix B, **no likely significant adverse effects** are predicted during operation of the Proposed Scheme. **Cumulative Effects**~~

~~There are no identified projects within the ZOI anticipated to result in significant effects that would require additional mitigation in response to cumulative effects. The assessment of cumulative effects and the list of the proposed developments is fully detailed in ES Chapter 15 (Cumulative effects assessment) (TR010037/APP/6.1) (APP-052) Section 15.7 with the list of the proposed developments contained in Appendices 15.1, Cumulative Effects Stage 2 Screening (APP-117) and 15.2 Cumulative Effects Development Type (Short List) (APP-118).~~

~~Although the vicinity of the Proposed Scheme does have habitat to support bird species such as gadwall, wigeon and ruff, and Bewick's and whooper swans, and marsh and hen harriers, none of these species were recorded in the area during the 2017, 2018 and 2019 bird surveys. Therefore, it is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. Although the arable fields are likely to provide a food source during~~

<del>the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the SPA.</del>	
<b>Habitat or species fragmentation</b>	<p>There is to be no habitat loss within the SPA boundary. Vegetation clearance will be minimal, limited only to only within the red line boundary. There will be no large-scale vegetation clearance which will result in no habitat or species fragmentation.</p> <p><u>Although the vicinity of the Proposed Scheme does have habitat to support bird species such as gadwall, wigeon and ruff, and Bewick's and whooper swans, and marsh and hen harriers, none of these species were recorded in the area during the 2017, 2018 and 2019 bird surveys. Therefore, it is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the SPA.</u></p> <p><b>No Likely Significant Effect</b></p>
<b>Reduction in species density</b>	<p>A baseline noise survey was undertaken in June 2018 to gain an understanding of the existing noise climate within the vicinity of the Proposed Scheme. The findings of the survey have been reviewed against the noise modelling results. A construction noise assessment has been undertaken. It is concluded that there will be no likely significant effects upon the SPA.</p> <p>None of the species for which the Broadland SPA is designated for overwintering populations were recorded within the study area during the wintering bird surveys undertaken in 2019, December 2017 and February 2018.</p> <p><b>No Likely Significant Effect</b></p>
<b>Changes in key indicators of conservation value (water quality, etc)</b>	<p><b>No Likely Significant Effect</b></p>
<b>Climate change</b>	<p>An assessment was undertaken which considered the Proposed Scheme's effect on climate (i.e. increases in carbon emissions) as well as the potential vulnerability of the Proposed Scheme to climate change.</p> <p>The construction, operation and use of the Proposed Scheme is predicted to increase carbon emissions by approximately 163,109 tonnes carbon dioxide equivalent (tCO<sub>2</sub>e) over the appraisal period of 60 years (up to 2085). As per DMRB LA 114, Proposed Scheme carbon emissions have been compared with the Government's published UK carbon budgets. These budgets currently extend until 2032 and can be compared with 23% of the emissions increase associated with the Proposed Scheme. The remaining 77% of the increase in carbon emissions will occur after 2032 (the end of the last currently published UK carbon budget). Further information on the assessment of materiality can be found in Chapter 145: Climate of the EIA <b>(TR010037/APP/6.1) (APP-051)</b>.</p> <p>The vulnerability of Proposed Scheme assets to projected changes in climate during operation has been assessed, and the Proposed Scheme has been deemed resilient. Therefore, no significant effects as a result of climate change are anticipated.</p>
<b>Describe any likely impacts on the European Site as a whole in terms of:</b>	
<b>Interference with the key relationships that define the structure of the site</b>	<p>There will be no impacts on Broadlands SPA through the interference with the key relationships which define the structure of the site.</p>
<b>Indicate the significance as a result of the identification of impacts set out above in terms of:</b>	
<b>Reduction of habitat area</b>	<p>As there will be no reduction in the habitat within the SPA it has been concluded that there will be <b>No Likely Significant Effect</b></p>
<b>Disturbance to key species</b>	<p>No qualifying species of SPA will be impacted and therefore <b>No likely Significant Effect</b> is anticipated.</p>

<b>Habitat or species fragmentation</b>	No habitat or species fragmentation will occur as part of the works and therefore it has been concluded there will be no Likely Significant Effect
<b>Loss</b>	There will be no habitat loss from the proposed works and therefore it was concluded there will be No Likely Significant Effect.
<b>Fragmentation</b>	There will be no fragmentation across the site from the proposed works and therefore it is concluded that there will be No Likely Significant Effect.
<b>Disruption</b>	No Likely Significant Effect
<b>Disturbance</b>	No Likely Significant Effect
<b>Change to key elements of the site (e.g. water quality, hydrological regime etc)</b>	No Likely Significant Effect
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
The impacts upon the key habitat and species features from both noise disturbance, pollution and air quality and lighting have been assessed in detail. Evidence from both noise and air quality modelling and the surveys undertaken on site since 2017 in combination with strict DMRB stated guidance on drainage and air quality assessments have concluded that there will be No Likely Significant Effect on SPA features both during construction and operation.	
<b>Outcome of screening stage (delete as appropriate).</b>	<b>No Likely Significant Effect</b>
<b>Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attached relevant correspondence).</b>	Natural England (NE) have been consulted regarding this Screening report and confirmed that they are satisfied with the conclusions that there will be no likely significant effects upon Broadlands SPA as a result of the proposed scheme.

## Broadlands Ramsar

Table A.3 Broadlands Ramsar Screening Matrix

<b>Project:</b>	A47/A11 Thickthorn Junction	
<b>European site under consideration</b>	Broadlands Ramsar	
<b>Date:</b>	<b>Author (name/organisation):</b>	<b>Verified (Name/Organisation):</b>
November 2020	Ishbel Campbell, Sweco	Keith Ross, Sweco
<b>Description of project</b> Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
<b>• Size and scale (road type and probable traffic volume)</b>	<ul style="list-style-type: none"> <li>The A47/A11 Thickthorn Junction is located less than 500m south of the western extent of Norwich built-up area. There is a row of houses along Cantley Lane South approximately 400m to the east of the Proposed Scheme, and a number of houses on Cantley Lane South which lies to the west of the A47. Several residential properties located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The</li> </ul>	

	<p>A47/A11 Thickthorn Junction forms a part of the main arterial highway route connecting Norwich with Great Yarmouth to the east.</p> <ul style="list-style-type: none"> <li>• This junction no longer meets the needs of its users.</li> <li>• Traffic volume will remain unchanged.</li> <li>• The Development Consent Order (DCO) boundary is provided in Appendix D (Figure 1).</li> <li>• The Proposed Scheme is categorised as Nationally Significant Infrastructure and therefore requires DCO.</li> </ul>
• Land-take	<p>The DCO boundary is provided in Appendix D (Figure 1). No land-take is required in the Ramsar.</p>
• Distance from the European Site or key features of the site (from edge of the project assessment corridor)	<p>Approximately 11.5km to the east of the Proposed Scheme.</p>
• Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)	<p>Not applicable as no land-take from Broadlands Ramsar is required.</p>
• Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	<p>Construction: Nitrogen dioxide from diesel-powered plant during construction. Proposed works machinery will be diesel / petrol powered, and on-site generators will also be required. Potential for spills during refuelling and machine servicing. Air quality modelling shows that during construction, there is no anticipated change in air quality of Broadlands Ramsar.</p> <p>Operation: Ongoing emissions from vehicles usage of the road (no increase in vehicle emissions concluded from air quality modelling). At operation, there is no anticipated change in air quality at Broadlands Ramsar.</p> <p>The air quality assessment has been undertaken using standardised methodologies and data sets.</p>
• Excavation requirements (e.g. impacts of local hydrogeology)	<p>All excavations are located in the vicinity of the new and existing roads. Excavations will not be deep enough to impact local hydrogeology.</p> <p>All excavated material will be stored in a safe location to prevent rainwater leaching silts into the waterbodies.</p>
• Transportation requirements	<p>Machinery will be transported to and from the site, this will be standard construction equipment of excavators, trucks etc. All excavated material will be stored in a safe location to prevent rainwater leaching silts into Cantley Stream.</p>
• Duration of construction, operation, etc.	<p>Construction is likely to commence in January 2023 and occur for a duration of 23 months.</p>
• Other.	<p>N/A</p>
<p><b>Description of avoidance and/or mitigation measures</b> <i>Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:</i></p>	
• Nature of proposals	<p>No mitigation measures included.</p>
• Location	
• Evidence for effectiveness	
• Mechanism for delivery (legal conditions, restrictions or other)	



legally enforceable obligations)	
<b>Characteristics of European Site(s)</b> A brief description of the European Site should be produced, including information on:	
Name of European Site and its EU code	Broadlands Ramsar (Ref No. UK9009253)
Location and distance of the European Site from the proposed works	Broadlands Ramsar – 11.5km from the proposed works
European Site size	Broadlands Ramsar – 5,508ha
<b>Key features of the European Site including the primary reasons for selection and any other qualifying interests</b>	The site qualifies under Ramsar criterion 2 – it supports a number of rare species and habitats within the biogeographical zone context, including the following Habitats Directive Annex I features: <ul style="list-style-type: none"> <li>• Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davalliana</i> (sedges)</li> <li>• Alkaline fens</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> (alder) and <i>Fraxinus excelsior</i> (ash).</li> </ul> Annex II species: <ul style="list-style-type: none"> <li>• Desmoulin’s whorl snail <i>Vertigo moulinsiana</i></li> <li>• Otter <i>Lutra lutra</i></li> <li>• Fen orchid <i>Liparis loeselii</i>.</li> </ul> <p style="color: green;">♦ <u>The site also supports outstanding assemblages of rare plants and invertebrates including nine British Red Data Book plants and 136 British Red Data Book invertebrates.</u></p> It also qualifies under Ramsar criterion 6 – species/populations occurring at levels of international importance. Species with peak counts in winter: <ul style="list-style-type: none"> <li>• Bewick’s swan <i>Cygnus columbianus bewickii</i></li> <li>• Eurasian wigeon <i>Anas penelope</i></li> <li>• Gadwall <i>Anas strepera strepera</i></li> <li>• Northern shoveler <i>Anas clypeata</i>.</li> </ul> Species/populations identified subsequent to designation for possible future consideration under criterion 6, species with peak counts in winter: <ul style="list-style-type: none"> <li>• Pink-footed goose <i>Anser brachyrhynchus</i></li> <li>• Greylag goose <i>Anser anser anser</i></li> </ul>
<b>Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways</b>	<p style="color: magenta;"><del>Pressures on the site include modification of cultivation practices, grazing, changes in land use such as annual and perennial non-timber crops, forest plantation, pollution to groundwater, invasive species and changes in abiotic conditions. Additional pressures include those to wintering birds, which are vulnerable to disturbance, especially from recreational activities such as boating.</del></p> <p style="color: magenta;"><del>These that pertain to the Proposed Scheme are:</del>  <del>pollution to groundwater, invasive species and human disturbance to the bird species.</del>The Site Improvement Plan for the Broalands SPA and The Broads SAC lists the following Threats/Pressures which are considered relevant to the Ramsar: <u>water pollution, climate change, invasive species, siltation, inappropriate water levels, hydrological changes, water abstraction, change in land management, inappropriate ditch management, inappropriate scrub control, changes in species distribution, public access/disturbance, undergrazing, drainage, direct impact from third party, inappropriate coastal management, air pollution: impact of atmospheric nitrogen deposition.</u></p>

	<p><u>The European Site Conservation Objectives: Supplementary advice on conserving and restoring site features for Broadland SPA suggests that disturbance associated with human activity in the form of noise, light, sound, vibration, trampling and presence of people, animals and structures, should be considered. This is also considered relevant to the Ramsar.</u></p>
<p><b>European Site conservation objectives – where these are readily available</b></p>	<p>The conservation objectives are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds and Habitats Directives, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>• The extent and distribution of the habitats of the qualifying features.</li> <li>• The structure and function of the habitats of the qualifying features.</li> <li>• The supporting processes on which the habitats of the qualifying features rely.</li> <li>• The population of each of the qualifying features.</li> <li>• The distribution of the qualifying features within the site.</li> </ul>
<p><b>Assessment criteria</b>  <b>Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.</b></p>	
<p><u>Within the scope of the proposed works we have scoped out all the vulnerabilities except the following: water pollution, hydrological changes, air pollution: impact of atmospheric nitrogen deposition, and disturbance associated with human activity in the form of noise and light.</u></p> <p><u>Water Pollution</u>  <u>It is considered that pollution through spillages may have a negative effect on the water quality thus having the potential to impact the Ramsar.</u>  <u>The machinery used during the works require fuel and chemicals to perform the tasks and this may lead to accidental spillages.</u></p> <p><u>Hydrological Changes</u>  <u>Road design may affect natural flow pathways which may induce hydrological changes of local waterbodies connected to the proposed scheme.</u></p> <p><u>Air Pollution</u>  <u>Effects from increases in air pollution due to increased traffic volume and/or traffic flow during operation may have an impact on the Ramsar site features.</u></p> <p><u>Disturbance Associated with Human Activity (Noise and light)</u>  <u>The works will create noise and increased lighting during the construction activities and have the potential for increased noise and lighting during operation, with the potential to affect qualifying features. Within the scope of the proposed works we have scoped out all the vulnerabilities except the following: water pollution, siltation of waterbodies, changes in water levels, hydrological changes, human disturbance.</u></p> <p><u>Minimising disturbance caused by human activity (Noise)</u>  <u>The works will create noise during the construction activities and potential for increased noise during operation.</u></p> <p><u>Hydrological Changes</u>  <u>Road design may affect natural flow pathways which may induce hydrological changes of local waterbodies connected to the proposed scheme.</u></p> <p><u>Water Pollution/Siltation of Waterbodies</u>  <u>It is considered that pollution through spillages may have a negative effect on the water quality thus impacting the designated sites.</u>  <u>The machinery used during the works require fuel and chemicals to perform the tasks and this may lead to accidental spillages.</u>  <u>Earthworks during construction may lead to siltation of waterbodies.</u></p> <p><u>Air Quality</u>  <u>Effects from increases in air pollution due to increased traffic volume and/or traffic flow during operation may have an impact on the Ramsar site features.</u></p>	



<b>Initial assessment</b>	
The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
<b>Reduction of habitat area</b>	There is to be no reduction in habitat area within the Ramsar site boundary.
<b>Disturbance to key features</b>	
<p><u>Water Pollution</u></p> <p><u>During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128). Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba et al. 2017; Murnane et al., 2006) and the Environment Agency’s approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).</u></p> <p><u>No likely significant adverse effects are predicted during construction of the Proposed Scheme, with the legally required construction and design elements detailed in Appendix B, it is considered that road drainage works will impose no likely significant effects will occur on Broadlands Ramsar or the qualifying interests during construction.</u></p> <p><u>Hydrological Changes</u></p> <p><u>The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100-year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of ‘dry culverts’ or cross-drains designed to 1 in 100-year plus 65% climate change allowance. With these reasons further detailed in Appendix B, no likely significant adverse effects are predicted during operation of the Proposed Scheme.</u></p> <p><u>Air Pollution</u></p> <p><u>As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK’s ability to comply with the Air Quality Directive.</u></p> <p><u>In addition, with the implementation of best practice construction measures, the impact of construction dust is considered highly unlikely to trigger a significant air quality effect as stated in the ES Chapter 5 (Air Quality) (TR010037/APP/6.1) (APP-042) Sections 5.10 and 5.12. Relevant sections of the Environmental Management Plan (EMP) (TR010037/APP/7.4) (APP-128) will be appended to this report once they have been produced.</u></p> <p><u>Therefore, it is considered that any changes in air quality during construction will impose no likely significant effects on the qualifying interests of the NSN network and Ramsar sites during construction as the nearest international site lies 11.3km from the Proposed Scheme.</u></p> <p><u>Air quality modelling has been undertaken using the approach outlined in LA 105, and the operation of the Proposed Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality. The assessment has therefore concluded that there will be no significant air quality effects as a result from the operation of the Proposed Scheme and that no likely significant effects will occur on the NSN network and Ramsar sites or their qualifying features during operation.</u></p> <p><u>Appendix B (potential effects) gives further information regarding air quality modelling pertaining to the Proposed Scheme.</u></p>	

### **Disturbance Associated with Human Activity (Noise and Light)**

Fen orchid and Desmoulin's whorl snail have been scoped out of this assessment as they are not susceptible to disturbance via noise or light.

#### **Noise and Vibration Disturbance**

An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and vibration) (TR010037/APP/6.1) (APP-048). It is concluded that, due to short work durations that occur during daylight hours only, and the large distance of the Ramsar, **no likely significant effects** will occur on the Ramsar as it is approximately 11.5km away from the site and therefore outside of the noise assessment zone.

During operation, as the ecological receptors are located further away than 30m from the Proposed Scheme, it can be concluded that these international sites will not be negatively affected by the operational noise of the Proposed Scheme. Therefore, the assessment concludes that mitigation is not necessary and that there are **no likely significant effects** of the Proposed Scheme on the designated sites.

Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.

#### **Lighting Disturbance**

Construction will take place mainly throughout the daytime, and night lighting will only take place in areas that have had vegetation cleared as part of best practice construction measures. In addition, the increase in night lighting over the proposed scheme is not considered to have any significant effects upon the international sites due to the presence of Norwich providing significant light at night.

The lighting design is ongoing and therefore only outline information is known at present. The existing columns around the A47/A11 Thickthorn Junction are 12 metres in height. It is proposed that most of these existing columns will remain in situ with new lanterns installed. This assessment will be updated when final information about the lighting design is provided. In addition, the increase in night lighting over the Proposed Scheme is not considered to have any significant effects upon the international sites due to the presence of the city of Norwich providing significant light at night. Therefore, it is considered that night lighting for the scheme will impose **no likely significant effects** will occur on the NSN network and Ramsar sites or their qualifying features.

#### **Cumulative Effects**

There are no identified projects within the ZOI anticipated to result in significant effects that would require additional mitigation in response to cumulative effects. The assessment of cumulative effects is fully detailed in ES Chapter 15 (Cumulative effects assessment) (TR010037/APP/6.1) (APP-052) Section 15.7 (TR010037/APP/6.1)-with the list of the proposed developments contained in Appendices 15.1, Cumulative Effects Stage 2 Screening (APP-117) and 15.2 Cumulative Effects Development Type (Short List) (APP-118).

#### **Noise and Vibration Disturbance**

An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and Vibration) (TR010037/APP/6.1). It is concluded that **no likely significant effects** will occur on the Ramsar site as it is approximately 11.5km away from the site and therefore outside of the noise assessment zone.

During operation, as the ecological receptors are located further away than 30m from the Proposed Scheme, it can be concluded that these international sites will not be negatively affected by the operational noise of the Proposed Scheme. Therefore, the assessment concludes that mitigation is not necessary and that there are **no likely significant effects** of the Proposed Scheme on the designated sites.

Appendix B (potential effects) gives further information regarding the noise and vibration modelling of the Proposed Scheme.

#### **Lighting Disturbance**

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#### **Air Pollution**

As construction activities are programmed to last less than two years it is unlikely there will be a significant long-lasting effect on air quality or affect the UK's ability to comply with the Air Quality Directive.

In addition, with the implementation of best practice construction measures, the impact of construction dust is considered highly unlikely to trigger a significant air quality effect as stated in the ES Chapter 5 (Air Quality)

~~(TR010037/APP/6.1) Sections 5.10 and 5.12. Relevant sections of the Environmental Management Plan (EMP) (TR010037/APP/7.4) will be appended to this report once they have been produced.~~

~~Therefore, it is considered that any changes in air quality during construction will impose **no likely significant effects** on the qualifying interests of the NSN network and Ramsar sites during construction as the nearest international site lies 11.3km from the Proposed Scheme.~~

~~Air quality modelling has been undertaken using the approach outlined in LA 105, and the operation of the Proposed Scheme is not predicted to affect compliance with the European Union (EU) Directive on ambient air quality. The assessment has therefore concluded that there will be no significant air quality effects as a result from the operation of the Proposed Scheme and that no likely significant effects will occur on the NSN network and Ramsar sites or their qualifying features during operation.~~

~~Appendix B (potential effects) gives further information regarding air quality modelling pertaining to the Proposed Scheme.~~

**Water Pollution**

~~During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP). Guidance pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba *et al.* 2017; Murnane *et al.*, 2006) and the Environment Agency's approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).~~

~~No likely significant adverse effects are predicted during construction of the Proposed Scheme. With legally required design and construction elements detailed in Appendix B, it is considered that road drainage works will impose **no likely significant effects** will occur on the Ramsar or the qualifying interests during construction.~~

~~The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100-year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance. With these reasons, and legally required construction and design elements set out in Appendix B, **no likely significant adverse effects** are predicted during operation of the Proposed Scheme.~~

~~There are no identified projects within the ZOI anticipated to result in significant effects that would require additional mitigation in response to cumulative effects. The assessment of cumulative effects and the list of the proposed developments is fully detailed in ES Chapter 15 (Cumulative effects assessment) (TR010037/APP/6.1) Section 15.7 (TR010037/APP/6.1) with the list of the proposed developments contained in Appendices 15.1, Cumulative Effects Stage 2 Screening (APP-XXX) and 15.2 Cumulative Effects Development Type (Short List) (APP-XXX).~~

~~Although the vicinity of the Proposed Scheme does have habitat to support bird species such as gadwall, wigeon, and Bewick's swans, none of these species were recorded in the area during the 2017, 2018 and 2019 bird surveys. Therefore, it is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the Ramsar.~~

<p><b>Habitat or species fragmentation</b></p>	<p>There is to be no habitat loss within the Ramsar boundary. Vegetation clearance will be minimal, limited only to only within the red line boundary. There will be no large-scale vegetation clearance which will result in no habitat or species fragmentation.</p> <p><u>Although the vicinity of the Proposed Scheme does have habitat to support bird species such as gadwall, wigeon, and Bewick's swans, none of these species were recorded in the area during the 2017, 2018 and 2019 bird surveys. Therefore, it is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the Ramsar.</u></p> <p>No Likely Significant Effect</p>
<p><b>Reduction in species density</b></p>	<p>As otters are also an EPS, best practice construction measures will be incorporated in order to minimise the risk of harming otters during construction. It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. In addition, an otter ledge will be installed on the A11 underpass to ensure that there will be no impact to otters throughout construction, which is a legally required action as the otter is a European protected species.</p>

	<p>None of the overwintering bird species or their populations for which the Ramsar site is designated were recorded within the study area during the wintering bird surveys undertaken in 2019, December 2017 and February 2018.</p> <p>No Likely Significant Effect</p>
<b>Changes in key indicators of conservation value (water quality, etc)</b>	No Likely Significant Effect
<b>Climate change</b>	<p>An assessment was undertaken which considered the Proposed Scheme's effect on climate (i.e. increases in carbon emissions) as well as the potential vulnerability of the Proposed Scheme to climate change.</p> <p>The construction, operation and use of the Proposed Scheme is predicted to increase carbon emissions by approximately 163,109 tonnes carbon dioxide equivalent (tCO<sub>2</sub>e) over the appraisal period of 60 years (up to 2085). As per DMRB LA 114, Proposed Scheme carbon emissions have been compared with the Government's published UK carbon budgets. These budgets currently extend until 2032 and can be compared with 23% of the emissions increase associated with the Proposed Scheme. The remaining 77% of the increase in carbon emissions will occur after 2032 (the end of the last currently published UK carbon budget). Further information on the assessment of materiality can be found in Chapter 145: Climate of the EIA <b>(TR010037/APP/6.1) (APP-051)</b>.</p> <p>The vulnerability of Proposed Scheme assets to projected changes in climate during operation has been assessed, and the Proposed Scheme has been deemed resilient. Therefore, no significant effects as a result of climate change are anticipated.</p>
<b>Describe any likely impacts on the European Site as a whole in terms of:</b>	
<b>Interference with the key relationships that define the structure of the site</b>	There will be no impacts on Broadlands Ramsar through the interference with the key relationships which define the structure of the site.
<b>Indicate the significance as a result of the identification of impacts set out above in terms of:</b>	
<b>Reduction of habitat area</b>	As there will be no reduction in the habitat within the Ramsar it has been concluded that there will be No Likely Significant Effect
<b>Disturbance to key species</b>	No qualifying species of the Ramsar will be impacted and therefore No likely Significant Effect is anticipated.
<b>Habitat or species fragmentation</b>	No habitat or species fragmentation will occur as part of the works and therefore it has been concluded there will be no Likely Significant Effect
<b>Loss</b>	There will be no habitat loss from the proposed works and therefore it was concluded there will be No Likely Significant Effect.
<b>Fragmentation</b>	There will be no fragmentation across the site from the proposed works and therefore it is concluded that there will be No Likely Significant Effect.
<b>Disruption</b>	No Likely Significant Effect
<b>Disturbance</b>	No Likely Significant Effect
<b>Change to key elements of the site (e.g. water quality, hydrological regime etc)</b>	No Likely Significant Effect
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	

<p>The impacts upon the key habitat and species features from both noise disturbance, pollution and air quality and lighting have been assessed in detail. Evidence from both noise and air quality modelling and the surveys undertaken on site since 2017 in combination with strict DMRB stated guidance on drainage and air quality assessments have concluded that there will be No Likely Significant Effect on Ramsar features both during construction and operation.</p>	
<p><b>Outcome of screening stage (delete as appropriate).</b></p>	<p><b>No Likely Significant Effect</b></p>
<p><b>Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attached relevant correspondence).</b></p>	<p>Natural England (NE) have been consulted regarding this Screening report and confirmed that NE are satisfied with the conclusions that there will be no likely significant effects upon Broadlands Ramsar as a result of the proposed scheme.</p>

## Appendix B. Assessment of potential effects

All potential effects have been split into either construction or operation effects for the purpose of this HRA report.

### Construction

#### *Road drainage and water environment*

Results from the ground water assessment undertaken in the ES Chapter 13 (Road drainage and water environment) (**TR010037/APP/6.1**) (**APP-050**) [Section 13.10 and Appendix 13.1 \(APP-111\)](#) show that, without the incorporation of best practice construction measures, there is the potential for mobilisation of sediment and contaminants from surface water runoff into drainage ditches and ponds from road construction activities, such as earthworks, construction dewatering, plant and vehicle washing.

Construction activities, including the demobilisation of site compounds, increase the risk of a pollution incident from accidental spillages or leakage of fuels, oils, chemicals, wastewater, concrete or cement admixtures used. Such accidental spillages are likely to impact on surface water features such as Cantley stream, Intwood Stream and the ponds local to the Proposed Scheme. There may be an indirect impact on the River Yare as a downstream receptor. This, in turn, may have a negative impact on downstream aquatic environments, recreation, water supply and quality and recreation.

During construction of the Cantley Stream realignment there is potential to impact on the habitat and ecology, within the water course. Disturbance or removal of this habitat could negatively impact upon the water quality and biodiversity of Cantley stream and its downstream receptors, including Mill Stream, the River Yare and ponds.

During construction, best practice construction measures for pollution prevention and water management will be implemented as part of the Environmental Management Plan (EMP) (**TR010037/APP/7.4**) (**APP-128**). Guidance on pollution prevention and water management is set out in CIRIA guidelines (Charles and Edward, 2015; Gaba *et al.* 2017; Murnane *et al.*, 2006) and the Environment Agency's approach to groundwater protection (Environment Agency, 2017a) and groundwater protection guides (Environment Agency, 2017b).

Monitoring of local non-designated watercourses, drainage ditches, and groundwaters at risk from pollution will be carried out prior to and during the construction phase, as is best practice. In addition, a temporary surface water drainage strategy shall be incorporated into the EMP (**TR010037/APP/7.4**)



**(APP-128)**. This is to prevent increased flood risk to people and property elsewhere, and to manage pollution risks most commonly associated with increased sediment loading. However, the NSN sites are 11.5km from the Proposed Scheme, and any effluents arising as a result of the proposed works would be sufficiently diluted to pose no likely significant effects upon the NSN sites.

Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the implementation of legally required design elements which includes construction of 'dry culverts' or cross-drains designed to 1 in 100-year flood event plus 65% climate change allowance.

The realignment and restoration of Cantley Stream has been designed with the use of legally required design elements to ensure that the ecological integrity and functionality of Cantley Stream is restored.

The design and construction of all above-ground structure have been designed to minimise the potential to impact on surface water features and flood risk through the implementation of best practice design and construction measures.

The potential for impacts to occur as a result of contamination from accidental spillages will be minimised by the following legally required construction elements:

- Appropriate storage of construction materials, including bunding of storage tanks, use of silt fencing and covering stockpiles.
- Spill kits will be located on sites near to ordinary watercourses and within the works compounds and staff will be trained in their use.
- Emergency response procedures included in the EMP to handle any leakages or spillages of potentially contaminating substances.

No pollution pathways will be created between the construction sites, including material lay down areas, and ordinary watercourses. Legally required construction elements shall be implemented to prevent surface water runoff containing suspended sediment reaching main rivers or ordinary watercourses through overland flow during rainfall events. This shall include an appropriate treatment train to prevent accidental spillages reaching groundwater, remove sediment and other contaminants as well as attenuating runoff. This shall be specified as part of a temporary surface water drainage strategy within the EMP **(TR010037/APP/7.4)** **(APP-128)**.

Temporary drainage from the main construction compound will be collected within a ditch surrounding the compound and redirected to settlement ponds



before being discharged to either a surface watercourse or ground. As discharge to a surface watercourse is not feasible, the temporary drainage is likely to discharge to ground. Infiltration features must be suitably designed taking into account the ground conditions.

Discharges to groundwater (or sewer and surface water) must only be made with the appropriate consents or permits in place from the Environment Agency.

There are construction activities planned within Cantley Stream and its floodplain. Consent in the form of a Land Drainage Act consent is required from the LLFA. There are no works proposed within 8m of a designated main river and as such, no consent (in the form of a Flood Risk Activity Permit) would be required from the Environment Agency.

In addition to this, there are no works proposed immediately adjacent to a watercourse managed by Norfolk Rivers Internal Drainage Board (IDB), and therefore no consent is required from the IDB. The potential increased flood risk and negative impacts on surface water receptors shall be managed by the implementation of a construction-phase drainage system. This shall include the construction of the new culvert on Cantley Stream to maintain the natural flow of the channel.

The potential impacts from the alignment and restoration of Cantley Stream shall be managed by the implementation of a phased construction programme. The new river channel shall be constructed first and will be designed to ensure that the ecological integrity and functionality of the stream is restored.

Works may lead to temporary changes in overland flow and volume by the alterations of ground elevations due to re-profiling, alterations of overland flow pathways and construction of above ground structures acting as a barrier to flow. This increased flood risk and negative impacts on surface water receptors shall be managed by the implementation of a construction-phase drainage system. This shall also include the construction of 'dry culverts' or cross drains to maintain natural flood flow pathways where they are intercepted by the Proposed Scheme.

A temporary surface water drainage strategy shall be incorporated into the EMP **(TR010037/APP/7.4) (APP-128)** to prevent increased flood risk to people and property elsewhere, and to manage pollution risks most commonly associated with increased sediment loading. Drainage will be constructed in the early stages of the Proposed Scheme.

Increased flood risk and negative impacts on surface water receptors caused by an increase in hardstanding area and alteration of ground levels leading to an increase in the peak flow rate, volume or change in the direction of surface water

runoff shall be managed by the implementation of a temporary surface water drainage strategy.

The strategy will adopt sustainable urban drainage systems (SuDS) principles to attenuate runoff to existing rates as well as provide water treatment; this will be incorporated into the EMP. This would prevent increased flood risk to people and property elsewhere and manage any impacts on consented discharges and the aquatic environment.

No likely significant adverse effects are predicted during construction of the Proposed Scheme. Relevant sections of the EMP (**TR010037/APP/7.4**) (**APP-128**) will be appended to this report once they have been produced.

It is considered that road drainage works will impose **no likely significant effects** will occur on the NSN network and Ramsar sites or their qualifying interests during construction.

### *Noise and vibration*

Identified receptors of concern in the noise assessment detailed in the ES, Chapter 11 (Noise and vibration) (**TR010037/APP/6.1**) (**APP-048**) are those located within 30m of the construction works. With the implementation of best practice construction measures, construction works are not due to reach a significant observed adverse effect level (SOAEL), and therefore these receptors are not expected to experience any significant effects due to construction noise and vibration.

A baseline noise survey was undertaken in May 2018 to gain an understanding of the existing noise climate within the vicinity of the Proposed Scheme. The findings of the survey have been reviewed against the noise modelling results. A construction noise assessment has been undertaken. It is concluded that significant construction noise effects are not predicted due to the distance of the NSN and Ramsar sites from the Proposed Scheme.

An assessment of construction vibration impacts has been undertaken. It is concluded that, with the implementation of best practice construction measures including early warning, pre-condition surveys, short work durations, and vibration monitoring, the Proposed Scheme is not predicted to give rise to any potential significant effects. A baseline noise survey was undertaken in May 2018 to gain an understanding of the existing noise climate within the vicinity of the Proposed Scheme. The findings of the survey have been reviewed against the noise modelling results.

A construction noise assessment has been undertaken. It is concluded that, significant construction noise effects are not predicted due to the distance of the NSN and Ramsar sites from the Proposed Scheme.

An assessment of construction vibration impacts has been undertaken and detailed in the ES in Chapter 11 (Noise and Vibration) **(TR010037/APP/6.1)** **(APP-048)**. It is concluded that **no likely significant effects** will occur on the NSN network and Ramsar sites as they are approximately 11.5km away from the site and therefore outside of the noise assessment zone.

## Operation

### *Road drainage and water environment*

The Proposed Scheme shall discharge to Cantley Stream, east of the railway bridge and south of the existing Thickthorn Interchange. Runoff shall be attenuated to a 1 in 100 year flood event (including an allowance for climate change) using oversized pipes and attenuation ponds. The drainage has been designed for an extreme pluvial event (1 in 100 year plus 20% climate change with a sensitivity check at 40% climate change) to ensure there would be no increase flood risk to others. Flood flow pathways that are intercepted by the Proposed Scheme will be maintained to allow natural overland drainage through the construction of 'dry culverts' or cross-drains designed to 1 in 100-year plus 65% climate change allowance.

The potential effects of the operation of the Proposed Scheme on the water environment have been assessed and the risk removed through the implementation of best practice design measures, and design as described below.

The drainage strategy detailed in the ES Chapter 13 (Road drainage and the water environment) **(TR010037/APP/6.1)** **(APP-050)** [Section 13.9.28](#) confirms there will be no surface water discharging to ground and all road drainage will drain to surface water features. The proposed drainage is split into seven catchments, utilising three existing outfalls and four new outfalls.

Prior to discharging to Cantley Stream the runoff will be directed through filter drains, except for the catchment which contains the junction with the B1172 Norwich Road to the new A11 to A47 link road bridge. Carrier drains will be used here due to the sensitive nature of the groundwater in this area. Attenuation ponds will be constructed north of the A11 and to the south of the Proposed Scheme, west of the A47. Details of the drainage design can be found in ES Appendix 13.2 **(TR010037/APP/6.3)** **(APP-112)**.

As the Proposed Scheme lies within Flood Zones 2 and 3, and has a footprint greater than 1ha, a flood risk assessment (FRA) has been prepared to

demonstrate that there would be no increase in flood risk as a result of the Proposed Scheme.

The potential water quality impacts of accidental spillages on surface water bodies were assessed using HEWRAT spillage assessment, as described in Appendix D of LA113 (Road Drainage and Water Environment). With this inclusion the legally required design elements in the drainage design all outfalls passed this assessment. The results indicated all drainage areas would have <0.5% annual risk of pollution, the output from these assessments can be found in the ES Chapter 13 (Road Drainage and Water Environment)

**(TR010037/APP/6.1) (APP-050) Section 13.9.30.**

The potential associated increase in the volume of traffic may result in an increase in pollutant loads in highway runoff, resulting in long-term increase in pollution and subsequent deterioration in water quality. Any potential impact shall be mitigated using filter drains and attenuation basins, which will be vegetated to as a pollution prevention and biodiversity enhancement.

The potential water quality impacts of routine runoff on surface water receptors has also been assessed using LA113 (Road Drainage and Water Environment) HEWRAT assessment (assessment of pollution impacts from routine runoff to surface waters), as described in ES Chapter 13 (Road Drainage Water Environment) **(TR010037/APP/6.1) (APP-050) Section 13.9.30 and Appendix 13.4, Water Quality Assessment (APP-114)**. The assessment indicates that there is a negligible impact following dilution in the channel for both soluble and sediment-bound pollutants when the additional measures from the drainage design have been included. The output from these assessments can be found in ES Chapter 13 (Road Drainage and Water Environment) **(TR010037/APP/6.1) (APP-050) Section 13.9.**

Existing surface water pathways for overland flows have been maintained or facilitated through interception using appropriately designed collection drains and cross-drains, also known as 'dry culverts'. Cross-drains shall be designed to convey a 1 in 100-year flow including an additional 65% climate change allowance in order to maintain connectivity of surface water flooding pathways.

The proposed increase in areas of hard standing and alteration of ground elevations due to re-profiling could result in an increase in peak flow. Any increase in surface water runoff shall be attenuated using oversized pipes and attenuation ponds. The drainage has been designed to 1 in 100 year plus 20% climate change allowance and sensitivity tested to 40% climate change sensitivity for pluvial flooding. This would ensure there is no increase in surface water runoff peak flow rate resulting from the Proposed Scheme. Further details

can be found in the Drainage Strategy, in ES Appendix 13.2 **(TR010037/APP/6.3)** [\(APP-112\)](#).

The Proposed Scheme, including the realignment of Cantley Stream, has been designed to estimated extreme fluvial conditions (1 in 100 year event plus 20% climate change). This will ensure the carriageway has been designed above the fluvial flood level. This level will also allow the outfalls to discharge freely up to this level without backing up and causing flooding on the road. The existing culvert, where the Proposed Scheme crosses Cantley Stream, shall be upgraded and designed to 1 in 100-year year even including an additional 65% climate change allowance. It will include a 428mm freeboard and a mammal shelf, in agreement with the LLFA, in order to convey the required flow without increasing flood risk downstream and to allow mammal movement. It was also agreed there was no requirement for compensatory storage.

**No likely significant adverse effects** are predicted during operation of the Proposed Scheme, subject to the implementation of best practice construction measures included in the EMP **(TR010037/APP/7.4)** [\(APP-128\)](#).

### Noise and vibration

Identified receptors of concern in the noise assessment detailed in the ES, Chapter 11 (Noise and vibration) **(TR010037/APP/6.1)** [\(APP-048\)](#) are those located within 30m of the Proposed Scheme.

Chapter 11 (Noise and vibration) **(TR010037/APP/6.1)** [\(APP-048\)](#) within the ES compares road traffic noise levels for the Do-Something Opening Year scenario with the Do-Minimum Opening Year scenario. The changes in road traffic noise due to the Proposed Scheme upon opening are due to changes in traffic flows and speeds, as well as the addition of new links (A11 to A47 link road and Cantley Lane South to B1172 Norwich Road link road) and removal of the existing access to Cantley Lane South (from the existing A47 westbound exit slip road to the junction with the new Cantley Lane link road).

Table B.1: Summary of short-term noise changes, with the Proposed Scheme

Scenario/Comparison: Do-Minimum Opening Year 2025 versus Do-Something Opening Year 2025						
Change in noise level, dB(A)	Magnitude of impact	Daytime, dB L <sub>A10,18hr</sub>		Night-time, dB L <sub>night,outside</sub>		
		Number of dwellings	Number of non-residential sensitive receptors	Number of dwellings	Number of non-residential sensitive receptors	
Increase in noise level	<1.0	Negligible	109 (60)	1	55 (44)	1
	1.0 – 2.9	Minor	0 (8)	1	0 (1)	0
	3.0 – 4.9	Moderate	0	0	0	0
	>5.0	Major	0	0	0	0

Scenario/Comparison: Do-Minimum Opening Year 2025 versus Do-Something Opening Year 2025						
Change in noise level, dB(A)		Magnitude of impact	Daytime, dB L <sub>A10,18hr</sub>		Night-time, dB L <sub>night,outside</sub>	
			Number of dwellings	Number of non-residential sensitive receptors	Number of dwellings	Number of non-residential sensitive receptors
No Change	0.0	No Change	148 (70)	1	126 (56)	1
Decrease in noise level	<1.0	Negligible	327 (221)	4	406 (258)	7
	1.0 – 2.9	Minor	6	3	3	1
	3.0 – 4.9	Moderate	0	1	0	1
	>5.0	Major	0	0	0	0

As the ecological receptors are located further away than 30m from the Proposed Scheme, it can be concluded that these international sites will not be negatively affected by the operational noise of the Proposed Scheme. Therefore, the assessment concludes that mitigation is not necessary and that there are **no likely significant effects** of the Proposed Scheme on the designated sites.

## Appendix C. Planning Inspectorate screening matrices

Potential effects upon the designated sites which are considered in this assessment are provided below in Table C.1 to be in line with Planning Advice Note Ten.

The European sites included within the screening assessment are:

- The Broads SAC
- Broadland SPA
- Broadland Ramsar site

Table C.1 Potential effects upon the designated sites with reference to Planning Inspectorate Advice Note Ten

Designation	Effects in submission information	Presented in screening matrix as
The Broads SAC	<del>Mortality of vegetation through pollution</del> <u>Water pollution as a result of hydrological linkage</u>	<del>Vegetation mortality – pollution</del> <u>Water pollution</u>
	<del>Acidification of water column and substrate through sediment run-off and subsequent change in botanical communities</del> <u>Public access/disturbance – disturbance of otter by noise and lighting</u>	<del>Change in botanical communities</del> <u>Disturbance</u>
	<del>Disturbance to faunal species from the severance of commuting routes</del> <u>Air pollution as a result of atmospheric nitrogen deposition</u>	<del>Disturbance – severance of commuting routes</del> <u>Air pollution</u>
	<u>Cumulative effects in combination with other developments</u>	<u>Cumulative effects</u>
Broadland SPA	<del>Water pollution and hydrological changes – reduction in nesting/drinking/preening/foraging habitat</del> <u>Mortality through increased air or ground water pollution</u>	<del>Mortality – pollution</del> <u>Water pollution &amp; hydrological changes</u>
	<del>Air pollution - reduction in nesting/roosting/foraging habitat</del> <u>Mortality through traffic collision</u>	<del>Mortality – collision</del> <u>Air pollution</u>
	<del>Disturbance associated with human activity in the form of noise and light</del> <u>Reducing foraging habitat can increase competition for resources and affect survival</u>	<del>Mortality – reduced food sources</del> <u>Disturbance</u>
	<del>Increased noise disturbance reducing breeding success</del> <u>Cumulative effects in combination with other developments</u>	<del>Cumulative effects</del> <u>Reduced breeding success- Noise disturbance</u>



Designation	Effects in submission information	Presented in screening matrix as
Broadland Ramsar	<del>Water pollution and hydrological changes – adverse effects on qualifying features</del> <del>Mortality through increased air or ground water pollution</del>	<del>Water pollution &amp; hydrological changes</del> <del>Mortality – pollution</del>
	<del>Air pollution - adverse effects on qualifying features</del> <del>Acidification of water column and substrate through sediment run-off and subsequent change in botanical communities</del>	<del>Air pollution</del> <del>Change in botanical communities</del>
	<del>Disturbance associated with human activity in the form of noise and light.</del> <del>Mortality of vegetation through increase in disease from sediment run-off</del>	<del>Disturbance</del> <del>Vegetation mortality – disease</del>
	<del>Cumulative effects in combination with other developments</del> <del>Increased noise disturbance reducing breeding success</del>	<del>Cumulative effects</del> <del>Reduced breeding success - Noise disturbance</del>

Evidence for, or against, likely significant effects on the European site(s) and its qualifying feature(s) is detailed within the footnotes to the screening matrices below in Tables C.2 to C.4, inclusive.

Matrix Key:

- ✓ = Likely significant effect cannot be excluded
- ✗ = Likely significant effect can be excluded
- C = construction
- O = operation
- D = decommissioning
- n/a = where effects are not applicable.

## The Broads SAC

Table C.2 Screening matrix of the potential likely significant effects upon The Broads SAC.

Name of European Site and Designation: The Broads SAC												
EU Code: UK0013577												
Distance to NSIP: 11.5km												
European site features	Likely effects of NSIP											
Effect	Mortality – pollution and disease Water pollution			Disturbance – severance of commuting routes			Acidification – Change in botanical communities Air pollution			Cumulative effects		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D
Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp</i>	x a	x -a	n/a	n/a	n/a	n/a	<u>x a/n/a</u>	<u>x a/n/a</u>	n/a	x e	x e	n/a
Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> -type vegetation	x a	x -a	n/a	n/a	n/a	n/a	<u>x a/n/a</u>	<u>x a/n/a</u>	n/a	x e	x e	n/a
Transition mires and quaking bogs	x a	x -a	n/a	n/a	n/a	n/a	<u>x a/n/a</u>	<u>x a/n/a</u>	n/a	x e	x e	n/a
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>	x a	x -a	n/a	n/a	n/a	n/a	x a	x -a	n/a	x e	x e	n/a
Alkaline fens	x a	x -a	n/a	n/a	n/a	n/a	x a	x -a	n/a	x e	x e	n/a
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i>	x a	x -a	n/a	n/a	n/a	n/a	<u>x a/n/a</u>	<u>x a/n/a</u>	n/a	x e	x e	n/a
Molinia meadows on calcareous, peaty or clayey silt laden soils ( <i>Molinion caeruleae</i> )	x a	x -a	n/a	n/a	n/a	n/a	<u>x a/n/a</u>	<u>x a/n/a</u>	n/a	x e	x e	n/a
Desmoulin's whorl snail	<u>x b a</u>	<u>x -b a</u>	n/a	n/a	n/a	n/a	<u>x a/n/a</u>	<u>x a/n/a</u>	n/a	x e	x e	n/a

Name of European Site and Designation: The Broads SAC													
EU Code: UK0013577													
Distance to NSIP: 11.5km													
European site features		Likely effects of NSIP											
Effect		<del>Mortality—pollution and disease</del> <u>Water pollution</u>			<del>Disturbance—severance of commuting routes</del>			<del>Acidification—Change in botanical communities</del> <u>Air pollution</u>			Cumulative effects		
Stage of Development		C	O	D	C	O	D	C	O	D	C	O	D
Lesser whirlpool ram's horn snail		<del>x</del> <u>ba</u>	<del>x</del> <u>-ba</u>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<del>x</del> <u>e</u>	<del>x</del> <u>e</u>	n/a
Fen orchid <i>Liparis loeselii</i>		<del>x</del> <u>ae</u>	<del>x</del> <u>ae</u>	n/a	<del>x</del> <u>ae</u>	<del>x</del> <u>ae</u>	n/a	n/a	n/a	n/a	<del>x</del> <u>e</u>	<del>x</del> <u>e</u>	n/a
Otter		<del>x</del> <u>a,bd</u>	<del>x</del> <u>a,bd</u>	n/a	<del>x</del> <u>bd</u>	<del>x</del> <u>bd</u>	n/a	<del>x</del> <u>an/a</u>	<del>x</del> <u>an/a</u>	n/a	<del>x</del> <u>e</u>	<del>x</del> <u>e</u>	n/a

### Aa.

None of the qualifying habitats for the Broads SAC are located where there is a direct hydrological link between the Proposed Scheme and these qualifying habitats. The nearest point of the Broads SAC lies 11.5 km east from the Proposed Scheme. There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into Broadlands Ramsar the Broads SAC. ~~No habitats suitable to support qualifying habitats of the Broads SAC were found within the respective study areas of the species from the Proposed Scheme during the surveys.~~ The large distance of 11.5km from the Proposed Scheme and the SAC means that any ~~pollutions-pollutants~~ would have sufficiently diluted such that there will be **no likely significant effects** upon the SAC or its qualifying features during construction. Similarly, as described in Section 5. 8 of ES Chapter 5 – Air Quality (APP-042), the distance of the NSN and Ramsar sites from the Proposed Scheme is such that there will be no likely significant effects as a result of air pollution.

~~Bb.~~

~~Neither species of lesser whirlpool ram's horn snail or Desmoulin's whorl snail was found during the aquatic invertebrate surveys. Therefore, both snail species has been screened out from further assessment as the Proposed Scheme does not affect any waterbodies that have suitable habitat for supporting this species therefore no effect pathways to populations of these species within the Broads SAC. **No likely significant effect** is expected.~~

~~C~~

~~Fen orchid was not found during the botanical surveys over the study area. Therefore, this species has been screened out from further assessment as there are no effect pathways to populations of these species within the Broads SAC. **No likely significant effect is expected.**~~

~~D~~

It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. This construction measure is with reference to best practice for protecting otters by maintaining the existing commuting route for otters to remain in situ with no impact upon otters ~~themselves or the integrity of their habitat~~ throughout construction. **No likely significant effect is expected.**

~~Ec.~~

There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects ~~will be assessed upon the receipt of this information as detailed within the Environmental Statement~~ ES Chapter 15 – Cumulative Effects Assessment (APP-052) and Chapter 8 – Biodiversity (APP-045).

## Broadlands SPA

Table C.3 Screening matrix of the potential likely significant effects upon Broadlands SPA.

Name of European Site and Designation: Broadlands SPA												
EU Code: UK9009253												
Distance to NSIP: 11.5km												
European site features	Likely effects of NSIP											
Effect	<u>Mortality—pollution</u> <u>Water Pollution &amp; Hydrological Changes</u>			<u>Mortality—reduced food sources/loss of habitat</u> <u>Air Pollution</u>			<u>Reduced breeding success—noise disturbance</u> <u>Disturbance</u>			Cumulative effects		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D
Ruff <del>Wigeon</del> <del>Gadwall</del>	x <del>a</del>	x <del>a</del>	n/a	x <del>a</del> *a	x <del>a</del> *a	n/a	x <del>b</del> *a	x <del>b</del> *a	n/an/a	x <del>c</del> *f	x <del>c</del> *f	n/an/a
<del>Wigeon</del>	x <del>a</del>	x <del>a</del>	n/a	x <del>a</del>	x <del>a</del>	n/a	x <del>b</del>	x <del>b</del>	n/a	x <del>c</del>	x <del>c</del>	n/a
<del>Gadwall</del>	x <del>a</del>	x <del>a</del>	n/a	x <del>a</del>	x <del>a</del>	n/a	x <del>b</del>	x <del>b</del>	n/a	x <del>c</del>	x <del>c</del>	n/a
Marsh harrier (breeding population)	x <del>a</del> *b	x <del>a</del> *b	n/a	x <del>a</del> *b	x <del>a</del> *	n/a	x <del>b</del> *b	x <del>b</del> *b	n/an/a	x <del>c</del> *f	x <del>c</del> *f	n/an/a
Hen harrier	x <del>a</del> *b	x <del>a</del> *b	n/a	x <del>a</del> *b	x <del>a</del> *	n/a	x <del>b</del> *b	x <del>b</del> *b	n/an/a	x <del>c</del> *f	x <del>c</del> *f	n/an/a
Shoveler	x <del>a</del> *e	x <del>a</del> *e	n/a	x <del>a</del> n/a	x <del>a</del> n/a	n/a	x <del>b</del> *e	x <del>b</del> *e	n/an/a	x <del>c</del> *f	x <del>c</del> *f	n/an/a
<del>Great Bittern</del> (breeding population)	x <del>a</del> *d	x <del>a</del> *d	n/a	x <del>a</del> n/a	x <del>a</del> n/a	n/a	x <del>b</del> *d	x <del>b</del> *d	n/an/a	x <del>c</del> *f	x <del>c</del> *f	n/an/a
Bewick's swan <del>Whooper swan</del>	x <del>a</del> *e	x <del>a</del> *e	n/a	x <del>a</del> *e	x <del>a</del> *e	n/a	x <del>b</del> *e	x <del>b</del> *e	n/an/a	x <del>c</del> *f	x <del>c</del> *f	n/an/a
<del>Whooper swan</del>	x <del>a</del>	x <del>a</del>	n/a	x <del>a</del>	x <del>a</del>	n/a	x <del>b</del>	x <del>b</del>	n/a	x <del>c</del>	x <del>c</del>	n/a

a.

There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into the Broadlands SPA. The large distance of 11.5km from the Proposed Scheme and the SPA means that any pollutants would have sufficiently diluted such that there will be **no likely significant effects** upon the SPA or its qualifying features during construction or operation. Similarly, as described in Section 5. 8 of ES Chapter 5 – Air Quality (**APP-042**), the distance of the NSN and Ramsar sites from the Proposed Scheme is such that there will be no likely significant effects as a result of air pollution.

b.

None of the qualifying bird species were recorded in the area of the Proposed Scheme during the 2017, 2018 and 2019 bird surveys. Furthermore, the Proposed Scheme will not improve access to the Broadlands SPA, nor will it contribute to recreational pressure. As such there will be **no likely significant effects** upon the SPA or its qualifying features during construction or operation.

c.

There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects as detailed within the ES Chapter 15 – Cumulative Effects Assessment (**APP-052**) and Chapter 8 – Biodiversity (**APP-045**).A

~~For ruff, gadwall and wigeon, the loss of habitat will be minimal for junctions and access roads are not considered to have a likely significant effect. The scheme is near the existing A47 in an environment dominated by road noise, it is considered unlikely that the qualifying bird species will be found in the vicinity of the road. None of these species were recorded in the area during surveys and therefore **no likely significant effect is expected.**~~

~~B~~

~~Neither marsh harrier nor hen harrier were recorded as present within the study area during the wintering or breeding bird surveys. In addition, it is considered that the loss of agricultural grassland and arable land is not likely to be significant for this species as there is more suitable habitat within and closer to the SPA boundary. **No likely significant effect is expected.**~~



~~C~~

~~Shoveler were not recorded during the wintering bird surveys and it is unlikely they would be found in the vicinity of the Proposed Scheme due to lack of suitable habitat. **No likely significant effect is expected.**~~

~~D~~

~~Bittern were not found on site during the breeding bird surveys. They have specific habitat requirements and are not likely to be found in the vicinity of these options. Suitable habitat for them is too far from the scheme for construction noise to be an issue. **No likely significant effect is expected.**~~

~~E~~

~~Neither Bewick's swan nor whooper swan were recorded in the study area during the 2017, 2018 or 2019 wintering bird surveys. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the SPA. It is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. **No likely significant effect is expected.**~~

~~F~~

~~There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects as detailed within the Environmental Statement Chapter 15 – Cumulative Effects Assessment and Chapter 8 – Biodiversity.~~

~~There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects will be assessed upon the receipt of this information.~~

## Broadlands Ramsar

Table C.4 Screening matrix of the potential likely significant effects upon Broadlands Ramsar.

Name of European Site and Designation: Broadlands Ramsar	
EU Code: UK9009253	
Distance to NSIP: 11.5km	
European site features	Likely effects of NSIP

Effect	Water Pollution & Hydrological Changes			Air Pollution			Disturbance			Cumulative effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> (sedges)	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	n/a	n/a	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Alkaline Fens	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	n/a	n/a	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Alluvial forests with <i>Alnus glutinosa</i> (alder) and <i>Fraxinus excelsior</i> (ash).	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	n/a	n/a	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Desmoulin's whorl snail	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	n/a	n/a	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Otter	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>c</sub>	x <sub>c</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Fen orchid	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	n/a	n/a	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a

Effect	Water Pollution & Hydrological Changes			Air Pollution			Disturbance			Cumulative effects		
	C	O	D	C	O	D	C	O	D	C	O	D
Bewick's swan	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>b</sub>	x <sub>b</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Wigeon	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>b</sub>	x <sub>b</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Gadwall	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>b</sub>	x <sub>b</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Shoveler	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>b</sub>	x <sub>b</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Pink-footed goose	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>b</sub>	x <sub>b</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Greylag goose	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>a</sub>	x <sub>a</sub>	n/a	x <sub>b</sub>	x <sub>b</sub>	n/a	x <sub>d</sub>	x <sub>d</sub>	n/a
Effect	Mortality—pollution / disease			Reduced breeding success—noise disturbance			Acidification—Change in botanical communities			-Cumulative effects		
Stage-of Development	C	O	D	C	O	D	C	O	D	C	O	D
Calcareous fens with <i>Gladium mariscus</i> and species of the <i>Caricion davalliana</i> (sedges)	* <sub>a</sub>	* <sub>a</sub>	n/a	n/a	n/a	n/a	* <sub>a</sub>	* <sub>a</sub>	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a
Alkaline Fens	* <sub>a</sub>	* <sub>a</sub>	n/a	n/a	n/a	n/a	* <sub>a</sub>	* <sub>a</sub>	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a
Alluvial forests with <i>Alnus glutinosa</i> (alder) and <i>Fraxinus excelsior</i> (ash).	* <sub>a</sub>	* <sub>a</sub>	n/a	n/a	n/a	n/a	* <sub>a</sub>	* <sub>a</sub>	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a
Desmoulin's whorl-snail	* <sub>b</sub>	* <sub>b</sub>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a
Otter	* <sub>c</sub>	* <sub>c</sub>	n/a	* <sub>c</sub>	* <sub>c</sub>	n/a	n/a	n/a	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a
Fen orchid	* <sub>a</sub>	* <sub>a</sub>	n/a	n/a	n/a	n/a	* <sub>a</sub>	* <sub>a</sub>	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a
Bewick's swan	* <sub>d</sub>	* <sub>d</sub>	n/a	* <sub>d</sub>	* <sub>d</sub>	n/a	n/a	n/a	n/a	* <sub>h</sub>	* <sub>h</sub>	n/a

Effect	Water Pollution & Hydrological Changes			Air Pollution			Disturbance			Cumulative effects		
	Stage of Development	C	O	D	C	O	D	C	O	D	C	O
Wigeon	*e	*e	n/a	*e	*e	n/a	n/a	n/a	n/a	*h	*h	n/a
Gadwall	*e	*e	n/a	*e	*e	n/a	n/a	n/a	n/a	*h	*h	n/a
Shoveler	*f	*f	n/a	*f	*f	n/a	n/a	n/a	n/a	*h	*h	n/a
Pink-footed goose	*g	*g	n/a	*g	*g	n/a	n/a	n/a	n/a	*h	*h	n/a
Greylag-goose	*g	*g	n/a	*g	*g	n/a	n/a	n/a	n/a	*h	*h	n/a

a.

There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into the Broadlands SPA. The large distance of 11.5km from the Proposed Scheme and the SPA means that any pollutants would have sufficiently diluted such that there will be **no likely significant effects** upon the SPA or its qualifying features during construction or operation. Similarly, as described in Section 5. 8 of ES Chapter 5 – Air Quality (**APP-042**), the distance of the NSN and Ramsar sites from the Proposed Scheme is such that there will be no likely significant effects as a result of air pollution.

b.

None of the qualifying bird species were recorded in the area of the Proposed Scheme during the 2017, 2018 and 2019 bird surveys. Furthermore, the Proposed Scheme will not improve access to the Broadlands SPA, nor will it contribute to recreational pressure. As such there will be **no likely significant effects** upon the SPA or its qualifying features during construction or operation.

c.

It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. This construction measure is with reference to best practice for protecting otters by maintaining the existing commuting route for otters to remain in situ with no impact upon otters or the integrity of their habitat throughout construction. **No likely significant effect is expected.**

d.

There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects as detailed within the ES Chapter 15 – Cumulative Effects Assessment (APP-052) and Chapter 8 – Biodiversity (APP-045).A

~~None of the qualifying habitats for Broadlands Ramsar are located where there is a direct hydrological link between the Proposed Scheme and these qualifying habitats. The nearest point of the Broadlands Ramsar lies 11.5 km east of the Proposed Scheme. There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into Broadlands Ramsar. No habitats suitable to support qualifying features of the Broadlands Ramsar, and no qualifying features themselves were found within the respective study areas of the species from the Proposed Scheme during the surveys. **No likely significant effect is expected.**~~

B

~~No Desmoulin's whorl snails were found during the aquatic invertebrate surveys. Therefore, this species has been screened out from further assessment as the Proposed Scheme does not affect any waterbodies that have suitable habitat for supporting this species therefore no effect pathways to populations of these species within the Broadlands Ramsar. There is a hydrological link that starts at Cantley Steam at the Proposed Scheme, which flows into Mill Stream and eventually into the River Yare, which runs into Broadlands Ramsar. **No likely significant effect is expected.**~~

~~G~~

~~It is proposed that the realignment of Cantley Steam will occur with the realignment being constructed and ecologically matured to optimum condition prior its connection to the existing Cantley Stream and the decommissioning of the existing stretch of Cantley Steam. This construction measure is with reference to best practice for protecting otters by maintaining existing commuting for otters to remain in situ with no impact upon otters themselves throughout construction. **No likely significant effect is expected.**~~

~~D~~

~~Bewick's swan were recorded in the study area during the 2017, 2018 or 2019 wintering bird surveys. Although the arable fields are likely to provide a food source during the winter, it is considered likely that there is more suitable foraging habitat within and closer to the boundary of the SPA. It is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. **No likely significant effect is expected.**~~

~~E~~

~~For ruff, gadwall and wigeon, the loss of habitat will be minimal for junctions and access roads are not considered to have a likely significant effect. The scheme is near the existing A47 in an environment dominated by road noise, it is considered unlikely that the qualifying bird species will be found in the vicinity of the road. None of these species were recorded in the area during surveys and therefore **no likely significant effect is expected.**~~

~~F~~

~~Shoveler were not recorded during the wintering bird surveys and it is unlikely they would be found in the vicinity of the Proposed Scheme due to lack of suitable habitat. **No likely significant effect is expected.**~~

~~G~~

~~For greylag goose and pink-footed goose it is considered unlikely that these species will forage around the study area. There is more suitable foraging habitat within and closer to the boundary of the Ramsar and that these species do not use the site. Neither species of greylag goose nor pink-footed goose was not found in the vicinity of the site during the~~



~~wintering and breeding bird surveys. It is considered that the loss of agricultural grassland/arable land is not likely to be significant for these species. **No likely significant effect is expected.**~~

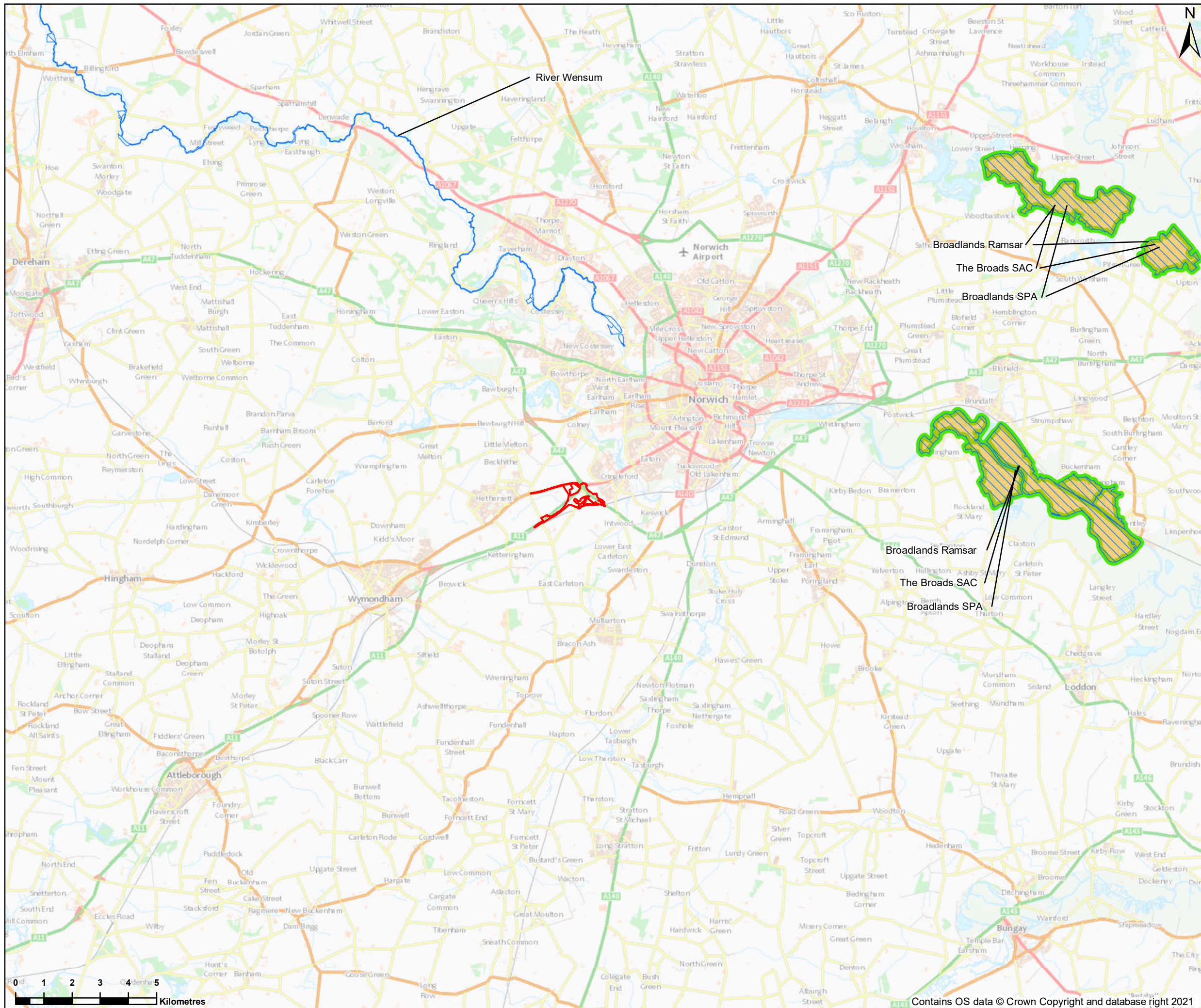
H

~~There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects as detailed within the Environmental Statement Chapter 15 – Cumulative Effects Assessment and Chapter 8 – Biodiversity.~~

~~There are no likely significant cumulative effects of the A47/A11 Thickthorn Junction scheme in combination with other identified projects will be assessed upon the receipt of this information.~~

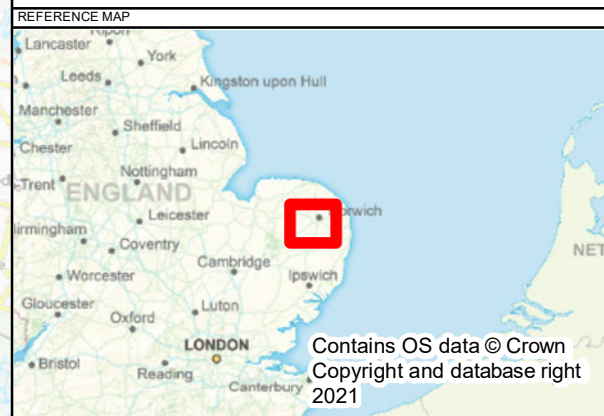
## Appendix D. Designated sites map





**LEGEND**

- DCO boundary
- Special area of conservation (SAC)
- Special protected area (SPA)
- Ramsar
- Scoped in



P02	06/12/2021	DATA UPDATES	AC	FB	FB
REV	DATE	REVISION NOTE	ORG	CHKD	APPD

DESIGNER

CONTRACTOR

CLIENT

PROJECT TITLE  
A47/A11 THICKTHORN JUNCTION

PROJECT STAGE  
PCF STAGE 3

DRAWING TITLE  
FIGURE 1 FOR APPENDIX D - DESIGNATED SITES TR010038/APP/6.2

SUITABILITY  
FOR INFORMATION

SHEET SIZE	SCALE	STATUS
A3	1:130,000	S2

DRAWING NUMBER  
HE551492-GTY-EBD-000-RP-LB-30018



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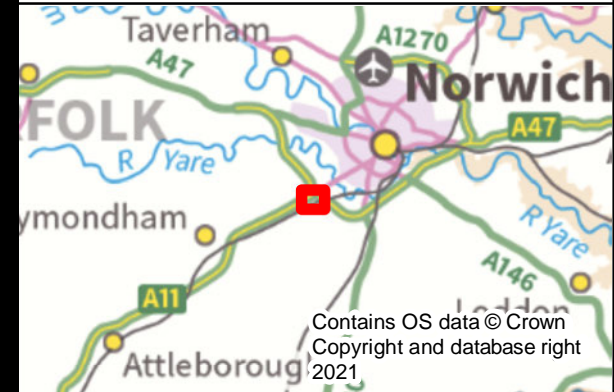


## Appendix E. Otter survey map

LEGEND

- DCO boundary
- Otter Survey**
- Footprint
- ⊗ Spraint

REFERENCE MAP



P02	24/03/2021	DCO UPDATE	AC	IC	DW
REV	DATE	REVISION NOTE	ORG	CHK'D	APP'D

DESIGNER



CONTRACTOR



CLIENT



PROJECT TITLE

A47/A11 THICKTHORN JUNCTION

PROJECT STAGE

PCF STAGE 3

DRAWING TITLE

FIGURE 2 FOR APPENDIX E - OTTER SURVEY

SUITABILITY

FOR INFORMATION

SHEET SIZE	SCALE	STATUS
A3	1:4,809	S3

DRAWING NUMBER

HE551492-GTY-EBD-000-RP-LB-30019

## **Appendix F. Natural England Acceptance**



Date: 25 November 2020  
Our ref: DAS/326471  
Your ref: 14593



Ishbel Campbell  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

Customer Services  
Hombeam House  
Crewe Business Park  
Electra Way  
Crewe  
Cheshire  
CW1 6GJ  
[REDACTED]

**BY EMAIL ONLY**

Dear Ishbel Campbell

**Discretionary Advice Service (Charged Advice) 14593**  
**Development proposal and location:** A47/A11 Junction Thickthorn

Thank you for your consultation on the above dated 29 October 2020, which was received on the same date.

This advice is being provided as part of Natural England's Discretionary Advice Service. Highways England and SWECO have asked Natural England to provide advice upon:

- Draft HRA
- Ecological mitigation plan
- Proposed operation methodology

This advice is provided in accordance with the Quotation and Agreement dated 03/09/2020. Currently, only the HRA has been received and the other documents will be reviewed once they are available.

The following advice is based upon the information within Draft A47/A11 Thickthorn Junction, Habitat Regulations Assessment, [REDACTED].

Natural England has reviewed the document and subject to the proposed avoidance and mitigation measures outlined within Chapter 4 of the report agree with the conclusion that there will be no likely significant effects on the below designated sites or their interest features:

- The Broads SAC
- Broadland SPA, Ramsar

We would advise that the proposed measures listed below will need to be secured via appropriate planning conditions to enable confidence in this conclusion of no likely significant effect:

Measures to be secured during the construction phase

- The acquisition of relevant consents for all works.

Air Quality

- The utilisation of best practice construction mitigation measures and the acquisition of appropriate permissions to ensure there are no lasting impacts to air quality.

## Road Drainage and Water Environment

- The utilisation of best practice construction mitigation measures to prevent pollution from dust and pollution of water.
- The utilisation of best practice measures for pollution prevention and water management as set out in CIRIA guidelines, Environment Agency groundwater protection and groundwater protection guidelines.
- The incorporation of a temporary surface water drainage strategy into the environmental management plan to prevent increased flood risk to people and property elsewhere. As well as, to manage pollution risks most commonly associated with increased sediment loading.
- The implementation of a temporary surface water drainage strategy for the duration of the construction phase of the project.

## Noise and Vibration

- The utilisation of best practice construction mitigation measures to prevent noise and vibration, such as, temporary noise barriers, and noise monitoring.

## Lighting

- Construction to predominantly take place in the daylight and night lighting will only be used in areas which have previously been cleared of vegetation.
- No use of night lighting during construction on Cantely stream to reduce impacts to otters using the stream.
- Given the potential risk to Otters, a European Protected Species and interest feature of the Broads SAC, associated with the realignment of Cantley stream we advise that you may need to consider whether this element of the work will need licensing, further information regarding this is provided within Annex 1. We support the proposed approach that that the realignment of Cantley Stream will occur with the new channel being constructed and allowed to mature to suitable condition prior its disconnection from the existing stream.

## Measures to be secured during the operational phase.

### Road drainage and water environment

- The measures detailed in the drainage strategies and the drainage designs.

### **Biodiversity net gain**

Whilst we recognise that this consultation is specifically regarding the Habitat Regulations Assessment for this project we take this opportunity to remind you that we support the use of the Biodiversity Net Gain approach to development. Any loss of biodiversity as a result of the proposed works should be assessed, mitigated and/or compensated using biodiversity net gain. Calculations should, ideally be based on the recently released [REDACTED], to compare the current biodiversity value of the habitats to be lost (excluding designated sites and ancient woodland) with the biodiversity value of the habitats forecast to be created following development, with the intention being able to demonstrate an overall increase in biodiversity (minimum 10 %).

For clarification of any points in this letter, please contact Perdeep Maan on [REDACTED]

### **Senior adviser to QA letter and check box below**

The advice provided in this letter has been through Natural England's Quality Assurance process

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Yours Sincerely,

Perdeep Maan  
Sussex and Kent

Cc [commercialservices@naturalengland.org.uk](mailto:commercialservices@naturalengland.org.uk)

## **Annex 1**

### **European Protected Species**

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's [REDACTED] publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's [REDACTED] on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on [REDACTED].